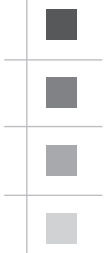
SAS Publishing

What's New in SAS® Software for Release 8.2



The Power to Know™

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The correct bibliographic citation for this manual is as follows: SAS Institute Inc., *What's New in SAS® Software for Release 8.2*, Cary, NC: SAS Institute Inc., 2001.

What's New in SAS® Software for Release 8.2

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ISBN 1–58025–817–4

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1st printing, February 2001

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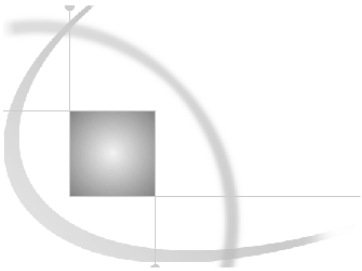

Important Information About This Book

Where to Find Complete Information About New and Enhanced Features **ix**
Get the Latest News **ix**

Where to Find Complete Information About New and Enhanced Features

This book gives you a quick, convenient overview of features that have been added or enhanced in base SAS software and in approximately 20 other SAS software products for Release 8.2. Detailed information for most products is located in the SAS System Help.

A new Web site provides information about what's new in Release 8.2 of SAS Software, as well as the changes and enhancements reports for SAS/ASSIST, SAS/ETS, SAS/IML, SAS/OR, SAS/QC, and SAS/STAT software. All of these reports can be accessed and printed in HTML or PDF formats at **`www.sas.com/newversion`**.

Visit this site often for the most up-to-date information about Release 8.2. The Release 8.2 changes and enhancements reports are also available to you in PDF format on CD-ROM by contacting the SAS Distribution Center at 919-531-7850. If you prefer hardcopy books, you can purchase the book version of selected* Release 8.2 documents from SAS Fufillment Services at 800-727-3228.

Get the Latest News

To stay up-to-date, you can subscribe to NEWDOCNEWS, a monthly electronic newsletter. This newsletter provides SAS software users with information about new books that were published during the previous month, notice of new Observations articles on our Web page, announcements of online documentation, notice of documentation updates, and general news items about SAS documentation.

Customers in the USA can subscribe to this electronic newsletter either by filling out a Web form at **`www.sas.com/service/doc/newdoc/newdocintro.html`** or as follows:

1. Send an e-mail message to **`listserv@vm.sas.com`**.
2. Leave the Subject line blank.

* Changes and enhancements reports for SAS/ASSIST, SAS/IML, and SAS/QC software are not available in hardcopy.

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4 Send the message.

You will receive a message confirming that you have been added to the NEWDOCNEWS mailing list. The message will also contain instructions on how to unsubscribe from the mailing list, in case you choose to do so in the future.

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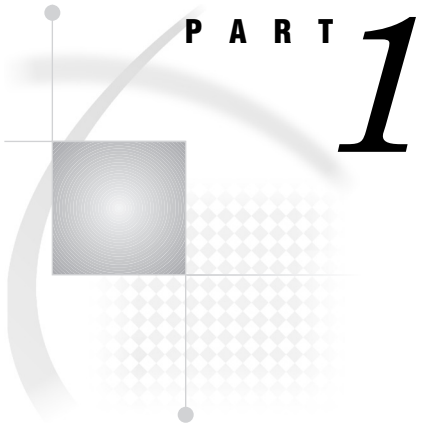
3 The text of the message should be **Subscribe NEWDOCNEWS John Doe** (replace John Doe with your name).

4 Send the message.

We will forward your name and e-mail address to your local SAS office, and they will add you to the mailing list for their electronic newsletter.



PART 1

Base SAS Software

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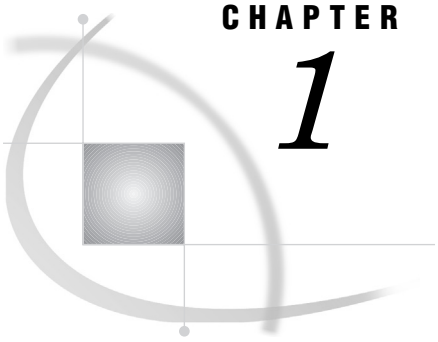

CHAPTER

1

Base SAS Software: General Features

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Cross-Environment Data Access (CEDA)

CEDA, which enables your SAS programs to directly access SAS data files that were created in another operating environment, is now available as part of base SAS software. You no longer need to license SAS/CONNECT software in order to use CEDA functionality.

SAS Output: Output Delivery System

- The following ODS statements are now available:
  - The ODS _ALL_ CLOSE statement closes all open ODS output destinations, including the Listing destination.
  - The ODS ESCAPECHAR statement enables you to apply simple formatting to a cell or paragraph in ODS output.
  - The ODS PROCLABEL statement enables you to change a procedure label in the table of contents.
  - The ODS RESULTS statement displays ODS output in the Results window.
- For all destinations except the Output and Listing destinations, the following style attributes are now supported:
  - BACKGROUNDIMAGE specifies an image to use as the background for your output.
  - PREIMAGE specifies an image to place before a table or cell.
  - POSTIMAGE specifies an image to place after a table or cell.
- The ODS HTML statement now supports the ID= option, which enables you to run multiple instances of the same destination at the same time.
- The ODS PATH statement now supports the following actions and path arguments. The actions enable you to place one or more locations in the ODS path or to remove one or more locations from the ODS path.

- APPEND adds one or more locations to the end of a path.
- PREPEND adds one or more locations to the beginning of a path.
- REMOVE removes one or more locations from the path.

The path arguments set or display the ODS path.

- RESET sets the ODS path to the default setting SASUSER.TEMPLAT (UPDATE) SASHELP.TMPLMST (READ).
- SHOW displays the current ODS path.
- VERIFY sets the ODS path to include only templates that SAS supplies. VERIFY is the same as specifying ODS PATH SASHELP.TMPLMST (READ).

- The ODS PRINTER statement now supports the following options:
  - The DISPLAY= option opens, manages, or closes the DISPLAY destination.
  - The ID= option enables you to run multiple instances of the same destination at the same time.
  - The PCL= option opens, manages, or closes the PCL destination.
  - The PDF= option opens, manages, or closes the PDF destination.
  - The PS= option opens, manages, or closes the PostScript destination.
  - The STARTPAGE= option controls page breaks.
- The ODS RTF statement now supports the following options:
  - The ID= option enables you to run multiple instances of the same destination at the same time.
  - The STARTPAGE= option controls page breaks.
- PROC TEMPLATE has been enhanced as follows:
  - New access modes have been added for the STORE= option:
    - READ provides read-only access.
    - WRITE provides write access (always creating a new template store). If the store name already exists, it will be overwritten.
    - UPDATE provides update access (creating a new template store only if the one that is specified does not exist). UPDATE is the default access mode.
  - New PATH statement actions enable you to place one or more locations in the ODS path or to remove one or more locations from the path:
    - APPEND adds one or more locations to the end of a path.
    - PREPEND adds one or more locations to the beginning of a path.
    - REMOVE removes one or more locations from a path.
  - New PATH statement path arguments set or display the ODS path:
    - RESET sets the ODS path to the default setting SASUSER.TEMPLAT (UPDATE) SASHELP.TMPLMST (READ).
    - SHOW displays the current ODS path.
    - VERIFY sets the ODS path to include only templates that SAS supplies. VERIFY is the same as specifying ODS PATH SASHELP.TMPLMST (READ).

SAS I/O Enhancements

When a request is made to compress a SAS data set with either the COMPRESS= data set option or the COMPRESS= system option, SAS now determines whether the

resulting compressed file will be larger than an uncompressed file. If so, SAS creates an uncompressed data set and issues a warning message stating that the file has not been compressed.

European Currency Conversion

SAS enables you to convert European currencies by providing a group of formats, informats, and a function that convert

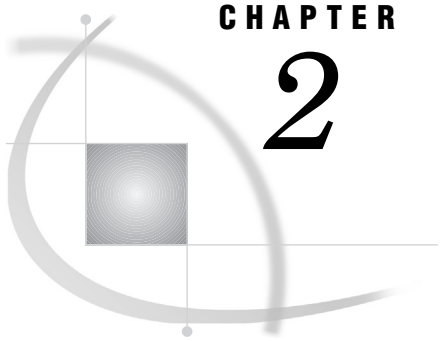
- an amount in one country's currency to an equivalent amount in another country's currency
- a country's currency to euros
- euros to a specific country's currency.

Windowing Environment

- For the External File Interface (EFI), the option **`Number of guessing rows`** has been added to the Options for Import window. The option specifies how many rows (observations) the EFI examines when you request that variables be automatically created.
- Color-coded syntax is now supported in code-editing windows, such as the Program Editor or Notepad. You can use the new Edit Scheme window to modify color schemes. You can also use the new COLOR SYNTAX command to invoke color-coded syntax at any time.
- There is a new Printer Setup window for Universal Printing.

Sending E-mail from SAS Using the SMTP Interface

You can now use the FILENAME, EMAIL (SMTP) Access Method to send electronic mail programmatically from SAS in all operating environments in which SAS runs. In addition, you can change encoding for processing the message as well as attachments. To send e-mail to an SMTP (Simple Mail Transfer Protocol) server, you first use the EMAILSYS system option to specify the SMTP e-mail interface. Next, use the FILENAME statement to specify the EMAIL device type, and then submit SAS statements in a DATA step or in SCL code. For example, you can use the logic of a DATA step to subset e-mail distribution based on a large data set of e-mail addresses. You can also direct output through e-mail based on the results of processing.



CHAPTER

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Base SAS Software: SAS Language Elements

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Commands

The following commands are new:

- The COLOR SYNTAX command applies color-coded syntax to code-editing windows, such as the Notepad or the Program Editor.
- The DMOPTLOAD command reads SAS system option settings that are stored in the SAS registry or in a SAS data set, and puts them into effect.
- The DMOPTSAVE command saves the current system option settings either to a registry key or to a data set that contains two variables named OPTNAME and OPTVALUE.

The following commands have been changed or enhanced:

- The DMPRTCREATE command opens a Wizard that lets you define a new printer definition.
- The DMPRTSETUP command opens the Print Setup dialog box.
- The SYNCOLOR command toggles the color-coded syntax in the Program Editor, Notepad, or SCL Editor on and off.
- The SYNCONFIG command opens the Edit Scheme window, which enables you to change the color syntax scheme for the color editor.

Data Set Options

When a request is made to compress a SAS data set with the COMPRESS= data set option, SAS now determines whether the resulting compressed file will be larger than an uncompressed file. If so, SAS creates an uncompressed data set and issues a warning message stating that the file has not been compressed.

Formats

- There are four new Unicode formats:
  - The $UTF8X*w*. format writes character data in 8–bit UCS2 (Unicode).
  - The $UCS2B*w*. format writes a SAS value in big endian 16–bit UCS2 Unicode without a byte-order mark.
  - The $UCS2L*w*. format writes a SAS value in little endian 16–bit UCS2 Unicode without a byte-order mark.
  - The $UCS2X*w*. format writes 16–bit UCS2 Unicode without a byte-order mark.
- The following Date and Time formats are new:
  - The DTMONYY*w*. format writes the date part of a datetime value as the month and year in the form *mmmyy* or *mmmyyyy*.
  - The DTWKDATX*w*. format writes the date part of a datetime value as the day of the week and the date in the form *day-of-week*, *dd mmm yy* (or *yyyy*).
  - The DTYEAR*w*. format writes the date part of a datetime value as the year in the form *yy* or *yyyy*.
  - The DTYYQC*w*. format writes the date part of a datetime value as the year and the quarter and separates them with a colon (:).
- The following binary formats are available:
  - The S370FHEX*w.d* format writes real binary (floating-point) values in hexadecimal representation.
  - The VAXRB*w.d* format writes real binary (floating-point) data in VMS format.
- The following European currency conversion formats are available:
  - The EURO*w.d* and EUROX*w.d* formats write values that contain the euro (E) symbol:

    The EURO*w.d* format writes numeric values with a leading euro (E) symbol, a comma that separates every three digits, and a period that separates the decimal fraction.

    The EUROX*w.d* format writes numeric values with a leading euro (E) symbol, a period that separates every three digits, and a comma that separates the decimal fraction. This format is commonly used in European countries.
  - The formats that begin with EUROFR convert an amount in a specific European currency to an equivalent amount in euros:

    EURFRATS*w.d* converts an amount from Austrian schillings to euros.

    EURFRBEF*w.d* converts an amount from Belgian francs to euros.

    EURFRCHF*w.d* converts an amount from Swiss francs to euros.

    EURFRCZK*w.d* converts an amount from Czech koruny to euros.

    EURFRDEM*w.d* converts an amount from German marks to euros.

    EURFRDKK*w.d* converts an amount from Danish kroner to euros.

    EURFRESP*w.d* converts an amount from Spanish pesetas to euros.

    EURFRFIM*w.d* converts an amount from Finnish markkaa to euros.

    EURFRFRF *w.d* converts an amount from French francs to euros.

    EURFRGBP*w.d* converts an amount from British pounds to euros.

    EURFRGRD*w.d* converts an amount from Greek drachmas to euros.

EURFRHUF*w*.*d* converts an amount from Hungarian forints to euros.
EURFRIEP*w*.*d* converts an amount from Irish pounds to euros.
EURFRITL*w*.*d* converts an amount from Italian lire to euros.
EURFRLUF*w*.*d* converts an amount from Luxembourg francs to euros.
EURFRNLG*w*.*d* converts an amount from Dutch guilders to euros.
EURFRNOK*w*.*d* converts an amount from Norwegian krone to euros.
EURFRPLZ*w*.*d* converts an amount from Polish zlotys to euros.
EURFRPTE *w*.*d* converts an amount from Portuguese escudos to euros.
EURFRROL*w*.*d* converts an amount from Romanian lei to euros.
EURFRRUR*w*.*d* converts an amount from Russian rubles to euros.
EURFRSEK*w*.*d* converts an amount from Swedish kronor to euros.
EURFRSIT*w*.*d* converts an amount from Slovenian tolars to euros.
EURFRTRL*w*.*d* converts an amount from Turkish liras to euros.
EURFRYUD*w*.*d* converts an amount from Yugoslavian dinars to euros.

- The formats that begin with EUROTO convert an amount in euros to an equivalent amount in a specific European currency:
  EURTOATS*w*.*d* converts an amount in euros to Austrian schillings.
  EURTOBEF*w*.*d* converts an amount in euros to Belgian francs.
  EURTOCHF*w*.*d* converts an amount in euros to Swiss francs.
  EURTOCZK*w*.*d* converts an amount in euros to Czech koruny.
  EURTOFIM*w*.*d* converts an amount in euros to Finnish markkaa.
  EURTODEM*w*.*d* converts an amount in euros to German marks.
  EURTODKK*w*.*d* converts an amount in euros to Danish kroner.
  EURTOESP*w*.*d* converts an amount in euros to Spanish pesetas.
  EURTOFRF*w*.*d* converts an amount in euros to French francs.
  EURTOGBP*w*.*d* converts an amount in euros to British pounds.
  EURTOGRD*w*.*d* converts an amount in euros to Greek drachmas.
  EURTOHUF*w*.*d* converts an amount in euros to Hungarian forints.
  EURTOIEP*w*.*d* converts an amount in euros to Irish pounds.
  EURTOITL*w*.*d* converts an amount in euros to Italian lire.
  EURTOLUF*w*.*d* converts an amount in euros to Luxembourg francs.
  EURTONLG*w*.*d* converts an amount in euros to Dutch guilders.
  EURTONOK*w*.*d* converts an amount in euros to Norwegian krone.
  EURTOPLZ*w*.*d* converts an amount in euros to Polish zlotys.
  EURTOPTE*w*.*d* converts an amount in euros to Portuguese escudos.
  EURTOROL*w*.*d* converts an amount in euros to Romanian lei.
  EURTORUR*w*.*d* converts an amount in euros to Russian rubles.
  EURTOSEK*w*.*d* converts an amount in euros to Swedish kronor.
  EURTOSIT*w*.*d* converts an amount in euros to Slovenian tolars.
  EURTOTRL*w*.*d* converts an amount in euros to Turkish liras.
  EURTOYUD*w*.*d* converts an amount in euros to Yugoslavian dinars.

Functions and CALL Routines

- The following function and CALL routine are experimental in Release 8.2:

    - The RXPATTERN function parses a pattern and returns a value.
    - The CALL RXSTYLE routine specifies using the registry key for pattern matching.
- The EUROCURR function converts one European currency to another and returns a value.
- The PATHNAME function now has an optional argument called *search-ref*. If the name of a fileref is identical to the name of a libref, you can use the *search-ref* argument to specify whether you want to search for a fileref or for a libref. If you specify a value of F, SAS searches for a fileref. If you specify a value of L, SAS searches for a libref.
- Six new functions are available to use with the ARM wrapper macros. Invoking the SAS interface to ARM through macros is preferable to using the ARM functions, because the ARM macros are easier to use and have additional capabilities. See ARM Macros.
- The new CALL SYMDEL routine deletes the specified variable from the macro global symbol table.
- SAS now supports processing on 64-bit platforms as well as on 32-bit platforms. This functionality provides a new set of functions and a CALL routine that enable you to perform pointer arithmetic on character values. The following new functions and CALL routine can be used on both 32-bit and 64-bit platforms:
    - The ADDRLONG function returns the memory address of a variable.
    - The PEEKLONG function stores the contents of a memory address in a numeric variable.
    - The PEEKCLONG function stores the contents of a memory address in a character variable.
    - The POKELONG function writes a value directly into memory.
    - The CALL POKELONG routine writes a value directly into memory.
    - The PTRLONGADD function returns the pointer address as a character variable.
- Because SAS now supports processing on 64-bit platforms as well as on 32-bit platforms, the following functions and CALL routine are now restricted to use on 32-bit platforms only:

  ADDR
  PEEK
  PEEKC
  POKE
  CALL POKE

Informats

- There are four new Unicode informats:
    - The $UTF8X*w*. informat reads character data in 8-byte Unicode without a byte-order mark.
    - The $UCS2B*w*. informat reads character data in big endian 16-bit UCS2 Unicode without a byte-order mark.
    - The $UCS2L*w*. informat reads character data in little endian 16-bit UCS2 Unicode without a byte-order mark.
    - The $UCS2X*w*. informat reads character data in 16-bit UCS2 Unicode without a byte-order mark.

- The following binary informat is available:
  - The S370FHEX*w.d* informat reads real binary (floating-point) values in hexadecimal representation.
- The following European currency conversion informats are available:
  - The EURO*w.d* informat reads numeric values and removes embedded characters.
  - The EUROX*w.d* informat reads numeric values and removes embedded characters in values where a comma is the separator between a whole number and the decimal portion.

Macro Facility

- The new %SYMDEL macro deletes the listed variable(s) from the macro global symbol table.
- The following automatic macro variables are new:
  - SYSPROCNAME is an automatic macro variable whose value indicates what the SAS language processor is currently executing. The value can be either DATASTEP or the name of a SAS procedure.
  - SYSMACRONAME is an automatic macro variable that returns the name of the currently executing macro.

ARM Macros

- The new Application Response Measurement (ARM) macros provide a way to measure the performance of an application as the application is executing. The ARM macros are not part of the SAS Macro Facility. They are used only with the ARM function calls. Invoking the SAS interface to ARM through macros is preferable to using the functions, because the ARM macros are easier to use and have additional capabilities.

Statements

- The FILE, FILENAME, and INFILE statements support the new ENCODING= statement option. This option enables you to dynamically change the character-set encoding for processing external data.
- You can now use the FILENAME, EMAIL (SMTP) access method to send electronic mail programmatically from SAS in all operating environments in which SAS runs. In addition, you can change encoding for processing the message as well as attachments. To send e-mail to an SMTP (Simple Mail Transfer Protocol) server, you first use the EMAILSYS system option to specify the SMTP e-mail interface. Next, use the FILENAME statement to specify the EMAIL device type, and then submit SAS statements in a DATA step or in SCL code. For example, you can use the logic of a DATA step to subset e-mail distribution based on a large data set of e-mail addresses. You can also direct output through e-mail based on the results of processing.

System Options

- The following system options are new:
  - When set to YES, AUTOSIGNON= causes the RSUBMIT command or statement to automatically execute a SIGNON command, if no current connection exists.
  - SYSPRINTFONT specifies which font to use when printing with the current default printer.
  - UUIDCOUNT= specifies the number of UUIDs (Universally Unique Identifiers) to acquire each time the UUID generator daemon is used.
  - UUIDGENDHOST= identifies the host and port of the UUID generator daemon.
- The following system options have been changed or enhanced:
  - When a request is made to compress a SAS data set with the COMPRESS= system option, SAS now determines whether the resulting compressed file will be larger than an uncompressed file. If so, SAS creates an uncompressed data set and issues a warning message stating that the file has not been compressed.
  - The PROGSIG= system option no longer has any effect on the printed output of statistical procedures. It has been superseded by features in the TEMPLATE procedure, which is part of ODS, the Output Delivery System.

CHAPTER

3

Base SAS Software: Procedures

The FREQ Procedure **13**
The OPTLOAD Procedure **13**
The OPTSAVE Procedure **13**
The PRINT Procedure **14**
The PRINTTO Procedure **14**
The PRTDEF Procedure **14**
The REGISTRY Procedure **14**
The REPORT Procedure **14**
The SQL Procedure **15**
The UNIVARIATE Procedure **15**

The FREQ Procedure

- The new POINT option in the EXACT statement requests exact point probabilities for the test statistics.
- The BINOMIAL option now includes a new LEVEL= suboption to specify which variable level PROC FREQ uses to compute the proportion of observations. By default, PROC FREQ computes the proportion of observations for the first variable level that appears in the output.
- The new BINOMIALC option in the TABLES statement computes the BINOMIAL option statistics for one-way tables and includes a continuity correction in the asymptotic confidence limits and asymptotic test. The BINOMIAL keyword in the OUTPUT statement writes these statistics to a SAS data set.
- The new RISKDIFFC option in the TABLES statement computes the RISKDIFF option statistics for 2×2 tables, and includes a continuity correction in the asymptotic confidence limits. The RISKDIFF keyword in the OUTPUT statement writes these statistics to a SAS data set.

The OPTLOAD Procedure

The new OPTLOAD procedure reads SAS system option settings that are stored in the SAS Registry or in a SAS data set and puts them into effect.

The OPTSAVE Procedure

The new OPTSAVE procedure saves the current SAS system option settings in the SAS Registry or in a SAS data set.

The PRINT Procedure

The new STYLE= option enables you to control presentation attributes like font face, font weight, and color when using the Output Delivery System. This option is supported for all destinations except Listing and Output. STYLE= is available on the PROC PRINT statement, ID statement, SUM statement, and VAR statement.

The PRINTTO Procedure

The LOG= and PRINT= options now support printing to a SAS catalog entry that is specified with a fileref.

The PRTDEF Procedure

The new PRTDEF procedure enables you to create printer definitions in batch mode either for yourself or for all SAS users at a site.

The REGISTRY Procedure

The new UPCASE option enables you to convert all incoming key names to upper case.

The REPORT Procedure

- The REPORT procedure now supports the use of a SAS format or a user-defined format as the value of a style attribute.
- The REPORT procedure now supports Quantile statistics. These include the median, P1, P5, P10, P25, P75, P90, P95, and P99. The new options in the PROC statement control how the procedure computes the quantile statistics.
  - The QMARKERS= option specifies the sample size to use for the P2 quantile estimation method.
  - The QMETHOD= option specifies the quantile estimation method.
  - The QNTLDEF= option specifies the mathematical definition to calculate quantiles.
- The new COMPLETECOLS | NOCOMPLETECOLS option in the PROC statement creates all possible combinations of across variable values.
- The new COMPLETEROWS | NOCOMPLETEROWS option in the PROC statement creates all possible combinations of group variable values.
- The new EXCLUSIVE option in the DEFINE statement excludes all combinations of an item that are not found in a preloaded range of user-defined formats.
- The new MISSING option in the DEFINE statement treats missing values as valid values for an item.

- The new PRELOADFMT option in the DEFINE statement specifies that all formats are preloaded for an item.
- The new WEIGHT= option in the DEFINE statement specifies a numeric variable whose values weight the value of the analysis variable.

The SQL Procedure

- The new BTRIM function trims a single character from the beginning, end or both beginning and end of a string.
- The SQL procedure contains three new joins:
  - The new CROSS JOIN produces the crossproduct of two tables.
  - The new NATURAL JOIN selects rows from two tables that have equal values in columns that share the same name.
  - The new UNION JOIN returns a union of the columns of both tables.
- The new fold functions change the case of their arguments.
- The new truncated string comparison operators compare two strings after making the strings the same length by truncating the longer string to the same length as the shorter string.
- The new SUBSTRING function returns part of a character expression.
- The LIKE condition has a new ESCAPE clause that overrides the default behavior of the _ (underscore) and the % (percent sign).

The UNIVARIATE Procedure

- The HISTOGRAM statement supports the following new options:
  - CTEXTSIDE= specifies the color for the row labels that are displayed along the left side of the comparative histogram.
  - CTEXTTOP= specifies the color for the row labels that are displayed along the top of the comparative histogram.
  - ENDPOINTS= uses the endpoints as the tick mark values for the horizontal axis instead of the midpoints.
  - The HISTOGRAM statement provides some additional goodness-of-fit tests based on the empirical distribution function (EDF). The following table summarizes the different combinations of the estimated parameters for which EDF tests are available.

Table 3.1 Availability of EDF Tests

Distribution	Parameters			Tests Available
	Threshold	Scale	Shape	
Beta	θ known	σ known	α, β known	all
	θ known	σ known	$\alpha, \beta < 5$ unknown	all
Exponential	θ known	σ known		all
	θ known	σ unknown		all
	θ unknown	σ known		all
	θ unknown	σ unknown		all

Distribution	Parameters			Tests Available
	Threshold	Scale	Shape	
Gamma	θ known	σ known	α known	all
	θ known	σ unknown	α known	all
	θ known	σ known	α unknown	all
	θ known	σ unknown	α unknown	all
	θ unknown	σ known	$\alpha > 1$ known	all
	θ unknown	σ unknown	$\alpha > 1$ known	all
	θ unknown	σ known	$\alpha > 1$ unknown	all
	θ unknown	σ unknown	$\alpha > 1$ unknown	all
Lognormal	θ known	ζ known	σ known	all
	θ known	ζ known	σ unknown	A^2 and W^2
	θ known	ζ unknown	σ known	A^2 and W^2
	θ known	ζ unknown	σ unknown	all
	θ unknown	ζ known	$\sigma < 3$ known	all
	θ unknown	ζ known	$\sigma < 3$ unknown	all
	θ unknown	ζ unknown	$\sigma < 3$ known	all
	θ unknown	ζ unknown	$\sigma < 3$ unknown	all
Normal	θ known	σ known		all
	θ known	σ unknown		A^2 and W^2
	θ unknown	σ known		A^2 and W^2
	θ unknown	σ unknown		all
Weibull	θ known	σ known	c known	all
	θ known	σ unknown	c known	A^2 and W^2
	θ known	σ known	c unknown	A^2 and W^2
	θ known	σ unknown	c unknown	A^2 and W^2
	θ unknown	σ known	$c > 2$ known	all
	θ unknown	σ unknown	$c > 2$ known	all
	θ unknown	σ known	$c > 2$ unknown	all
	θ unknown	σ unknown	$c > 2$ unknown	all

- The PROBPLOT statement supports the following new options:
  - CTEXTSIDE= specifies the color for the row labels that are displayed along the left side of the comparative probability plot.
  - CTEXTTOP= specifies the color for the row labels that are displayed along the top of the comparative probability plot.

- The QQPLOT statement supports the following new options:
  - CTEXTSIDE= specifies the color for the row labels that are displayed along the left side of the comparative quantile-quantile plot.
  - CTEXTTOP= specifies the color for the row labels that are displayed along the left side of the comparative quantile-quantile plot.

CHAPTER

4

SAS Software in the CMS Environment

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Byte File System Support

IBM Open Edition for VM/ESA implements a directory-based file system, known as Byte File System (BFS), that is very similar to the file systems used in UNIX. The SAS System under CMS enables you to read and write BFS files and to issue OPENVM CMS commands.

Sending E-mail from SAS Using the SMTP Interface

When you use the FILENAME, EMAIL (SMTP) access method, you can now specify a character-set encoding for processing messages and attachments.

Universal Printing

Universal Printing has been enabled under CMS. Universal Printing is a printing mechanism that provides printing support for all operating environments. It is especially helpful for those operating environments in which printing can be a challenge.

Writing to the SAS Log From a Pipeline

A new SAS pipeline command, SASLOG, enables you to write messages to the SAS log from pipelines that are defined by FILENAME, INFILE, or FILE statements

(including pipelines that are invoked by the CALLPIPE or ADDPIPE CMS pipeline subcommands under such pipelines).

SAS Language Elements

Commands

The following commands have been enhanced:

- The FILE and INCLUDE commands support a new ENCODING= option. This option enables you to dynamically change the character-set encoding when reading from or writing to external files.

Macros

The %KEYDEF macro, for defining function keys, is obsolete.

Procedures

The PRTDEF procedure, which enables you to define Universal Printers in batch mode, has a host-specific requirement for printing directly to a printer. You must specify PIPE as the DEVICE value and SASPRT as the DEST value.

Statements

The following statements have been enhanced:

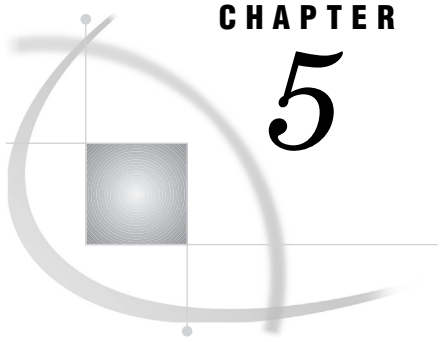
- The FILE, FILENAME, and INFILE statements support the BFS file type and BFS file and directory names in the file-specification argument.
- The FILENAME statement supports the UPRINTER device type for Universal Printing.
- The FILE, FILENAME, and INFILE statements support a new ENCODING= option. This option enables you to dynamically change the character-set encoding when reading from or writing to external files.

System Options

- The following system options are new:
  - ENCODING= specifies the character-set encoding for reading from or writing to external files.
  - LOCALE= specifies the locale for the SAS session. The locale reflects the local conventions, language, and culture for a geographical region.
  - NLSCOMPATMODE specifies whether to use the default character-set encoding to process data.
  - REALMEMSIZE= specifies the amount of virtual memory that SAS can allocate to procedures and applications.

- VIOBUF= specifies the size of the virtual storage area to be used for members of the WORK library.

- The following system options have been modified:
  - SYSIN= now accepts a concatenated list of filenames in the *file-specification* argument. For each filename, a filetype of "SAS" and a filemode of "*" is assumed. Previously, only complete file specifications could be concatenated.
  - The default value for UNIVERSALPRINT is now UNIVERSALPRINT.



CHAPTER

5

SAS Software in the Microsoft Windows Environment

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Enhanced Editor

The following Enhanced Editor features are new:

- You can open multiple views of the same file.
- Using the SUBTOP command, you can submit a specified number of lines from the beginning of a program for processing. You can also submit your program from the Open dialog box.
- You can search for matching DO-END pairs.
- Scrolling and line number commands can be entered from the command bar.
- The previous search string is the initial Find text value in the Find and Replace dialog boxes.
- When an external file on disk has been modified, the Enhanced Editor automatically reloads unchanged files.
- When the Enhanced Editor option Strip Ctrl + Z characters is selected, the Ctrl + Z characters are removed from files that were created in a DOS editor.
- You can change the background color of the Enhanced Editor window by using the background color selection for normal text.

Basic Operation of the SAS System

The basic operation of the SAS System has been enhanced as follows:

- The F11 key default command is now set to COMMAND FOCUS, which places the window focus in the command bar regardless of whether the command bar is docked to the main SAS window or undocked and contained in a separate window.
- When your preferences are set to turn off the message area of the status line, messages appear in the active window.

SAS Language Elements

Commands

The following SAS commands have been enhanced:

- In the COMMAND command, the new FOCUS argument places the window focus in the command bar regardless of whether the command bar is docked to the main SAS window or undocked and contained in a separate window.
- The SUBTOP command is now supported in the Enhanced Editor as well as in the Program Editor.
- In the FILE and INCLUDE commands, the new ENCODING argument specifies a character-set encoding for processing external data that is in a different language.
- In the FILE and INCLUDE commands, the *file-specification* argument now accepts filerefs.
- In the FILE and INCLUDE commands, the host option IGNOREDOSEOF specifies that ^Z is interpreted as character data and not as an end-of-file marker.

Functions and CALL Routines

The documentation for the following CALL routine has been updated:

- The CALL SOUND duration is measured in milliseconds.

Macros

The SYSSCPL automatic macro variable returns a value for the Windows Millennium Edition operating environment.

Statements

The following SAS statements have been enhanced:

- In the FILENAME, FILE, and INFILE statements, the new ENCODING option specifies a character-set encoding for processing external data that is in a different language.
- In the %INCLUDE, FILENAME, FILE, and INFILE statements, the host option IGNOREDOSEOF specifies that ^Z is interpreted as character data and not as an end-of-file marker.

System Options

- The following system options are new:
  - ENCODING specifies the character-set encoding for your SAS session.
  - LOCALE specifies the locale of your SAS session. The locale reflects the local conventions, language, and culture for a geographic region.
  - NLSCOMPATMODE controls the default character-set encoding for processing data.

- PRTABORTDLGS specifies whether you want the Print Abort dialog box to be displayed.
- PRTSETFORMS displays or removes the **`Use Forms`** check box from the Print Setup dialog box.
- REALMEMSIZE specifies how much virtual memory SAS can allocate.

- The following system options have been enhanced:
  - The default value for SGIO is now NOSGIO.
  - DBCSTYPE now accepts WINDOWS as an alias for the PCMS character-set encoding method.
  - The default value for SASUSER has been modified to include (as part of the path) a Windows variable whose value is a user's Personal folder or My Documents folder.

CHAPTER 6

SAS Software in the OpenVMS Environment

SAS Language Elements **25**
Commands **25**
Statements **25**
System Options **25**

SAS Language Elements

Commands

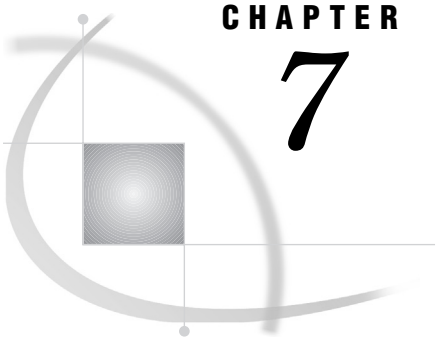
The FONTLIST command, which lists available software fonts, is now specific to the OpenVMS environment.

Statements

RECFM=N is now supported for the FILE, FILENAME, and INFILE statements and the FILENAME function. RECFM=N specifies that the record format of the file is binary.

System Options

- The default for the SEQENGINE system option has been changed to TAPE.
- The REALMEMSIZE system option is not supported on OpenVMS.
- The ENCODING system option, which specifies the default character-set encoding for external data, has been added.
- The LOCALE system option, which reflects the local conventions, language and culture for a geographic region, has been added.
- The NLSCOMPATMODE system option, which uses the default character-set encoding to process data, has been added.



CHAPTER 7

SAS Software in the OS/2 Environment

SAS Language Elements **27**
Commands **27**
Functions and CALL Routines **27**
Statements **27**
System Options **27**

SAS Language Elements

Commands

The following commands have been enhanced:

- In the COMMAND command, the new FOCUS argument places the window focus in the command bar regardless of whether the command bar is docked to the main SAS window or undocked and contained in a separate window.
- In the FILE and INCLUDE commands, the new ENCODING argument specifies a character-set encoding for processing external data that is in a different language.
- In the FILE and INCLUDE commands, the *file-specification* argument now accepts filerefs.

Functions and CALL Routines

The documentation for the following CALL routine has been updated:

- The CALL SOUND duration is measured in milliseconds.

Statements

The following SAS statements have been enhanced:

- In the FILENAME, FILE, and INFILE statements, the new ENCODING option specifies a character-set encoding for processing external data that is in a different language.

System Options

- The following system options are new:

- ENCODING specifies the character-set encoding for your SAS session.
- LOCALE specifies the locale of your SAS session. The locale reflects the local conventions, language, and culture for a geographic region.
- NLSCOMPATMODE controls the default character-set encoding for processing data.
- PRTABORTDLGS specifies whether you want the Print Abort dialog box to be displayed.
- PRTSETFORMS displays or removes the **`Use Forms`** check box from the Print Setup dialog box.
- REALMEMSIZE specifies how much virtual memory SAS can allocate.

- The following system option has been enhanced:
  - DBCSTYPE now accepts WINDOWS as an alias for the PCMS character-set encoding method.

CHAPTER

8

SAS Software in the OS/390 Environment

Universal Printing **29**
Sending E-mail from SAS Using the SMTP Interface **29**
SAS Language Elements **29**
Commands **29**
Macros **29**
Statements **30**
System Options **30**

Universal Printing

Universal Printing has been enabled under OS/390. Universal Printing is a printing mechanism that provides printing support to all operating environments. It is especially helpful for those operating environments in which printing can be a challenge.

Sending E-mail from SAS Using the SMTP Interface

When you use the FILENAME, EMAIL (SMTP) access method, you can now specify a character-set encoding for processing messages and attachments.

SAS Language Elements

Commands

The following commands have been enhanced:

- INCLUDE supports the * wildcard character for specifying a concatenation of UNIX System Services files.
- The FILE and INCLUDE commands support a new ENCODING= option. This option enables you to dynamically change the character-set encoding when reading from or writing to external files.

Macros

The %KEYDEF macro, for defining function keys, is obsolete.

Statements

The following statements have been enhanced:

- The FILENAME statement supports REP as a valid value for the DISP= option. Specifying DISP=REP enables you to create or replace an external file without knowing whether the file already exists.
- The FILENAME statement supports the UPRINTER device type for Universal Printing.
- The FILENAME, INFILE, and %INCLUDE statements support the * wildcard character for specifying a concatenation of UNIX System Services files.
- The FILE, FILENAME, and INFILE statements support a new ENCODING= option. This option enables you to dynamically change the character-set encoding when reading from or writing to external files.

System Options

- The following system options are new:
  - ENCODING= specifies the character-set encoding for reading from or writing to external files.
  - LOCALE= specifies the locale for the SAS session. The locale reflects the local conventions, language, and culture of a geographical region.
  - NLSCOMPATMODE controls the encoding that is used for processing character data.
  - REALMEMSIZE= specifies the amount of virtual memory that SAS can allocate to procedures and applications.
  - SET= defines environment variables.
- The following system option has been modified:
  - The default value for UNIVERSALPRINT is now UNIVERSALPRINT.

CHAPTER

9

SAS Software in UNIX Environments

SAS Language Elements **31**
Commands **31**
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SAS Language Elements

Commands

- The new SETDMSFONT command specifies a windowing environment font for the current SAS session.
- The FILE and INCLUDE commands support the new ENCODING option.

Statements

The FILE, FILENAME, and INFILE statements support the new ENCODING option. This option enables you to dynamically change the character-set encoding when reading from or writing to external files.

System Options

- The following SAS system options are new:
  - The ENCODING system option specifies a default character-set encoding for processing external data.
  - The LOCALE system option specifies the locale for the SAS session. The locale reflects the local conventions, language, and culture for a geographical region.
  - The NLSCOMPATMODE system option specifies whether to use the default character-set encoding to process data.
- The following system options have been changed or enhanced:
  - The default for the SORTPGM system option has been changed to BEST.
  - The EMAILSYS system option now supports SMTP (Simple Mail Transport Protocol).

SAS Resources

The new resource **`SAS.suppressMenuIcons`** suppresses the use of icons in menus.

PART 2

Other SAS Software Products

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CHAPTER 10

SAS/ACCESS Software

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SAS/ACCESS Software for Relational Databases

In All SAS/ACCESS Interfaces to Relational Databases

The following changes and enhancements have been made to all of the SAS/ACCESS interfaces to relational databases:

- A new system option, DBSRVTP=, enables you to improve SAS server throughput by specifying whether certain SAS/ACCESS engines put a hold (or block) on the originating client while making performance-critical calls to the database. This option applies when SAS is invoked as a server that is responding to multiple clients.
- The LIBNAME option PRESERVE_COLUMN_NAMES= now applies only to table creation. This option is now also available as a data set option.
- SAS/ACCESS can now convert many SAS functions into the SQL of the DBMS, which improves performance by causing the functions to be processed by the DBMS. This enhancement is available for WHERE clauses and PROC SQL when you use the SAS/ACCESS LIBNAME statement.

SAS/ACCESS Interface to DB2 under OS/390

Bulk loading, which uses the DB2 LOAD utility to enable you to rapidly load rows into a DB2 table, is now supported.

SAS/ACCESS Interface to DB2 under UNIX and PC Hosts

- The BIGINT numeric data type, which specifies a big integer, is now supported. Values in a column of this type can range from -9223372036854775808 to +9223372036854775807.
- A new LIBNAME and data set option, INSERTBUFF=, specifies the number of rows in a single DBMS insert.

SAS/ACCESS Interface to Microsoft SQL Server

- A new LIBNAME and data set option, UPDATE SQL=, determines which method is used to update and delete rows in a data source.
- A new LIBNAME and data set option, INSERTBUFF=, specifies how many rows are included in a single DBMS insert.
- The BIGINT numeric data type, which specifies a big integer, is now supported. Values in a column of this type can range from -9223372036854775808 to +9223372036854775807.
- SAS/ACCESS can now pass outer joins between two or more tables, with certain restrictions.

SAS/ACCESS Interface to ODBC

- A new LIBNAME and data set option, UPDATE SQL=, determines which method is used to update and delete rows in a data source.
- A new LIBNAME and data set option, INSERTBUFF=, specifies how many rows are included in a single DBMS insert.
- SAS/ACCESS can now pass outer joins between two or more tables, with certain restrictions.
- The BIGINT numeric data type, which specifies a big integer, is now supported. Values in a column of this type can range from -9223372036854775808 to +9223372036854775807.

SAS/ACCESS Interface to OLE DB

The Microsoft Data Link API is supported through a new LIBNAME engine connection option, UDL_FILE=.

SAS/ACCESS Interface to ORACLE

SAS/ACCESS can now pass outer joins between two or more tables.

SAS/ACCESS Interface to SYBASE

SAS/ACCESS can now pass outer joins between two or more tables, with certain restrictions.

SAS/ACCESS Interface to Teradata

The TIME and TIMESTAMP date/time data types are now supported.

SAS/ACCESS Interface to CA-DATACOM/DB (Available under OS/390)

- The interface view engine has been enhanced to support the CA-DATACOM/DB SQL-DATE, SQL-TIME, and SQL-STMP date types.
- A new data set option, DDBERLMT=, specifies how many errors are allowed before SAS stops processing and issues a rollback.
- The DDBCOMIT= data set option has been modified to interact with DDBERLMT=.

SAS/ACCESS Interface to IMS-DL/I (Available under OS/390)

The DBCONTENT= argument of the PROC ACCESS ITEM= statement supports two new date values: TFGY2KD4. and TFGY2KN4.

SAS/ACCESS Software for PC File Formats

SAS/ACCESS Software for PC File Formats enables you to read and load Excel 4 and 5 files. Under Windows in Release 8.1 and later, you use the Import/Export Facility to read or load Excel 4, 5, 7 (95), 98, and 2000 files, as well as Microsoft Access files. These same files can also be used in the IMPORT and EXPORT procedures. In Release 8.2, you can use the Import/Export Facility and procedures under Microsoft Windows 2000 as well as other Windows releases.

SAS/ACCESS Interface to PeopleSoft

The new SAS/ACCESS interface to PeopleSoft enables you to extract, browse, and search PeopleSoft metadata. You can query the extracted PeopleSoft metadata to generate views of the PeopleSoft data and save these views as SAS data files and SAS views. You can also save the code that was used to build the query as SAS source code.

For specific information about these features, invoke the SAS/ACCESS interface to PeopleSoft and use the Help buttons on the windows to display the appropriate Help topic.

SAS/ACCESS Interface to R/3

- You can now specify an ODD name when exporting to a new target ODD, or you can select an existing ODD name. Previously you had to use the R/3 table name when exporting to an existing ODD in SAS/Warehouse Administrator.
- In the R/3 Application Setup window, you can now specify three default librefs: Descriptor Library, SAS Data Library, and Source Library. These librefs

correspond to the descriptor information, the location of the SAS data set or view, and the location of the source code.

- You can use the new R/3 BAPI Connector: Logon window to define the R/3 BAPI connection parameters that are required for accessing the R/3 System. When you submit the %CALLRFC function call, the R/3 BAPI Connector: Logon window is automatically displayed unless you use the RFC_LOGON_INFO macro string instead.

For specific information about these new features, invoke the SAS/ACCESS interface to R/3 and use the Help buttons on the windows to display the appropriate Help topic.

CHAPTER
11
SAS ADX Interface

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Process Variables

The ADX interface now enables you to specify process variables for mixture designs. A process variable is a factor in an experiment that is not part of the mixture but whose levels, when varied, could affect the blending properties of the mixture ingredients.

Import Design Wizard

An import design wizard has been added to enable external design data to be imported into ADX. The external data can be stored in a SAS data set or other file type, including Microsoft Excel. Two-level designs, response surface designs, mixed-level designs, mixture designs, and split-plot designs can be imported.

Design Details

The Design Details window now enables you to view two additional details of the basic design. Variance dispersion plots, for Resolution 5 two-level and response surface designs, provide a variance graph to evaluate a design. For mixture designs, the mixture design points can be viewed graphically.

CHAPTER
12

SAS/ASSIST Software

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New Facility for Defining Your Own Metadata **41**
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Improved Performance Through the Use of Metadata

SAS/ASSIST no longer accesses your data sources every time you build a task. Instead, when SAS/ASSIST starts, it examines your data sources and stores metadata about the available tables and columns for the duration of your SAS/ASSIST session. You can also request current information about a data source at any time.

When you are using SAS/ASSIST to access a data warehouse or a DBMS on a remote computer, these enhancements improve performance considerably.

New Data Sources Window

A new Data Sources window displays the data libraries that you have defined. You can use this window to select the libraries that you want to use in your SAS/ASSIST session.

New Facility for Defining Your Own Metadata

You can now define and prepare metadata to be used by all or a selected group of SAS/ASSIST users. This significantly speeds up the process of preparing data information at the beginning of a session, enabling users to get straight to the task at hand.

When a user starts SAS/ASSIST, the program examines all available data. If users have access to very large volumes of data on remote hosts, this can take considerable time, and would in addition have to be performed for each user. With the new facility for predefining metadata, this problem no longer exists. An administrator creates metadata in one central task, using a metadata-generation program—for example, as a batch job in an off-peak period. This metadata is then distributed so that it is immediately available to users when they start their sessions.

The metadata-generation program can also be customized to present information about only a subset of all available data. You can build this logic into an SQL program

that retrieves information about data in the database. (Sample metadata-generation programs are provided with SAS/ASSIST.)

For example, an administrator can specify that only information about tables that have a certain attribute or name prefix is made available to certain groups. Thus, a single metadata-generation process can produce differentiated metadata output. This means that an employee in the finance department views predefined metadata relating only to tables that are relevant for that department, whereas an employee in the personnel department sees a different set of metadata.

New Sample Programs

Sample programs are supplied. These programs extract information from a DBMS and create the metadata that SAS/ASSIST uses. See the previous topic, "New Facility for Defining Your Own Metadata," for more details.

New Table/Column Search

A new Table/Column search gives you extended search capabilities in case you don't know the name of the table that you are looking for, but you know the name of a column that the table contains. When selecting a table, you can search through all existing column names to find the table that you need.

For Additional Information

For detailed information about the features described here, see *SAS/ASSIST Software: Changes and Enhancements, Release 8.2*.

CHAPTER
13

SAS Component Language

SCL List Initialization Syntax Supports Brackets **43**

SCL List Initialization Syntax Supports Brackets

When you use the DECLARE statement to initialize an SCL list, you can now use either braces ({ and }) or brackets ([and]) to enclose a series of list items. For example, both of the following list definitions are now valid:

```
dcl list x = {1,2,3};
dcl list z = [4,5,6];
```

Previously only braces were supported in DECLARE statement syntax.

CHAPTER
14

SAS/CONNECT Software

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CEDA Technology Is Now Part of Base SAS **46**

Enhancements to RSUBMIT

- For an asynchronous RSUBMIT, you can now use the new LOG= and OUTPUT= options to spool the SAS log or SAS output to the backing store or to a specified file for subsequent retrieval. Also, these options can be used to purge the SAS log or SAS output.
- With Multi-Process (MP) CONNECT, you can use the new KILLTASK statement to force one or more asynchronous tasks or SAS sessions to terminate immediately.

Monitoring SAS/CONNECT Tasks

The SAS Explorer now provides a menu selection that enables you to monitor SAS/CONNECT tasks that are executing either synchronously or asynchronously in one or more remote SAS sessions.

RSUBMIT and Macro Processing

Macro processing within a macro-generated RSUBMIT is not always executed in the remote session, as you might expect. To ensure that your RSUBMIT statements are executed in the correct session, you can take advantage of a few simple programming techniques, which are now documented in the “RSUBMIT and MACRO Processing” topic of the SAS/CONNECT Help.

Complete Set of Agent Services

- You can use the CALL Routine Interface to Agent Services to write applications that create, manage, and schedule agents to run on a remote host. These CALL routines are used with SAS data set or SAS macro programming.
- You can also use the new CALL Routine Interface to Agent Services to optionally direct the results of the agent's execution to a specified message queue. In addition to the default SAS messaging service, SAS/CONNECT now supports the external messaging-service providers MQSeries from IBM, MSMQ from Microsoft, and Geneva Message Queuing from Level 8 Systems, all of which require a separate license for SAS Integration Technologies.
- Before you can execute an agent application, you must first prepare the application's execution environment. New documentation about "Setting Up and Running Agent Applications" is in the SAS/CONNECT Help.

Common Messaging Interface

The new Common Messaging Interface is a set of CALL routines that can be used in an application to access a message queue and to store and retrieve messaging information from the local SAS registry or from a distributed LDAP repository. A primary benefit of using this interface is that you can write applications in a consistent manner that is independent of the application messaging transport that is used. The Common Messaging Interface uses the SAS Messaging Service transport by default.

SAS/CONNECT Spawners

See the "SAS/CONNECT Spawners" topic in the SAS/CONNECT Help for updated, comprehensive information about SAS/CONNECT spawners, including

- the benefits of using spawners
- how to start the spawner on the remote host
- how to connect to the spawner from the local host.

File Compression Improves Performance for Large Data Transfers

A new file-compression algorithm facilitates faster exchange of large amounts of data. This performance improvement is especially beneficial when you are using PROC UPLOAD and PROC DOWNLOAD to transfer large files.

CEDA Technology Is Now Part of Base SAS

CEDA (Cross-Environment Data Access) technology facilitates data access between users on incompatible host architectures. CEDA functionality, which formerly required a SAS/CONNECT license, is now available in base SAS software.

CHAPTER 15

SAS/EIS Software

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Computed Values Window **47**
Sorting by Unformatted Category Values **47**
Specifying Labels for Statistics **48**
Activating Access Control **48**

Distinct Values (NUNIQUE) Window

- The Distinct Values (NUNIQUE) window has been enhanced to enable you to
  - define multiple NUNIQUE columns without closing the window
  - delete multiple NUNIQUE columns
  - define a label and a format for the NUNIQUE column
  - register an NUNIQUE column that was created while you were running a report.
- In addition, the Distinct Values (NUNIQUE) window is now available at run time for the Multidimensional Report object.

Computed Values Window

The Computed Values window has been enhanced to enable you to

- define a format for the computed value, when the computed value is defined for the analysis dimension of a Multidimensional Report object.
- register a computed value on the analysis dimension as a computed column in a repository for a Multidimensional Report object.

Sorting by Unformatted Category Values

Sorting by unformatted category values is now available in all multidimensional objects that support category sorts. In Release 8.2, unformatted category values are stored on MDDBs that are created in this release. If the unformatted values are stored, you can specify an unformatted sort.

Note: Unformatted category values are not sorted for MDDBs that were created with prior releases. If you specify an unformatted sort for these MDDBs, a message in the Log window tells you that the sort has not been performed. △

Specifying Labels for Statistics

You can now specify customized statistic labels for all statistics that an MDDB supports. The Statistic Labels window is available from the SAS/EIS Setup window or by selecting

Solutions ► Development and Programming ► OLAP Server Administration

The customized statistic labels are stored in the current parameter catalog entry and are available to any report that is run with the current parameter catalog entry. SASUSER.PARMS.PARMS.SLIST is the default parameter catalog entry. To specify a different parameter catalog entry, use the PARMS= option on the EIS or RUNEIS command.

Activating Access Control

If you used access control for your SAS/EIS applications in a previous release, be sure to activate it for this release, as well. Follow the steps described in the *SAS OLAP Server Administrator's Guide* to activate access control and to point it to the location of your existing access control files.

CHAPTER
16
SAS/ETS Software

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ARIMA Procedure

The new OUTLIER statement can be used as a diagnostic tool to detect shifts in the mean level of the response series that are not accounted for by the estimated model. The types of changes in the mean level that can be detected are: Additive Outliers, Permanent level shifts, and Temporary level shifts of given durations.

COUNTREG Procedure

The COUNTREG procedure is a new experimental procedure that analyzes count data. Poisson and negative binomial regression as well as zero-inflated Poisson and negative binomial models are supported.

DATETIME Formats

Four new DATETIME formats have been added:

- The DTMONYYw. format writes the date part of a datetime value as the month and year in the form *mmmyy* or *mmmyyyy*.
- The DTWKDATXw. format writes the date part of a datetime value as the day of the week and the date in the form *day-of-week*, *dd mmm yy* (or *yyyy*).
- The DTYEARw. format writes the date part of a datetime value as the year in the form *yy* or *yyyy*.

- The DTYYQCw. format writes the date part of a datetime value as the year and the quarter and separates them with a colon (:).

Investment Analysis System

Investment Analysis now enables you to print computed tables and analysis results to the SAS session print device.

MDC Procedure

The MDC procedure analyzes multinomial discrete choice models. PROC MDC handles most of the commonly used multinomial choice models, such as conditional logit, heteroscedastic extreme value, mixed logit, nested logit, and multinomial probit models. The nested logit model can handle the general level of decision trees.

MODEL Procedure

The MODEL procedure now supports multivariate *t* and general likelihood estimation.

QLIM Procedure

The QLIM procedure is an experimental procedure that can be used for analyzing qualitative choice variables and limited dependent variables. PROC QLIM supports a wide variety of models, including Box-Cox regression, logit/probit/tobit with heteroscedasticity, panel data models, and sample selection models. The new version has added a RESTRICT statement, various goodness-of-fit measures, Box-Cox transformation of regressors for logit/probit/tobit models, bivariate probit models, and sample selection models. Most multinomial choice models (conditional logit, mixed logit, heteroscedastic extreme value, value, and nested logit) are supported in the MDC procedure.

Time Series Forecasting System

- You can now add models that contain regressors (including dynamic regressors) to the model selection list. The list can be saved with the project and/or saved as the default list, so that the regressor models are tried when automatic model fitting is performed.
- The FORECAST command now supports the AUDIT=<YES|NO> argument for controlling the audit trail.
- The Forecast Command Builder utility has been improved to make selection of large numbers of series easier. It also provides new types of forecast graphs that are not available elsewhere, including a batch graphing option to graph all the forecasts at once and display them in a framed Web page with thumb-nails. Documentation for this utility is available on the Web. In the Time Series Forecasting System, select

Help ► SAS on the Web ► Time Series Forecasting System

VARMAX Procedure

The VARMAX procedure now includes maximum likelihood estimation for VARMA models and multivariate GARCH models:

- Vector time series can now be estimated by a finite order VAR process with a finite order MA error term. The VARMA processes have infinite order pure VAR and MA representations. Impulse response analysis and forecasting VARMA processes are included.
- Multivariate GARCH models now enable you to specify a functional form for the conditional covariance and also enable you to model the first and second moments jointly.

X12 Procedure

- BY and ID statements have been added.
- The user can control forecasting with the FORECAST statement that has the LEAD option.
- In the TRANSFORM statement, some standard Box-Cox transformations can be requested using the FUNCTION= options, which include the values NONE, LOG, SQRT, INVERSE, LOGISTIC, and AUTO.
- The X11 statement has been greatly expanded with the addition of the OUTFORECAST, SEASONALMA=, and TRENDMA= options.
- The new predefined regression variables available through the REGRESSION PREDEFINED= option are CONSTANT, LOMSTOCK, SEASONAL, TD, TDNOLPYEAR, TD1COEF, and TD1NOPYEAR.
- The following new tables are available:
  - prior-adjustment factors (A2)
  - chi-squared tests for groups of regressors (RegressorGroupChisq)
  - average absolute percentage error in win-sample forecasts (AvgFcstErr)
  - seasonal MA roots (Roots)
  - day of the week trading day component factors (F4).

For Additional Information

For more information about the features described here, see *SAS/ETS Software: Changes and Enhancements, Release 8.2*.

CHAPTER
17

SAS/GIS Software

PROC GIS MAP ACTION Statement **53**
Updated Tutorial **54**

PROC GIS MAP ACTION Statement

The PROC GIS MAP ACTION statement has been changed to enable you to create, replace and update actions. In addition, arguments have been added to enable you to create specific action types:

CREATE
makes a new action

REPLACE
replaces a specified action

TYPE
specifies the type of action to be created or updated

LINK
specifies a link to an attribute table

OUT
specifies an output data table name

OUTMODE
specifies how the output data table will be written to

SCREEN
specifies a screen catalog entry to be used by FSBROWSE as a result of a BROWSE type action

FORMULA
specifies a formula catalog entry to be used by FSVIEW as a result of a VIEW type action

IMAGEVAR
specifies the name of the variable in the link data table that contains the image to display for the currently selected feature

SOURCE
specifies the location of the source code for a program action

MAPVAR
specifies the name of the variable in the link data table containing the name of the map to open when a feature is selected

COMMAND
specifies the command or a variable in a linked data table to be executed when either a command action or a system command action is run

REDISTRICTVAR
specifies the value in the linked data table that contains the name of the value upon which redistricting is based

REDISTRICTLAYER
specifies the name of the polygonal layer to be rethemed by the redistricting action

SUMMARYVAR
specifies one or more numeric variables to display in the redistricting window when a redistrict action is executed

Updated Tutorial

The SAS/GIS tutorial has been updated and is now run from a Web browser. The data that is created for the tutorial has been changed to reflect the new content. In addition, new menu options enable you to resume work in the tutorial and to delete the tutorial data.

CHAPTER
18

SAS/GRAPH Software

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GCONTOUR Procedure **55**
GPLOT Procedure **55**
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GRADAR Procedure **56**
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Generating Graphs for the Web **56**

GCHART Procedure

The HBAR, HBAR3D, VBAR, and VBAR3D statements support the following new options:

- The RANGE option displays on the axis of the chart the range of numeric data that each bar represents.
- The CREF= and LREF= options enable you to specify the color and style of reference lines that are drawn at the points specified by the REF= option.
- The CAUTOREF= and LAUTOREF= options enable you to specify the color and style of reference lines that are drawn at major tick marks. The tick marks are specified by the AUTOREF= option.

GCONTOUR Procedure

In the PLOT statement, the new CHREF=, CVREF=, LHREF=, and LVREF= options enable you to specify the line style and line color for individual reference lines.

GPLOT Procedure

The BUBBLE, BUBBLE2, PLOT, and PLOT2 statements support the following new options:

- The CHREF=, CVREF=, LHREF=, and LVREF= options enable you to specify the color and style of reference lines that are drawn at the points specified by the REF= option.
- The CHAUTOREF=, CVAOUTREF=, LHAUTOREF=, and LVAUTOREF= options enable you to specify the color and style of reference lines that are drawn at major tick marks. The tick marks are specified by the AUTOHREF= and AUTOVREF= options.

GMAP Procedure

In the BLOCK and CHORO statements, the new WOUTLINE= option specifies the width of the outline for all outlined blocks and for the outline of the map areas.

GRADAR Procedure

- The GRADAR procedure now supports the global AXIS statement, which controls the location, values, and appearance of the axes in plots and charts.
- The CHART statement supports the following new options:
  - The MODE= option specifies the display mode for a radar chart.
  - The STARAXIS= option assigns one or more axis definitions to the axes in the radar chart.
  - The HTML= and HTML_LEGEND= options create links in the HTML files that the Output Delivery System produces.
- By default, tick marks on the spokes are now placed at the minimum value, the maximum value, and at one value in between. Also, the tick marks on the 12 o'clock spoke are now labeled.

GREPLAY Procedure

In the TREPLAY statement, the new NAME= and DES= options enable you to differentiate between multiple templates.

Generating Graphs for the Web

Information about generating Web graphs with the JAVA, JAVAMETA, ACTIVEX, HTML, WEBFRAME, GIF, and GIFANIM device drivers has been moved into the SAS/GRAPH Help from its previous location on the SAS Web site.

CHAPTER
19

SAS/IML Software

Wavelet Analysis **57**
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Wavelet Analysis

New subroutines for computing, inverting, and displaying wavelet transforms have been added:

- The WAVFT subroutine computes a specified wavelet transform of one-dimensional data.
- The WAVGET subroutine returns requested information encapsulated in a wavelet transform.
- The WAVIFT subroutine inverts a wavelet transform after applying specified thresholding to the detail coefficients.
- The WAVPRINT subroutine displays requested information encapsulated in a wavelet transform.
- The WAVTHRSH subroutine applies specified thresholding to the detail coefficients of a wavelet transform.

For Additional Information

For more information about the new SAS/IML features, see *SAS/IML Software: Changes and Enhancements, Release 8.2*.

CHAPTER
20

SAS Integration Technologies Software

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SAS Business Intelligence Portal

The SAS Business Intelligence Portal enables you to provide a single, customizable Web interface that aggregates information and applications for users in your enterprise. It uses a role-based security mechanism to deliver only the content that is pertinent to a particular user based on his or her role in the organization. When used in combination with the features of the SAS Publishing Framework, the SAS Business Intelligence Portal becomes the centerpiece of your corporate knowledge-management infrastructure.

SAS Publishing Framework

- The Web Distributed Authoring and Versioning (WebDAV) delivery type for publishing packages to WebDAV-compliant servers such as Intraspect c-business Server and Microsoft Exchange 2000 is now fully supported. This delivery type has also been improved to enable users to name subdirectories.
- The support for archiving packages has been improved. You can now archive packages to remote file systems, using HTTP and FTP protocols.
- The e-mail delivery type now accepts a data set that contains e-mail recipient addresses. This makes it easier for you to publish to an address list.
- Release 8.1 introduced a very powerful way to publish SAS output by applying a *viewer* that can format result set packages (or specific package entries) into an

HTML-rendered e-mail message. In Release 8.2, you can also create viewers that format packages into e-mail messages that are sent in text format.

Directory Services

You can now use SAS Integration Technologies with Version 3 LDAP servers. (Prior support was based on LDAP Version 2.)

Distributed Objects

- The Integrated Object Model (IOM) interfaces now support versioning. This enables your client applications to query the server to determine what features it supports.
- Release 8.1 added support for using the VisiBroker CORBA ORB on NT servers. In Release 8.2, support for using the IONA Orbix 2000 ORB on NT servers has been added.
- Workspace pooling for Windows clients enables you to share a pool of server workspaces (serially) among multiple clients. This is particularly useful in three-tier deployments like those that use Active Server Pages (ASP).
- Enhancements to the Java Workspace Factory make it easier for you to use the Workspace Pooling feature in your Java clients. In this release, the functions of the WorkspacePoolDriver have been integrated into the Java Workspace Factory. In addition, an LDAP server is no longer required in order to use the Java Workspace Pooling feature.

Message Queuing

- Release 8.1 introduced a set of SAS CALL routines for configuring and accessing message queues on systems that use Geneva Message Queuing (GMQ) software from Level 8 Systems. In Release 8.1, this feature was experimental. In Release 8.2, it is fully supported.
- You can now use the SAS Common Messaging Interface in your SAS applications to access message queues on systems that are running TIBCO TIB/Rendezvous message queuing software.

Enhancements to SAS Package Retriever

New WebDAV Delivery Type

- Web Distributed Authoring and Versioning (WebDAV) is an emerging industry standard that is based on extensions to HTTP 1.1. It enables package publishers, programmers, and package consumers to collaborate on the development of files and collections of files on remote Web servers. It also enables consumers to retrieve packages that have been delivered to a WebDAV-compliant server.
- In order to retrieve a package or a package entry from a secured WebDAV-compliant server, a package consumer must supply an HTTP user ID and an HTTP password.

Additional Properties for the HTML Package Entry Type

- An HTML file package entry can now reference additional HTML files for inclusion in an HTML file package entry. The additional files are called companion files. The Companion File option enables you to retrieve companion files and to specify the output location.
- An HTML file package entry can now be delivered with a property for Character-Set Encoding. When you retrieve the package entry, you can either accept the specified encoding, or you can specify your own encoding value. Encoding is necessary only when the host architectures of the publishing host and the retrieving host are incompatible.

Enhancements to SAS Publisher

New WebDAV Delivery Type

- Web Distributed Authoring and Versioning (WebDAV) is an emerging industry standard that is based on extensions to HTTP 1.1. It enables package publishers, programmers, and package retrievers to collaborate on the development of files and collections of files on remote Web servers. It also enables publishers to publish packages for delivery to a Web-compliant server.
- With the WebDAV delivery type, you can specify several advanced properties. For example, you can specify a collection URL or a parent URL as the storage location for the published package. If you are publishing to a secured server, you must specify an HTTP user ID and an HTTP password. You can specify one or multiple namespaces, or contexts, on a server to which you publish the package. Finally, you can specify a template that contains formatting directives for rendering a specific view of a published package.

FTP and HTTP User ID and Password Properties Support Package Delivery

When you publish packages, you can now include the user ID and password properties that are appropriate to the protocol (FTP or HTTP) for delivery to these delivery types:

- archive
- WebDAV-compliant server
- SAS channel that delivers an archive package by e-mail
- archive package that is published to e-mail
- archive package that is published to a message queue.

Publishers need a user ID and a password in order to publish to a secured server. In addition to the user ID and password attributes, other advanced attributes can be selected to specify package delivery to the WebDAV and e-mail delivery types.

Additional Properties for the E-mail Delivery Type

- Besides rendering package views in HTML format, the viewer processing facility can now render views in text format. A text-formatted view might be necessary if the destination e-mail program does not support the HTML MIME type.
- The package publisher can now pass Reply To and From values to the package recipient's e-mail program. The Reply To value enables recipients to return an e-mail message to the package sender, or package publisher, or to some other designated e-mail address. The From value specifies the e-mail address of the package publisher.
- The e-mail delivery type now supports the specification of an e-mail address list that can be derived from a SAS data set according to a specific variable. SAS options can be specified for opening a data set.

Additional Properties for the ODS Package Entry Type

- An ODS-generated package entry can now reference additional HTML files for inclusion in an ODS package entry. Companion files are typically HTML files and are not ODS-generated files.
- A package publisher can now assign a character-set encoding property to an ODS package entry. The encoding is applied when the package is retrieved. The encoding property is necessary only when the host architectures of the publishing host and the retrieving host are incompatible.

URL Package Entry Type Supports Relative URL Specification

In addition to explicitly specifying the appropriate URL prefix type (http://, ftp://, or file:///), you can now specify a URL that is relative to a base URL. For example, if the base URL is www.mycorp.com, then the relative URL ./news/article.html locates article.html in the subdirectory news, which is relative to the base URL.

Data Set Entry Type Supports Data Set Options

SAS options can now be specified for a data set that is being included in a package. The PW= option, which enables package consumers to access a read-protected SAS file when they retrieve a package, might be especially useful.

For Additional Information

For more information about these features, please see the Enterprise Integration Community Web site at **`www.sas.com/rnd/eai/`**.

CHAPTER
21

SAS/IntrNet Software

Application Dispatcher **63**
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Application Dispatcher

- Improved administration interface

  When you access the Application Broker URL using no parameters, a default administration page appears in your browser. This page gives you access to administration information, SAS/IntrNet samples, and SAS/IntrNet documentation. Also, additional usage statistics are now available from a Load Manager statistics report.

- Support for new catalog entry types

  The replay program feature and the automatic HTTP header generation feature of Application Dispatcher now support several Web-related catalog entry types. These new types include CSS, CSV, PDF, RTF, WML, and XML.

- Support for additional output destinations

  The automatic HTTP header generation feature now recognizes most of the Output Delivery System (ODS) output destinations and generates appropriate default Content-type headers. Supported output destinations include HTML, CSV, PDF, POSTSCRIPT, RTF, WML, and XML.

- Support for Application Server and Load Manager as Windows NT services

  The Application Server and the Load Manager can now be installed as Windows NT services. This enables you to automatically invoke Application Dispatcher at system boot time on a Windows NT server.

- Improved tools for configuring Application Dispatcher services

  The inetcfg utility now generates shared configuration files for all servers in a service. On some hosts, the inetcfg utility generates sample configuration information for the broker.cfg file.

- Improved Load Manager scheduling

  Load Manager scheduling for Web applications that use sessions has been improved.

- Customized handling of expired and invalid sessions

A user exit for expired and invalid sessions is now available. You can customize the handling of expired sessions to enable users to re-authenticate and restart a Web application.

- Improved Application Dispatcher samples

  Improved Application Dispatcher samples demonstrate many features of ODS, including generating multiple output formats, building drill-down links into an application, and generating graphical output with the GIF, JAVA, and ACTIVEX drivers.

Java Tool

Version 2.5 of the Java Tools package is now available.

MDDB Report Viewer

The MDDB Report Viewer now supports all of the features of the SAS/EIS Software Access Control system. For more information, see the *SAS/EIS Software Administrator's Guide*.

New Tool: SAS Design-Time Controls

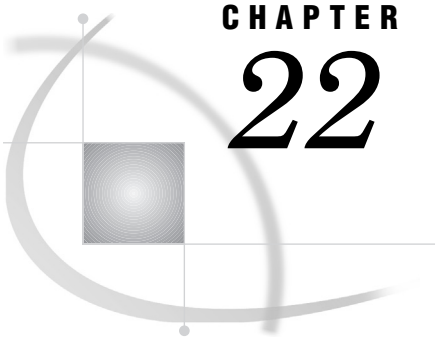
SAS Design-Time Controls are now available for building SAS/IntrNet Web applications. With SAS Design-Time Controls, you can use a WYSIWYG editor on your Windows desktop system to create Web pages that access the power of SAS/IntrNet software.

Xplore Sample Application

Xplore supports new catalog entry types. These new types include CSS, CSV, PDF, RTF, WML, and XML.

For Additional Information

For more information about SAS/IntrNet software and its components, see the SAS/IntrNet Web site at **`www.sas.com/rnd/web/intrnet/`**.



CHAPTER

22

SAS/MDDB Server Software

New Methods for the MDDB_M Class **65**
Enhanced Method for the MDDB_M Class **65**

New Methods for the MDDB_M Class

The MDDB_M class supports the following new methods:

- _GET_ORIGINAL_UNFORMATTED_CLASS_VALUES_ returns the unformatted class values, if any, from the MDDB. The unformatted class values are listed in the order in which they were originally stored on the MDDB. Optionally, the method also returns the formatted class values list, so that the correlation between the unformatted and formatted class values can be determined.
- _GET_CLASS_STORED_STATUS_ retrieves the stored format status for the classifier values. If the classifier stores both the unformatted and formatted values, then the method returns a 1. If the classifier stores only the formatted values, then the method returns a 0.

Enhanced Method for the MDDB_M Class

The MDDB_M class contains the following updated method:

- _MAKE_TABLE_ creates a subtable from the main MDDB table. The NUNIQUE list can contain named items for each classifier that is specified. In Release 8.2, each named item corresponds to the name of the analysis variable that is based on the classifier. In previous releases, the name of the analysis variable was generated by SAS. If the named item is omitted from the NUNIQUE list, then SAS creates a name that is compatible with previous releases. The named items on an NUNIQUE list must be unique.

CHAPTER

23

SAS OLAP Server Software

Support for Multiple Environments **67**
Experimental User Interface for Building MDDBs **67**
Activating Access Control **67**

Support for Multiple Environments

The SAS OLAP Server is now available in the Windows NT and UNIX environments, in addition to the previously supported OS/390 environment. You can now use the SAS OLAP Server in these operating environments to

- create MDDBs using PROC MDDB
- register OLAP metadata
- define and register HOLAP (multidimensional data provider or MDP) data groups
- create access control definitions
- use model coordination to synchronize multiple EIS viewers, which are displayed side by side on the screen or in an Application Screen Builder object
- surface MDDBs and HOLAP data groups using the Open OLAP Server.

Experimental User Interface for Building MDDBs

A new experimental user interface guides you through the steps of building an MDDB and registering it in a repository. Optionally, you can create crossings for the MDDB.

Enter **`af c=sashelp.eissrv.startmd.scl`** on the command line to start the interface.

Activating Access Control

If you used access control for your SAS OLAP Server environment in a previous release, be sure to activate it for this release, as well. Follow the steps described in the *SAS OLAP Server Administrator's Guide* to activate access control and to point it to the location of your existing access control files.

CHAPTER

24

SAS/OR Software

BOM Procedure **69**
CPM Procedure **69**
GANTT Procedure **69**
INTPOINT Procedure **70**
PM Procedure **70**
For Additional Information **70**

BOM Procedure

The new BOM procedure performs bill-of-material processing. It composes a series of single-level bills of material into a multilevel, tree-structured bill of material, determines the level of each part in the bill, and represents the multilevel bill-of-material structure in the form of an indented bill of material. PROC BOM can also output a summarized bill of material.

CPM Procedure

- The SETFINISHMILESTONE option has been added to the CPM procedure statement to enable you to specify that milestones (zero duration activities) should have the same start and finish times as the finish time of their predecessor. In other words, this option enables milestones that mark the *end* of the preceding activity to coincide with its finish time.
- The FIXASTART option has been added to the ACTUAL statement to enable you to request that the actual start and finish times of an activity should be left unchanged even if they coincide with a non-working time. Thus, if the actual start time is specified to be sometime on Sunday, it is left unchanged even if Sunday is a non-working day in the activity's calendar.

GANTT Procedure

- The milestone color specifications have been made more flexible. The milestone colors are now determined using the same rules as for schedule bars, and consequently, they can also be set individually.
- The WEB= variable enables you to define an HTML reference for each activity. In the past the URL was only associated with the schedule bars for the activity. This association has now been extended to include milestones and ID variables.

INTPOINT Procedure

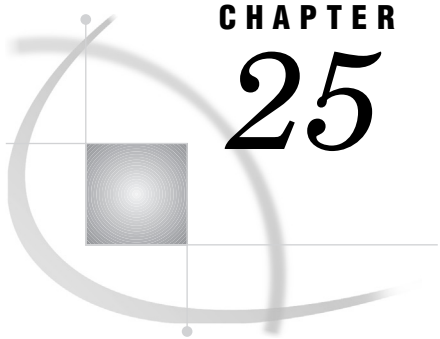
The new INTPOINT procedure performs optimization using the Interior Point algorithm. This is the same Interior Point algorithm used by the NETFLOW procedure to solve Linear Programming problems and Network problems. In the future, PROC INTPOINT will exploit parallel processing.

PM Procedure

- MP2KTOPM is a new SAS macro that converts Microsoft Project 2000 data saved in MDB format to a form that is readable by the PM procedure. The converted data can also be read by the CPM procedure.
- The new options added to the CPM procedure are also available with PROC PM.

For Additional Information

For more information about the features described here, see *SAS/OR Software: Changes and Enhancements, Release 8.2*.



CHAPTER

25

SAS/QC Software

CAPABILITY Procedure **71**
RELIABILITY Procedure **71**
SHEWHART Procedure **72**
For Additional Information **73**

CAPABILITY Procedure

- The BARLABEL= option on the HISTOGRAM and COMPHISTOGRAM statements displays labels above histogram bars.
- The CLIPSPEC= option on the HISTOGRAM and COMPHISTOGRAM statements clips histogram bars at the upper and lower specification limit lines when there are no observations outside the specification limits.
- The CTEXTSIDE= option on the COMPHISTOGRAM statement specifies the color of row labels.
- The CTEXTTOP= option on the COMPHISTOGRAM statement specifies the color of column labels.
- The ENDPOINTS= option on the HISTOGRAM and COMPHISTOGRAM statements specifies histogram interval boundary values and causes the boundaries, rather than interval midpoints, to be labeled.
- The NENDPOINTS= option on the HISTOGRAM statement specifies the number of histogram interval boundaries and causes the boundaries, rather than interval midpoints, to be labeled.
- The NMIDPOINTS= option on the HISTOGRAM statement specifies the number of histogram intervals.

RELIABILITY Procedure

- The LOGSCALE statement enables the logarithm of the distribution scale parameter to be modeled as a function of explanatory variables.
- The PLOTSYMBOL= option enables symbols to represent events in a MCF plot.
- The PLOTCOLOR= option, within the MCFPLOT statement, enables the specification of symbol colors in a MCF plot.
- The logistic function has been added as an optional transformation of the independent variable in a regression model for the RELATION= option within the MODEL and RELATIONPLOT statements.
- The CFIT= option, within the PROBPLOT and RELATIONPLOT statements, has been enhanced to allow for multiple colors of fit lines.

- The LFIT= option, within the PROBPLOT and RELATIONPLOT statements, enables the specification of line styles for fit lines and confidence curves in a probability plot.
- The NOPPOS option, within the PROBPLOT and RELATIONPLOT statements, suppresses the plotting of symbols for failures.
- The NPINTERVALS= option, within the PROBPLOT statement, enables the specification of the type of nonparametric confidence interval displayed in a probability plot.
- The PINTERVALS= option, within the PROBPLOT and RELATIONPLOT statements, enables the specification of the type of parametric pointwise confidence interval displayed.
- The PPOSSYMBOL= option, within the PROBPLOT statement, enables symbols to represent failures on a probability plot.
- The PPOSCOLOR= option, within the PROBPLOT statement, enables the specification of colors of symbols representing failures on a probability plot.
- The SHOWMULTIPLES option, within the PROBPLOT and RELATIONPLOT statements, displays the count for multiple overlaying symbols.
- The CPLOTFIT= option, within the RELATIONPLOT statement, enables the specification of colors for percentile lines.
- The FITTYPE= option, within the RELATIONPLOT statement, specifies the method of estimating distribution parameters.
- The LPLOTFIT= option, within the RELATIONPLOT statement, enables the specification of line styles for percentile lines.
- The RCENCOLOR= option, within the RELATIONPLOT statement, enables the specification of colors for the symbols representing uncensored, right censored, and left censored observations in a relation plot.
- The RCENSYMBOL= option, within the RELATIONPLOT statement, enables symbols to represent right censored and left censored observations in a relation plot.

SHEWHART Procedure

- The OVERLAY= option specifies variables to be plotted as overlays on the primary control chart.
- The COVERLAY= option specifies the colors used to plot overlay variables on the primary chart.
- The CCOVERLAY= option specifies colors for the line segments connecting points on primary chart overlays.
- The LOVERLAY= option specifies line types for the line segments connecting points on primary chart overlays.
- The OVERLAYHTML= option specifies uniform resource locators (URLs) to be associated with points on primary chart overlays.
- The OVERLAYSYM= option specifies symbols used to plot overlays on the primary chart.
- The OVERLAYSYMHT= option specifies the heights of symbols used to plot overlays on the primary chart.
- The WOVERLAY= option specifies the widths in pixels of the line segments connecting points on primary chart overlays.
- The OVERLAY2= option specifies variables to be plotted as overlays on a secondary control chart.

- The COVERLAY2= option specifies the colors used to plot overlay variables on the secondary chart.
- The CCOVERLAY2= option specifies colors for the line segments connecting points on secondary chart overlays.
- The LOVERLAY2= option specifies line types for the line segments connecting points on secondary chart overlays.
- The OVERLAY2HTML= option specifies URLs to be associated with points on secondary chart overlays.
- The OVERLAY2SYM= option specifies symbols used to plot overlays on the secondary chart.
- The OVERLAY2SYMHT= option specifies the heights of symbols used to plot overlays on the secondary chart.
- The WOVERLAY2= option specifies the widths in pixels of the line segments connecting points on secondary chart overlays.
- The OVERLAYLEGLAB= option specifies the label displayed to the left of the overlay legend.
- The COVERLAYCLIP= option specifies the color used to plot clipped values on overlay plots.
- The OVERLAYCLIPSYM= option specifies the symbol used to plot clipped values on overlay plots.
- The OVERLAYCLIPSYMHT= option specifies the height of the symbol used to plot clipped values on overlay plots.
- The NOOVERLAYLEGEND option suppresses the legend for overlay plots.

For Additional Information

For more information about the features described here, see *SAS/QC Software: Changes and Enhancements, Release 8.2*.

CHAPTER
26
SAS/SHARE Software

Services Support **75**

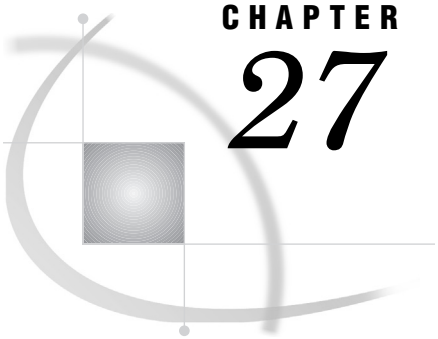
Services Support

SAS/SHARE servers are now implemented as *services*. This means that they can now respond to system requests such as start and stop commands from the host operating system.

For example, in Windows NT and Windows 2000 environments, you can configure a SAS/SHARE server as a Windows service that starts automatically when the operating system is started. You can also start, stop, and restart your SAS/SHARE server using the Windows Service Control Manager.

Note: In order to configure your SAS/SHARE server as a Windows service, you must run the SAS Service Configuration Utility (SSCU). The SSCU is shipped with Base SAS software for Windows. On Windows, more instructions are available in *Configuring a SAS/SHARE Server as a Windows Service* from the table of contents in SAS/SHARE Help.

In an OS/390 operating environment, the SAS/SHARE server also now responds to console STOP commands. This means that you no longer have to use the PROC OPERATE procedure to terminate a SAS/SHARE server.



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SAS/STAT Software

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BOXPLOT Procedure

The BOXPLOT procedure supports several new options in the PLOT statement. These options enable you to overlay plots of additional variables on a box plot and to create links in a plot when graphics output is directed into HTML.

- The HTML= option specifies uniform resource locators (URLs) to be associated with box-and-whisker plots.
- The COVERLAY= option specifies the colors used to plot overlay variables.
- The CCOVERLAY= option specifies colors for the line segments connecting points on overlays.
- The LOVERLAY= option specifies line types for the line segments connecting points on overlays.
- The NOOVERLAYLEGEND option suppresses the legend for overlay plots.
- The OVERLAY= option specifies variables to be plotted as overlays on a box plot.
- The OVERLAYHTML= option specifies URLs to be associated with points on overlays.
- The OVERLAYLEGLAB= option specifies the label displayed to the left of the overlay legend.
- The OVERLAYSYM= option specifies symbols used to plot points on overlays.

- The OVERLAYSYMHT= option specifies the heights of symbols used to plot points on overlays.
- The WOVERLAY= option specifies the widths in pixels of the line segments connecting points on overlays.

CATMOD Procedure

You can now produce Wald confidence limits for the parameter estimates with the CLPARM option in the MODEL statement; the ALPHA= option enables you to set the significance level.

FACTOR Procedure

The FLAG=, FUZZ=, and ROUND options are restored and function as they did previously. However, when standard errors or confidence intervals are also requested, these options will have no effect.

FREQ Procedure

The new POINT option in the EXACT statement provides point probabilities for the exact test statistics. In the TABLES statement, there is now a LEVEL= suboption for the BINOMIAL option. The LEVEL= option specifies the variable level for the binomial proportion for one-way tables. The new BINOMIALC option requests the BINOMIAL option statistics, but includes a continuity correction in the asymptotic confidence limits and the asymptotic test. Similarly, the RISKDIFFC option requests the RISKDIFF} option statistics, but includes a continuity correction in the asymptotic confidence limits.

GAM Procedure

The GAM procedure, experimental in Release 8.1, is production in Release 8.2 and includes the following new features:

- In the MODEL statement, a local regression smoother (LOESS) is provided for univariate smoothing.
- Several new distributions are available with the DIST= option in the MODEL statement. These include the gamma, Poisson, and binomial distributions.
- The MAXITER=, MAXITSCORE=, EPSILON=, and EPSSCORE= options are provided for users to control the convergence of the backfitting algorithm and local score algorithm.
- In the OUTPUT statement, the keywords PRED and ADIAG, UCLM, LCLM, RESID, STD, and ALL have been added. They request upper and lower component-wise confidence limits, residual, standard deviation, or all of them to be put into the output data set.
- Multiple SCORE statements are now supported so that users can make predications on multiple data sets.

LIFEREG Procedure

- The MODEL statement now enables you to specify interaction terms among any of the specified explanatory variables. Because of the more complicated models that you can specify, you can only use a single MODEL statement in each PROC LIFEREG invocation.
- The new PROBPLOT statement enables you to construct probability plots for complete or censored data. You can display the fitted distribution and confidence intervals along with nonparametric estimates of the CDF on the probability plots. In addition, you can control graphical features such as plot layout, colors, plotting symbols, line styles, and the text fonts used in the probability plot.
- You can now include models that contain variables listed in the CLASS statement in the OUTEST= data set.
- You can now obtain standardized and Cox-Snell residuals in the OUTPUT= data set.

LOGISTIC Procedure

- You can now fit a generalized logit model (Agresti, 1990) when you have nominal response data. In this multiple-group logit model, each nonreference response category is contrasted against the reference category. This model reduces to the binary logit model when there are only two response categories. Unlike the cumulative logit model (for ordinal response data) that contains one set of slope parameters for the entire model, the generalized logit model contains a set of slope parameters for each response category other than the prespecified reference category.

  The generalized logit model is specified by the MODEL statement option LINK= GLOGIT. You can choose a response category as the reference in forming the various logit functions. The default is to use the last response category as the reference.
- Options specific to the response variable can be specified immediately after the response variable in the MODEL statement by enclosing them in a pair of parentheses. These response variable options include the EVENT= option for specifying the event category for the binary response model, the REFERENCE= option for specifying the reference category, the ORDER= option for specifying the order of the response categories, and the DESCENDING option for reversing the order of the response categories.
- For an exact conditional analysis, the new EXACTOPTIONS option NOSORT processes your data without resorting. This enables you to input your data in an order that you think may speed up computations.

LOESS Procedure

The SELECT= option in the MODEL statement now enables you to specify one of three degree of freedom criteria and an associated target value. The model that is selected is the model whose specified degree of freedom criterion is the closest to the specified target value.

MI Procedure

Multiple imputation is a strategy for dealing with data sets with missing values. You replace each missing value with a set of plausible values that represent the uncertainty about the right value to impute. You create multiply imputed data sets, analyze them with standard analyses, and then combine the results. You produce valid statistical inferences that properly reflect the uncertainty due to the missing values.

The MI procedure creates multiple imputed data sets for incomplete p-dimensional multivariate data. It offers three methods for creating the imputed data sets: the regression method, the propensity score method, and the Markov Chain Monte Carlo (MCMC) method. The procedure creates an output data set containing m imputed versions of the original data. In each version, the missing values are replaced with imputed values. For the MCMC method, you can specify whether you want a single chain for all m imputations or a separate chain for each imputation. You can also specify the initial estimates for the MCMC method. After analyzing your imputed data with standard procedures, you use the MIANALYZE procedure to combine the results.

The MI procedure was introduced in Release 8.1 and remains experimental in Release 8.2, with various new options and output displays available. Among others, a new TRANSFORM statement enables you to transform variables before imputation and back-transform these variables before combining inferences and creating output data sets.

MIANALYZE Procedure

The MIANALYZE procedure combines the results of the analyses of m imputations and generates valid statistical inferences. The procedure uses as input either a specially structured SAS data set that contains the parameter estimates and associated covariance matrix from each imputed data set or a pair of specially structured SAS data sets that contain the parameter estimates and covariance matrices of the parameter estimates, respectively.

The MIANALYZE procedure was introduced in Release 8.1 and remains an experimental procedure in Release 8.2.

NPAR1WAY Procedure

The new KS option in the EXACT statement provides the exact Kolmogorov-Smirnov two-sample test. Also, the new POINT option in the EXACT statement provides point probabilities for the exact test statistics.

PROBIT Procedure

- The MODEL statement now enables you to specify interaction terms among any of the specified explanatory variables. Because of the more complicated models that you can specify, you can only use a single MODEL statement in each PROC PROBIT invocation.
- You can now graphically display results of model parameter estimation. For binary data analysis, you can construct plots of predicted probabilities, inverse predicted

probabilities, and cumulative probabilities. For ordinal multinomial models, you can display plots of predicted probabilities, linear predictors, and cumulative probabilities. In addition, you can control graphical features such as plot layout, colors, plotting symbols, line styles, and the text fonts used in the plots.

- You can now include models that contain variables listed in the CLASS statement and ordinal response multinomial models in the OUTEST= data set.

REG Procedure

The SCORR1 and SCORR2 options in the MODEL statement now enable you to specify TEST and SEQTEST options that request F-tests, *p*-values, and cumulative R-Square values as variables are sequentially added to a model.

SURVEYMEANS Procedure

The RATIO statement requests ratio analysis for means or proportions of analysis variables. A ratio statement names the variables whose means will be used as numerators or denominators in a ratio. There can be any number of analysis variables, either continuous or categorical, in the input data set.

TRANSREG Procedure

The MODEL statement now enables you to specify Box-Cox (1964) transformations of the dependent variables. You can specify a list of power parameters using the LAMBDA= transformation option. The procedure chooses the optimal power parameter using a maximum likelihood criterion (Draper and Smith, 1981). The output contains a table of power parameters, log likelihood, and a confidence interval.

References

Agresti, A. (1990), "Categorical Data Analysis," New York: John Wiley & Sons, Inc.

Box, G.E.P. and Cox, D.R. (1964), "An Analysis of Transformations," *Journal of the Royal Statistics Society*, B-26, 211-252.

Draper, N.R. and Smith, H. (1981), *Applied Regression Analysis*, Second Edition, New York: John Wiley & Sons, Inc.

For Additional Information

For more information about these features, see *SAS/STAT Software: Changes and Enhancements, Release 8.2*.

CHAPTER

28

SAS/Warehouse Administrator Software

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Metadata API Enhancements

You can use the SAS/Warehouse Administrator metadata API to add, update , and delete process objects. For example, you can write a metadata API program that creates a data store and also creates all of the processes that are required to extract, transform, and load information into that data store.

For details about this feature and other new API features in this release, see *SAS/Warehouse Administrator Metadata API Reference, Release 2.2*. You can download a PDF version of this manual from the SAS Web site. To download this manual:

1. Display the SAS Web page at www.sas.com.
2. Select **Service and Support**, then **Online Documentation.**
3. From the Product-Specific Documentation window, select **SAS/Warehouse Administrator.**
4. From the page that is displayed, download *SAS/Warehouse Administrator Metadata API Reference, Release 2.2*.

LDAP Security Interface Enhancements

The LDAP security interface, which was experimental in Release 8.1 but is fully supported in Release 8.2, enables you to define a security hierarchy for the data stores in a Data Warehouse. This hierarchy can be used to control access to warehouse data stores in much the same way that an operating system uses access control lists (ACLs) to control access to files. New features in this release include:

- the ability to control access to OLAP Groups, OLAP Tables, and OLAP MDDBs
- the ability to control access to a SAS/EIS metabase that contains metadata that was exported from SAS/Warehouse Administrator. This enables LDAP applications to access warehouse data through SAS/EIS.

Closer Integration with Enterprise Reporter

It is now easier to use Enterprise Reporter to generate reports on groups and data stores that you have selected in the SAS/Warehouse Administrator Explorer. The following menu options are available from the Explorer:

- **Documenting the Data Warehouse** — exports metadata for the current Data Warehouse, as well as the metadata for all ODD Groups in the current Warehouse Environment. The exported metadata is in a form that is optimized for reporting in Enterprise Reporter.

  To use this feature, open a Warehouse Environment in the SAS/Warehouse Administrator Explorer and select a group or data store in the Environment. Go to the SAS menu bar and select **Tools**, then **Documenting the Data Warehouse**. The Documenting the Data Warehouse window appears. For details about that window, click its Help button.

  If Enterprise Reporter software is installed locally, you are given the option of creating an InfoFolder for the exported metadata.

- **Open in Enterprise Reporter** — reads the metadata for the selected data store into Enterprise Reporter. Use this option to create ad hoc reports about data stores. You will not see this option unless Enterprise Reporter software is installed locally. To use this feature, right-click a data store and select **Data Utilities**, then **Open in Enterprise Reporter**. The main Enterprise Reporter window appears.

OLAP Data Store Enhancements

The code that SAS/Warehouse Administrator generates for OLAP Table Load Steps is now more efficient.

- Level 2.0 code generation can now take advantage of recent PROC SUMMARY enhancements to maximize performance for OLAP Tables with multiple crossings. You can specify different sort orders for each class variable. To specify more than 32 class columns in an OLAP Table, use character _TYPE_ columns (instead of numeric _TYPE_ columns, which can support a maximum of 32 class columns).
- The Load Options tab for Load Steps has a new option for OLAP Tables: **Single Pass Summarization**. Use this option to either maximize performance or minimize memory use.

  To maximize performance. If the Load Step for an OLAP Table is generated by SAS/Warehouse Administrator, and the **Single Pass Summarization** option is set to **Yes**, data for all crossings is produced by a single PROC SUMMARY step.

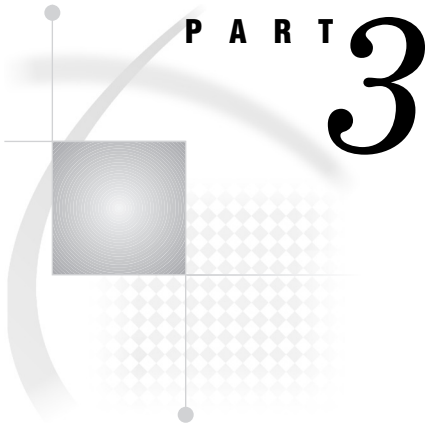
  To minimize memory use. If the Load Step for an OLAP Table is generated by SAS/Warehouse Administrator, and if the **Single Pass Summarization** option is set to **No**, data for each crossing is produced by a separate PROC SUMMARY step.
- On the Columns tab of the OLAP Table Properties window, you can now assign a role of _FREQ_ to an OLAP Table column. For an OLAP Table, a _FREQ_ column gives the number of observations (whether any column values are missing or not) for each crossing and combination of class column values.

Process Library Enhancements

You can now register a Process Library routine as a Post-Load Step. Previously, you could register these routines only as Load Steps.

Getting Started Tutorial

The *Getting Started with SAS / Warehouse Administrator* tutorial is now available from the SAS/Warehouse Administrator desktop. To access the tutorial, select its icon from the desktop.

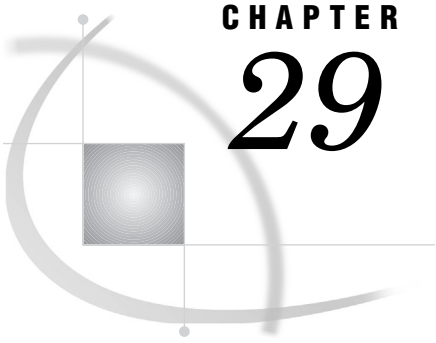


PART 3

New Products

Chapter **29** . . . . . **SAS/ACCESS Interface to PeopleSoft** *89*

Chapter **30** . . . . . **SAS Data Quality - Cleanse Software** *91*



CHAPTER

29

SAS/ACCESS Interface to PeopleSoft

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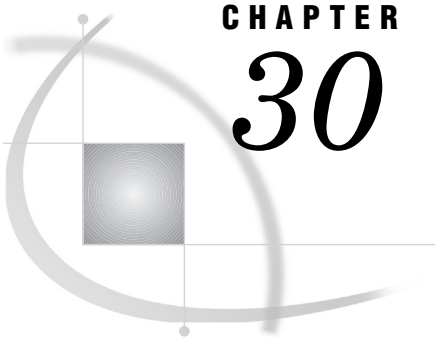
Overview

The new SAS/ACCESS interface to PeopleSoft enables you to extract, browse, and search PeopleSoft metadata. You can query the extracted PeopleSoft metadata to generate views of the PeopleSoft data and save these views as SAS data files and SAS views. You can also save the code that was used to build the query as SAS source code.

For Additional Information

For more information about these features, invoke the SAS/ACCESS interface to PeopleSoft and use the Help buttons on the windows to display the appropriate Help topic.



CHAPTER

30

SAS Data Quality - Cleanse Software

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SAS Data Quality – Cleanse Features **91**

Overview

SAS Data Quality – Cleanse software enables you to analyze, cleanse, and standardize your data. This enhances the value of your data by reducing duplication and by increasing accuracy and usability. For example, the STATE variable might contain several variations for West Virginia (such as WV, W.V., and W. Virginia). This makes it difficult to construct a query based on the STATE variable that will yield accurate results. You can use SAS Data Quality – Cleanse software's specialized clustering algorithm for state names and abbreviations to group these variations together. Then you can transform the data to conform to a preferred, or standard, form of the state name.

SAS Data Quality – Cleanse Features

- The MATCH procedure enables you to analyze a SAS data set to identify the variations of data that occur for a specified variable and to match similar observations based on criteria that you specify.
- The SCHEME procedure enables you to build standardization schemes from your data and to use those schemes to transform your data.
- The SAS Data Quality – Cleanse functions and CALL routines enable you to perform a wide variety of data analysis, cleansing, and standardization tasks on your data. For example, they enable you to analyze and parse input data and to return standardized values for data such as names and addresses. They also enable you to standardize the capitalization of data values and to determine whether a particular character value represents an individual or an organization.

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