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What's New in SAS[®] 9.2



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What's New in SAS® 9.2

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About This Book

What's New in SAS 9.2 gives you a quick, convenient overview of new functionality, enhanced features, and new products that you might use in SAS 9.2. This document is a compilation of all the What's New topics for products that ship with a SAS release. It also contains What's New topics for several SAS products that ship on top of SAS 9.2. This document does not contain What's New topics for SAS products that have secure documentation. For more information about those SAS products, contact your SAS consultant.

The What's New documentation is cumulative and is updated whenever there is an update of a SAS product, so you should review the What's New topics for your products whenever you receive a product update. In general, the What's New topic for each product contains all of the features and enhancements in the SAS 9.2 release. For example, the "What's New in SAS 9.2 Procedures" topic contains features and enhancements for SAS 9.2, the second maintenance release for SAS 9.2, and the third maintenance release for SAS 9.2. Features and enhancements that were part of a maintenance release are clearly labeled. (For more information about maintenance releases, see <http://support.sas.com/software/maintenance/index.html>.)

Some SAS products (such as SAS Enterprise Miner) use their own product release numbers. For these products, What's New topics for all product releases that shipped on top of SAS 9.2 are included in **What's New in SAS 9.2**. For example, this document contains the What's New topics for SAS Enterprise Miner 6.1 and the SAS Enterprise Miner 6.1 maintenance release.

All of the What's New topics in **What's New in SAS 9.2** are also available in the product documentation. For example, the "What's New for SAS Language Reference" topic is available in the **SAS Language Dictionary**. For more information about a specific new feature or enhancement, see the product documentation in the following locations:

- the product documentation pages at <http://support.sas.com/documentation>
- SAS OnlineDoc
- the Help that is available within the product

Note: Your site might not license all of the products that are listed in the What's New. Therefore, you might not be able to access the Help for all SAS products.

To view the What's New documentation for previous releases of SAS, see <http://support.sas.com/documentation/whatsnew>.

New Products in SAS 9.2: SAS Analytics Accelerator 1.2 for Teradata

SAS Analytics Accelerator 1.2 for Teradata enables in-database processing for a set of core functions with the goals of reducing data movement between the SAS System and the database and taking advantage of database processing power. The set of core functions includes SAS procedures from the following products:

- SAS/STAT in-database versions of the CANCELL, FACTOR, PRINCOMP, REG, SCORE, and VARCLUS procedures
- Base SAS in-database version of the CORR procedure
- SAS/ETS in-database version of the TIMESERIES procedure
- SAS Enterprise Miner in-database versions of the DMDB, DMINE, and DMREG procedures plus an in-database sampling macro

Each procedure has been modified to perform critical functions inside the database. Each procedure generates SQL code—some of which depends on proprietary SAS functions that are installed in the database. The procedure syntax and output for in-database processing is identical to the syntax and output for conventional SAS processing in most cases. In those cases, existing procedure steps in SAS programs can run in-database without modification.

These in-database procedures do not support the full set of options available in the SAS System. Together with the in-database Base SAS procedures, they can be used for a variety of analytics tasks, including data aggregation and summarization, dimension reduction, and linear and logistic model building and scoring.

SAS Analytics Accelerator 1.2 for Teradata is a separate product that requires the SAS/ACCESS Interface to Teradata in addition to the respective underlying SAS analytics product and its prerequisites. SAS Analytics Accelerator 1.2 for Teradata also requires Teradata 13 with Global and Persistent Memory (GLOP) feature support (consult Teradata Support for the specific database version).

The ***SAS Analytics Accelerator for Teradata: Guide*** provides information about the use of the SAS Analytics Accelerator for Teradata. The user's guide in PDF format is located at <http://support.sas.com/documentation/onlinedoc/analyticsaccel/index.html>.

For more information about the current release, see [What's New in SAS Analytics Accelerator 1.2 for Teradata](#).

New Products in SAS 9.2: SAS Data Surveyor for Clickstream Data

SAS Data Surveyor for Clickstream Data is new for SAS 9.2. This product does the following:

- automates the extraction of useful information from large volumes of clickstream data collected in Web logs
- enables you to use and customize templates for common process flows that are used to cleanse and enrich clickstream data

For more information about the current release, see [What's New in SAS Data Surveyor for Clickstream Data 2.2](#).

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New Products in SAS 9.2: SAS Data Surveyor for Salesforce.com

A new SAS data surveyor is available to access data from the Customer Relationship Management (CRM) software vendor Salesforce.com.

The new SAS data surveyor for Salesforce.com and certain current SAS data surveyors operate in a new way in SAS 9.2.

SAS has partnered with Composite Software, Inc. to provide customers with access to data from CRM and Enterprise Resource Planning (ERP) system software vendors. The following SAS data surveyors have the new functionality:

- SAS Data Surveyor for Salesforce.com 4.6
- SAS Data Surveyor for Oracle Applications 4.6
- SAS Data Surveyor for PeopleSoft 4.6
- SAS Data Surveyor for Siebel 4.6

Composite Software provides the Composite Information Server and Application Data Services that customize the Composite Information Server's access to the ERP or CRM data source.

For more information, see the following documentation:

- Composite Software documentation for information about the Application Data Services and Information Server
- Chapter 2, "Connecting to Common Data Sources" in **SAS 9.2 Intelligence Platform: Data Administration Guide** for a detailed example using data from Salesforce.com; see <http://support.sas.com/92administration>

SAS Data Surveyor for SAP 4.3 is enhanced in SAS 9.2, but SAP data is not accessed through Composite Software.

New Products in SAS 9.2: SAS/GRAPH ODS Graphics Designer

The third maintenance release for SAS 9.2 includes a production version of SAS/GRAPH ODS Graphics Designer. The ODS Graphics Designer is an interactive graphical application that you can use to create and design custom graphs. Using point-and-click technology, you can create simple or complex graphical views of data for analysis. The ODS Graphics Designer enables you to design sophisticated graphs by using a wide array of plot types. You can design multi-cell graphs, classification panels, and scatter plot matrices. Your graphs can have titles, footnotes, legends, and other graphics elements. You can save the results as an image for inclusion in a report or as an ODS Graphics Designer file (SGD) that you can later edit.

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New Products in SAS 9.2: SAS Rapid Predictive Modeler

SAS Rapid Predictive Modeler is a new feature for users who need to rapidly produce models for common business problems such as promotion response and customer churn. These models can be integrated into standard reporting and production scoring processes on many platforms and databases. The modeling techniques have been designed to produce robust and accurate models in a large number of scenarios.

SAS Rapid Predictive Modeler is highly automated. You must choose one dependent target variable, but all other selections are automated. All data transformations and modeling techniques have been parameterized. Output and reports have been predefined. The model can be registered in the SAS Metadata Server for integration by other products such as SAS Model Manager, SAS Data Integration Studio, SAS Enterprise Guide, the SAS Add-In for Microsoft Office, SAS Enterprise Miner, and many SAS solutions.

SAS Rapid Predictive Modeler appears as a custom task in SAS Enterprise Guide 4.3 or in Microsoft Excel by using the SAS Add-In 4.3 for Microsoft Office. You can find complete usage documentation in those products.

Note: Your license for SAS Enterprise Miner includes SAS Rapid Predictive Modeler and a limited license for the SAS Add-In for Microsoft Office in Microsoft Excel.

Models that you create using SAS Rapid Predictive Modeler can also be opened, modified, and run in SAS Enterprise Miner 6.2.

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New Products in SAS 9.2: SAS Scoring Accelerator for Netezza

SAS Scoring Accelerator for Netezza translates SAS Enterprise Miner models into functions that are specific to Netezza. These functions are registered and can be executed for scoring purposes directly within the Netezza environment. SAS Scoring Accelerator for Netezza is a separate product that works in conjunction with SAS Enterprise Miner.

SAS Scoring Accelerator for Netezza enhances the performance of model scoring, resulting in faster processing of more analytic models. Better-performing models help to ensure the accuracy of the analytic results you are using to make critical business decisions.

SAS Scoring Accelerator for Netezza is specifically for organizations that use SAS Enterprise Miner and have a Netezza database. It is designed for data miners, marketing analysts, risk analysts, fraud investigators, engineers, and scientists who play a major role in solving critical business or research issues.

SAS Scoring Accelerator for Netezza provides the following key benefits:

- higher performance run-times and faster analytical development and processing
- improved discovery and use of critical business information throughout the enterprise
- reduced data movement and network overhead
- more efficient use of decision support infrastructure resources
- increased productivity of business analysts with a solution that enables them to focus more on business issues rather than the mechanics of transforming and scoring data

SAS Scoring Accelerator for Netezza includes these key features:

- Export Utility
 - functions as a plug-in to SAS Enterprise Miner that exports the model scoring logic, including metadata about the required input and output variables.
- Publishing Client
 - automatically translates and publishes the model into C source code for creating the scoring function in Netezza.
 - generates a script of Netezza commands for registering the scoring functions in Netezza. Scoring functions are available to use in any SQL expression wherever Netezza built-in functions are typically used.
 - supports a robust class of SAS Enterprise Miner predictive and descriptive models, including the preliminary transformation layer.

The **SAS Scoring Accelerator for Netezza: User's Guide** provides information on the use of the SAS Scoring Accelerator. The user's guide in PDF format is located at <http://support.sas.com/documentation/onlinedoc/scornet/index.html>.

For more information about the current release, see [What's New in SAS Scoring Accelerator 1.6 for Netezza](#).

New Products in SAS 9.2: SAS Scoring Accelerator for Teradata

SAS Scoring Accelerator for Teradata translates SAS Enterprise Miner models into functions that are specific to Teradata. These functions are registered and can be executed for scoring purposes directly within the Teradata environment. SAS Scoring Accelerator for Teradata is a separate product that works in conjunction with SAS Enterprise Miner.

SAS Scoring Accelerator for Teradata enhances the performance of model scoring, resulting in faster processing of more analytic models. Better-performing models help to ensure the accuracy of the analytic results you are using to make critical business decisions.

SAS Scoring Accelerator for Teradata is specifically for organizations that use SAS Enterprise Miner and have a Teradata database. It is designed for data miners, marketing analysts, risk analysts, fraud investigators, engineers, and scientists who play a major role in solving critical business or research issues.

SAS Scoring Accelerator for Teradata provides the following key benefits:

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- improved discovery and use of critical business information throughout the enterprise
- reduced data movement and network overhead
- more efficient use of decision support infrastructure resources
- increased productivity of business analysts with a solution that enables them to focus more on business issues rather than the mechanics of transforming and scoring data

SAS Scoring Accelerator for Teradata includes these key features:

- Export Utility
 - functions as a plug-in to SAS Enterprise Miner that exports the model scoring logic, including metadata about the required input and output variables.
- Publishing Client
 - automatically translates and publishes the model into C source code for creating the scoring function in Teradata.
 - generates a script of Teradata commands for registering the scoring functions in Teradata. Scoring functions are available to use in any SQL expression wherever Teradata built-in functions are typically used.
 - supports a robust class of SAS Enterprise Miner predictive and descriptive models, including the preliminary transformation layer.

The **SAS Scoring Accelerator for Teradata: User's Guide** provides information on the use of the SAS Scoring Accelerator. The user's guide in PDF format is located at <http://support.sas.com/documentation/onlinedoc/scoraccl/index.html>.

For more information about the current release, see [What's New in SAS Scoring Accelerator 1.7 for Teradata](#).

New Products in SAS 9.2: SAS Web Parts for Microsoft SharePoint

SAS Web Parts for Microsoft SharePoint is a new product for SAS 9.2. Using SAS Web Parts, you can add dynamic SAS dashboards and stored processes directly to your SharePoint site. As a result, your SharePoint site visitors can easily access the power of SAS analytics.

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What's New in Base SAS 9.2: Overview

Additional Information

For more information about new features, see the What's New information for Base SAS in these documents:

- [*Base SAS Guide to Information Maps*](#)
- [*Encryption in SAS*](#)
- [*SAS CDISC Procedure User's Guide*](#)
- [*SAS Companion for OpenVMS on HP Integrity Servers*](#)
- [*SAS Companion for UNIX Environments*](#)
- [*SAS Companion for Windows*](#)
- [*SAS Companion for z/OS*](#)
- [*SAS Language Dictionary: Reference*](#)
- [*SAS Language Interfaces to Metadata*](#)
- [*SAS Logging Facility: Configuration and Programming Reference*](#)
- [*SAS Macro Language Facility*](#)
- [*SAS National Language Support: Reference*](#)
- [*SAS Output Delivery System: User's Guide*](#)
- [*SAS Procedures Guide*](#)
- [*SAS Scalable Performance Data Engine*](#)

The What's New topic in the individual documents provides links to the documentation for the new features.

Supported Operating Environments

SAS 9.2 supports new operating systems and hardware that includes Microsoft Windows x64 editions, Linux on x86-64-based CPUs and Solaris 10x64. Also new for SAS 9.2 is support for OpenVMS on HP Integrity (Itanium) servers. OpenVMS on Integrity servers supports a product set that is similar to what is offered on OpenVMS Alpha systems. SAS 9.2 continues to support key platforms for SAS, including Microsoft Windows 2003/2008 (32-bit) server families, z/OS, Solaris on SPARC, AIX on Power, HP-UX on Itanium and PA-RISC, and Linux 32-bit distributions.

For a list of all operating environments that are supported by SAS 9.2, see <http://support.sas.com/resources/sysreq/hosts/index.html>.

Migration

The MIGRATE procedure now supports more cross-environment migrations to SAS 9.2.

ODS and Output Formatting

ODS (Output Delivery System) packages enable ODS destinations to use the SAS Publishing Framework, which is a feature of SAS Integration Technologies. An ODS package tracks the output from any active destinations that connect with it. After the destinations close, the package can be published to any of the publish destinations.

Measured RTF output enables you to specify how and where page breaks occur and when to place titles and footnotes in the body of a page.

Inline formatting has new syntax and can now be nested. With inline formatting you can change border styles individually.

Style element inheritance has been enhanced in SAS 9.2. In addition, the functionality of the REPLACE statement has been completely incorporated into the STYLE statement.

The TEMPLATE procedure now enables you to customize the appearance of crosstabulation (contingency) tables that are created with the FREQ procedure.

You can now define styles by using TEMPLATE procedure syntax as well as cascading style sheets (CSS).

You can use table header and footer style elements in the TEMPLATE procedure to change the borders of the regions that surround the table header and footer.

The PRINT procedure now enables the insertion of blank lines and the BY variable label on the summary line, as well as the formatting of large numbers.

Universal Printing

Universal Printing now supports the following printers:

- PNG (Portable Network Graphics)
- SVG (Scalable Vector Graphics)
- PDF/A, a printer that produces archivable PDF files that are compliant with PDF/A-1b

All Universal Printers now render TrueType fonts for output in all operating environments, including 40 new TrueType fonts.

Several new system options enable you to control the use, layout, viewing, security, description, metadata, and printing options of PDF documents.

SAS Logging Facility

The SAS logging facility logs SAS server and SAS program messages based on message categories such as authentication, administration, and performance. The logging facility has six message levels: trace, debug, warn, info, error, and fatal. The contents of the log message can be customized, and for SAS servers, you can view the log messages in SAS Management Console. In SAS programs, you can create customized message categories and log messages either in the same destinations as SAS server logs, or you can log messages in a file that you specify. The SAS logging facility enhances SAS logging and does not replace the traditional SAS log.

National Language Support

SAS 9.2 adds support for several more locales and encodings, as well as international currency informats and formats, and alternate collating sequences such as linguistic collation.

SAS Information Maps

The INFOMAPS procedure has been updated so you can make more modifications to information maps programmatically. You can add new data sources, data items, filters, folders, or relationships. Or, you can change the definitions of any existing data item, filter, data source, folder or relationship within an information map.

For the SAS Information Maps LIBNAME engine, you can now specify whether detail data or aggregated data is used by the engine. You can also specify an authentication domain.

SAS Remote Browsing

In all operating environments except Windows 32-bit environments, the SAS Remote Browser replaces the SAS Help Browser. You now view ODS HTML, PDF, and RTF output, SAS documentation, and other Web pages that are specified by the WBROWSE command by using the Web browser on your computer.

User-Written Functions

You can now write your own functions in either C, C++, or the SAS language, and use them in a SAS program. External functions that are written in C or C++ can be used in SAS programs after they have been registered using the PROTO procedure. To write your own functions in the SAS language, use the FCMP procedure. The new FUNCTIONS DICTIONARY table contains information about all functions that can be used in SAS.

IPv6

To support the "next generation" of Internet protocol, SAS supports the new IPv6 Internet protocol as well as the current IPv4 protocol.

Web Services

The HTTP procedure invokes a Web service that uses the HTTP protocol.

The SOAP (Simple Object Access Protocol) procedure enables a Web messaging protocol that invokes a Web service by using the Java Native Interface (JNI) and the Axis2 Java Client.

The WebDAV access method is now available in the z/OS operating environment. New WebDAV options enable you to access directory files and automatically append a file extension to a filename.

User IDs and passwords can be authenticated for WebDAV server access.

Performance

SAS programs that run in batch mode and terminate before they complete can be resumed at the DATA or PROC step that follows the last completed DATA or PROC step. To do this, you can specify that your SAS program runs in checkpoint mode and restart mode.

The SQL procedure has been optimized to improve the performance of queries to external databases and SAS libraries.

The SORT procedure determines whether a data set has already been sorted before it attempts to sort a data set.

The IBUFNO system option enables you to specify an optional number of extra buffers to be allocated for navigating an index file.

You can specify when SAS files are written to disk by using the new FILESYNC system option.

The DATASETS procedure now enables you to continue processing if indexes and integrity constraints are disabled.

Security

SAS now supports the Advanced Encryption Standard (AES) data encryption algorithm. Secure Sockets Layer (SSL) and Secure Shell (SSH) are now supported in the z/OS operating environment.

The Secure File Transfer Protocol (SFTP) access method provides a secure connection and file transfers between two hosts (client and server) over a network, where both commands and data are encrypted.

The PWENCODE procedure now supports the sas003 encoding method, which uses a 356-bit key encryption method to generate encoded passwords.

You can now specify in the LIBNAME statement whether user ID and password credentials are necessary

when accessing a WebDAV server.

Diagnostics

The SCAPROC procedure is a SAS Code Analyzer that captures information in a file about the input, output, variables, and macros for a SAS job while the job is running.

The JAVAINFO procedure reports diagnostic information about the Java environment that SAS is using.

Using the DATA statement, notes to the SAS log can be written at the beginning and end of each level of nested DO statements.

Procedures

In the second maintenance release after SAS 9.2, the `FREQ`, `MEANS`, `RANK`, and `SUMMARY` procedures have been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW).

You can transport SAS data sets between hosts by using the `DATASETS` procedure `COPY` statement with either the `XPORT` engine or the `REMOTE` engine.

The `REPORT` procedure has new features:

- In addition to the `REPORT` procedure supporting several style attributes, styles can be concatenated.
- You can now write reports to `ODS DOCUMENT` and `ODS OUTPUT` destinations.
- You can reset page numbers between `BY` groups, and the `BY` statement is now available when you request an output data set that uses the `OUT=` option.
- The `REPORT` procedure enables you to specify that group and order variable cells span table rows.
- The `REPORT` procedure now creates a table of contents.

The `TABULATE` procedure enables you to specify variable name list shortcuts within the `TABLE` statement and now supports style attributes.

The `SQL` procedure has new features:

- You can now better optimize your queries.
- You can use custom functions that are created with the `FCMP` procedure.
- Dictionary tables have been added for functions, information maps, and `ODS` destinations. The `DICTIONARY.EXTFILES` table now includes access method and device type information.
- The `AUTHDOMAIN` option of the `CONNECT` statement supports the lookup of security credentials.

Output from the `OPTIONS` procedure can now expand the value of an environment variable and display a list of system option groups.

The `FREQ` procedure and the `UNIVARIATE` procedure create plots and graphs by using `ODS` styles.

SAS now supports data models for the Clinical Data Interchange Standards Consortium (CDISC). The CDISC procedure supports validating a SAS data set against the Study Data Tabulation Model (SDTM) standards. In addition, several enhancements are implemented for importing and exporting a CDISC Operational Data Model (ODM) XML document.

Language Elements

You can now access remote files by using Secure File Transfer Protocol (SFTP).

Data sets can be repaired automatically without the indexes and integrity constraints.

The DATA step component Java object enables instantiation of Java classes and accesses fields and methods on the resultant objects.

Data set options can now be used with the DATA step component objects.

The new SYSECHO statement enables IOM clients to manually track the progress of a segment of a submitted SAS program.

Files that are located in an aggregate storage location whose filename does not comply with SAS naming conventions can now be accessed through the %INCLUDE, FILE, and the INFILE statements. A new DATA statement option enables notes to be written to the SAS log at the beginning and end of each level of nested DO statements.

Several new informats and formats read and write date, time, and datetime data that is formatted according to ISO 8601.

New character functions return information about character position or words in a character string. Other new functions return date and time interval and various mathematical computations. Several functions from other SAS products that return date or time information are now part of Base SAS.

New automatic macro variables contain information about the SAS session encoding, local and remote computer names, and SAS log error and warning messages.

Many new system options support the new SAS 9.2 features. Others support e-mail, SAS/GRAPH features, macro enhancements, and a default logical record length.

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What's New in SAS 9.2 Base Procedures

Overview

The following Base SAS procedures are new:

- [CALLRFC](#)
- [FCMP](#)
- [HTTP](#)
- [JAVAINFO](#)
- [PROTO](#)
- [SCAPROC](#)
- [SOAP](#)
- [XSL](#)

The following Base SAS procedures have been enhanced:

- [APPEND](#)
 - [CIMPORT](#)
 - [CONTENTS](#)
 - [COPY](#)
 - [CPORT](#)
 - [CORR](#)
 - [DATASETS](#)
 - [FREQ](#)
 - [MEANS](#)
 - [MIGRATE](#)
 - [OPTIONS](#)
 - [PRINT](#)
 - [PWENCODE](#)
 - [RANK](#)
 - [REPORT](#)
 - [SORT](#)
 - [SQL](#)
 - [SUMMARY](#)
 - [TABULATE](#)
 - [UNIVARIATE](#)
-

New Base SAS Procedures

The CALLRFC Procedure

The CALLRFC procedure enables you to invoke Remote Function Call (RFC) or RFC-compatible functions on an SAP System from a SAS program. You must license and configure SAS/ACCESS Interface to R/3 to use the CALLRFC procedure.

The FCMP Procedure

The FCMP procedure is new for 9.2. The SAS Function Compiler Procedure (FCMP) enables you to create, test, and store SAS functions and subroutines before you use them in other SAS procedures. PROC FCMP accepts slight variations of DATA step statements, and most features of the SAS programming language can be used in functions and subroutines that are processed by PROC FCMP.

The JAVAINFO Procedure

The JAVAINFO procedure conveys diagnostic information to the user about the Java environment that SAS is using. The diagnostic information can be used to confirm that the SAS Java environment has been configured correctly, and can be helpful when reporting problems to SAS technical support. Also, PROC JAVAINFO is often used to verify that the SAS Java environment is working correctly because PROC JAVAINFO uses Java to report its diagnostics.

The PROTO Procedure

The PROTO procedure enables you to register, in batch mode, external functions that are written in the C or C++ programming languages. You can use these functions in SAS as well as in C-language structures and types. After the C-language functions are registered in PROC PROTO, they can be called from any SAS function or subroutine that is declared in the FCMP procedure. They can also be called from any SAS function, subroutine, or method block that is declared in the COMPILE procedure.

The SCAPROC Procedure

The SCAPROC procedure enables you to specify a filename or fileref that will contain the output of the SAS Code Analyzer and to write the output to the file. The SAS Code Analyzer captures information about the job step, input and output information such as file dependencies, and information about macro symbol usage from a running SAS job. The SCAPROC procedure also can generate a grid-enabled job that can simultaneously run independent pieces of a SAS job.

The CONCATMEM comment has been added to the SCAPROC procedure output for the third maintenance release for SAS 9.2. The CONCATMEM comment specifies the name of a concatenated library that contains a specified libref.

The SOAP Procedure

The SOAP procedure reads XML input from a file that has a fileref and writes XML output to another file that has a fileref. The envelope and headings are part of the content of the fileref.

The HTTP Procedure

The HTTP procedure invokes a Web service that issues requests.

The XSL Procedure

The XSL procedure is new for the third maintenance release for SAS 9.2. The XSL procedure transforms an XML document into another format, such as HTML, text, or another XML document type. The procedure reads an input XML document, transforms it by using an XSL style sheet, and then writes an output file.

Enhanced Base SAS Procedures

The APPEND Procedure

The NOWARN option has been added to the APPEND procedure. The NOWARN option suppresses the warning message when it is used with the FORCE option to concatenate two data sets with different variables.

The CIMPORT Procedure

The following enhancement has been made to the CIMPORT procedure:

- ISFILEUTF8= is a new option that specifies whether the encoding of the transport file is UTF-8. This feature is useful when you import a transport file whose UTF-8 encoding identity is known to you but is not stored in the transport file. SAS releases before SAS 9.2 do not store any encodings in the transport file.
- New warning and error messages are available to alert you to transport problems and recovery actions.

The CONTENTS Procedure

The WHERE option of the CONTENTS procedure has been restricted. You cannot use the WHERE option to affect the output because PROC CONTENTS does not process any observations.

The COPY Procedure

The PROC COPY option of the COPY procedure ignores concatenations with catalogs. Use PROC CATALOG COPY to copy concatenated catalogs.

The CPORT Procedure

The documentation about the READ= data set option (used in the DATA statement of PROC CPORT) was enhanced to explain when a read-only password might be required. You can create a transport file for a read-only data set only when you also specify the data set's password using the READ= option in PROC CPORT. Clear-text and encoded passwords are supported.

The CORR Procedure

The new ID statement for the CORR procedure specifies one or more additional tip variables to identify observations in scatter plots and scatter plot matrices.

The DATASETS Procedure

The following options are new or enhanced in the DATASETS procedure:

- The new REBUILD option specifies whether to correct or delete disabled indexes and integrity constraints. When a data set is damaged in some way and the DLDMGACTION=NOINDEX data set or system option is used, the data set is repaired, the indexes and integrity constraint are disabled, and the index file is deleted. The data set is then limited to INPUT mode only until the REBUILD option is executed. This option enables you to continue with production without waiting for the indexes to be repaired, which can take a long time on large data sets.
- Here is a list of enhancements for the COPY statement:
 - The COPY statement with the NOCLONE option specified supports the OUTREP= and ENCODING= LIBNAME options for SQL views, DATA step views, and some SAS/ACCESS views (Oracle and Sybase).
 - You can use the COPY statement, along with the XPORT engine or a REMOTE engine, to transport SAS data sets between hosts.
- Here is a list of enhancements for the CONTENTS statement:
 - When using the OUT2 option, indexes and integrity constraints are labeled if disabled.

The FCMP Procedure

In the third maintenance release for SAS 9.2, the following statements have been added to the FCMP procedure:

LISTFUNC | LISTSUBR causes the source code for a function to be written to the SAS listing.

DELETEFUNC | DELETESUBR causes a specified function to be deleted from the library that is specified in the OUTLIB option.

In the third maintenance release for SAS 9.2, the following option has been added:

LISTFUNCS enables you to list the prototypes for all visible FCMP procedure functions in the SAS listing.

The **FREQ** Procedure

The FREQ procedure can now produce frequency plots, cumulative frequency plots, deviation plots, odds ratio plots, and kappa plots by using ODS Graphics. The crosstabulation table now has an ODS template that you can customize using the TEMPLATE procedure. Equivalence and noninferiority tests are now available for the binomial proportion and the proportion difference. New confidence limits for the binomial proportion include Agresti-Coull, Jeffreys, and Wilson (score) confidence limits. The RISKDIFF option in the EXACT statement provides unconditional exact confidence limits for the proportion (risk) difference. The EQOR option in the EXACT statement provides Zelen's exact test for equal odds ratios.

In the third maintenance release for SAS 9.2, the FREQ procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The **MEANS** Procedure

The following enhancements have been made to the MEANS procedure:

- The PRT statistic is now an alias for the PROBT statistic.
- The MODE statistic can now be used with PROC MEANS.

In the third maintenance release for SAS 9.2, the MEANS procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The **MIGRATE** Procedure

The MIGRATE procedure now supports more cross-environment migrations. You can migrate a SAS 8.2 data library from almost every SAS 8.2 operating environment to any SAS 9.2 operating environment. Most SAS 6 operating environments are also supported, but not for cross-environment migration.

The **OPTIONS** Procedure

The following enhancements have been made to the OPTIONS procedure:

- Restricted options are now supported in all operating environments.
- The value of environment variables can be displayed by using the EXPAND option.
- System options that have a character value can be displayed as a hexadecimal value by using the HEXVALUE option.
- You can display a list of SAS system option groups by using the LISTGROUPS option.
- To display the options in multiple groups, you can list more than one group in the GROUP= option.
- The following system option groups are new and can be specified on the GROUP= option: CODEGEN, LOGCONTROL, LISTCONTROL, SMF, SQL, and SVG.

The PRINT Procedure

The following new options have been added to the PRINT procedure:

SUMLABEL

enables you to display the label of the BY variable on the summary line.

BLANKLINE

enables you to insert a blank line after every n observations.

The PWENCODE Procedure

The following enhancements have been made to the PWENCODE procedure :

- Encoded passwords are now supported for SAS data sets.
- The sas003 encoding method, which uses a 256-bit key to generate encoded passwords, is now supported. The sas003 encoding method supports the AES (Advanced Encryption Standard), which is a new security algorithm for SAS/SECURE.
-

The RANK Procedure

The TIES= option of the RANK procedure has a new value, DENSE, which computes scores and ranks by treating tied values as a single-order statistic.

In the third maintenance release for SAS 9.2, the RANK procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The REPORT Procedure

The following enhancements have been made to the REPORT procedure:

- The PROBT statistic is now an alias for the PRT statistic.
- The MODE statistic can now be used with PROC REPORT.
- The STYLE/MERGE attribute name option has been added so that styles can be concatenated. Currently, there is no way to concatenate styles using a CALL DEFINE statement. Each time the CALL DEFINE statement is executed, it replaces any previous style information.
- The BY statement is now available when requesting an output data set with the OUT= option in the PROC REPORT statement.
- The new Table of Contents (TOC) now supports the CONTENTS= option in the BREAK, RBREAK, and DEFINE statements.
- The BYPAGENO=n option has been added to reset the page number between BY groups.
- The SPANROWS option has been added for the PROC REPORT statement. This option permits the GROUP and ORDER variables to be contained in a box rather than in blank cells appearing underneath the GROUP or ORDER variable values.
- The SPANROWS option also permits GROUP and ORDER variable values to repeat when the values break across pages in PDF, PS, and RTF destinations.
- PROC REPORT now supports the ODS DOCUMENT and ODS OUTPUT destinations.
- PROC REPORT now supports style attributes BORDERBOTTOMSTYLE, BORDERBOTTOMWIDTH, BORDERBOTTOMCOLOR, BORDERTOPSTYLE, BORDERTOPWIDTH, and BORDERTOPCOLOR.
- In the third maintenance release for SAS 9.2, the REPORT procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The SOAP Procedure

In the third maintenance release for SAS 9.2, the following options have been added to the SOAP procedure:

ENVFILE

specifies the location of the SAS environments file.

ENVIRONMENT

specifies to use the environment that is defined in the SAS environments file.

SERVICE

specifies the SAS Web service to use.

In the third maintenance release for SAS 9.2, you can call SAS Web services by using one of two methods. The first method requires that you know the URL of the Service Registry Service and the URL of the endpoint of the service you are calling. You must set the URL of the Service Registry Service on the SRSURL option. The URL option indicates the endpoint of the service that you are calling.

The second method that is used to call SAS Web services uses the SAS environments file to specify the endpoint of the service you are calling. Using this method, you can indicate the location of the SAS environments file in one of two ways:

- use the ENVFILE option in PROC SOAP
- define the Java property `env.definition.location` in JREOPTIONS on the SAS command line or in the SAS configuration file

The SORT Procedure

The following options and statements are new or enhanced in the SORT procedure:

- The new PRESORTED option causes PROC SORT to check within the input data set to determine whether the observations are in order before sorting. Use the PRESORTED option when you know or strongly suspect that a data set is already in order according to the key variables specified in the BY statement. By specifying this option, you avoid the cost of sorting the data set.
- The SORTSEQ= option is enhanced. New suboptions have been added as follows:
 - The LINGUISTIC suboption specifies linguistic collation, which sorts characters according to rules of language. The rules and default collating sequence options are based on the language specified in the current locale setting. You can modify the default collating rules of linguistic collation. The following are the collating rules that can be used to modify the LINGUISTIC collation suboption:
 - ALTERNATE_HANDLING=
 - CASE_FIRST=
 - COLLATION=
 - LOCALE=
 - NUMERIC_COLLATION=
 - STRENGTH=
 - You can now specify all possible encoding values. The result is the same as a binary collation of the character data represented in the specified encoding. The encoding values available are found in the **SAS National Language Support (NLS): Reference Guide**.
 - The KEY statement has been added to PROC SORT. You can specify multiple KEY statements and multiple variables per KEY statement. You can specify the DESCENDING option to change the default collating direction from ascending to descending.

In the third maintenance release for SAS 9.2, the SORT procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The SUMMARY Procedure

The following enhancements have been made to the SUMMARY procedure:

In the third maintenance release after SAS 9.2, the SUMMARY procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The SQL Procedure

The following enhancements have been made to the SQL procedure:

- A number of features have been added which enable you to optimize queries.
 - Depending on which engine type the query uses, you can replace the PUT function with a logically equivalent expression.
 - You can replace references to the DATE, TIME, DATETIME, and TODAY functions in a query to their equivalent constant values before the query executes.
 - You can specify the minimum number of rows that must be in a table or the maximum number of SAS format values that can exist in a PUT function in order for PROC SQL to consider optimizing the PUT function.
 - You can bypass the remerging process when a summary function is used in a SELECT clause or a HAVING clause.
 - If indexing is present, PROC SQL now uses the index files when processing SELECT DISTINCT statements.
 - Semicolons can now be used in explicit queries for pass-through.
- You can use custom functions that are created with PROC FCMP in PROC SQL.
- The DICTIONARY.EXTFILES table will now include the access method and device type information.
- Three new DICTIONARY tables have been added. The FUNCTIONS table contains information about currently accessible functions. The INFOMAPS table returns information on all known information maps. The DESTINATIONS table contains information about all known ODS destinations.
- The DESCRIBE TABLE CONSTRAINTS statement will not display the names of password-protected foreign key data set variables that reference the primary key constraint.
- The TRANSCODE=NO argument is not supported by some SAS Workspace Server clients. In SAS 9.2, if the argument is not supported, column values with TRANSCODE=NO are replaced (masked) with asterisks (*). Before SAS 9.2, column values with TRANSCODE=NO were transcoded.
- The SAS/ACCESS CONNECT statement has a new AUTHDOMAIN option that supports lookup of security credentials (user ID and password) without your having to explicitly specify the credentials.

The following new options have been added to the PROC SQL statement:

CONSTDATETIME | NOCONSTDATETIME

specifies whether the SQL procedure replaces references to the DATE, TIME, DATETIME, and TODAY functions in a query with their equivalent constant values before the query executes.

Note: The CONSTDATETIME option provides the same functionality as the new SQLCONSTDATETIME system option. ■

EXITCODE

specifies whether PROC SQL clears an error code for any SQL statement.

IPASSTHRU | NOIPASSTHRU

specifies whether implicit pass-through is enabled or disabled.

REDUCEPUT

specifies the engine type that a query uses for which optimization is performed by replacing a PUT function in a query with a logically equivalent expression.

Note: The REDUCEPUT option provides the same functionality as the new SQLREDUCEPUT system option. ■

REMERGE | NOREMERGE

specifies that the SQL procedure does not process queries that use remerging of data.

Note: The REMERGE option provides the same functionality as the new SQLREMERGE system option. ■

The following new global system options affect SQL processing and performance:

DBIDIRECTEXEC (SAS/ACCESS)

controls SQL optimization for SAS/ACCESS engines.

SQLCONSTANTDATETIME

specifies whether the SQL procedure replaces references to the DATE, TIME, DATETIME, and TODAY functions in a query with their equivalent constant values before the query executes.

SQLMAPPUTTO (SAS/ACCESS)

for SAS 9.2 Phase 2 and later, specifies whether the PUT function in the SQL procedure is processed by SAS or by the SAS_PUT() function inside the Teradata database.

SQLREDUCEPUT

for the SQL procedure, specifies the engine type that a query uses for which optimization is performed by replacing a PUT function in a query with a logically equivalent expression.

SQLREDUCEPUTOBS

for the SQL procedure when the SQLREDUCEPUT= system option is set to NONE, specifies the minimum number of observations that must be in a table in order for PROC SQL to consider optimizing the PUT function in a query.

SQLREDUCEPUTVALUES

for the SQL procedure when the SQLREDUCEPUT= system option is set to NONE, specifies the maximum number of SAS format values that can exist in a PUT function expression in order for PROC SQL to consider optimizing the PUT function in a query.

SQLREMERGE

specifies whether the SQL procedure can process queries that use remerging of data.

SQLLUNDOPOLICY

specifies whether the SQL procedure keeps or discards updated data if errors occur while the data is being updated.

The TABULATE Procedure

The following enhancements have been made to the TABULATE procedure:

- The PROBT statistic is now an alias for the PRT statistic.
- The MODE statistic can now be used with PROC TABULATE.
- You can specify variable name list shortcuts within the TABLE statement.
- PROC TABULATE now supports style attributes BORDERBOTTOMSTYLE, BORDERBOTTOMWIDTH, BORDERBOTTOMCOLOR, BORDERTOPSTYLE, BORDERTOPWIDTH, and BORDERTOPCOLOR.
- In the third maintenance release for SAS 9.2, the TABULATE procedure has been enhanced to run inside the Teradata Enterprise Data Warehouse (EDW), DB2 under UNIX, and Oracle. Using conventional processing, a SAS procedure, by means of the SAS/ACCESS engine, receives all the rows of the table from the database. All processing is done by the procedure. Large tables mean that a significant amount of data must be transferred. Using the new in-database technology, the procedures that are enabled for processing inside the database generate more sophisticated queries that allow the aggregations and analytics to be run inside the database. For most in-database procedures, a much smaller result set is returned for the remaining analysis that is required to produce the final output. As a result of using the in-database procedures, more work is done inside the database and less data movement can occur. Using in-database procedures can result in significant performance improvements.

The UNIVARIATE Procedure

The UNIVARIATE procedure now produces graphs that conform to ODS styles, so that creating consistent output is easier. Also, you now have two methods for producing graphs. With traditional graphics, you can control every detail of a graph through familiar procedure syntax and the GOPTION and SYMBOL statements. With ODS Graphics (experimental for the UNIVARIATE procedure in SAS 9.2), you can obtain the highest quality output with minimal syntax. You also now have full compatibility with graphics that are produced by the SAS/STAT and SAS/ETS procedures.

The new UNIVARIATE procedure CDFPLOT statement plots the observed cumulative distribution function (cdf) of a variable and enables you to superimpose a fitted theoretical distribution on the graph. The new PPLOT statement creates a probability-probability plot (also referred to as a P-P plot or percent plot). This statement compares the empirical cumulative distribution function (ecdf) of a variable with a specified theoretical cumulative distribution function. The beta, exponential, gamma, lognormal, normal, and Weibull distributions are available in both statements.

Documentation Enhancements

The following Base SAS Procedures have had part or all of their documentation relocated to other SAS documents.

The CV2VIEW Procedure

Documentation for the CV2VIEW procedure is now in the **SAS/ACCESS for Relational Databases: Reference**.

The DBCSTAB Procedure

Documentation for the DBCSTAB procedure is now in the **SAS National Language Support (NLS): Reference Guide**.

The EXPORT Procedure

The **Base SAS Procedures Guide** contains only overview and common syntax information for the EXPORT procedure. Information that is specific to PC Files is now in the **SAS/ACCESS Interface to PC Files: Reference**.

The IMPORT Procedure

The **Base SAS Procedures Guide** contains only overview and common syntax information for the IMPORT procedure. Information that is specific to PC Files is now in the **SAS/ACCESS Interface to PC Files: Reference**.

The TRANTAB Procedure

Documentation for the TRANTAB procedure is now in the **SAS National Language Support (NLS): Reference Guide**.

What's New in the Base SAS 9.2 Statistical Procedures

CORR Procedure

The new ID statement specifies one or more additional tip variables to identify observations in scatter plots and scatter plot matrices.

FREQ Procedure

The FREQ procedure can now produce frequency plots, cumulative frequency plots, deviation plots, odds ratio plots, and kappa plots by using ODS Graphics. The crosstabulation table now has an ODS template that you can customize with the TEMPLATE procedure. Equivalence and noninferiority tests are now available for the binomial proportion and the proportion difference. New confidence limits for the binomial proportion include Agresti-Coull, Jeffreys, and Wilson (score) confidence limits. The RISKDIFF option in the EXACT statement provides unconditional exact confidence limits for the proportion (risk) difference. The EQOR option in the EXACT statement provides Zelen's exact test for equal odds ratios.

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The new CDFPLOT statement plots the observed cumulative distribution function (cdf) of a variable and enables you to superimpose a fitted theoretical distribution on the graph. The new PPLOT statement creates a probability-probability plot (also referred to as a P-P plot or percent plot), which compares the empirical cumulative distribution function (ecdf) of a variable with a specified theoretical cumulative distribution function. The beta, exponential, gamma, lognormal, normal, and Weibull distributions are available in both statements.

What's New in the Base SAS 9.2 Language

Overview

The SAS 9.2 Base new features, language elements, and enhancements to the language elements continue to expand the capabilities of SAS:

- SAS now supports the next generation [Internet Protocol, IPv6](#), as well as IPv4.
- The DATA step component Java object enables instantiation of Java classes and accessing fields and methods on resultant objects.
- The SAS logging facility is a new logging subsystem that can be used to collect, categorize, and filter log events and write them to various output devices. The logging facility can be used to log SAS server events or events that are initiated from SAS programs. This feature is new for SAS 9.2 Phase 2.
- In addition to SAS Monospace and SAS Monospace Bold TrueType fonts, new TrueType fonts are available when you install SAS.
- [Universal Printing](#) now supports Scalable Vector Graphics (SVG), Portable Network Graphics (PNG), and PDF/A-1b print output formats.
- You can access remote files by using the [Secure File Transfer Protocol \(SFTP\) access method](#).
- SAS now [reads](#) and [writes](#) ISO 8601 dates, time, and intervals.
- In support of batch programming, if a program terminates without completion, the new [checkpoint mode](#) enables programs to be resubmitted in restart mode, resuming with the DATA or PROC step that was executing when the program terminated.
- In the "[Functions and CALL Routines](#)" section there are several new and enhanced functions as well as functions that were previously in other products and that are now part of Base SAS. The functions that moved from the Risk Dimensions product calculate the call and put prices from European options on futures, based on various models. The functions that moved from SAS/ETS return information about various date and time intervals. The functions from SAS High-Performance Forecasting return specific dates.
- The documentation for string functions and CALL routines now has a restriction that identifies whether these functions and CALL routines support Single Byte Character Sets (SBCS), Double Byte Character Sets (DBCS), or Multi-Byte Character Sets (MBCS). This distinction is important because improper use of these functions and CALL routines can result in unexpected behavior in programs that are written in a non-English language. The description for the restrictions is located in the Function Compatibility with DBCS, MBCS, and SBCS Character Sets section of the documentation.
- In a DATA step, you can track the execution of code within a DO group. The [DATA statement](#) has an optional argument for you to write a note to the SAS log when the DO statement begins and ends.
- New [SAS system options](#) enable you to set a default record length, specify options for accessing PDF files, specify values for Scalable Vector Graphics, support the checkpoint mode and the restart mode, and support fonts.

- Some of the new features for the [DATA step object attributes, operators, and methods](#) remove all items from the hash object without deleting the instance of the hash object, consolidate the FIND and ADD methods into a single method call, return the number of items in the hash object, and specifies a starting key item for iteration.
- In previous versions of **SAS Language Reference: Dictionary**, references to language elements in other publications were included in their respective dictionary for each language element type. For example, you could find a reference for the \$BIDI format in the format dictionary entries. You can now find references to language elements that are documented in other publications within each section for the language element types. Online, this section appears just before the dictionary entries for each language element type. In the PDF or print copy, this section appears as the last topic for each language element type.

A section that describes how SAS syntax is written has been added. This section contains examples of how to interpret the syntax.

SAS System Features

Checkpoint Mode and Restart Mode

If a batch program terminates before it completes and it was started in checkpoint mode, the program can be resubmitted in restart mode, resuming with the DATA or PROC step that was executing when the program terminated. DATA and PROC steps that have already completed do not need to be rerun. See "Checkpoint Mode and Restart Mode" in **SAS Language Reference: Concepts**.

Support for ISO 8601 Basic and Extended Time Notations

In SAS 9.1.3, the formats and informats that support the ISO 8601 basic and extended time notations were documented in the **SAS 9.1.3 XML LIBNAME: User's Guide**. These formats and informats have been renamed and are now documented in **SAS Language Reference: Dictionary**.

The new names clearly distinguish the basic and extended formats and informats. You can see the renamed formats and informats in their respective sections in the topics that follow. In addition, a new CALL routine, IS8601_CONVERT, converts ISO 8601 intervals to datetime and duration values, and datetime and duration values to an ISO 8601 interval.

Support for IPv6

SAS 9.2 introduces support for the "next generation" of Internet Protocol, IPv6, which is the successor to the current Internet Protocol, IPv4. Rather than replacing IPv4 with IPv6, SAS 9.2 supports both protocols. A primary reason for the new protocol is that the limited supply of 32-bit IPv4 address spaces is being depleted. IPv6 uses a 128-bit address scheme, which provides more IP addresses than IPv4 did.

For more information, see Internet Protocol Version 6 (IPV6) in **SAS Language Reference: Concepts**.

Universal Printing and New TrueType Fonts

In SAS 9.2, all Universal Printers and many SAS/GRAPH devices use the FreeType engine to render TrueType fonts for output in all of the operating environments that SAS software supports. In addition, by default, many SAS/GRAPH device drivers and all Universal Printers generate output using ODS styles, and these ODS styles use TrueType fonts.

In addition to SAS Monospace and SAS Monospace Bold, 40 additional fonts (TrueType) are available when you install SAS:

- Three Latin fonts compatible with Microsoft
- Ten graphic symbol fonts
- Eight multilingual Unicode fonts
- Nineteen monolingual Asian fonts

In the third maintenance release for SAS 9.2, the MingLiU_HKSCS TrueType font is new. In addition, the HeiT, MingLiU, MingLiU_HKSCS, and PMingLiu fonts support the HKSCS2004 (Hong Kong Supplemental Character Set) characters.

New Universal printers include the following:

| | |
|----------|---|
| PDFA | produces an archivable PDF compliant with PDF/A-1b . |
| PNG | produces Portable Network Graphics, which is a raster image format that is designed to replace the older simple GIF and the more complex TIFF format. |
| PNGt | produces transparent Portable Network Graphics. |
| SVG | produces Scalable Vector Graphics, which is a language for describing two-dimensional graphics and graphical applications in XML. |
| SVGt | produces transparent Scalable Vector Graphics. |
| SVGnotip | produces Scalable Vector Graphics without tooltips. |
| SVGView | produces Scalable Vector Graphics with controls to navigate through multi-page SVG documents. |
| SVGZ | produces compressed Scalable Vector Graphics. |

For more information, see Printing with SAS in **SAS Language Reference: Concepts**.

SAS Logging Facility Language Elements

The SAS logging facility is a flexible, configurable logging subsystem that you can use to collect, categorize, and filter log events and write them to a variety of output devices. The SAS language now includes autocall macros, functions, and DATA step component objects for creating logging facility components that categorize log events. The logging facility and the SAS log are two separate logging systems. For more information, including the reference documentation for the logging facility language elements, see The SAS Logging Facility in **SAS Logging: Configuration and Programming Reference**. This feature is new for SAS 9.2 Phase 2.

WHERE-Expression Processing

In a WHERE expression, the LIKE operator now supports an escape character. The escape character enables you to search for the percent sign (%) and the underscore (_) characters in values. For more information, see Syntax of WHERE Expression in **SAS Language Reference: Concepts**.

DATA Step Java Object

The DATA step component Java object enables you to instantiate Java classes and access fields and methods on the resultant objects. Although the documentation for the DATA step component Java object for SAS 9.2 Phase 1 has been available on <http://support.sas.com>, the documentation is available in SAS Help and Documentation for SAS 9.2 Phase 2.

Viewing Help and ODS Output in the Remote Browser

The remote browser has been used in some operating environments in prior releases of SAS to view SAS Help and ODS HTML output. You can now view SAS Help and ODS HTML output, and PDF and RTF output under z/OS, OpenVMS, UNIX, and Windows 64-bit environments. Windows 32-bit environments use the SAS browser to view Help and ODS output.

You enable remote browsing by configuring these system options:

HELPBROWSER= specifies whether you want to use the remote browser or the SAS browser.

HELPHOST= specifies the name of the computer where the remote browser sends Help and ODS output.

HELPPORT= specifies the port number for the remote browser client.

For more information about remote browsing, see the Help documentation for your operating environment: OpenVMS, UNIX, Windows, z/OS

SAS Language Elements

Data Set Options

The DLDMGACTION=NOINDEX data set option has a new argument.

The NOINDEX argument automatically repairs the data set without the indexes and integrity constraints, deletes the index file, updates the data file to reflect the disabled indexes and integrity constraints, and limits the data file to be opened only in INPUT mode.

Formats

- The following formats are new:

\$BASE64X

converts character data to ASCII text using Base 64 encoding.

\$N8601B

writes ISO 8601 duration, datetime, and interval forms using the basic notations *PnYnMnDTnHnMnS* and *yyyymmddThhmmss*.

\$N8601BA

writes ISO 8601 duration, datetime, and interval forms using the basic notations *PyyyyymmddThhmmss* and *yyyymmddThhmmss*.

\$N8601E

writes ISO 8601 duration, datetime, and interval forms using the extended notations *PnYnMnDTnHnMnS* and *yyyy-mm-ddThh:mm:ss*.

\$N8601EA

writes ISO 8601 duration, datetime, and interval forms using the extended notations *Pyyyy-mm-ddThh:mm:ss* and *yyyy-mm-ddThh:mm:ss*.

\$N8601EH

writes ISO 8601 duration, datetime, and interval forms for the extended notations *Pyyyy-mm-ddThh:mm:ss* and *yyyy-mm-ddThh:mm:ss*, using a hyphen (-) for omitted components.

\$N8601EX

writes ISO 8601 duration, datetime, and interval forms for the extended notations *Pyyyy-mm-ddThh:mm:ss* and *yyyy-mm-ddThh:mm:ss*, using an x for each digit of an omitted component.

\$N8601H

writes ISO 8601 duration, datetime, and interval forms *PnYnMnDTnHnMnS* and *yyyy-mm-ddT^hh:mm:ss*, dropping omitted components in duration values and using a hyphen (-) for omitted components in datetime values.

\$N8601X

writes ISO 8601 duration, datetime, and interval forms *PnYnMnDTnHnMnS* and *yyyy-mm-ddT^hh:mm:ss*, dropping omitted components in duration values and using an x for each digit of an omitted component in datetime values.

B8601DA

writes date values using the ISO 8601 base notation *yyyymmdd*.

B8601DN

writes the date from a datetime value using the ISO 8601 basic notation *yyyymmdd*.

B8601DT

writes datetime values in the ISO 8601 basic notation *yyyymmddThhmmssffffff*.

B8601DZ

writes datetime values in the Coordinated Universal Time (UTC) time scale using the ISO 8601 datetime and time zone basic notation *yyyymmddThhmmss+|-hhmm*.

B8601LZ

writes time values as local time by appending a time zone offset difference between the local time and UTC, using the ISO 8601 basic time notation *hhmmss+|-hhmm*.

B8601TM

writes time values using the ISO 8601 basic notation *hhmmssffff*.

B8601TZ

adjusts time values to the Coordinated Universal Time (UTC) and writes them using the ISO 8601 basic time notation *hhmmss+|-hhmm*.

BESTD

prints numeric values, lining up decimal places for values of similar magnitude, and prints integers without decimals.

E8601DA

writes date values using the ISO 8601 extended notation *yyyy-mm-dd*.

E8601DN

writes the date from a SAS datetime value using the ISO 8601 extended notation *yyyy-mm-dd*.

E8601DT

writes datetime values in the ISO 8601 extended notation *yyyy-mm-ddT hh:mm:ss.ffffff*.

E8601DZ

writes datetime values in the Coordinated Universal Time (UTC) time scale using the ISO 8601 datetime and time zone extended notation *yyyy-mm-ddT hh:mm:ss+|-hh:mm*.

E8601LZ

writes time values as local time, appending the Coordinated Universal Time (UTC) offset for the local SAS session, using the ISO 8601 extended time notation *hh:mm:ss+|-hh:mm*.

E8601TM

writes time values using the ISO 8601 extended notation *hh:mm:ss.ffffff*.

E8601TZ

adjusts time values to the Coordinated Universal Time (UTC) and writes the values using the ISO 8601 extended notation *hh:mm:ss+|-hh:mm*.

MDYAMPM

writes datetime values in the form *mm/dd/yy<yy> hh:mm AM|PM*. The year can be either two or four digits. This feature is new for SAS 9.2 Phase 2 and later.

PERCENTN

produces percentages, using a minus sign for negative values.

SIZEK

writes a numeric value in the form *nK* for kilobytes. This feature is new for SAS 9.2 Phase 2 and later.

SIZEKB

writes a numeric value in the form *nKB* for kilobytes. This feature is new for SAS 9.2 Phase 2 and later.

SIZEKMG

writes a numeric value in the form *nKB* for kilobytes, *nMB* for megabytes, or *nGB* for gigabytes. This feature is new for SAS 9.2 Phase 2 and later.

VMSZN

generates VMS and MicroFocus COBOL zoned numeric data.

- The following formats were previously documented in other publications and are now part of this document:

WEEKUw.

writes a week number in decimal format by using the U algorithm.

WEEKVw.

writes a week number in decimal format by using the V algorithm.

WEEKWw.

writes a week number in decimal format by using the W algorithm.

- The following format is enhanced:

DATEw.

In addition to writing dates in the form *ddmmmyy* or *ddmmmyyyy*, the DATEw. format now writes dates in the form *dd-mmm-yyyy*.

Functions and CALL Routines

- In the second maintenance release for SAS 9.2, best practices for custom interval names for date and time functions is new.
- The following functions and CALL routines are new:

ALLCOMB

generates all combinations of the values of n variables taken k at a time in a minimal change order.

ALLPERM

generates all permutations of the values of several variables in a minimal change order.

ARCOSH

returns the inverse hyperbolic cosine.

ARSINH

returns the inverse hyperbolic sine.

ARTANH

returns the inverse hyperbolic tangent.

CALL ALLCOMB

generates all combinations of the values of n variables taken k at a time in a minimal change order.

CALL ALLCOMBI

generates all combinations of the indices of n objects taken k at a time in a minimal change order.

CALL GRAYCODE

generates all subsets of n items in a minimal change order.

CALL ISO8601_CONVERT

converts an ISO 8601 interval to datetime and duration values, or converts datetime and duration values to an ISO 8601 interval.

CALL LEXCOMB

generates all distinct combinations of the nonmissing values of n variables taken k at a time in lexicographic order.

CALL LEXCOMBI

generates all combinations of the indices of n objects taken k at a time in lexicographic order.

CALL LEXPERK

generates all distinct permutations of the nonmissing values of n variables taken k at a time in lexicographic order.

CALL LEXPERM

generates all distinct permutations of the nonmissing values of several variables in lexicographic order.

CALL SORTC

sorts the values of character arguments.

CALL SORTN

sorts the values of numeric arguments.

CATQ

concatenates character or numeric values by using a delimiter to separate items and by adding quotation marks to strings that contain the delimiter.

CHAR

returns a single character from a specified position in a character string.

CMISS

counts the number of missing arguments.

COUNTW

counts the number of words in a character expression.

DIVIDE

returns the result of a division that handles special missing values for ODS output.

ENVLEN

returns the length of an environment variable.

EUCLID

returns the Euclidean norm of the nonmissing arguments.

FINANCE

computes financial calculations such as depreciation, maturation, accrued interest, net present value, periodic savings, and internal rates of return.

FINDW

searches a character string for a word.

FIRST

returns the first character in a character string.

GCD

returns the greatest common divisor for one or more integers.

GEODIST

returns the geodetic distance between two latitude and longitude coordinates.

GRAYCODE

generates all subsets of n items in a minimal change order.

INTFIT

returns a time interval that is aligned between two dates.

INTGET

returns an interval based on three date or datetime values.

INTSHIFT

returns the shift interval that corresponds to the base interval.

INTTEST

returns 1 if a time interval is valid, and returns 0 if a time interval is invalid.

LCM

returns the smallest multiple that is exactly divisible by every number in a set of numbers.

LCOMB

computes the logarithm of the COMB function--that is, the logarithm of the number of combinations of n objects taken r at a time.

LEXCOMB

generates all distinct combinations of the nonmissing values of n variables taken k at a time in lexicographic order.

LEXCOMBI

generates all combinations of the indices of n objects taken k at a time in lexicographic order.

LEXPBK

generates all distinct permutations of the nonmissing values of n variables taken k at a time in lexicographic order.

LEXPBKM

generates all distinct permutations of the nonmissing values of several variables in lexicographic order.

LFACT

computes the logarithm of the FACT (factorial) function.

LOG1PX

returns the log of 1 plus the argument.

LPERM

computes the logarithm of the PERM function--that is, the logarithm of the number of permutations of n objects, with the option of including r number of elements.

LPNORM

returns the L_p norm of the second argument and subsequent nonmissing arguments.

MD5

returns the result of the message digest of a specified string.

MODEXIST

determines whether a software image exists in the version of SAS that you have installed.

MSPLINT

returns the ordinate of a monotonicity-preserving interpolating spline.

RENAME

renames a member of a SAS library, an external file, or a directory.

SUMABS

returns the sum of the absolute values of the nonmissing arguments.

TRANSTRN

removes or replaces all occurrences of a substring in a character string.

WHICHC

searches for a character value that is equal to the first argument, and returns the index of the first matching value.

WHICHN

searches for a numeric value that is equal to the first argument, and returns the index of the first matching value.

ZIPCITYDISTANCE

returns the geodetic distance between two ZIP code locations.

- The descriptions of the arguments in the following functions are enhanced:

DOPEN

opens a directory, and returns a directory identifier value.

EXIST

verifies the existence of a SAS library member.

FOPEN

opens an external file and returns a file identifier value.

FEXIST

verifies the existence of an external file that is associated with a fileref.

FILENAME

assigns or deassigns a fileref to an external file, a directory, or an output device.

FILEREF

verifies whether a fileref has been assigned for the current SAS session.

LIBNAME

assigns or deassigns a libref for a SAS library.

LIBREF

verifies that a libref has been assigned.

MOPEN

opens a file by directory ID and member name, and returns either the file identifier or a 0.

PATHNAME

returns the physical name of a SAS library or an external file, or returns a blank.

- The following functions were previously in Risk Dimensions, and are now in Base SAS:

BLACKCLPRC

calculates the call price for European options on futures, based on the Black model.

BLACKPTPRC

calculates the put price for European options on futures, based on the Black model.

BLKSHCLPRT

calculates the call price for European options, based on the Black-Scholes model.

BLKSHPTPRT

calculates the put price for European options, based on the Black-Scholes model.

GARKHCLPRC

calculates the call price for European options on stocks, based on the Garman-Kohlhagen model.

GARKHPTPRC

calculates the put price for European options on stocks, based on the Garman-Kohlhagen model.

MARGRCLPRC

calculates the call price for European options on stocks, based on the Margrabe model.

MARGRPTPRC

calculates the put price for European options on stocks, based on the Margrabe model.

- The following functions were previously in SAS/ETS, and are now in Base SAS:

INTCINDEX

returns the cycle index, given a date, time, or datetime value.

INTCYCLE

returns the date, time, or datetime interval at the next higher seasonal cycle, given a date, time, or datetime interval.

INTFMT

returns a recommended format, given a date, time, or datetime interval.

INTINDEX

returns the seasonal index, given a date, time, or datetime interval and value.

INTSEAS

returns the length of the seasonal cycle, given a date, time, or datetime interval.

- The following functions were previously in SAS High-Performance Forecasting, and are now in Base SAS:

HOLIDAY

returns the date of the specified holiday for the specified year.

NWKDOM

returns the date for the *n*th occurrence of a weekday for the specified month and year.

- The following functions were moved from **SAS Language Reference: Dictionary** to the SAS/IML documentation:

MODULEIC

calls an external routine and returns a character value (in the IML environment only).

MODULEIN

calls an external routine and returns a numeric value (in the IML environment only).

CALL MODULEI

calls an external routine without any return code (in the IML environment only).

- The following functions and CALL routines are enhanced:

CALL POKE

can now write floating-point numbers directly into memory on a 32-bit platform.

CALL POKELONG

can now write floating-point numbers directly into memory on 32-bit and 64-bit platforms.

CALL SCAN

returns the position and length of a given word from a character expression.

DATDIF

now has new values for the *basis* argument, and has a reference to a document that is published by the Securities Industry Association.

FSEP

now has an optional argument for a hexadecimal character delimiter.

INDEX

now has an example that shows how leading and trailing spaces are handled.

INDEXW

can now have alternate delimiters. If you use an alternate delimiter, then INDEXW does not recognize the end of the text as the end data. Another example has also been added to the function.

INTCK

now has a fifth argument in the syntax. Retail calendar intervals that are ISO 8601 compliant, and custom intervals have been added.

INTNX

can now use retail calendar intervals that are ISO 8601 compliant.

INTCINDEX, INTCYCLE, INTFIT, INTFMT, INTGET, INTINDEX, INTSEAS, INTSHIFT, and INTTEST

are now able to use retail calendar intervals that are ISO 8601 compliant.

LAG

now has more information about memory limits.

LIBNAME

now has sections that explain how to use the LIBNAME function with one, two, three, and four arguments.

OPEN

has a new fourth argument. This argument specifies whether the first argument is a two-level name (data set name) or a filename.

SCAN

returns the *n*th word from a character expression.

TRANSTRN

has been rewritten.

TRANWRD

has an updated Comparisons section and a new example.

WEEK

now has enhanced documentation for the U, V, and W descriptors.

ZIPSTATE

now has information about Army Post Office (APO) and Fleet Post Office (FPO) codes.

- The RX set of functions and CALL routines have been removed from the documentation. They

have been replaced by a set of PRX functions and CALL routines, which have been available in previous versions of SAS, and which provide superior functionality.

The following table lists the RX functions and CALL routines and their PRX replacements:

| RX Function | PRX Replacement |
|------------------------|----------------------------|
| CALL RXCHANGE | CALL PRXCHANGE |
| CALL RXFREE | CALL PRXFREE |
| CALL RXSUBSTR | CALL PRXSUBSTR |
| RXMATCH | PRXMATCH |
| RXPARSE | PRXPARSE |

- The SCANQ function and the CALL SCANQ routine have been removed from the documentation and replaced by the superior functionality of the SCAN function and CALL SCAN routine.

Informats

- The following informats are new:

\$BASE64X

converts ASCII text to character data by using Base 64 encoding.

\$N8601B

reads complete, truncated, and omitted forms of ISO 8601 duration, datetime, and interval values that are specified in either the basic or extended notations.

\$N8601E

reads ISO 8601 duration, datetime, and interval values that are specified in the extended notation.

B8601DA

reads date values that are specified in the ISO 8601 basic notation *yyyymmdd*.

B8601DN

reads date values that are specified the ISO 8601 basic notation *yyyymmdd* and returns SAS datetime values where the time portion of the value is 000000.

B8601DT

reads datetime values that are specified in the ISO 8601 basic notation *yyyymmddThhmmssfffff*.

B8601DZ

reads datetime values that are specified in the Coordinated Universal Time (UTC) time scale using the ISO 8601 datetime basic notation *yyyymmddThhmmss+|-hhmm* or *yyyymmddThhmmssfffffZ*.

B8601TM

reads time values that are specified in the ISO 8601 basic notation *hhmmssfffff*.

B8601TZ

reads time values that are specified in the ISO 8601 basic time notation *hhmmssfffff+|-hhmm* or *hhmmssfffffZ*.

E8601DA

reads date values that are specified in the ISO 8601 extended notation *yyyy-mm-dd*.

E8601DN

reads date values that are specified in the ISO 8601 extended notation *yyyy-mm-dd* and returns SAS datetime values where the time portion of the value is 000000.

E8601DT

reads datetime values that are specified in the ISO 8601 extended notation *yyyy-mm-ddThh:mm:ss.fffff*.

E8601DZ

reads datetime values that are specified in the Coordinated Universal Time (UTC) time scale using the ISO 8601 datetime extended notation *hh:mm:ss+|-hh:mm.ffff* or *hh:mm:ss.ffffZ*.

E8601LZ

reads Coordinated Universal Time (UTC) values that are specified in the ISO 8601 extended notation *hh:mm:ss+|-hh:mm.ffff* or *hh:mm:ss.ffffZ* and converts them to the local time.

E8601TM

reads time values that are specified in the ISO 8601 extended notation *hh:mm:ss.fffff*.

E8601TZ

reads time values that are specified in the ISO 8601 extended time notation *hh:mm:ss+|-hh:mm.fffff* or *hh:mm:ssZ*.

S3270FZDB

reads zoned decimal data in which zeros have been left blank. This feature is new for

SAS 9.2 Phase 2 and later.

SIZEKMG

reads numeric data that is appended to the letters K, M, or G. This feature is new for SAS 9.2 Phase 2 and later.

VMSZN

reads VMS and MicroFocus COBOL zoned numeric data.

- The following informat is enhanced:

TRAILSGN

In addition to reading trailing plus (+) and minus (-) signs, the TRAILSGN informat now reads values that contain commas.

- The following informats were previously documented in other publications and are now part of this document:

WEEKUw.

reads the format of the number-of-week value within the year and returns a SAS date value using the U algorithm.

WEEKVw.

reads the format of the number-of-week value within the year and returns a SAS date value using the V algorithm.

WEEKWw.

reads the format of the number-of-week value within the year and returns a SAS date value using the W algorithm.

Statements

- The following statements are new:

CHECKPOINT EXECUTE_ALWAYS

enables you to execute the DATA or PROC step that immediately follows without considering the checkpoint-restart data.

FILENAME, SFTP Access Method

enables you to access remote files by using the SFTP protocol.

SYSECHO

enables IOM clients to manually track the progress of a segment of a submitted SAS program.

- The following statements are enhanced:

%INCLUDE

- The filename of a file that is located in an aggregate storage location and does not have a valid SAS name can be used as a fileref if the filename is enclosed in quotation marks.
- The maximum line limit is now 6K.

ABORT

Two new optional arguments enable you to do the following:

- cause the execution of the submitted statements to be canceled.
- suppress the output of all variables to the SAS log.

ATTRIB

The TRANSCODE=NO attribute is not supported by some SAS Workspace Server clients. In SAS 9.2, if the attribute is not supported, variables with TRANSCODE=NO are replaced (masked) with asterisks (*). Before SAS 9.2, variables with TRANSCODE=NO were transcoded.

BY

The BY statement honors the linguistic collation of data that is sorted by using the SORT procedure with the SORTSEQ=LINGUISTIC option.

DATA

Three new optional arguments enable you to do the following:

- write a note to the SAS log for the beginning and end of each level of nesting DO statements.
- specify the maximum number of nested LINK statements.
- suppress the output of all variables to the SAS log.

DECLARE

- Data set options can now be used with the dataset: argument tag.
- Three new argument tags enable you to do the following:
 - maintain a summary count of hash object keys.
 - ignore duplicate keys when loading a data set into the hash object.
 - specify whether multiple data items are allowed for each key.

FILE

- The filename of a file that is located in an aggregate storage location and does not have a valid SAS name can be used as a fileref if the filename is enclosed in quotation marks.
- A new option enables you to specify a character string as an alternate delimiter (other than a blank) to be used for LIST output.

FILENAME, CATALOG Access Method

You can now specify RECFM=S (stream-record format).

FILENAME, EMAIL (SMTP) Access Method

- You can now specify a file attachment without an extension.
- A new option enables you to specify the priority of the e-mail message.

FILENAME, FTP Access Method

Seven new FTP options enable you to do the following:

- specify the name of an authentication domain metadata object that references credentials (user ID and password) in order to connect to the FTP server without your having to explicitly specify the credentials.
- specify that the member type of DATA is automatically appended to the member name when you use the DIR option.
- enable autocall macro retrieval of lowercase directory or member names from FTP servers.
- save the user ID and password after the user ID and password prompt are successfully executed.
- specify the line delimiter to use for variable-record formats: carriage return followed by a line feed, a line feed only, or a NULL character.
- specify the length of the FTP server response message.
- in the second maintenance release for SAS 9.2, specify an FTP response wait time in milliseconds.

FILENAME, SFTP Access Method

In SAS 9.2 Phase 2 and later, two new SFTP options enable you to do the following:

- specify the fully qualified pathname and the filename of the batch file that contains the SFTP commands. These commands are submitted when the SFTP access method is executed.
- specify an SFTP response wait time in milliseconds.

FILENAME, URL Access Method

- N can now be used as an alias for a stream-record format (RECFM=S).
- Five new URL options enable you to do the following:
 - specify the name of an authentication domain metadata object that references credentials (user ID and password) in order to connect to the proxy or Web server without your having to explicitly specify the credentials.
 - specify a fileref to which the header information is written when a file is opened using the URL access method. The header information is the same information that is written to the SAS log.
 - specify a user name with which you can access the proxy server.
 - specify a password with which you can access the proxy server.
 - specify the line delimiter to use when RECFM=V.

FILENAME, WebDAV Access Method

- For SAS 9.2 Phase 2 and later, the FILENAME statement, WebDAV Access

Method is available for use in the z/OS operating environment.

- The SASBAMW keyword in the FILENAME statement syntax has been changed to WEBDAV.
- Three new WebDAV options enable you to do the following:
 - access directory files.
 - specify that a file extension is automatically appended to the filename when you use the DIR option.
 - retry lowercase directory or member names from WebDAV servers by using an autocall macro.

FOOTNOTE

a new argument enables you to specify formatting options for the ODS HTML, RTF, and PRINTER(PDF) destinations.

INFILE

- The filename of a file that is located in an aggregate storage location and does not have a valid SAS name can be used as a fileref if the filename is enclosed in quotation marks.
- A new option enables you to specify a character string as an alternate delimiter (other than a blank) to be used for LIST input.
- A new optional argument specifies the type of device or the access method that is used if the fileref points to an input or output device or location that is not a physical file.

LIBNAME for WebDAV Server Access

- When you assign a libref to a file on a WebDAV server, the path (URL location), user ID, and password are associated with that libref. After the first libref is assigned, the user ID and password will be validated on subsequent attempts to assign another libref to the same library.
- SAS will honor a lock request on a file on a WebDAV server only if the file is already locked by another user.
- Two new WebDAV options enable you to do the following:
 - specify the name of an authentication domain metadata object that references credentials (user ID and password) in order to connect to the WebDAV server without your having to explicitly specify the credentials.
 - prompt the user for an ID and password.

MERGE

a new argument enables you to specify at least two existing SAS data sets by using either a numbered range list or a named prefix list.

SET

- a new argument creates and names a variable that stores the name of the SAS data set from which the current observation is read. The stored name can be a data set name or a physical name. The physical name is the name by which the operating environment recognizes the file.

- a new argument enables you to specify at least two existing SAS data sets by using either a numbered range list or a named prefix list.

TITLE

added an argument that enables you to specify formatting options for the ODS HTML, RTF, and PRINTER(PDF) destinations.

System Options

- The following system options are new:

CGOPTIMIZE=

specifies the level of optimization to perform during code optimization. This feature is new for SAS 9.2 Phase 2 and later.

CMPMODEL=

specifies the output model type for the MODEL procedure.

DEFLATION=

specifies the level of compression for device drivers that support the Deflate compression algorithm.

DMSPGMLINESIZE=

specifies the maximum number of characters in a Program Editor line.

EMAILFROM

when sending an e-mail that uses SMTP, specifies whether the e-mail option FROM is required in either the FILE or the FILENAME statement.

FILESYNC=

specifies when operating system buffers that contain contents of permanent SAS files are written to disk.

FONTEMBEDDING

specifies whether font embedding is enabled in Universal Printer and SAS/GRAPH printing.

FONTRENDERING=

specifies whether SAS/GRAPH devices that are based on the SASGDGIF, SASGDTIF, and SASGDIMG modules render fonts by using the operating system or by using the FreeType font engine.

GSTYLE

specifies whether ODS styles can be used in the generation of graphs that are stored as GRSEG catalog entries.

HELPPORT=

specifies the browser to use for SAS Help and ODS output. This feature is new for SAS 9.2 Phase 2 and later.

HELPHOST=

specifies the name of the computer where the remote browser is to send Help and ODS output. This feature is new for SAS 9.2 Phase 2 and later.

HELPPORT=

specifies the port number for the remote browser client. This feature is new for SAS 9.2 Phase 2 and later.

HTTPSERVERPORTMAX=

specifies the highest port number that can be used by the SAS HTTP server for remote browsing. This feature is new for SAS 9.2 Phase 2 and later.

HTTPSERVERPORTMIN=

specifies the lowest port number that can be used by the SAS HTTP server for remote browsing. This feature is new for SAS 9.2 Phase 2 and later.

IBUFNO=

specifies an optional number of extra buffers to be allocated for navigating an index file. SAS automatically allocates a minimal number of buffers in order to navigate the index file. Typically, you do not need to specify extra buffers. However, using IBUFNO= to specify extra buffers could improve execution time by limiting the number of input/output operations that are required for a particular index file.

INTERVALDS=

specifies a SAS data set that contains user-supplied holidays that can be used by the INTNX and INTCK functions. This feature is new for SAS 9.2 Phase 2 and later.

JPEGQUALITY

specifies the JPEG quality factor that determines the ratio of image quality to the level of compression for JPEG files processed by the SAS/GRAPH JPEG device driver.

LRECL=

specifies the default logical record length to use for reading and writing external files.

PDFACCESS

specifies whether text and graphics from PDF documents can be read by screen readers for the visually impaired.

PDFASSEMBLY

specifies whether PDF documents can be assembled.

PDFCOMMENT

specifies whether PDF document comments can be modified.

PDFCONTENT

specifies whether the contents of a PDF document can be changed.

PDFCOPY

specifies whether text and graphics from a PDF document can be copied.

PDFFILLIN

specifies whether PDF forms can be filled in.

PDFPAGELAYOUT

specifies the page layout for PDF documents.

PDFPAGEVIEW

specifies the page viewing mode for PDF documents.

PDFPASSWORD

specifies the password to use to open a PDF document and the password used by a PDF document owner.

PDFPRINT

specifies the resolution to print PDF documents.

PDFSECURITY

specifies the printing permissions for PDF documents.

PRIMARYPROVIDERDOMAIN=

specifies the domain name of the primary authentication provider. This feature is new for SAS 9.2 Phase 2 and later.

RLANG

specifies whether SAS executes R language statements.

S2V=

specifies the starting position to begin reading a file specified in a %INCLUDE statement, an autoexec file, or an autocall macro file with a variable length format.

SORTVALIDATE

specifies whether the SORT procedure verifies that a data set is sorted according to the variables in the BY statement when the sort indicator metadata indicates a user-specified sort order.

SQLCONSTDATETIME

specifies whether the SQL procedure replaces references to the DATE, TIME, DATETIME, and TODAY functions in a query with their equivalent constant values before the query executes.

SQLREDUCEPUT=

for the SQL procedure, specifies the engine type that a query uses for which optimization is performed by replacing a PUT function in a query with a logically equivalent expression.

SQLREDUCEPUTOBS=

for the SQL procedure when the SQLREDUCEPUT= system option is set to NONE, specifies the minimum number of observations that must be in a table for PROC SQL to consider optimizing the PUT function in a query.

SQLREDUCEPUTVALUES=

for the SQL procedure when the SQLREDUCEPUT= system option is set to NONE, specifies the minimum number of SAS format values that can exist in a PUT function expression in order for PROC SQL to consider optimizing the PUT function in a query.

SQLREMERGE

specifies whether the SQL procedure can process queries that use remerging of data.

SQLLUNDOPOLICY=

specifies whether the SQL procedure keeps or discards updated data if errors occur while the data is being updated.

STEPCHKPT

specifies whether to run a batch program in checkpoint-restart mode. In checkpoint-restart mode, if a batch program terminates during execution, the program can be restarted beginning with the DATA or PROC step that was executing when the program terminated.

STEPCHKPTLIB

specifies the libref which identifies the library that contains the checkpoint-restart data.

STEPRESTART

specifies whether to start a batch program using the checkpoint data.

SVGCONTROLBUTTONS

specifies whether to display the paging control buttons and an index in a multi-page SVG document.

SVGHEIGHT

specifies the height of the viewport unless the SVG output is embedded in another SVG output; specifies the value of the **HEIGHT** attribute of the outermost <svg> element in the SVG file.

SVGPRESERVEASPECTRATIO

specifies whether to force uniform scaling of SVG output; sets the `preserveAspectRatio` attribute on the outermost `<svg>` element.

SVGTITLE

specifies the title in the title bar of the SVG output; specifies the value of the `<title>` element in the SVG file.

SVGVIEWBOX

specifies the coordinates, width, and height that are used to set the `viewBox` attribute on the outermost `<svg>` element, which enables SVG output to scale to the viewport.

SVGWIDTH

specifies the width of the viewport unless the SVG output is embedded in another SVG output; specifies the value of the `width` attribute of the outermost `<svg>` element in the SVG file.

SVGX

specifies the x-axis coordinate of one corner of the rectangular region into which an embedded `<svg>` element is placed; specifies the `x` attribute on the outermost `<svg>` element of the SVG file.

SVGY

specifies the y-axis coordinate of one corner of the rectangular region into which an embedded `<svg>` element is placed; specifies the `y` attribute on the outermost `<svg>` element of the SVG file.

UPRINTCOMPRESSION

specifies whether to enable compression of Universal Printer and SAS/GRAPH print files.

VARLENCHK=

specifies the type of message to write to the SAS log if the length of a variable is increased when the input data set is read using the SET, MERGE, UPDATE, or MODIFY statements. This option is new for SAS 9.2 Phase 2.

- The following system options have a new argument:

DLDMGACTION=NOINDEX

For data sets, automatically repairs the data set without the indexes and integrity constraints, deletes the index file, updates the data file to reflect the disabled indexes and integrity constraints, and limits the data file to be opened only in INPUT mode.

CMPOPT=FUNCDIFFERENCING

specifies whether analytic derivatives are computed for user-defined functions.

- The following system options are enhanced:

ECHOAUTO

SAS writes the autoexec file statements to the SAS log.

EMAILHOST

You can now specify multiple Simple Mail Transfer Protocol (SMTP) mail servers.

EMAILPW

In the third maintenance release for SAS 9.2, you can use encoded e-mail passwords. These passwords are encoded with PROC PWENCODE.

E-mail system options

All e-mail system options can now be set at any time. They are no longer restricted to being set when SAS starts.

OVP

The default value for the OVP system option is now NOOVP.

SYSPRINTFONT=

You can specify the name of a Universal Printer to which the SYSPRINTFONT system option setting applies.

- The syntax for the following system options is different when these system options are used after SAS starts, as compared to the syntax that is used when SAS starts. For the syntax to use when SAS starts, see the documentation for your operating environment. This feature is new for SAS 9.2 Phase 2:

APPEND=

Appends a value to the existing value of the specified system option.

INSERT=

Inserts the specified value as the first value of the specified system option.

- The following system options are no longer supported and have been removed from the documentation:

BATCH

no longer has an impact on the settings for the LINESIZE, OVP, PAGESIZE, and SOURCE system options when SAS executes.

GISMAPS

SAS 9.2 no longer supplies U.S. Census Tract maps for SAS/GIS.

- The following system option has been deleted from SAS:

CONSOLELOG=

DATA Step Object Attributes, Operators, and Methods

- For SAS 9.2 Phase 2 and later, the Java object language elements in Java Object Language Elements are now documented in **SAS Language Reference: Dictionary**.
- The following hash and hash iterator methods are new:

CLEAR

removes all items from the hash object without deleting the hash object instance.

EQUALS

determines whether two hash objects are equal.

FIND_NEXT

sets the current list item to the next item in the current key's multiple item list and sets the data for the corresponding data variables.

FIND_PREV

sets the current list item to the previous item in the current key's multiple item list and sets the data for the corresponding data variables.

HAS_NEXT

determines whether there is a next item in the current key's multiple data item list.

HAS_PREV

determines whether there is a previous item in the current key's multiple data item list.

REF

consolidates the FIND and ADD methods into a single method call.

REMOVEDUP

removes the data that is associated with the specified key's current data item from the hash object.

REPLACEDUP

replaces the data that is associated with the current key's current data item with new data.

SETCUR

specifies a starting key item for iteration.

SUM

retrieves the summary value for a given key from the hash table and stores the value in a DATA step variable.

SUMDUP

retrieves the summary value for the current data item of the current key and stores the value in a DATA step variable.

- The following hash object method is enhanced:

DEFINEDONE

added an optional argument that enables recovery from memory failure when loading a data set into a hash object.

- The following hash object attribute is new:

ITEM_SIZE

returns the number of items in the hash object.

- The `_NEW_` statement has been reclassified as an operator.
- For SAS 9.2 Phase 2 and later, the items in a multiple data item list are now maintained in the order in which you insert them.

What's New in the Base SAS 9.2 Windowing Environment

Overview

Base SAS for the windowing environment enables you to view on-line help in your windowing environment. For each window, you can access help. Links in the documentation guide you to related topics.

New Features

The following new features were documented:

- In the Metadata Browser window, the timestamp displays Greenwich Mean Time (GMT).
 - The new ODS Document Recorder window writes PROC DOCUMENT code.
 - You can enable the editing of ODS graphics by entering the SGEDIT ON command in the Results window.
-

Documentation Enhancements

The following documentation enhancements have been made for SAS 9.2:

- Documentation for the Customize Tools dialog box has been added.

The dialog box has two tabs: **Toolbars** and **Customize**. The **Toolbars** tab controls the behavior and appearance of the toolbar. The **Customize** tab enables you to add, delete, and modify commands on the toolbar.

- All of the commands now have short descriptions, and can be accessed from the command line by entering the following command: help *command-name*.
- Documentation for terminating a SAS session has been added.
- The structure of the Base Help topics has changed to provide easier readability.

What's New in SAS 9.2 Output Delivery System

Overview

New and enhanced features in the Output Delivery System (ODS) provide an almost limitless number of choices for reporting and displaying analytical results with a greater variety of formatting selections and output destinations.

- With ODS statements, you can use new ODS packages, measured RTF output, and enhanced inline formatting, among other new features.
- Using the DOCUMENT procedure, you can perform four new tasks.
- Several new features and enhancements have been added to the TEMPLATE procedure, including a new crosstabulation table template and enhanced style inheritance.
- Improved ODS statistical graphics enable you to use ODS and SAS/GRAPH to create and modify statistical graphics.
- SAS/GRAPH uses ODS styles by default for graphical output.
- You can use the PDFSECURITY system option to encrypt and password-protect your PDF files.
- SVG (Scalable Vector Graphics) and new TrueType fonts can be added to ODS output.
- You can use PROC SQL to query open ODS destinations.
- You can control the way you view your PDF document by specifying system options PDFPAGELAYOUT and the PDFPAGEVIEW.

New Features and Enhancements for ODS Statements

The following ODS statements are new:

ODS TAGSETS.RTF

creates measured RTF output that enables you to specify how and where page breaks occur and when to place titles and footnotes in the body of a page.

ODS PACKAGE

opens, adds to, publishes, or closes one SAS ODS package object. ODS packages enable ODS destinations to use the SAS Publishing Framework, which is a feature of SAS Integration Technologies. An ODS package tracks the output from any active destinations that connect with it. After the destinations close, the package can be published to any of the publish destinations. You can use ODS packages with the ODS PACKAGE statement.

ODS TEXT=

inserts text into ODS output.

The following new functionality works with the ODS PRINTER and PDF destinations:

- Style attribute TEXTDECORATION= can now be specified with the PDF destination.
- In addition to supporting HTTP, the URL= style attribute now supports HTTPS, FTP, NEWS, and

MAILTO.

New options have been added to the following ODS statements:

- Inline formatting has new syntax for SAS 9.2 and inline styles can now be nested. The ODS ESCAPECHAR Statement now supports functions that can be used with various destinations. In addition, you can now use the UNICODE inline formatting function to select any available Unicode character in the current Unicode font.
- The ODS EXCLUDE statement now supports the following options:

NOWARN

suppresses the warning that an output object was requested but not created.

WHERE=

excludes output objects that meet a particular condition.

- The ODS GRAPHICS statement now supports the following options:

ANTIALIAS | NOANTIALIAS | ANTIALIAS=

specifies whether anti-aliasing is applied to the rendering of the line and markers in the graph. Anti-aliasing smooths the appearance of diagonal lines and some markers.

ANTIALIASMAX=

specifies the maximum number of markers or lines to be anti-aliased before anti-aliasing is disabled. The default is 600.

BORDER | NOBORDER | BORDER=

specifies whether to draw the graph with a border on the outermost layout.

DISCRETEMAX=

specifies the maximum number of discrete values to be shown in a plot.

GROUPMAX=

specifies the maximum number of group values to be shown in a plot.

HEIGHT=

specifies the height of the graph.

IMAGEFMT=

specifies the image format to display graphics in ODS output. If the image format is not valid for the active output destination, the device is automatically remapped to the default image format.

IMAGEMAP | NOIMAGEMAP | IMAGEMAP=

specifies whether data tips are generated.

IMAGENAME=

specifies the base image filename. By default, the name of the output object is used. You can

determine the name of the output object by using the ODS TRACE statement.

LABELMAX=

specifies the maximum number of labeled areas before labeling is disabled.

MAXLEGENDAREA=

specifies an integer that is interpreted as the maximum percentage of the overall graph's area that a legend can occupy.

PANELCELLMAX=

specifies the maximum number of cells in a graph panel where the number of cells is determined dynamically by classification variables.

RESET | RESET=

resets one or more ODS GRAPHICS options to its default.

SCALE | NOSCALE | SCALE=

specifies whether the content of the graph is scaled proportionally.

TIPMAX=

specifies the maximum number of distinct data tip boxes that are allowed before the boxes are disabled.

WIDTH=

specifies the width of the graph.

- The ODS HTML statement now supports the following options:

DEVICE=

specifies the name of a device driver. ODS automatically selects an optimal default device for each open output destination.

OPTIONS=

specifies tagset-specific suboptions and a named value. The DOC= suboption allows you to produce a list of other suboptions that can be specified for OPTIONS=

- The ODS LISTING statement now supports the following option:

DEVICE=

specifies the name of a device driver. ODS automatically selects an optimal default device for each open output destination.

GPATH=

specifies the location for all graphics output that is generated while the destination is open.

PACKAGE

specifies that the output from the destination be added to a package.

- The ODS MARKUP statement now supports the following options:

CSSSTYLE=

specifies a cascading style sheet to apply to your output.

DEVICE=

specifies the name of a device driver. ODS automatically selects an optimal default device for each open output destination.

IMAGE_DPI

specifies the image resolution in dots per inch for output images.

EVENT=

specifies an event and the value for event variables that are associated with the event.

OPTIONS=

specifies tagset-specific suboptions and a named value. The DOC= suboption allows you to produce a list of other suboptions that can be specified for OPTIONS=

PACKAGE

specifies that the output from the destination be added to a package. The PACKAGE option is valid for all markup family statements.

TEXT=

inserts text into your document by triggering the paragraph event and specifying a text string to be assigned to the VALUE event variable.

- The ODS OUTPUT statement now supports the following option:

NOWARN

suppresses the warning that an output object was requested but not created.

- The ODS PRINTER, ODS PDF, and ODS PCL statements now support the following options:

CSSSTYLE=

specifies a cascading style sheet to apply to your output.

DPI=

specifies the image resolution in dots per inch for output images.

NEWFILE=

creates a new file at the specified *starting-point*.

PACKAGE

specifies that the output from the destination be added to an ODS package.

- The ODS PDF and ODS PRINTER statements now support the following options.

PDFTOC=

controls the level of the expansion of the table of contents in PDF documents.

- The ODS RTF statement now supports the following options:

BODYTITLE

specifies that SAS titles and footnotes are placed in the body of the RTF document rather than the headers and footers section of the document.

BODYTITLE_AUX

specifies that SAS titles and footnotes are placed in the body of the RTF document rather than the headers and footers section of the document. The titles and footnotes are placed in cells, which allows the titles and footnotes to be centered, right-justified and left-justified.

CONTENTS

produces a table of contents page that is inserted into the RTF document when the TOC_DATA option is specified.

CSSSTYLE=

specifies a cascading style sheet to apply to your output.

DEVICE=

specifies the name of a device driver. ODS automatically selects an optimal default device for each open output destination.

IMAGE_DPI=

specifies the resolution for your graphics.

PACKAGE

specifies the location of an aggregate storage location or a SAS catalog for all RTF files.

TOC_DATA

specifies whether contents data is inserted into the RTF document.

- The ODS SELECT statement now supports the following options:

NOWARN

suppresses the warning that an output object was requested but not created.

WHERE=

selects output objects that meet a particular condition.

- The ODS TRACE statement now supports the following option:

EXCLUDED

includes, in the trace record, information about excluded output objects.

New Features and Enhancements for the DOCUMENT Procedure

The DOCUMENT procedure now enables you to do the following:

- Use all PROC DOCUMENT features with the REPORT procedure.
- Create columns for BY variables in the contents list with the new BYGROUPS option in the LIST statement.
- Conditionally select a subset of entries in an ODS document for copying, listing, deleting, moving, or replaying by using WHERE expressions with these statements:
 - COPY TO
 - DELETE
 - LIST
 - MOVE TO
 - REPLAY
- Specify the level of the path that you want to delete with the new LEVELS= option in the DELETE statement.
- Write, to any open ODS destination, the source code of the ODS template that is associated with the specified output object, with the new OBTEMPL statement.

The DOCUMENT procedure now supports the REPORT procedure.

New Features and Enhancements for the TEMPLATE Procedure

The following general enhancements and features have been added to the TEMPLATE procedure:

- The LIST Statement now supports WHERE expressions, which enables you to select items for listing that meet a particular condition.
- The SOURCE Statement now supports WHERE expressions, which enables you to select items that meet a particular condition.
- The TEMPLATE procedure now enables you to customize the appearance of crosstabulation tables that are created with the FREQ procedure. The new CrossTabFreqs table template describes how to display PROC FREQ's crosstabulation table. You can create a customized CrossTabFreqs table template to do the following:
 - use custom formats for cellvalues
 - specify a style for each value in a cell
 - change the stacking order of values in a cell
 - change and style headers and footers
 - use variable labels in headers and footers
 - style table regions independently
 - change or remove the legend

The following enhancements and features have been added to the TEMPLATE procedure for table templates:

- You can now create the master table templates that are globally applied to all of your tabular output:

Base.Template.Column

Base.Template.Footer

Base.Template.Header

Base.Template.Table

These master templates are available in all of the DEFINE statements within a table template.

- You can now use subsetting variables with the CELLSTYLE AS Statement to find common values in table templates and column templates.
- You can use the TableHeaderContainer and TableFooterContainer style elements along with the border control style attributes to change the borders of the regions that surround the table header and footer.

The following new statements are provided in the TEMPLATE procedure for style definitions:

CLASS

creates a style element from a like-named style element.

IMPORT

imports Cascading Style Sheet (CSS) code from an external file and converts the code to style elements and style attributes that are then included in the style definition.

The following enhancements and features have been added to the TEMPLATE procedure for ODS style definitions:

- You can now create the master template, Base.Template.Style, that is globally applied to all of your style definitions. Base.Template.Style is created with the DEFINE STYLE Statement.
- Style element inheritance has been enhanced. In addition, the functionality of the REPLACE statement has been replaced by the STYLE statement, and the REPLACE statement is no longer supported. For more information, see Understanding Inheritance.
- You can now use the following style attributes with inline formatting or the TableHeaderContainer and TableFooterContainer style elements to make individual border style changes to RTF output:
 - BORDERBOTTOMCOLOR=
 - BORDERBOTTOMSTYLE=
 - BORDERBOTTOMWIDTH=
 - BORDERCOLOR=
 - BORDERLEFTSTYLE=

- BORDERLEFTCOLOR=
 - BORDERLEFTWIDTH=
 - BORDERRIGHTCOLOR=
 - BORDERRIGHTSTYLE=
 - BORDERRIGHTWIDTH=
 - BORDERTOPCOLOR=
 - BORDERTOPSTYLE=
 - BORDERTOPWIDTH=
- The new style HighContrast enables you to produce reports with HTML output in high contrast to meet accessibility requirements.

The STYLE statement now supports the following option:

`_SELF_`

specifies to use the preceding style element or style elements of the same name for the parent of the new style.

The following new statements are provided in the TEMPLATE procedure for the tagset template:

CONTINUE

specifies that the execution of the DO loop returns to the corresponding DO statement.

DO

begins a statement block that executes if the required condition is true.

DONE

ends a statement block.

ELSE

begins a statement block that executes if the corresponding DO statement is false.

EVAL

creates or updates a user-defined variable and its value.

ITERATE

specifies a dictionary variable or list variable to loop through, and for each iteration, assigns the variable's values to the `_NAME_` and `_VALUE_` event variables.

NEXT

increments a dictionary or list variable to the next value.

STOP

moves execution to the end of the current statement block.

The following enhancements has been added to the TEMPLATE procedure for tagset templates:

- Stream commands in tagset templates are able to specify variables.
- You can now use the master template Base.Template.Tagset that is globally applied to all of your tagsets. Base.Template.Tagset is created with the DEFINE TAGSET statement.

Improved ODS Statistical Graphics

The ODS graphics capability, which was experimental for SAS 9.1, is now production for SAS 9.2 as ODS graphics.

- There are over 50 procedures in SAS/STAT, SAS/ETS, SAS/QC, and Base SAS that have been modified to use ODS graphics. Many new plots are now produced by these procedures, either by default or with the specification of procedure options.
- The functionality of ODS graphics has been extended with the addition of new graph types, ODS styles designed for statistical work, and a point-and-click editor for enhancing titles, labels, and other graph features.
- You can also modify graphs by changing their underlying templates, which are supplied by SAS and are written with PROC TEMPLATE and the Graph Template Language (GTL).
- The LISTING destination is now supported by ODS graphics.
- A new family of SAS/GRAPH procedures uses ODS graphics to create stand-alone plots, such as scatterplots overlaid with smoothers, which are particularly useful for exploratory data analysis.
- The new SGRENDER procedure provides a way to create customized displays by writing your own templates with the GTL and PROC TEMPLATE.

For complete documentation about ODS graphics, see the **SAS/GRAPH: Statistical Graphics Procedures Guide**, **SAS/GRAPH: Graph Template Language Reference**, and the **SAS/GRAPH: Graph Template Language User's Guide**.

Note: A SAS/GRAPH license is now required to use ODS graphics. ■

New ODS Support for SAS/GRAPH

All SAS/GRAPH procedures and devices now support ODS styles. By default, all colors, fonts, symbols, and graph sizes are derived from the current style. Procedure statement options and SAS/GRAPH GOPTIONS can still be used to override individual elements of the graph, providing you the flexibility to customize the appearance of any graph.

Additionally, the colors used by the styles have been updated to enhance the appearance of your graphics output.

If you have multiple ODS destinations open, SAS/GRAPH automatically selects the appropriate device for

each destination. In addition, each graph uses the ODS style that is associated with each destination. You do not need to specify a device or style to get optimal results. For example, if you do not specify a device, then SAS/GRAPH automatically selects the PNG device for the HTML destination and the SASEMF device for the RTF destination.

Also, if you have multiple ODS destinations open and you are using a device other than the Java or ActiveX devices (ACTIVEX, JAVA, ACTXIMG, or JAVAIMG), a different GRSEG is created for each open destination. The GRSEG for the first destination is stored in WORK.GSEG. The GRSEGs for any other open destinations are named according to the destination (for example, WORK.HTML).

New PDF Security

You can now encrypt and password-protect your PDF files easily in SAS with the PDFSECURITY system option. See the PDFSECURITY system option in **SAS Language Reference: Dictionary**.

New Scalable Vector Graphics and Fonts

ODS styles can now use new TrueType fonts. All Universal Printers and many SAS/GRAPH devices use the FreeType library to render TrueType fonts for output in all of the operating environments that SAS software supports. In addition, by default, many SAS/GRAPH device drivers and all Universal Printers generate output using ODS styles, and these ODS styles use TrueType fonts. In addition to SAS Monospace and SAS Monospace Bold, 21 new TrueType fonts are made available when you install SAS:

- five Latin fonts compatible with Microsoft
- eight multilingual Unicode fonts
- eight monolingual Asian fonts

ODS now supports Scalable Vector Graphics, which is a language for describing two-dimensional graphics and graphical applications in XML. For more information about Scalable Vector Graphics and the TrueType fonts, see the section "Printing with SAS" in **SAS Language Reference: Concepts**.

Query Open ODS Destinations

You can now programmatically query SAS for open ODS destinations with the new SQL dictionary table DESTINATIONS and its associated view. See the section "Using the DICTIONARY Tables" in the SQL Procedure in the **Base SAS Procedures Guide**.

What's New in the INFOMAPS Procedure and Information Maps LIBNAME Engine

Overview

The INFOMAPS procedure in Base SAS software has been enhanced for this release. You can change the definitions of any existing data item, filter, data source, folder, or relationship within an information map. You can move items between folders and associate stored processes with information maps.

The Information Maps LIBNAME engine has also been enhanced for this release. The engine supports complex filter clauses and can read aggregated data as well as detailed data. You can specify an authentication domain for user logons.

INFOMAPS Procedure

The INFOMAPS procedure is now available on all operating systems for the SAS 9.2 release except OpenVMS on HP Integrity. Previously, the procedure was available only on Windows (32-bit), Solaris (64-bit), HP-UX, HP-UX on Itanium, AIX (64-bit), and z/OS.

The following statements in the INFOMAPS procedure have changes and enhancements:

- The PROC INFOMAPS statement has changed. The METAPASS and METAUSER= arguments are optional if the current metadata server supports single sign-on. The new DOMAIN= option enables you to specify an authentication domain on the current server for user logons.
- The EXPORT statement has changed. The FILE= argument is now required rather than optional.
- The INSERT DATAITEM statement has been enhanced. The new HIERARCHY= and MEASURE= options provide simpler alternatives to the EXPRESSION= option for creating data items for OLAP data sources. You can use the HIERARCHY= option to specify a physical hierarchy in an OLAP data source. You can use the MEASURE= option to specify a physical measure in an OLAP data source

You can use the new LOCATION= option to specify a folder within an information map where a data item should be inserted. You can use the new CREATE option to create the location for the data item if it does not already exist.

- The INSERT FILTER statement has changed. You now specify the filter name using the NAME= argument rather than as an explicit argument in the INSERT FILTER statement.
- The INSERT RELATIONSHIP statement has been enhanced. The following syntax is now obsolete:

```
INSERT RELATIONSHIP left-table INNER | LEFT | RIGHT |  
FULL  
JOIN right-table ON "conditional-expression";
```

You now use the LEFT_TABLE=, RIGHT_TABLE=, JOIN=, and CONDITION= arguments to specify the relationship.

The new DESCRIPTION= option enables you to specify a description for a relationship.

- The LIST statement has been enhanced. The new RELATIONSHIPS option lists the identifier, left and right tables, cardinality, type of join, and join expression for each relationship defined in an information map.

The output for the LIST statement now indicates when the information map does not contain the type of business data that has been requested.

- The MOVE DATAITEM statement is new for this release. This statement enables you to move data items to a new location.
- The MOVE FILTER statement is new for this release. This statement enables you to move filters to a new location.
- The MOVE FOLDER statement is new for this release. This statement enables you to move folders to a new location.
- The OPEN INFOMAP statement has been replaced with the NEW INFOMAP statement to create a new information map and the UPDATE INFOMAP statement to update an existing information map.
- The SAVE statement has been updated. You can use the new LOCATION= option to specify where an information map should be stored. You can use the new CREATE option to create the location for the information map if it does not already exist.
- The SET STORED_PROCESS statement is new for this release. This statement associates a stored process with an information map.
- The UPDATE DATAITEM statement is new for this release. This statement updates the properties of a specified data item in an information map.
- The UPDATE DATASOURCE statement is new for this release. This statement updates the properties of a data source in an information map.
- The UPDATE FILTER statement is new for this release. This statement updates the properties of a specified filter in an information map.
- The UPDATE FOLDER statement is new for this release. This statement updates the properties of a specified folder in an information map.
- The UPDATE RELATIONSHIP statement is new for this release. This statement updates the properties of a join relationship in an information map.

Information Maps LIBNAME Engine

The Information Maps LIBNAME engine in Base SAS software has the following changes and enhancements:

- The Information Maps LIBNAME engine is now available on all operating systems for the SAS 9.2 release except OpenVMS on HP Integrity. Previously, the engine was available only on Windows (32-bit), Solaris (64-bit), HP-UX, HP-UX on Itanium, AIX (64-bit), and z/OS.
- The AGGREGATE= LIBNAME statement option and AGGREGATE= data set option are new for this release. These options specify whether the engine uses detailed data or aggregated data.
- The DOMAIN= LIBNAME statement option is new for this release. This option specifies an authentication domain on the current server for user logons.
- The PRESERVE_MAP_NAMES= LIBNAME statement option has replaced the PRESERVE_TAB_NAMES LIBNAME= statement option. (PRESERVE_TAB_NAMES is still supported as an alias for PRESERVE_MAP_NAMES.)
- The FILTER= data set option has been enhanced for this release. The OR and NOT Boolean operators are now supported. You can also use parentheses to signify precedence or any needed grouping within the clause.

When you use the CONTENTS procedure in Base SAS software to show the contents of an information map referenced by the Information Maps LIBNAME engine, the Label column in the procedure output now shows only the data item description.

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What's New in Encryption in SAS 9.2

Overview

Here are the new and enhanced features supported for Encryption in SAS:

- encoded passwords for SAS data sets
- AES data encryption algorithm
- Secure Sockets Layer (SSL) for the z/OS operating environment
- Secure Shell (SSH) for the z/OS operating environment
- new system options, SSLPKCS12LOC= and SSLPKCS12PASS=, for the z/OS and UNIX operating environments
- new PDFSECURITY= system option

General Enhancements

- This release introduces support of encoded passwords for SAS data sets. The ability to accept encoded passwords is now supported by all areas of password handling within SAS.
- The AES data encryption algorithm is new to SAS/SECURE and SSL.
- This release introduces support for SSL under the z/OS and OpenVMS operating environments. Examples are provided for SAS/CONNECT and SAS/SHARE.
- This release introduces support for SSH under the z/OS operating environment.
- New system options introduced in this release are SSLPKCS12LOC= and SSLPKCS12PASS=.
- The PDFSECURITY= option is introduced to allow encrypting of ODS generated PDF files. This option along with other PDF system options can be used to restrict or access PDF files.

What's New in Moving and Accessing SAS 9.2 Files

Overview

Topics that relate to moving and accessing SAS 9.2 files contain several documentation enhancements.

Documentation Enhancements

Several documentation enhancements relate to the Cross-Environment Data Access (CEDA) functionality:

- CEDA limitations are identified.
- Improved methods and examples are provided to create a SAS file in a foreign format and to change a SAS file from a native format to a foreign format.

What's New in SAS Interface to Application Response Measurement (ARM)

Overview

In 9.2, the SAS ARM interface uses the SAS logging facility to enhance and simplify gathering performance data for analysis. The SAS logging facility is a flexible and configurable framework that you can use to collect, categorize, and filter events, and write them to a variety of output devices. The SAS 9.2 ARM interface offers two logging methods, the SAS logging facility and the ARM log. The SAS ARM interface contains the following new features:

- %PERFINIT Macro, which specifies the application name
- ARM Appender Overview, which processes ARM transaction events and sends the events to a specified output destination
- Default Correlators, which are used to track parent and child transactions
- Default User Metrics and Performance Macros, which are used to measure start, update, and stop times
- ARM Performance Macros, which contain default user metrics
- SAS Logging Facility, which enables more flexibility and control of the ARM log locations and message formats

What's New in SAS 9.2 Logging

Overview

The logging facility, new with SAS 9.2, is a flexible, configurable framework that you can use to collect, categorize, and filter events and write them to a variety of output devices. The logging facility supports problem diagnosis and resolution, performance and capacity management, and auditing and regulatory compliance.

General Enhancements

In the second maintenance release after SAS 9.2, `FilteringAppender` has been added to the documentation. This appender enables you to filter events to determine whether they should be passed to a referenced appender. The appender can apply a layout to the events before they are passed.

The primary use of `FilteringAppender` is to specify different layouts for different categories of events that are to appear together in the same log.

What's New in the SAS 9.2 Macro Language Facility

Overview

The Macro Language Facility has the following enhancements:

- new automatic macro variables that enable you to reduce the amount of text that is needed to perform common tasks
 - new macro system options that enable you to define and redefine macros and to better control their execution
 - new %MACRO statement options that enable you to create secure macros and to integrate macros with other parts of your SAS programs
 - new autocall macros and macro functions that support DBCS
-

New Automatic Macro Variables

- The &SYSENCODING automatic macro variable contains the name of the current session encoding.
 - The &SYSERRORTXT automatic macro variable contains the text of the last error message formatted for display on the SAS log.
 - The &SYSHOSTNAME automatic macro variable contains the host name of a computer.
 - The &SYSLOGAPPLNAME automatic macro variable contains the value of the LOGAPPLNAME system option. This automatic macro variable is for SAS 9.2 Phase 2 and later.
 - The &SYSTCPIPHOSTNAME automatic macro variable contains the host names of the local and remote computers when multiple TCP/IP stacks are supported.
 - The &SYSWARNINGTEXT automatic macro variable contains the text of the last warning message formatted for display on the SAS log.
-

New SAS Macro System Options

- The MCOMPILE system option allows new definitions of macros.
 - The MEXECNOTE system option displays the macro execution information in the SAS log at macro invocation.
 - The MEXECSIZE system option specifies the maximum macro size that can be executed in memory.
 - The MINOPERATOR system option specifies that the macro processor recognizes and evaluates the mnemonic **IN** and the special character **#** as logical operators when evaluating arithmetic or logical expressions during the execution of the macro.
 - The MREPLACE system option enables existing macros to be redefined.
-

New Options for the %MACRO Statement

- The MINDELIMITER= option specifies a value that overrides the MINDELIMITER= global option during a macro session.
- The SECURE option enables you to write secure macros that protect intellectual property contained in

stored compiled macros.

- The MINOPERATOR option specifies that the macro processor recognizes and evaluates the mnemonic **IN** and the special character **#** as logical operators when evaluating arithmetic or logical expressions during the execution of the macro.
-

New Autocall Macros and Macro Functions for DBCS

- In SAS 9.2 release, there are new autocall macros and macro functions that support East Asian double-byte character sets. The autocall macros and macro functions for DBCS were not documented until the third maintenance release for SAS 9.2.

What's New in the SAS 9.2 Scalable Performance Data Engine

Overview

The SAS 9.2 Scalable Performance Data (SPD) Engine has the following enhancements:

- new and enhanced data set options
- new and enhanced LIBNAME statement options
- new and enhanced system options

These enhancements enable the SPD Engine to perform rapid processing of very large data sets that are stored in partitions across multiple disk volumes.

SPD Engine Data Set Options

COMPRESS=

The COMPRESS= data set option now supports binary compression with the CHAR and BINARY options.

ENCRYPT=

The new ENCRYPT= data set option specifies whether to encrypt an output SPD Engine data set.

IDXBY=

The new IDXBY= data set option specifies whether to use indexes when processing BY statements in the SPD Engine. In some cases, this option can enhance performance.

LISTFILES=

The new LISTFILES= data set option is used only with the CONTENTS procedure. It lists the complete pathnames of all of the component files of an SPD Engine data set.

PARTSIZE=

The PARTSIZE= data set option now expresses the partition size value in gigabytes, terabytes, or the default megabytes. The maximum number of megabytes has increased to 8,796,093,022,207.

SPD Engine LIBNAME Statement Options

ACCESS=READONLY

The ACCESS=READONLY LIBNAME statement option determines the access level of the data source. Using this option prevents writing to the data source.

IDXBY=

The new IDXBY= LIBNAME statement option specifies whether to use indexes when processing BY statements in the SPD Engine. In some cases, this option can enhance performance.

PARTSIZE=

The PARTSIZE= LIBNAME statement option now expresses the partition size value in gigabytes, terabytes, or the default megabytes. The maximum number of megabytes has increased to 8,796,093,022,207.

SPD Engine System Options

COMPRESS=

The COMPRESS= system option now supports binary compression with the CHAR and BINARY options.

MINPARTSIZE=

The MINPARTSIZE= system option now has a default of 16 megabytes, instead of 0 megabytes.

SPD Engine Compatability

A new section has been added with information for upgrading from SAS 9.1.3 to SAS 9.2.

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What's New in the SAS 9.2 XML LIBNAME Engine

Overview

SAS 9.2 provides two versions for XML LIBNAME engine functionality.

- By specifying the engine nickname **XML**, you access the SAS 9.1.3 XML engine functionality.
- By specifying the engine nickname **XML92**, you access the new SAS 9.2 XML engine functionality with enhancements and changes.

Note: In the third maintenance release for SAS 9.2, XML92 functionality is production, except for the WSDL markup type, which is preproduction. ■

Note: In the z/OS environment, XML92 functionality is preproduction. ■

The **XML92** engine nickname provides the following enhancements and changes:

- an enhanced LIBNAME statement
- new XMLMap functionality
- diagnostics of obsolete syntax

See Understanding the XML LIBNAME Engine Versions: XML and XML92.

Enhanced LIBNAME Statement

The LIBNAME Statement Syntax has the following enhancements for the **XML92** engine nickname. Some functionality is for SAS 9.2 Phase 2 and later, and some functionality is for the third maintenance release for SAS 9.2.

- In addition to assigning a libref to a specific XML document, you can assign a libref to the physical location of a SAS library in a directory-based environment.
- The XMLTYPE= option now supports the XMLMAP markup type. The XMLMAP markup type specifies that the XML markup is determined by an XMLMap, which tells the XML engine how to interpret an XML document that is being imported or a SAS data set that is being exported.
- For SAS 9.2 Phase 2 and later, the XMLTYPE= option supports the WSDL markup type. The WSDL markup type supports the markup standards of the Web Services Description Language (WSDL). Specifying the WSDL markup type enables the XML engine to invoke a Web service and import the Web service results. The PARMS= data set option is provided to specify the input parameters SAS data set when importing Web service results. See Importing Web Service Results Using the WSDL Markup Type (Preproduction) and PARMS= Data Set Option.
- For the third maintenance release for SAS 9.2, there are several new options for the WSDL markup type. For a list of the new options, see LIBNAME Statement Options.

For both the **XML** and **XML92** engine nicknames, the value RELAX for the XMLPROCESS= option has changed to PERMIT. XMLPROCESS=PERMIT accepts character data that does not conform to World Wide Web Consortium (W3C) specifications. Use XMLPROCESS=PERMIT cautiously; this value is provided as a convenience. If an XML document has non-escaped characters, the content is not standard XML construction.

New XMLMap Functionality

XMLMap functionality has the following enhancements for the **XML92** engine nickname:

- You can now export an XML document from a SAS data set using the XMLMap that was created to import the XML document. The XMLMap tells the XML engine how to map the SAS format (variables and observations) into the specific XML document structure. See Exporting XML Documents Using an XMLMap.
 - The XMLMap Syntax Version 1.9 has the following enhancements:
 - The new OUTPUT, HEADING, ATTRIBUTE, and TABLEREF elements enable you to include file attribute information in the exported XML document.
 - The COLUMN element now supports the replace= attribute, which controls concatenation of data. The COLUMN element also supports the class= attribute, which determines the type of generated variable.
 - The new DECREMENT-PATH element defines when to decrement the accumulated value for a counter variable.
-

Obsolete Syntax

For the **XML92** engine nickname, the following syntax is obsolete:

- The OIMDBM and HTML markup types for the XMLTYPE= option in the LIBNAME statement are obsolete.
- The OIMSTART= option in the LIBNAME statement is obsolete.
- You can no longer specify the XMLMAP= option as a data set option. You must specify the XMLMap in the LIBNAME statement for the XML engine.

What's New in the SAS 9.2 CDISC Procedure

Overview

The SAS 9.2 CDISC procedure supports validating a SAS data set against CDISC (Clinical Data Interchange Standards Consortium) Study Data Tabulation Model (SDTM) standards. In addition, several enhancements are implemented for importing and exporting a CDISC Operational Data Model (ODM) XML document.

CDISC SDTM Validation Support

PROC CDISC performs data content validation on a SAS data set that conforms to CDISC SDTM version 3.1. PROC CDISC validates the SAS data set against domains that are provided by CDISC SDTM.

Enhanced CDISC ODM Support

For a CDISC ODM XML document, PROC CDISC provides the following changes:

- There is no longer an ODM normative document (ODM-ND) non-conformance issue. The SignificantDigits attribute (decimal precision) in an ItemDef element for a floating-point value (DataType=float) that is required by the ODM-ND is now generated.
- PROC CDISC behavior for handling SAS data set (ItemGroupDef element), variable (ItemDef element), and format (CodeList element) names is controlled by the new LONGNAMES= processing option. The option determines the sources of captured SAS name parameters and controls the maximum length of SAS names that is valid.
- PROC CDISC produces a directory listing of the CDISC ODM XML document with the DATASETS statement, and PROC CDISC describes the contents of a CDISC ODM SAS data set with the CONTENTS statement.
- The PROC CDISC statement now includes the LANGUAGE= option to specify a language identifier.
- The ORDERNUMBER= processing option determines whether PROC CDISC validates OrderNumber attributes when you import a CDISC ODM XML document.
- PROC CDISC behavior to determine the sources of captured SAS data set and variable labels is controlled by the new USENAMEASLABEL= processing option.
- The CLINICALDATA statement now supports the INVESTIGATORREF= option to determine whether to import the unique identifier for the investigator user, and the SITEREF= option to determine whether to import the unique identifier for the clinical data study location.

What's New in the SAS 9.2 Companion for Windows

Overview

SAS under Windows enables you to complete your data and computation tasks in SAS while integrating with the Windows applications that are already in place on your desktop and within your enterprise. SAS supports information sharing through Windows tools and techniques.

The following changes and enhancements are new in SAS under Windows:

- [SAS Default Directory Path](#)
- [Word Tip](#)
- [Software Migration](#)
- [Support for Windows Version](#)
- [Running SAS In Batch Mode](#)
- [SAS Disk Cleanup Handler Utility](#)
- [Recovery Information If SAS Does Not Start](#)
- [SAS Logging Facility](#)
- [Remote Browsing](#)
- [Reformatting SPSS Files](#)
- [SAS Language Elements](#)

SAS Default Directory Path

The default directory path where SAS is installed has changed. The `C:\Program Files\SAS` directory is now the root location for all of the SAS products that you install. In previous versions of SAS, the directory path was `C:\Program Files\SAS\SAS X.X`. The directory path is now `C:\Program Files\SAS\SASFoundation\9.2`. This path maps to the `!SASROOT` directory that is used in this document.

Word Tip

Information was added about Word Tips that help you understand abbreviations that you add.

Software Migration

The following information was added and enhanced regarding the migration of SAS software.

- Differences between 32-bit SAS for Windows and 64-bit SAS for Windows are clarified.
- Short extensions are now included in Windows File Extensions and their corresponding SAS Member Types table.
- References are now included in Using SAS Files from Other Versions with SAS 9.2 for Windows to the SAS Migration focus area at support.sas.com/migration.
- Starting with SAS 9.1, you can now use the MIGRATE procedure to migrate a SAS library from a previous release. You are now warned not to use the CPORT and CIMPORT procedures when you are regressing a SAS file to a previous release.
- New references to cross-release compatibility are included in the Migration focus area at support.sas.com/migration.

Support for Windows Versions

The following are new:

- Windows Vista x64. Home editions are not supported.
- In the third maintenance release for SAS 9.2, support for Windows 7 x64 is new.
- Windows Server 2008 EPIC (Itanium).
- Windows Server 2008 R2 EPIC (Itanium).

Windows NT, Windows 2000 Server, and Windows Server 2008 are not supported.

Running SAS in Batch Mode

Information about running SAS in batch mode was added to the document.

SAS Disk Cleanup Handler Utility

The SAS Disk Cleanup Handler Utility is new. The SAS Disk Cleanup Handler will search for and clean any temporary files or directories that were generated by SAS. The SAS Disc Cleanup Handler Utility cleans directories such as SAS Work and SAS_util directories as well. SAS Disk Cleanup Handler is a COM hook into the Microsoft Disk Cleanup Handler (cleanmgr.exe).

Recovery Information If SAS Does Not Start

Information has been added to the What If SAS Does Not Start? section to recover if SAS does not start, if the screen appears and then disappears, or if SAS is very slow.

SAS Logging Facility

Information about the SAS Logging Facility has been added to the document.

Remote Browsing

Information about remote browsing has been added to the document.

Reformatting SPSS Files

Information about reformatting SPSS files has been added to the document.

SAS Language Elements

Commands

The following SAS command was modified:

- The ICON command has two new arguments: ON and OFF.

Data Set Options

The following data set option is new:

- The SGIO data set option

Functions

Options FILE SIZE and DATE MODIFIED were added to the FINFO function.

Statements

The following statements was modified:

- In the third maintenance release for SAS 9.2, the INFILE statement's option TERMSTR values: CRLF, LF were modified. NL was replaced with CR.

The range of the LRECL (record-length) option was changed to 1 - 1,073,741,823 for the following statements:

- FILE
- FILENAME
- %INCLUDE
- INFILE

Macros

The automatic macro variable, SYSSCPL, has several new values. The SYSSCPL variable returns the name of the specific Windows environment that you are using.

System Options

The following system options are enhanced:

- Information was added to the MEMSIZE system option to specify the total amount of memory that is available to each SAS session.
- In the third maintenance release for SAS 9.2, information was modified to the SASINITIALFOLDER to clarify the open OPEN and CLOSE dialog boxes and current folder.

The following system options are new:

- APPEND
- INSERT
- PRIMARYPROVIDERDOMAIN
- PRNGETLIST

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What's New in the SAS 9.2 Companion for UNIX Environments

Overview

SAS 9.2 in UNIX environments has the following new and enhanced features:

- [direct file I/O options](#)
- [file locking](#) capabilities
- [SAS Remote Browser](#)
- [multiple work directories](#)
- [installation and configuration changes](#)
- [64-bit architecture](#)
- [SAS logging facility](#)
- [shared executable libraries](#) enhancements
- [data set option](#) enhancements
- [function](#) changes
- [procedure](#) enhancements
- [statement](#) changes
- [system option](#) changes
- [IPv6 Standard](#)
- [documentation enhancements](#)

Direct File I/O Options

Changes to direct file I/O include the addition of the following new options:

- ENABLEDIRECTIO LIBNAME statement option
- USEDIRECTIO= data set option
- USEDIRECTIO= LIBNAME statement option

File Locking

File locking has been enhanced in the following ways:

- The FILELOCKWAITMAX system option is new.
- A new syntax format has been added to the FILELOCKS system option.

SAS Remote Browser

The SAS Remote Browser enables you to view SAS documentation, URLs that are specified in the

WBROWSE command, and some ODS HTML output in the default Web browser on your local computer. By displaying this documentation locally, you have faster access to the documentation. In addition, you free resources on the SAS server that were used by Netscape.

You configure remote browsing by using the following system options:

- HELPHOST
- HELPPORT System Option in **SAS Language Reference: Dictionary**.

Multiple Work Directories

SAS makes the distribution of work libraries dynamic by optionally distributing work libraries across several directories. When the argument to work is a list of directories in a file, you can also specify a method to use for choosing which directory to use for Work. METHOD=RANDOM and METHOD=SPACE are available.

Installation and Configuration Changes

- The default directory path where SAS is installed has changed.

In SAS 9.2, the default directory path and executable are:

```
!SASROOT          = /usr/local/SAS/SASFoundation/9.2/  
SAS executable    = /usr/local/SAS/SASFoundation/9.2/sas
```

In previous releases, the default directory path and executable were:

```
!SASROOT          = /usr/local/SAS/SAS_x.x/  
SAS executable    = /usr/local/SAS/SAS_x.x/sas
```

- The sasv9_local.cfg file, which contains user-specified options and overrides the options in the default configuration file, has been added to the !SASROOT directory and to the order of precedence for SAS configuration files.

64-bit Architecture

You can now run a 64-bit version of SAS on Linux for x64.

SAS Logging Facility

The SAS 9.2 logging facility enables the categorization and collection of log event messages and writes them to a variety of output devices. The logging facility supports problem diagnosis and resolution, performance and capacity management, and auditing and regulatory compliance.

Shared Executable Libraries

Shared libraries in SAS can store useful routines that might be needed by multiple applications. When an application needs a routine that resides in an external shared library, the application loads the shared library, invokes the routine using the ROUTINE statement, and unloads the shared library upon completion of the routine. In the ROUTINE statement, the following three return types for the RETURNS= argument have been added:

- PTR
 - [U]INT32
 - [U]INT64
-

SAS Language Elements

Data Set Options

The new USEDIRECTIO= data set option turns on direct file I/O for the library that contains the file to which the ENABLEDIRECTIO option in the LIBNAME statement has been applied.

Functions

The LIBNAME function was removed from this Companion because it is portable.

Procedures

The SORT procedure now supports the DETAILS statement option. The DETAILS statement option specifies that PROC SORT write messages to the SAS log about whether the sort was performed in memory.

Statements

The following statements have been enhanced:

- The FILENAME statement now supports the LOCKINTERNAL statement option, which specifies SAS system locking for files that are associated with a fileref in the FILENAME statement. LOCKINTERNAL has the following arguments:

AUTO

locks a file so that in a SAS session, if a user has Write access to the file, then no other users can have Read or Write access to the file.

SHARED

locks a file so that in a SAS session, two users do not have simultaneous Write access to the file. The file can be shared simultaneously by one user who has Write access and multiple users who have Read access.

- The FILENAME statement now supports the Secure File Transfer Protocol (SFTP) access method, which enables you to access remote files by using SFTP.
- The LIBNAME statement now supports the following new statement options:

ENABLEDIRECTIO

specifies that direct file I/O can be available for all of the files that are opened in the library that is identified in the LIBNAME statement.

FILELOCKWAIT

specifies the number of seconds that SAS will wait for a locked file to become available to another process.

TRANSFERSIZE

specifies the size of a large block of data that is read from a file that is opened.

USEDIRECTIO=

if used with the ENABLEDIRECTIO option in the LIBNAME statement, turns on direct file I/O for all of the files that are associated with the libref that is listed in the LIBNAME statement.

System Options

The following system options are new:

- FILELOCKWAITMAX, which sets an upper limit on the time that SAS will wait for a locked file.
- FMTSEARCH, which specifies the order in which format catalogs are searched.
- HELPHOST, which specifies the name of the local computer where the SAS Remote Browser displays HTML pages.
- PRIMARYPROVIDERDOMAIN, which specifies the domain name of the primary authentication provider.

The following system options have been enhanced:

- The APPEND system option now supports the FMTSEARCH option.
- The INSERT system option now supports the FMTSEARCH option.
- The FULLSTIMER system option now specifies whether to display all available system performance statistics, as well as the datetime stamp in the SAS log.

The following system options are obsolete:

- ASYNCHIO
- COMAUX2
- DOCLOC
- FSDEVICE
- GISMAPS
- HELPENCMD

- INGOPTS
- NETMAC
- SEQENGINE
- TAPECLOSE

The following system options are no longer specific to UNIX, and are documented in **SAS Language Reference: Dictionary**:

- S
- S2

IPv6 Standard

SAS supports the next generation of IPv6 (Internet Protocol version 6), which is the successor to IPv4. Rather than replacing IPv4 with IPv6, SAS 9.2 supports both standards. A primary reason for the new version is that the limited supply of 32-bit IPv4 address spaces is being depleted. IPv6 uses a 128-bit address scheme, which provides more IP addresses than IPv4.

Documentation Enhancements

The following documentation enhancements have been made:

- A new section called Sharing External Files in a UNIX Environment has been added to the documentation about file locking in external files.
- A new section called Using Direct I/O has been added.
- A table of tools in the !SASROOT/utilities/bin directory has been added to Appendix 2, "Tools for the System Administrator."
- A section called Case Sensitivity in Data Set Names has been added.
- In the performance tuning section of PROC SORT, a section called How SAS Determines the Amount of Memory to Use has been added. The section provides a discussion of the MEMSIZE, REALMEMSIZE, and SORTSIZE system options.
- The documentation for the SSLCALISTLOC, SSLCERTLOC, SSLCLIENTAUTH, SSLCRLCHECK, SSLCRLLOC, SSLPVTKEYLOC, and SSLPVTKEYPASS system options has been relocated to **Encryption in SAS**. The "Using SSL in a UNIX Environment" section has been moved to **Encryption in SAS**.
- Sections called SAS Invocation Scripts and SAS Configuration Files have been added.
- The documentation for UMASK has been enhanced. It now includes a section about changing the file permissions for your SAS session. The discussion of UMASK in the WORKPERMS system option has also been enhanced.
- The table of kill signals and their functions has been added. The table includes options and descriptions of `kill` commands, such as SIGINT, SIGNULL, and SIGTERM.
- An appendix has been added that lists and describes command line commands that are not specific to UNIX, but that you can use for editing in your SAS session.

What's New in SAS 9.2 OpenVMS Companion

Overview

The following features are new or enhanced for SAS 9.2:

- SAS 9.2 is supported on the OpenVMS 8.3 for HP Integrity Servers operating environment.
 - The SAS Remote Browser displays HTML documents in the Web browser on your computer.
 - The Work library name is unique for each SAS session. SAS appends the time that it started to the Work library name.
 - SAS commands, functions, and statements support new record lengths and command-line lengths.
-

The SAS Remote Browser

The SAS Remote Browser displays the following HTML documents in the default Web browser on your local computer:

- SAS documentation
- URLs that are specified in the WBROWSE command
- ODS HTML, PDF, and RTF output

By displaying these HTML documents locally, you have faster access to the documentation. In addition, you free resources on the SAS server that were used by Netscape. You configure remote browsing using the HELPBROWSER=, HELPHOST= and HELPPORT= system options.

For more information, see [Viewing Output and Help in the SAS Remote Browser](#).

Update to the CONCUR Engine

Beginning with SAS 9.2, phase 2, the CONCUR engine reads only SAS data sets that are aligned by data type. Data sets that were created with the CONCUR engine before SAS 9.2, phase 2, are unaligned. These data sets must be aligned to be read e CONCUR engine in SAS 9.2, phase 2, or later. For more information, see [Reading Aligned and Unaligned Data Sets](#).

SAS Language Elements

Commands

The following command has been enhanced:

- The X command accepts the new maximum OpenVMS command-line length of 4,096 characters.

Functions

The following functions have been enhanced:

- The RENAME function now runs on all operating environments. For OpenVMS, the RENAME function renames a file, not a data set, when the current filename and the new filename are the only two arguments for the function.
- The RECFM=N host option for the FILENAME function documents the maximum number of bytes (8,192) that can be read at one time from a binary file with no record boundaries.

Procedures

The following procedure has been renamed:

- The VAXTOAXP procedure has been renamed VAXTOINTEG.

Statements

The following statements have been enhanced:

- The default value of the LRECL= host option for the FILE, FILENAME, %INCLUDE, and INFILE statements is the value of the new LRECL= system option.
- The RECFM=N host option for the FILE, FILENAME, %INCLUDE, and INFILE statements documents the maximum number of bytes (8,192) that can be read at one time from a binary file with no record boundaries.

System Options

The following system option is new:

- The HELPHOST system option specifies the name of the local computer where the SAS Remote Browser displays HTML pages.

The following system options have been enhanced:

- The FULLSTIMER system option displays additional statistics in the SAS log.
- When the NOXCMD system option is specified, several SAS statements, functions, and macros cannot be used.

The following system options are no longer specific to OpenVMS; see these system options in **SAS Language Reference: Dictionary**:

- S
- S2

The following system options are obsolete:

- COMAUX2
- DOCLOC
- GISMAPS
- INGOPTS
- NETMAC
- SEQENGINE
- TAPECLOSE

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What's New in the SAS 9.2 Companion for z/OS

Overview

SAS for z/OS has the following new features and enhancements:

- [installation change](#)
- [software enhancements](#)
- [new support for Extended Addressability Volumes](#)
- [new cleanwork utility](#)
- [new %ISHCONV macro](#)
- [new SAS logging facility](#)
- [new FTP function](#)
- [new TKMVSENV Option](#)
- [enhanced statements](#)
- [new system options](#)
- [enhanced system options](#)
- [deprecated system options](#)
- [documentation enhancements](#)

Installation Change

The default directory path where SAS is installed has changed to the following location:

```
SASROOT = /<customer specified UFS root>/<customer.mvs.prefix>/SASFoundation/9.2/  
SASHOME = /<customer specified UFS root>/<customer.mvs.prefix>/  
UFSROOT = /<customer specified UFS root>/
```

UFS refers to the UNIX file system.

SAS Software Enhancements

- The SASRX REXX exec provides an alternative to the SAS CLIST for invoking SAS. SASRX supports the same command-line syntax as the SAS CLIST. SASRX also supports more options than the SAS CLIST, including mixed-case option values, options specified in a UNIX format, direct specification of SAS system options, and the use of UNIX System Services (USS) file and directory names as option values.
- The Default Options Table and Restricted Options Table enable site administrators to specify SAS system options in a restricted options table for their entire site, a specific group of users, or an individual user.
- The SAS Remote Browsing System has replaced the SAS Help Browser. The SAS Remote Browsing System enables you to view SAS documentation from a Web browser the same as the SAS Help Browser did in previous versions of SAS. Remote browsing is invoked when SAS displays HTML output, usually from the Output Delivery System (ODS), the Help system, or from the WBROWSE command. The process to set up the remote browser has been simplified, and the SAS Remote Browsing System also enables you to convert your item store help files to HTML help files.

- SAS supports random access (byte-addressable) techniques to create and to read BSAM files.
 - SAS supports the next generation of Internet Protocol, IPv6, which is the successor to the current Internet Protocol, IPv4. Rather than replacing IPv4 with IPv6, SAS 9.2 supports both protocols. A primary reason for the new protocol is that the limited supply of 32-bit IPv4 address spaces was being depleted. IPv6 uses a 128-bit address scheme, which provides more IP addresses than did IPv4. For information about the `DISABLESASIPV6=` and `TCPRSLV=` options that control TCP/IP, see `TKMVSENV` File.
 - The format of a SAS configuration file has been enhanced with support for variable-length records. The configuration file also has been improved to support comments and to support the continuation of long option specifications across multiple lines.
 - SAS autocall macros can be stored in a UFS directory, a native z/OS PDS or a PDSE, or a combination of these locations. For more information about autocall libraries, see `SASAUTOS=` System Option.
 - When you access a UFS file by using aggregate syntax, such as `fileref(member)`, where `fileref` is assigned to a UFS directory, without a file extension and without quotation marks around the member name, the file name is converted to lowercase and an appropriate file extension is appended. The previous implementation respected the file name case as it was entered and appended the appropriate extension. For more information about accessing a UFS file with aggregate syntax, see `Accessing a Particular File` in a UNIX System Services Directory.
-

Support for z/OS Extended Addressability Volumes

The second maintenance release for SAS 9.2 provides support for z/OS Extended Addressability Volumes (EAV). This support is new in z/OS V1R10, and it is expanded in z/OS V1R11. The following list contains details about the support that SAS offers for EAV.

- SAS supports the VTOC ACCESS METHOD when this access method is used with EAV volumes.
 - SAS support for VSAM data sets has been expanded to include data sets that are allocated in Extended Addressability Space. This support includes external file support (`FILENAME`, `FILE`, and `INFILE` statements, and the `FILENAME` function), as well as support for SAS bound libraries in VSAM linear data sets.
 - zFS file systems are allocated within VSAM data sets and can be placed in Extended Addressability Space.
 - SAS support for Extended Format Sequential data sets has been expanded to include data sets that are allocated in the Extended Addressability Space. This feature is new in z/OS V1R11.
-

New cleanwork Utility

The cleanwork utility enables you to delete any leftover Work and Utility directories whose associated SAS process has ended.

New SAS Macro

The `%ISHCONV` macro enables you to convert item store help to HTML files that can be read by the Remote Browsing System.

New SAS Logging Facility

The SAS logging facility is a flexible, configurable framework for collecting, categorizing, and filtering events that are generated by SAS processes and writing events to a variety of output devices.

New FTP Function

SAS supports Using FTP with Universal Printing for sending universal printing output to a printer or to a file that is on another server, another machine, or another operating system.

New TKMVSENV Option

The third maintenance release for SAS 9.2 contains the new TKMVSENV option, TKOPT_ENV_UTILLOC. This option enables you to specify a UFS directory for temporary files.

Enhanced SAS Statements

The following SAS statements have been enhanced:

- The FILE statement has two new options, BOM and BOMFILE. These options include a Byte Order Mark in a UNICODE-encoded file when the file is created.
 - FILENAME
 - The BOM and BOMFILE options include a Byte Order Mark when a UNICODE-encoded file is created.
 - The DSNTYPE option enables you to specify a sequential data set with a format of basic, large, or extended.
 - The LOCKINTERNAL option enables you to set restrictions on how multiple users can simultaneously access a file.
 - The LRECL option for UNIX file system (UFS) files and for spanned-format native MVS files has been increased to 16,777,215. LRECL can now be expressed in kilobytes or megabytes by specifying an integer followed with a **k** or **m** suffix.
 - The NOMVSTRANS option has been restricted so that it is supported only for the Single-Byte Character Set (SBCS) version of SAS.
 - The REUSE option enables you to reuse an existing file allocation for a new allocation.
 - You can access files on other systems in your network by using the FTP, SFTP, and SOCKET access methods.
 - %INCLUDE
 - The ENCODING option specifies the encoding to use when reading from the specified source. The value for ENCODING indicates that the specified source has a different encoding from the current session encoding.
 - The S2V option specifies which column to use to begin scanning text from secondary source files that have a variable record format.
 - LIBNAME has a new option, DSNTYPE, that enables you to specify a sequential data set with a format of basic, large, or extended.
-

New SAS System Options

The following SAS system options are new:

- The APPEND option enables you to append the specified value for the FMTSEARCH, HELPLOC, MAPS, MSG, SASAUTOS, SASHELP, or SASSCRIPT system options to the existing value of the specified option.
- The DLDISPCHG option controls changes in the allocation disposition for an existing library data set.
- The DLDSNTYPE option specifies whether the default value of the DSNTYPE LIBNAME option is BASIC, LARGE, or NONE.

- The DLHFSDIRCREATE option creates a UFS directory for a SAS library that is specified with LIBNAME if the library does not exist.
 - The DLSEQDSNTYPE option specifies the default value of the DSNTYPE LIBNAME option for sequential-format disk files.
 - The ECHO option specifies a message that is to be echoed to the SAS log while you are initializing SAS.
 - The FILELBI option controls the use of the z/OS Large Block Interface support for BSAM and QSAM files, as well as files on tapes that have standard labels.
 - The FILESEQDSNTYPE option specifies the default value that is assigned to the DSNTYPE FILENAME option when it is not specified with a filename statement, a DD statement, or a TSO ALLOC command.
 - The FILESYNC option specifies when the operating system is to write the buffers that contain modified contents of permanent SAS files to disk.
 - The INSERT option enables you to insert the specified value for the FMTSEARCH, HELPLOC, MAPS, MSG, SASAUTOS, SASHELP, or SASSCRIPT options at the beginning of the value that is already specified for the system option.
 - The LRECL option specifies the default logical record length to use for reading and writing external files.
 - The PRIMARYPROVIDERDOMAIN system option specifies the domain name of the primary authentication provider.
 - The V6GUIMODE option specifies that SAS uses the Version 6 style for all of the SCL selection list windows.
-

Enhanced SAS System Options

The following SAS system options have been enhanced:

- The BLKSIZE(*device-type*) option has a default value of HALF, instead of 6144. HALF corresponds to the largest efficient block size that is supported by SAS and standard access methods.
 - The CONFIG option can be specified on a command line or in a configuration file.
 - The FILELOCKS option has four new values: AUTO, SHARED, <path>, and <setting>. The AUTO and SHARED values perform the same as the equivalent values of the LOCKINTERNAL option of the FILENAME statement. The <path> and <setting> values specify a UFS directory and operating system locking value for the directory.
 - In the third maintenance release for SAS 9.2, the SASAUTOS system option supports the concatenation of autocall libraries that have different encodings.
 - The SORTWKNO option can specify the allocation of 0-99 sort work data sets.
 - The WORK option enables the specification of the SAS WORK library in a UFS directory.
 - The WORKTERM option specifies whether SAS erases WORK files at the termination of a SAS session. NOWORKTERM is still the default value for work libraries that reside in a bound library, but WORKTERM is the default value for libraries that reside in a UFS directory.
-

Deprecated SAS System Options

The following SAS system options have been deprecated:

- HELPINDEX
 - HELPTOC
 - PRODTOC
-

Documentation Enhancements

The documentation for SAS on z/OS has traditionally used the terms UNIX System Services (USS) and hierarchical

file system (HFS) to refer to the UNIX file system on z/OS. The SAS 9.2 documentation uses the terms UNIX file system and UFS to refer to this file system. The UNIX environment on z/OS and the UNIX file system are not the same thing. The documentation continues to use the terms UNIX System Services and USS to refer to the UNIX environment instead of the UNIX file system.

In addition to the original HFS implementation, the z/OS operating system also provides another UNIX file system known as the z/OS file system (zFS). zFS, which provides certain performance and manageability benefits, is functionally equivalent to HFS from the perspective of a SAS user.

Most occurrences of HFS, USS, and zFS have been changed to UFS. HFS is still used in feature names and in syntax statements and prefixes where it is the correct term. USS is still used where it refers to the UNIX environment on z/OS. The following list indicates the terminology changes:

- UFS file system replaces HFS file system and USS file system.
- UFS file replaces HFS file and USS file.
- UFS library replaces HFS library and USS library.

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What's New in the SAS 9.2 VSAM Processing for z/OS

Overview

SAS 9.2 VSAM processing for z/OS has a new system option, VSAMRLS, that enables record-level sharing for a VSAM data set.

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What's New in SAS/ACCESS 9.2 Interface to PC Files

Overview

SAS/ACCESS 9.2 Interface to PC Files enables you to read data from PC files to use in your SAS reports and applications. The following enhancements were made in SAS 9.2:

- Support for additional PC Files types.
- The enhanced PC Files Server application can run as a Windows service and supports user authentication. PC Files Server supports the client/server model for JMP, SPSS, and Stata files.
- The IMPORT and EXPORT procedures and the Import and Export Wizard have been enhanced to support PC-specific 64-bit SAS running on a 64-bit Windows operating environment.
- Reading date and time value differences between SAS and Microsoft files is supported.
- Support for the LIBNAME UNICODE= option has been added.
- The FMTLIB= option enables you to associate a format library to PC data.
- Document enhancements.

PC Files

Starting in SAS 9.2 Phase 2, the SAS import and export utilities support the following file types:

- dBase DBF Files
- Lotus 1-2-3 WK n Files
- Microsoft Access Database Files
- Microsoft Excel Workbook Files
- JMP Files
- Paradox DB File Formats
- SPSS SAV Files
- Stata DTA Files

Starting in the third maintenance release for SAS 9.2, Base SAS supports access to JMP files. You can access JMP files with the Import and Export procedures and the Import and Export Wizard without a license for SAS/ACCESS Interface to PC Files.

PC Files Server

Starting in SAS 9.2 Phase 2, the enhancements to the PC Files Server application include the following features:

- support for running PC Files Server as a Windows service
- authentication options enabling PC Files Server system administrators to secure the server and enforce security

- autostart option for Microsoft 64-bit Windows systems

In the third maintenance release for SAS 9.2, SAS/ACCESS Interface to PC Files supports the client/server model for JMP, SPSS, and Stata files. This enables you to run SAS on UNIX and access these PC file types by connecting to a PC Files Server.

The Import and Export Wizards and Procedures

In the third maintenance release for SAS 9.2, PC-specific 64-bit SAS and 64-bit Windows support for the IMPORT and EXPORT procedures and the Import and Export Wizard are new. Microsoft Excel Workbook on PC Files Server and Microsoft Access Database on PC Files Server have been added to the data source options list in the wizard.

Date and Time Value Differences between SAS and Microsoft Files

Starting in SAS 9.2 Phase 2, in different versions of SAS, the IMPORT procedure and the LIBNAME engine can read formatted date and time values from Microsoft Access and Excel files.

The LIBNAME Option

Starting in SAS 9.2 Phase 2, support for the LIBNAME UNICODE= option is available. You can specify whether SAS binds the character type columns with wide character mode (YES) or narrow character mode (NO). By adding UNICODE=YES to your LIBNAME statement, you enable character data such as DBCS to be returned correctly.

Support for Formats

Starting in SAS 9.2 Phase 2, support for the FMTLIB= option is available. You can associate a format library with your PC data.

Documentation Enhancements

SAS/ACCESS 9.2 Interface for PC Files: Reference was significantly reorganized and rewritten.

What's New in SAS/ACCESS 9.2 for Relational Databases

Overview

SAS/ACCESS 9.2 for Relational Databases has these new features and enhancements:

- In the second maintenance release for SAS 9.2, [SAS/ACCESS Interface to Greenplum](#) and [SAS/ACCESS Interface to Sybase IQ](#) are new. In the December 2009 release, [SAS/ACCESS Interface to Aster nCluster](#) is new.
- Pass-through support is available for database management systems (DBMSs) for new or additional SAS functions. This support includes new or enhanced function for the SQL_FUNCTIONS= LIBNAME option, a new SQL_FUNCTIONS_COPY= LIBNAME option for specific DBMSs, and new or enhanced hyperbolic, trigonometric, and dynamic SQL dictionary functions.
- You can create temporary tables using DBMS-specific syntax with the new DBMSTEMP= LIBNAME option for most DBMSs.
- SAS/ACCESS supports additional hosts for existing DBMSs.
- You can use the new SAS In-Database technology to generate a SAS_PUT() function that lets you execute PUT function calls inside the Teradata Enterprise Data Warehouse (EDW). You can also reference the custom formats that you create by using PROC FORMAT and most formats that SAS supplies.
- In the second maintenance release for SAS 9.2, you can use the new SAS In-Database technology to run some Base SAS and SAS/STAT procedures inside the Teradata Enterprise Data Warehouse (EDW).
- In the third maintenance release for SAS 9.2, three additional Base SAS procedures have been enhanced to run inside the database: REPORT, SORT, and TABULATE. In addition, the Base SAS procedures can be run now inside Oracle and DB2 UNIX and PC Hosts.
- The second maintenance release for SAS 9.2 contains [Documentation Enhancements](#).

All Supported SAS/ACCESS Interfaces to Relational Databases

These options are new.

- AUTHDOMAIN= LIBNAME option
- DBIDIRECTEXEC= system option, including DELETE statements
- brief trace capability (',,db' flag) on the SASTRACE= system option

To boost performance when reading large tables, you can set the OBS= option to limit the number of rows that the DBMS returns to SAS across the network.

Implicit pass-through tries to reconstruct the textual representation of a SAS SQL query in database SQL syntax. In the second maintenance release for SAS 9.2, implicit pass-through is significantly improved so that you can pass more SQL code down to the database. These textualization improvements have been made.

- aliases for:
 - inline views

- SQL views
 - tables
 - aliased expressions
 - expressions that use the CALCULATED keyword
 - SELECT, WHERE, HAVING, ON, GROUP BY, and ORDER BY clauses
 - more deeply nested queries or queries involving multiple data sources
 - PROC SQL and ANSI SQL syntax
-

DBMS-Specific New Function and Enhancements

[SAS/ACCESS Interface to Aster nCluster](#)

[SAS/ACCESS Interface to DB2 under UNIX and PC Hosts](#)

[SAS/ACCESS Interface to DB2 under z/OS](#)

[SAS/ACCESS Interface to Greenplum](#)

[SAS/ACCESS Interface to HP Neoview](#)

[SAS/ACCESS Interface to Informix](#)

[SAS/ACCESS Interface to MySQL](#)

[SAS/ACCESS Interface to Netezza](#)

[SAS/ACCESS Interface to ODBC](#)

[SAS/ACCESS Interface to OLE DB](#)

[SAS/ACCESS Interface to Oracle](#)

[SAS/ACCESS Interface to Sybase](#)

[SAS/ACCESS Interface to Sybase IQ](#)

[SAS/ACCESS Interface to Teradata](#)

SAS/ACCESS Interface to Aster nCluster

In the December 2009 release for SAS 9.2, SAS/ACCESS Interface to Aster nCluster is a new database engine that runs on specific UNIX and Windows platforms. SAS/ACCESS Interface to Aster nCluster provides direct, transparent access to Aster nCluster databases through LIBNAME statements and the SQL pass-through facility. You can use various LIBNAME statement options and data set options that the LIBNAME engine supports to control the data that is returned to SAS.

In the third maintenance release for SAS 9.2, this option is new or enhanced:

- PARTITION_KEY= LIBNAME and data set option

SAS/ACCESS Interface to DB2 under UNIX and PC Hosts

These options are new or enhanced.

- FETCH_IDENTITY= LIBNAME and data set options
- automatically calculated INSERTBUFF= and READBUFF= LIBNAME options for use with pass-through
- SQLGENERATION= LIBNAME and system option (in the third maintenance release for SAS 9.2)

These bulk-load data set options are new:

- BL_ALLOW_READ_ACCESS=
- BL_ALLOW_WRITE_ACCESS=
- BL_CPU_PARALLELISM=
- BL_DATA_BUFFER_SIZE=
- BL_DELETE_DATAFILE=
- BL_DISK_PARALLELISM=
- BL_EXCEPTION=
- BL_PORT_MAX=
- BL_PORT_MIN=

BLOB and CLOB data types are new.

In the third maintenance release for SAS 9.2, this new feature is available.

- You can use the new SAS In-Database technology to run these Base SAS procedures inside DB2 under UNIX and PC Hosts:
 - FREQ
 - RANK
 - REPORT
 - SORT
 - SUMMARY/MEANS
 - TABULATE

These procedures dynamically generate SQL queries that reference DB2 SQL functions. Queries are processed and only the result set is returned to SAS for the remaining analysis.

SAS/ACCESS Interface to DB2 under z/OS

These options are new or enhanced.

- DB2CATALOG= system option
- support for multivolume SMS-managed and non-SMS-managed data sets through

BL_DB2DATACLAS=, BL_DB2MGMTCLAS=, BL_DB2STORCLAS=, and BL_DB2UNITCOUNT= data set options

- DB2 parallelism through the DEGREE= data set option
- LOCATION= connection, LIBNAME, and data set options

The BLOB and CLOB data types are new.

In the third maintenance release for SAS 9.2, SAS/ACCESS Interface to DB2 under z/OS included many important overall enhancements, such as:

- significant performance improvements
- reduced overall memory consumption
- improved buffered reads
- improved bulk-loading capability
- improved error management, including more extensive tracing and the ability to retrieve multiple error messages for a single statement at once
- extended SQL function support
- dynamic SQL dictionary
- EXPLAIN functionality
- database read-only access support

IBM z/OS is the successor to the IBM OS/390 (formerly MVS) operating system. SAS/ACCESS 9.1 and later for z/OS is supported on both OS/390 and z/OS operating systems. Throughout this document, any reference to z/OS also applies to OS/390 unless otherwise stated.

SAS/ACCESS Interface to Greenplum

In the October 2009 release for SAS 9.2, SAS/ACCESS Interface to Greenplum is a new database engine that runs on specific UNIX and Windows platforms. SAS/ACCESS Interface to Greenplum provides direct, transparent access to Greenplum databases through LIBNAME statements and the SQL pass-through facility. You can use various LIBNAME statement options and data set options that the LIBNAME engine supports to control the data that is returned to SAS.

SAS/ACCESS Interface to HP Neoview

You can use the new BULKEXTRACT= LIBNAME and data set options, as well as these new data set options for bulk loading and extracting:

- BL_BADDATA_FILE=
- BL_DATAFILE=
- BL_DELIMITER=
- BL_DISCARDS=
- BL_ERRORS=
- BL_DELETE_DATAFILE=

- BL_FAILEDDATA=
 - BL_HOSTNAME=
 - BL_NUM_ROW_SEPS= LIBNAME and data set options (in the third maintenance release for SAS 9.2)
 - BL_PORT=
 - BL_RETRIES=
 - BL_ROWSETSIZE=
 - BL_STREAMS=
 - BL_SYNCHRONOUS=
 - BL_SYSTEM=
 - BL_TENACITY=
 - BL_TRIGGER=
 - BL_TRUNCATE=
 - BL_USE_PIPE=
 - BULKEXTRACT=
 - BULKLOAD=
-

SAS/ACCESS Interface to Informix

These items are new.

- AUTOCOMMIT= LIBNAME option
 - GLOBAL and SHARED options for the CONNECTION= LIBNAME option
 - DBSASTYPE= data set option
 - DBDATASRC environmental variable
 - DATEPART and TIMEPART SAS functions
 - support for special characters in naming conventions
-

SAS/ACCESS Interface to MySQL

The ESCAPE_BACKSLASH= LIBNAME and data set options are new.

SAS/ACCESS Interface to Netezza

The BULKUNLOAD= LIBNAME option is new.

In the third maintenance release for SAS 9.2, you can specify a database other than SASLIB in which to publish the SAS_COMPILEUDF function. If you publish the SAS_COMPILEUDF function to a database other than SASLIB, you must specify that database in the new COMPILEDB argument for the %INDNZ_PUBLISH_FORMATS macro.

In the third maintenance release for SAS 9.2, the SAS_PUT() function supports UNICODE (UTF8) encoding.

SAS/ACCESS Interface to ODBC

These items are new.

- LOGIN_TIMEOUT= LIBNAME option
 - READBUFF= data set option, LIBNAME option, and pass-through support for improved performance
-

SAS/ACCESS Interface to OLE DB

These items are new.

- GLOBAL and SHARED options for the CONNECTION= LIBNAME option
 - BULKLOAD= data set option
 - DBTYPE_GUID and DBTYPE_VARIANT input data types
-

SAS/ACCESS Interface to Oracle

These items are new.

- ADJUST_BYTE_SEMANTIC_COLUMN_LENGTHS=, ADJUST_NCHAR_COLUMN_LENGTHS=, DB_LENGTH_SEMANTICS_BYTE=, DBCLIENT_MAX_BYTES=, and DBSERVER_MAX_BYTES= LIBNAME options for more flexible adjustment of column lengths with CHAR, NCHAR, VARCHAR, and NVARCHAR data types to match encoding on both database and client servers
- BL_DELETE_ONLY_DATAFILE= data set option
- GLOBAL and SHARED options for the CONNECTION= LIBNAME option
- OR_ENABLE_INTERRUPT= LIBNAME option
- BL_DEFAULT_DIR= data set option
- BL_USE_PIPE= data set option
- function and default value for SHOW_SYNONYMS= LIBNAME option
- SQLGENERATION= LIBNAME and system option (in the third maintenance release for SAS 9.2)
- In the third maintenance release for SAS 9.2, this new feature is available:
 - You can use the new SAS In-Database technology to run these Base SAS procedures inside Oracle:
 - FREQ
 - RANK
 - REPORT
 - SORT
 - SUMMARY/MEANS
 - TABULATE

These procedures dynamically generate SQL queries that reference Oracle SQL functions. Queries are processed and only the result set is returned to SAS for the remaining analysis.

SAS/ACCESS Interface to Sybase

These LIBNAME options are new or enhanced.

- GLOBAL and SHARED options for CONNECTION=
- SQL_FUNCTIONS= and SQL_FUNCTIONS_COPY=
- SQL_OJ_ANSI=

Pass-through support is available for new or additional SAS functions, including hyperbolic, trigonometric, and dynamic SQL dictionary functions.

SAS/ACCESS Interface to Sybase IQ

In the December 2009 release for SAS 9.2, SAS/ACCESS Interface to Sybase IQ is a new database engine that runs on specific UNIX and Windows platforms. SAS/ACCESS Interface to Sybase IQ provides direct, transparent access to Sybase IQ databases through LIBNAME statements and the SQL pass-through facility. You can use various LIBNAME statement options and data set options that the LIBNAME engine supports to control the data that is returned to SAS.

SAS/ACCESS Interface to Teradata

These options are new or enhanced.

- BL_CONTROL= and BL_DATAFILE= data set options
- GLOBAL and SHARED options for the CONNECTION= LIBNAME option
- DBFMTIGNORE= system option for bypassing Teradata data type hints based on numeric formats for output processing (in the second maintenance release for SAS 9.2)
- DBSASTYPE= data set option
- FASTEXPORT= LIBNAME options
- MODE= LIBNAME option (in the second maintenance release for SAS 9.2)
- MULTISTMT= LIBNAME and data set option
- QUERY_BAND= LIBNAME and data set options
- SQLGENERATION= LIBNAME and system option (in the second maintenance release for SAS 9.2)
- The Teradata Parallel Transporter (TPT) application programming interface (API) is now supported for loading and reading data using Teradata load, update, stream, and export drivers. This support includes these new options:
 - TPT= LIBNAME and data set options
 - TPT_APPL_PHASE= data set option
 - TPT_BUFFER_SIZE= data set option
 - TPT_CHECKPOINT_DATA= data set option
 - TPT_DATA_ENCRYPTION= data set option
 - TPT_ERROR_TABLE_1= data set option
 - TPT_ERROR_TABLE_2= data set option
 - TPT_LOG_TABLE= data set option
 - TPT_MAX_SESSIONS= data set option
 - TPT_MIN_SESSIONS= data set option

- TPT_PACK= data set option
- TPT_PACKMAXIMUM= data set option
- TPT_RESTART= data set option
- TPT_TRACE_LEVEL= data set option
- TPT_TRACE_LEVEL_INF= data set option
- TPT_TRACE_OUTPUT= data set option
- TPT_WORK_TABLE= data set option
- LDAP function for the USER= and PASSWORD= connection options in the LIBNAME statement

You can use a new SAS formats publishing macro, %INDTD_PUBLISH_FORMATS, and a new system option, SQLMAPPUTTO, to generate a SAS_PUT() function that enables you to execute PUT function calls inside the Teradata EDW. You can also reference the custom formats that you create by using PROC FORMAT and most of the formats that SAS supplies.

In the second maintenance release for SAS 9.2, this new feature is available.

- You can use the new SAS In-Database technology to run these Base SAS and SAS/STAT procedures inside the Teradata Enterprise Data Warehouse (EDW):
 - FREQ
 - PRINCOMP
 - RANK
 - REG
 - SCORE
 - SUMMARY/MEANS
 - VARCLUS

These procedures dynamically generate SQL queries that reference Teradata SQL functions and, in some cases, SAS functions that are deployed inside Teradata. Queries are processed and only the result set is returned to SAS for the remaining analysis.

In the third maintenance release for SAS 9.2, these procedures have been enhanced to run inside the Teradata EDW:

- REPORT
- SORT
- TABULATE

In the third maintenance release for SAS 9.2, the SAS_PUT() function supports UNICODE (UCS2) encoding.

Documentation Enhancements

In addition to information about new and updated features, this edition of **SAS/ACCESS for Relational Databases: Reference** includes information about these items:

- BL_RETURN_WARNINGS_AS_ERRORS= data set option

- DB_ONE_CONNECT_PER_THREAD data set option for Oracle (in the third maintenance release for SAS 9.2)
- DBSERVER_MAX_BYTES= LIBNAME option for Oracle and Sybase
- SESSIONS= LIBNAME and data set options for Teradata
- special queries for data sources and DBMS info for DB2 under UNIX and PC Hosts and ODBC
- significant performance improvement when you work with large tables by using the OBS= option to transmit a limited number of rows across the network
- the importance of choosing the degree of numeric precision that best suits your business needs

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What's New in SAS/ACCESS 4.3 Interface to R/3

Overview

The SAS/ACCESS Interface to R/3 provides a read-only engine for using SAS to access data in your SAP R/3 or SAP BW system. SAS/ACCESS Interface to R/3 has the following changes and enhancements:

- authorization checks for Business Information Warehouse Objects
- CALLRFC procedure DESCRIBE FUNCTION enhancement
- SAP LIBNAME engine AUTHDOMAIN= option
- secure network communication for single sign-on
- SAS RFC server changes

Note: The changes discussed here are from SAS/ACCESS 4.3 Interface to R/3 and later. ■

Authorization Checks for Business Information Warehouse Objects

SAS provides a set of Business Add-Ins (BAI) that the SAP LIBNAME engine uses to perform authorization checks for BW and BI objects. The authorization checks are enabled or disabled by activating or deactivating the BAIs. The authorization check implementation depends on the SAP release:

- For SAP NetWeaver BI 7.0 and later, authorization checks are performed using the analysis authorization method. This provides an authorization check for the following:
 - the infoProvider (infoCube, infoObject, DSO)
 - column-level restrictions on master data attributes and key figures
 - row-level restrictions on attributes
 - For SAP Systems older than SAP NetWeaver BI 7.0, the SAP LIBNAME engine supports checking user authorization with the reporting authorization method. User authorization is checked at the InfoCubes, InfoObject, and ODS levels.
-

Enhanced CALLRFC Procedure

The CALLRFC procedure DESCRIBE FUNCTION statement is enhanced to retrieve information about the expected SAS data type, length, and format of the data sets and parameters.

New AUTHDOMAIN= Option

This new option enables retrieving user identity credentials from a SAS Metadata Server, when SAS/ACCESS Interface to R/3 is used in a metadata environment.

Secure Network Communication for Single Sign-on

Secure network communication (SNC) enables secure communication between the SAP LIBNAME engine and the SAP System. SNC can be configured to provide single sign-on.

SAS RFC Server Changes

A SAS RFC Server was needed in previous releases to enable communication between the SAP LIBNAME engine and the SAP System. The SAS RFC Server required administration to start and stop, as well as configuration. In SAS/ACCESS 4.3 Interface to R/3, the SAP LIBNAME engine communicates directly with the SAP System, removing the need for a SAS RFC Server. However, a SAS RFC Server is needed for z/OS.

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What's New in the SAS Add-In 4.3 for Microsoft Office

Overview

The SAS Add-In 4.3 for Microsoft Office is available in Microsoft Excel, Microsoft Word, Microsoft PowerPoint, and Microsoft Outlook. Although some functionality is unique to a specific Microsoft Office application, most functionality is similar in each Microsoft application.

The SAS Add-In 4.3 for Microsoft Office has the following changes and enhancements:

- [integration with Microsoft Outlook](#)
- [an improved user interface](#)
- [a more robust automation interface](#)
- [the ability to edit a data source and new options for viewing data sources](#)
- [longer names and custom filters for SAS Information Maps](#)
- [a new OLAP Viewer for working with OLAP cubes](#)
- [the ability to send and replicate results](#)
- [the ability to specify input streams and output parameters for a SAS Stored Process](#)
- [new and enhanced SAS tasks](#)

For information about the new features and enhancements in the SAS Add-In 4.2 for Microsoft Office, see [What's New in the SAS Add-In 4.2 for Microsoft Office](#).

Integration with Microsoft Outlook

The SAS Add-In for Microsoft Office is now available in Microsoft Outlook 2010 and Microsoft Outlook 2007. Here are some key features of using the SAS add-in in Microsoft Outlook:

- view SAS reports, SAS dashboards, and SAS dashboard indicators
 - share a SAS report, SAS dashboard, or SAS dashboard indicator with others at your site by sending the results in an e-mail, scheduling a meeting, or assigning a task
-

Improvements to the User Interface

In Microsoft Excel, Microsoft Word, and Microsoft PowerPoint 2007, the **SAS** tab in the Ribbon has been simplified. Additional groups become available depending on the type of SAS content that you select.

When you want to run a task, you are always prompted to select the data source. You are not required to use the selected data source as the input for the task.

Enhancements to the Automation Interface

You can write Visual Basic scripts to automate the functionality in the SAS Add-In for Microsoft Office. Using the automation interface, you can perform the following tasks:

- insert a stored process, report, data view, or PivotTable into your Microsoft Office document.
 - refresh SAS content that is generated by a stored process, report, information map, or task. You can also refresh data views and PivotTables.
-

Enhancements to Editing and Viewing Data Sources

- In Microsoft Excel, you can now edit any data source that is accessible from a SAS server.
 - By default, in Microsoft Excel, SAS data is opened into an Excel Table that uses Microsoft Excel formats. You can change the default by using the **Open data into an Excel Table** option on the **Data** tab in the SAS Options dialog box.
 - You can specify how many data sources to keep in recent history. You can specify this value by using the **Number of items to display in recent data list** option on the **Data** tab in the SAS Options dialog box.
-

Longer Names and Custom Filters for SAS Information Maps

- If you have applied the third maintenance release for SAS 9.2 at your site, then the SAS add-in can open information maps with names longer than 32 bytes in length.
 - You can create a custom filter for an information map. This custom filter is available only during your current session and is not saved to the information map.
-

New OLAP Viewer for Working with OLAP Cubes

The new OLAP Viewer enables you to view data that is stored in an OLAP (online analytical processing) cube. Using the OLAP Viewer, you can create table and graph views of your data. You can

also drill down through the data, create bookmarks, add calculated measures and calculated members, filter the OLAP data, and view ESRI maps.

Sending and Replicating Results

- You can now send results from Microsoft PowerPoint or Word to a workbook in Microsoft Excel.
 - After you run a report in Microsoft Outlook, you can send the results to Microsoft Excel, Word, or PowerPoint.
 - You can replicate SAS content. Replicated content and the original content are treated as different SAS jobs.
-

Specifying Input Streams and Output Parameters for a SAS Stored Process

SAS stored processes are created in SAS applications such as SAS Enterprise Guide or SAS Management Console. If a stored process allows input streams, then you are prompted to select a range of Excel data that will be used as the input data for a stored process. If a stored process contains output parameters, then you are prompted to select which output parameters to include in the results.

New and Enhanced SAS Tasks

New Tasks

- Map Chart creates a two-dimensional (choropleth) or three-dimensional (block and prism) color map that shows the variation in the value of a response variable for different geographical areas, such as counties, states, and countries.
- Scatter Plot Matrix creates a paneled graph of scatter plots for multiple combinations of variables. You can use options to overlay fit plots and ellipses on your scatter plots.
- Tile Chart enables you to create a tile chart. A tile chart is a rectangular tree map that enables you to view a large quantity of hierarchical data in a limited space. Each unique category combination is represented by a rectangular tile whose size and color are determined by response variables. These tiles are placed in a hierarchical arrangement.

Task Enhancements

- If the input data source for a SAS task is from a DBMS engine, then SAS uses the sort

functionality on the database to sort the data before running the task. Using the database functionality rather than the SORT procedure, which is used for files that are not saved to a database, optimizes the performance of the SAS task.

- To enable the SAS add-in to run tasks in a SAS grid computing environment, select the new **Generate ODS macros instead of ODS statement** option on the **Results** tab in the SAS Options dialog box. By generating ODS macro variables, the SAS add-in can set the value of these macro variables each time a SAS job is submitted. No ODS statements are generated because the ODS results are generated on the grid node and do not need to be generated again when the SAS add-in returns the results to the Microsoft application.

- The following tasks now support the DTQTR, DTMONTH, and DTDAY datetime intervals:
 - ARIMA Modeling and Forecasting
 - Basic Forecasting
 - Prepare Time Series Data
 - Regression Analysis with Autoregressive Errors

- In the Principal Component task, you can create these new plots:
 - a pattern profile plot. The value on the Y-axis is the correlation between the variable and the principal component.
 - pattern component plots. Each observation on the plot is the correlation between the variable and the two corresponding components on the plot. You can choose whether to plot the patterns in a vector.

- The interface for the Random Sample task has been redesigned.

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What's New in the SAS Add-In 4.2 for Microsoft Office

Overview

The SAS Add-In 4.2 for Microsoft Office has the following changes and enhancements:

- [role-based settings](#)
- [new tools for managing server connections and profiles](#)
- [specifying security settings](#)
- [previewing results and restoring content](#)
- [opening an OLAP cube into a PivotTable](#)
- [new and enhanced SAS tasks](#)

For information about the new features and enhancements in the SAS Add-In 4.3 for Microsoft Office, see [What's New in the SAS Add-In 4.3 for Microsoft Office](#).

Role-Based Settings

Because the SAS Add-In for Microsoft Office is used by a variety of people and groups within an organization, your administrator might choose to restrict the menu items and functionality that users can access. By default, the SAS add-in ships with several default roles. These roles manage the availability of application features.

New Tools for Managing Server Connections and Profiles

The Connections window now enables you to examine your metadata server connection and perform the following tasks:

- add, modify, or delete a profile. You can also specify the profile to use when working with the SAS add-in.
 - change your default server. You can specify a default server for a profile. You need to connect to a server to access SAS data sources and to run SAS tasks.
 - specify whether to automatically update the configuration.
-

Specifying Security Settings

The new **Security** tab in the SAS Add-In Options dialog box enables you to specify the security settings for password-protected data in a workbook. You can specify the duration of security credentials.

Previewing Results and Restoring Content

If you are using the SAS Report format for your results, you can now preview your results before they are inserted into Excel, Word, or PowerPoint. Using the new Preview and Preview Changes windows, you can choose to insert all of the results or only selected items.

If you delete SAS content or choose not to include content in the results, you can now restore content by using the new Restore Content window. From this window, you can choose to restore all of the content or only selected items.

Opening an OLAP Cube into a PivotTable

When an OLAP cube is opened into the PivotTable report, the SAS add-in automatically populates the rows and columns of the PivotTable. However, you can add additional variables, calculated measures, or calculated members to the PivotTable. Using the SAS add-in, you can now create calculated members and calculated measures for an OLAP cube.

New and Enhanced SAS Tasks

General Enhancements

- When you open a task, the task uses the active data source as the input data source by default. Now, from the **Data** panel for the task or the Verify Data step of the wizard, you can create a filter.
- In the advanced tasks, you can now edit and view the properties of the task from the new Properties panel.
- Task templates enable you to save your settings for a specific task to a template. You can then run that template with any input data source. After they have been created, these templates are available to use in SAS Enterprise Guide and the SAS Add-In for Microsoft Office.

Enhanced Tasks

The following tasks have been enhanced:

- The Bar Chart task now supports multiple chart variables within a single group variable. Two new bar types, Multiple Measures Vertical Groups and Multiple Measures Horizontal Groups, have been added.
- In the Bar-Line Chart task, you can now create multiple line plots and specify the line statistics for each individual plot. You can also create multiple legends for the chart.
- In the Correlations task, you can now use the Fisher options for Pearson or Spearman correlations.
- The following tasks now support ODS statistical graphics. The tasks are listed by category.
 - ANOVA: Linear Models, One-Way ANOVA, t Test
 - Describe: Distribution Analysis, One-Way Frequencies, Summary Statistics
 - Multivariate: Cluster Analysis, Correlations, Factor Analysis, Mixed Models, Principal Components
 - Regression: Generalized Linear Models, Linear Regression, Logistic Regression
 - Survival Analysis: Life Tables, Proportional Hazards
 - Time Series: Create Time Series Data

New Tasks

The new List Report Wizard enables you to create detail or summary reports. A detail report contains one row for every observation selected for the report. A summary report consolidates data so that each row represents multiple observations.

The following tasks are available in a maintenance release of the SAS Add-In 4.2 for Microsoft Office:

- Forecast Studio Create Project enables you to create a new SAS Forecast Studio project. You can specify the forecasting variables, choose whether to forecast your data hierarchically, and specify the forecast horizon.
- Forecast Studio Open Project enables you to open the selected series from an existing SAS Forecast Studio project and specify how to display the results.
- Forecast Studio Override Project enables you to submit overrides for the forecast data in an existing SAS Forecast Studio project.

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What's New in SAS/AF 9.2

Overview

SAS/AF has the following changes and enhancements:

- the Tree View Control and Dual Selector Control are now production status
 - new V6GUIMODE system option
 - long format and informat names are now supported
 - the Variable Values List Model no longer automatically closes associated data sets
-

V6GUIMODE System Option

The V6GUIMODE system option enables mainframe z/OS customers to use the SAS 6 style of selection list windows. For more information, see the **SAS Companion for z/OS**.

Long Format and Informat Names Are Supported

Long format and informat names are supported in SAS/AF, SAS/FSP, SCL, and the VIEWTABLE window. Data that is displayed with the VIEWTABLE window will be formatted, and SAS/AF methods and SCL functions will no longer truncate format and informat names.

The Variable Values List Model Requires Manual Close of Data Set

The Variable Values List Model no longer automatically closes an associated data set when you destroy the model or set the dataSet attribute to missing (`variableValuesList1.dataSet=""`). Instead, you must manually close such data sets using the `_close` method.

Failure to properly close a data set with the `_close` method can result in the Variable Values List Model maintaining a Read lock on the data set. This can result in a contention error when you need exclusive access to a data set (for example, when you want to recreate the data set or use PROC SORT on it).

What's New in SAS Analytics Accelerator 1.2 for Teradata

Overview

SAS Analytics Accelerator 1.2 for Teradata includes two new SAS/STAT procedures, one new SAS/ETS procedure, and one new Base SAS procedure. There is also a notable change to the syntax of the SQLGENERATION option and one licensing requirement change for installations in a Linux operating system environment.

New Procedures

In-database versions of the CANCECORR and FACTOR procedures are available in SAS/STAT 9.22. The CANCECORR procedure performs canonical correlation, partial canonical correlation, and canonical redundancy analysis. The FACTOR procedure performs a variety of common factor and component analyses and rotations.

An in-database version of the TIMESERIES procedure is available in SAS/ETS 9.22. The TIMESERIES procedure analyzes time-stamped transactional data with respect to time and accumulates the data into a time series format. The procedure can perform trend and seasonal analysis on the transactions. After the transactional data are accumulated, time domain analysis and frequency domain analysis can be performed on the accumulated time series.

An in-database version of the Base SAS CORR procedure is also now available. The CORR procedure computes correlation coefficients, three nonparametric measures of association, and the probabilities associated with these statistics.

Syntax Changes

In the initial release of SAS Analytics Accelerator, the SQLGENERATION option of the LIBNAME and OPTIONS statements had four suboptions: NONE, DBMS, ALL, and DBMUST. In this latest release, the DBMUST suboption has been eliminated.

Licensing Requirements

Installation of SAS Analytics Accelerator for Teradata in a Linux operating system environment now requires the installation of Teradata 13 with Global and Persistent Memory (GLOP) feature support. Consult Teradata Support for the specific database version.

What's New in SAS BI Dashboard 4.3

Overview

The SAS BI Dashboard 4.3 has the following enhancements and new features:

- features for dashboard users
 - features for dashboard administrators
-

Features for Dashboard Users

- You can run SAS BI Dashboard in a separate window (the dashboard viewer) rather than in the SAS Information Delivery Portal.

When run in the dashboard viewer, the software offers more functionality than when displayed in the SAS Information Delivery Portal.

- You can zoom in and view details in a dashboard.
 - You can display multiple columns in zoomed-out view.
 - You can create comments for a dashboard.
 - You can create and manage personal favorites.
 - The software offers new display types, such as waterfall chart, vector plot, and spark lines in tables.
 - The software can brush (interactively highlight) data within an indicator. Also, indicators can interact with each other.
-

Features for Dashboard Administrators

- You create a dashboard interactively using drag-and-drop to add indicators to a dashboard.
- The software saves files in a tree folder structure.
- You can search for existing dashboards and objects, and filter a search by a specific type of object.
- You can more easily customize and size each indicator in a dashboard, as well as the dashboard itself.
- The software offers the ability to set up indicators so that they interact with each other via events.
- You can open and view multiple dashboards on different tabs.
- You can optimize screen space when building indicators and dashboards.
- As you design a dashboard, you can preview different indicator display types to easily decide which display is most appropriate for the data to be displayed.

- You can customize fonts, font colors, and font sizes in a dashboard.

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What's New in the SAS BI Dashboard 4.2

Overview

The SAS BI Dashboard 4.2 has the following enhancements and new features:

- data source enhancements and new features
- indicator enhancements
- general enhancements

SAS BI Dashboard 4.3 is now available. For more information, see [What's New in SAS BI Dashboard 4.3](#).

Data Source Enhancements and New Features

- You can use filters defined in SAS Information Map Studio.

When a dashboard administrator creates a SAS Information Map data source, one or more filters defined in SAS Information Map Studio can be applied. Filters with prompts are supported (but require that a default value be specified in SAS Information Map Studio).

- You can specify the current date in a SAS Strategic Performance Management data source. Use the pound sign (#) to specify the current date.
- You can create a data source based on a SAS metadata table.

Indicator Enhancements

- The software now enables you to create alerts to signal changes to an indicator's value. This feature enables you to more easily focus on problem areas as they occur.
- The software now provides better support for links to SAS Web Report Studio. Clicking a link to a report opens the report to the point where the indicator value is located.

General Enhancements

- You can specify access rights on ranges.

A dashboard administrator can control which users and user groups can edit a range definition,

which provides better control of dashboards. Access rights to range definitions are provided in SAS Management Console.

- You can show data using interactive displays that are based on Adobe Flash.

The interactive summary chart and detail chart display and the interactive summary chart and detail plot display use Adobe Flash to enable dashboard users to interactively traverse large amounts of detailed data.

What's New in SAS/CONNECT 9.2

Overview

SAS/CONNECT has the following changes or enhancements in this release:

- new features and enhancements for server sign-on and Compute Services
 - enhancements for Remote Library Services
 - documentation enhancements
-

New Features and Enhancements for Server Sign-On and Compute Services

When the SIGNON INHERITLIB= option is used with the SASCMD= option and the RSUBMIT INHERITLIB= option is used with the RSUBMIT SASCMD= option, and the client session and the server session attempt to access the same SAS file concurrently, only one of the sessions might be able to access the file.

The -LOGCONFIGLOC system option in a SAS invocation activates the SAS logging facility for a SAS/CONNECT session.

The SIGNON AUTHDOMAIN= option and RSUBMIT AUTHDOMAIN= option provide a convenient way to obtain the SAS metadata-based user credentials rather than having to explicitly supply them during server sign-on.

E-mail is a new supported value for the SIGNON NOTIFY= option and the RSUBMIT NOTIFY= option. New code examples are given for enabling and disabling notification in an asynchronous RSUBMIT.

The SIGNON SUBJECT= option and RSUBMIT SUBJECT= option are available when notification via e-mail is also specified.

An additional server sign-on method is provided for SAS/CONNECT: Sign-on to a server that is defined in the SAS Metadata Repository.

The SIGNON SERVER= option and RSUBMIT SERVER= option offer a convenient way to obtain the server sign-on properties that are associated with the SAS Application Server without having to explicitly supply them during server sign-on. The SAS Application Server contains a SAS/CONNECT server component in its grouping.

Enhancements for Remote Library Services

When using the LIBNAME statement and the SASESOCK engine to specify an alias for an implicit port, you must have access to a SAS metadata repository.

Documentation Enhancements

The descriptions of the syntax for the SAS/CONNECT statements are more readable and accessible than in previous documentation releases. More extensive information is provided for restrictions, examples, references, and interactions with other options in SAS/CONNECT statements.

Improved illustrations show SAS/CONNECT programming services Compute Services, Remote Library Services, and Data Transfer Services.

Although a brief summary of the SAS security technologies is provided, detailed information about SAS Proprietary, SAS/SECURE, SSL, SSH, and the networking and encryption SAS system options, is relocated to **Encryption in SAS**. Here are the relocated system options:

- NETENCRYPT
- NETENCRYPTALGORITHM=
- NETENCRYPTKEYLEN=
- SSLCALISTLOC=
- SSLCERTISS=
- SSLCERTLOC=
- SSLCERTSERIAL=
- SSLCERTSUBJ=
- SSLCLIENTAUTH=
- SSLCRLCHECK
- SSLCRLLOC=
- SSLPVTKEYLOC=
- SSLPVTKEYPASS=

What's New in Communications Access Methods for SAS/CONNECT 9.2 and SAS/SHARE 9.2

Overview

The following are changes or enhancements for communications access methods for SAS/CONNECT and SAS/SHARE software:

- [changes to Security Support Provider Interface \(SSPI\)](#)
 - [changes to TCP/IP and XMS under z/OS](#)
 - [changes to the spawners](#)
 - [documentation enhancements](#)
-

Changes to Security Support Provider Interface under Windows for TCP/IP

Security Support Provider Interface (SSPI) enables users who are members of trusted domains to be authenticated automatically when connecting to SAS/CONNECT or SAS/SHARE server sessions. However, the SSPI system option is not supported for SAS/CONNECT 9.2 or SAS/SHARE 9.2.

Changes to TCP/IP and XMS under z/OS

- Although this release does not support CA Unicenter TCPAccess Communications Server, SAS does support any vendor's TCP/IP software that is functionally compatible with the IBM z/OS IP Communications Server package.
- The z/OS operating environment and the TCP/IP access method exclusively use the IBM z/OS Resolver for domain-name resolution. Support of the IBM OS/390 Resolver and the SAS Name Resolver has been discontinued in this release.
- In previous releases of SAS, TCP/IP was implemented using the SAS/C compiler and runtime library. In order to configure the SAS/C TCP/IP runtime environment several SAS system options were used for z/OS. These SAS system options were TCIPMCH, TCIPPRF, and CTRANSLOC. In this release, these SAS system options are obsolete and will be ignored.
- The new TCIPMCH environment variable provides the same functionality as the former TCIPMCH system option, which specifies the TCP/IP stack name. This variable is useful in z/OS operating environments that support multiple TCP/IP stacks. The TCIPMCH environment variable is specified in the SAS TKMVSENV data set file.
- A networked computer that runs under TCP/IP can be addressed by its fully qualified domain name (FQDN) or its IP address. Support for the IPv6 addressing standard is new in this release. The implications for the support on z/OS are two new IBM resolver functions getnameinfo(BPX1GNI) and getaddrinfo(BPX1GAI). They are used to retrieve IP addresses in IPv6 format.
- TCP/IP and XMS under the z/OS operating environments require the installation of the TCP/IP SAS SVC control program routine or the XMS SAS SVC control program routine, as appropriate. The SAS SVC control program routine is an interface between the z/OS operating environment and a specific request, such as "third-party checking." This facility provides verification in the form of calls for authentication of user IDs and passwords and of library authority.

- Two-level server IDs are supported in a SAS/SHARE client session under z/OS when XMS is used as the primary access method and TCP as the auxiliary access method. Two-level server IDs are used only in the LIBNAME statement and the PROC OPERATE statement.
-

Changes to the Spawners

- The -SASDAEMONSERVICE option is specified in a SAS/CONNECT spawner invocation for all operating environments -- OpenVMS, UNIX, Windows, and z/OS -- to identify the port through which the spawner and the SAS/CONNECT server communicate. When socket inheritance is enabled, this port is also used for all SAS client and SAS/CONNECT server communications.
 - The -shell option in the UNIX spawner enables X command processing.
 - The -LOGCONFIGLOC option is specified in a SAS/CONNECT spawner invocation for all operating environments -- OpenVMS, UNIX, Windows, and z/OS -- to identify the location of the XML configuration file that is used to initialize the SAS logging facility.
 - The -OMRCONFIGFILE option has been renamed as -XMLCONFIGFILE for all operating environments -- OpenVMS, UNIX, Windows, and z/OS. However, the old option name, -OMRCONFIGFILE, is still supported for backward compatibility.
 - The z/OS spawner start-up script contains three new BPX environment variables that improve the start-up performance of a spawned SAS session.
-

Documentation Enhancements

- A revised example of a firewall configuration illustrates the use of socket inheritance and restricted ports.
- Details about the security technologies that SAS supports have been relocated from this document to **Encryption in SAS**. These technologies are SAS Proprietary, SAS/SECURE, SSL, and SSH.

What's New in SAS Data Integration Studio 4.2 and 4.21

Overview

SAS Data Integration Studio versions 4.2 and 4.21 have many new features. The main enhancements that are common to both versions include the following:

- enhanced Job Editor
- new Details pane for jobs
- new advanced debugging
- enhanced mapping and propagation
- enhanced workflow
- new options format for transformations
- enhanced data cleansing and enrichment
- new metadata reporting
- new tree structure
- new Basic Properties window
- new security enhancements

The enhancements that are new to SAS Data Integration Studio 4.21 include the following:

- a Teradata Loader transformation
 - the ability to restart jobs from checkpoints
 - an enhanced ability to push some job steps to a database server for processing
 - an enhanced ability to set options on tables, especially for transformation inputs and outputs
 - an enhanced ability to redirect the temporary output tables for transformations
 - the ability to register Netezza and Neoview tables
 - the ability to convert a SAS program into a SAS Data Integration Studio job
 - the Forecasting transformation is available again
 - summary of changes to the interface
-

Enhanced Job Editor

The Job Editor, the window that is used for building and maintaining jobs, has been completely redesigned. It has many new features, including the following:

- integrated and customized design-time checks for early notification of potential problems as you build the process flow for a job.
- process flow layout is saved along with the job. When a job is reopened, the layout appears in the same state as when it was last saved.
- integrated overview pane for navigating large process flows and a details panel to show node details.
- easy zoom and pan features to better view the process flow.
- the ability to disable and enable nodes and submit flows in any state.

- complete control over the order in which transformations in a process flow are executed.
 - integrated impact analysis.
 - full Undo to reverse an action, and Redo to reverse the Undo operation.
 - tables can be included in a process flow more than once.
 - documentation available in the form of notes on nodes and on the canvas.
 - integrated debugging that includes interactive submit features, performance monitoring and statistics capture, and progress and status notification.
 - log checking with the ability to jump to errors, warnings, status, and the code that is generated for each transformation in the job.
 - enhanced mapping features that includes intelligent handling of data type conversions, easy and selectable customizes mappings, and controlled propagation of changes to mappings.
-

New Details Pane for Jobs

The Job Editor has an optional Details pane that enables you to maintain column definitions and mappings, view the status of each transformation when the job is executed, check errors and warnings when the job is executed, view run-time statistics for the job, and change the order in which transformations in the job are executed. The Details pane includes the following tabs:

- a **Columns** tab that enables you to manipulate column metadata for tables or external files that are selected in the current job.
 - a **Mappings** tab that enables you to control column mapping and column propagation settings. The **Mappings** tab is displayed only when a transformation is selected in the current job.
 - a **Status** tab that displays the status of each step (transformation) in a submitted job.
 - a **Warnings and Errors** tab that displays any warnings and errors that are generated when a job is submitted.
 - a **Statistics** tab that displays run-time and table statistics that are generated by submitted job. This tab includes tabular and graphical displays.
 - a **Control Flow** tab that displays the order in which transformations in the job are executed. This tab also enables you to validate and change the order of execution.
-

New Advanced Debugging

Advanced debugging of jobs that are opened in the Job Editor window is supported by the following features:

- status indicators that identify complete and incomplete transformations in a job.
- status messages that explain the status issues with incomplete transformations.
- an integrated debugger toolbar that includes the following functions: **Run**, **Stop**, **Run From Selected Transformation**, **Run To Selected Transformation**, **Run Selected Transformations**, **Step**, and **Continue**.
- the ability to easily identify run-time errors in the **Status** and **Warnings and Errors** tabs of the Details pane.
- run-time progress and status indicators that enable you to follow the progress of a job running in the **Job Editor** window. You can also review status messages about each node on the **Status** tab of the Design pane. These messages are displayed as each step is processed.
- the ability to click an error or warning on the **Errors and Warnings** tab of the Design pane to see it displayed on the **Log** tab of the Job Editor window. You can also jump to the **Code** tab or the properties

window for any step.

Enhanced Mapping and Propagation

Mapping and propagation controls enable you to manage the flow of data and the propagation of changes in your jobs. This flexibility is supported by the following features:

- rules-based mappings that support pattern mapping, user customizations, and automatic numeric to character or character to numeric mappings.
 - mapping and propagation controls on the **Mappings** tab in selected transformations and the Details pane, the **Diagram** tab of the **Job Editor** window, and the **Diagram** tab toolbar. These controls enable you to manage the scope and direction of mapping and propagation in your jobs.
-

Enhanced Workflow

Workflow issues have been enhanced with the following features:

- the **Control Flow** tab on the Details pane, which enables you select a node in the process flow diagram and specify when it runs. Simply drag the row for the node to the desired position in the flow.
 - the **Statistics** tab on the Details pane, which enables you to easily capture and display performance information such as real time, CPU time, memory use, input/output, and record count data. This data can be displayed as a table or as a graph.
 - the ability to start job runs from the source, the target, or the middle of the job.
-

New Transformation Features

Transformations now support the following new features:

- A dynamic target table structure enables you to replace a temporary output with a permanent target table or register the temporary table in place. Both options support existing mappings.
- Values for many options can be selected from a drop-down menu.
- Enhancements to the Transformation Generator wizard include more parameter types such as dates, calendars, and sets of values; the ability to select more elements from a static list or dynamically populated list; the ability to validate and test features while building the transformation; and the ability to import or export parameter sets between transformations by using the **Import from XML** button or the **Export to XML** button on the Options page of the Transformation Generator wizard.
- The Analysis transformations have been rewritten and enhanced, including Correlations, Distribution Analysis, the Frequency transformations, and the Summary transformations. Enhancements include support for dynamic target updates, ODS integration, and support for most options in the corresponding SAS procedures (FREQ, SUMMARY, and so on).
- A fast change data capture technique reads changes for Oracle, DB2, and Attunity data. You can also create custom data formats for change data capture.
- The UPSERT load option, which simultaneously updates and inserts during a load, is now supported for the Table Loader transformation for Teradata.
- Slowly Changing Dimensions now support multiple techniques in a row, Type 1 and Type 2 columns, and many performance enhancements.
- SQL Join now supports the optional ability to disable automatic joins, easy order swapping, and layout

persistence in the Designer window.

Enhanced Data Cleansing and Enrichment

Data cleansing and enrichment have been enhanced by running DataFlux jobs and real-time services on the DataFlux Integration Server. The following transformations have been added to support this process:

- the DataFlux IS Job transformation, which executes a DataFlux job on a DataFlux Integration Server
 - the DataFlux IS Service transformation, which executes a DataFlux real-time service on a DataFlux Integration Server
-

New Metadata Reporting

The new **Reports** feature enables you to generate reports and review the metadata for tables and jobs in a convenient format. You can also generate your own reports by creating a Java report plug-in. You can perform the following tasks with these reports:

- finding information about a table or job quickly
 - comparing information between different tables or jobs
 - obtaining a single file that contains summary information of all tables or jobs in HTML, RTF, or PDF format
 - performing custom behaviors that are defined by user-created plug-in SAS code, Java code, or both
-

Enhanced Tree Structure

The Custom tree is replaced by the Folders tree, which is a new, standard interface in many SAS 9.2 applications. The Folders tree enables you to add custom folders so that you can organize metadata in categories that are meaningful to your organization. The Folders tree might be the interface you use most often when you want to select metadata for update. For more information about the Folders tree, see the "Getting Started" chapter in the *SAS Data Integration Studio: User's Guide*.

The Inventory tree contains folders for more types of objects. Most of the time, however, SAS Data Integration Studio users work with the same objects as before, such as tables, libraries, and jobs. You can right-click objects in the Inventory tree and select **Find In** ➔ **Folders** to find them in the Folders tree.

The Process Library tree is now called the Transformations tree.

The Project tree, a special tree that was used under change management, is now called the Checkouts tree. You can check in objects individually. Set up and administration of change management is easier. There is no need to set up a metadata repository dependency chain.

New Basic Properties Pane

When you click an object such as a table, a transformation, or a job, a list of the main properties for the object is displayed in the Basic Properties pane in the bottom-left corner of the SAS Data Integration Studio desktop. You can turn this feature on and off with the **View** menu.

Security Enhancements

SAS Data Integration Studio can use the following new security features from the 9.2 Server platform:

- support for single signon (for Windows servers only). This feature is an option when you connect to a metadata server. When single signon is enabled, user host credentials are used to connect to all servers and users are not prompted for connection information.
- the ability to honor DBMS login settings. Some databases such as Oracle and DB2 provide optional support for always prompting for user name and password. The client now honors this setting. If you configure this setting on your database, you are prompted to enter credentials that surface in your LIBNAME statement.
- site settings that you can configure for your metadata server. If the metadata server is configured to **not** store passwords on the clients, then the client login screen always appears and the client metadata server connection profile does not store credentials.
- a run-time credential lookup for libraries. When this option is set, LIBNAME statements never shows user names and passwords in generated code or the logs. Instead the LIBNAME engine looks up credentials when the job is run and uses them. No credentials are ever placed in the log.

Teradata Loader Transformation

The Teradata Table Loader transformation can be added to a process flow when a Teradata table is used as a target. This transformation has a unique **Load Technique** tab that provides different load options depending on whether the source table is in the same Teradata database as the target table. The Teradata Table Loader transformation also supports the pushdown feature that enables you to process relational database tables directly on the appropriate relational database server.

Restart Jobs from Checkpoints

The restart feature enables you to restart a job at the beginning of a step (transformation) when a job previously failed at that step or a subsequent step. The code for the steps preceding the checkpoint is skipped, and the state is restored from the save-state information that is preserved by the checkpoint code. Then, processing can pick up from the specified transformation.

Push Job Code down to a Database

When both the inputs and outputs of the Extract, SQL Join, Teradata Table Loader, and Table Loader transformations are stored in the same relational database, the code for these transformations can be pushed down to a database server for execution. This option increases performance by shifting data transformation to the most appropriate processing resource.

Specify Table Options

To display most table options, display the properties window for a table and select the new **Options** tab. The

options that are available vary according to the data format of the tables (SAS or DBMS). You can specify table options for the inputs and outputs of most transformations on the new **Table Options** tab of the properties window for the transformation. The options that are available vary according to the data format of the tables (SAS or DBMS) and whether the table is an input or an output.

Redirect Temporary Output Tables

Transformations in a job typically create temporary work tables as they execute. The default location for these temporary tables is the SAS WORK library. You can now easily redirect these temporary tables to an alternative location, including a DBMS. Redirecting this output can improve performance, support the restart of jobs from a checkpoint, and support the pushdown of work to a third-party database.

Register Netezza and Neoview Tables

You can register Netezza and Neoview tables and include them in SAS Data Integration Studio jobs.

Convert SAS Programs into SAS Data Integration Studio Jobs

The Import SAS Code wizard enables you to analyze a SAS program and to automatically create a SAS Data Integration Studio job that performs the same tasks as the program.

Forecasting Transformation is Available Again

You can use the Forecasting transformation to run the High-Performance Forecasting procedure (PROC HPF) against a warehouse data store. PROC HPF provides a quick and automatic way to generate forecasts for many sets of time-series data or transactional data. The procedure can forecast millions of series at a time, with the series organized into separate variables or across BY groups. The Forecasting transformation provides a simple interface for entering values for various options that are associated with PROC HPF.

Summary of Changes to the Interface

Changes to the interface for SAS Data Integration Studio versions 4.2 and 4.21 include the following:

- | | |
|-----------|--|
| Trees | The Custom tree is replaced by the Folders tab. The Process Library tree is replaced by the Transformations tab. The Quick Properties pane is now called the Basic Properties pane. The Metadata tree is no longer available. |
| File Menu | The File menu includes a New submenu which enables you to register new tables, jobs, and other objects; a Register Tables submenu which enables you to register existing tables; an Import submenu that includes a new Import SAS Code option; and a Connection Profile option (formerly called Metadata Profile). |

| | |
|-----------------|---|
| Edit Menu | The Edit menu includes a new Connections option, which displays the Connections window. Use the Connections window to manage the input and output connections for tables or transformations in the Diagram tab of the Job Editor window. |
| View Menu | The View menu now contains Control Order, Layout, Zoom, and Grid options that are specific to jobs. The Comparison Results option is moved to the Tools menu. The View Libname option is moved to the Actions menu. |
| Check Outs Menu | The Check Outs menu replaces the Project menu. The Fetch option is no longer available. For more information, see the change management topic in the user's guide or the online Help. |
| Actions Menu | The Actions menu includes many new features that are mostly related to jobs. For more information, see the section about creating jobs in the user's guide or the online Help. |
| Debug Menu | The Debug menu is new. For more information, see the section about managing jobs in the user's guide or the online Help. |
| Tools Menu | The Tools menu has a number of changes. The Source Designer option is now Register Tables on the File menu. The Target Designer option is now available by selecting File ➤ New ➤ Table . The Transformation Generator option is now available by selecting File ➤ New ➤ Transformation . The Update Table Metadata option is now available by selecting Actions ➤ Update Metadata . The Process Designer option is much simplified and is available by selecting File ➤ New ➤ Job . The following options are no longer available: Advanced Aggregation Tuning, Calculated Members, Import Cube, Transformation Importer, Configure Status Handling. |

For more information and about the main menus and windows, see the topics under "Windows and Other Components" in the table of contents in the online Help.

What's New in SAS Data Surveyor for Clickstream Data 2.2

Overview

SAS Data Surveyor for Clickstream Data 2.2 contains the following new and enhanced features:

- Customer Intelligence Integration
- SAS Real-Time Manager Integration
- Support for Multi-Byte Character Data
- Enhanced SAS Page Tagging Functionality
- Enhanced or New Clickstream Jobs
- Enhanced User Agent Processing
- Support for Tracking Internal Searches
- Enhanced Log Type Handling

For more information about the new features and enhancements in SAS Data Surveyor for Clickstream Data 2.1, see [What's New in SAS Data Surveyor for Clickstream Data 2.1](#).

Customer Intelligence Integration

SAS Data Surveyor for Clickstream Data is part of the Customer Intelligence suite of solutions and integrates with the SAS Web Analytics, SAS Marketing Automation, SAS Digital Marketing, and SAS Real-Time Decision Manager products. This integration provides support for processing campaign information and preparing the information for analysis and reporting.

SAS Real-Time Decision Manager Integration

Integration with SAS Real-Time Decision Manager allows for real-time campaign content to be presented to the Web site visitor based on information specific to the visitor's session. Any subsequent activity as a result of user actions taken upon the presented content will be tracked. This can help with determining the success of campaigns and analyzing customers' responses to different types of content presented within a campaign.

Support for Multi-Byte Character Data

New support for multi-byte character data provides the capability to process and display data containing multi-byte encoded characters. New default processing uses the UTF-8 character encoding.

Enhanced SAS Page Tagging Functionality

Enhanced SAS Page Tag functionality includes the ability to track the following:

- User responses to web content dynamically driven by SAS Real-time Decision Manager
 - Different loads of the same page by the same user
 - HTML Tag, ID, and Name attributes
 - Internal search result counts
-

Enhanced or New Clickstream Jobs

Clickstream Jobs have been re-organized to provide both tutorial and template jobs. Tutorial jobs provide a way to learn the basics of clickstream processing, while template jobs use parallel processing to perform high-performance ETL for production environments. In support of tighter page tag integration with SAS Real-Time Decision Manager, a new job has been added.

Support for Tracking Internal Searches

New columns are provided for tracking searches performed on pages internal to the Web site. In addition, by using the SAS Page tag functionality, search result counts can be obtained.

Enhanced User Agent Processing

User agent processing has been enhanced to identify a larger number of browsers, browser versions, and operating systems, while improving the processing performance.

Enhanced Log Type Handling

You now have greater control over character positioning when reading records from a web log enhances the ability to properly read various log types.

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What's New in SAS Data Surveyor for Clickstream Data 2.1

Overview

This maintenance release of SAS Data Surveyor for Clickstream Data 2.1 has the following new features:

- new job template for customer campaigns
- enhanced management of sparsely populated column values
- enhanced page tag link tracking

For more information about the current release, see [What's New in SAS Data Surveyor for Clickstream Data 2.2](#).

New Job Template for Customer Campaigns

You can use the new Customer Integration Template to associate customer Web activity with the marketing campaign that originated the activity. The new template provides out-of-the-box recognition of the data values that are passed from SAS Digital Marketing campaigns. For more information, see the "Processing Campaign Information" chapter in the ***SAS Data Surveyor for Clickstream Data 2.1: User's Guide***.

Enhanced Management of Sparsely Populated Column Values

If only a subset of the records in a session have column values, then you can now copy those values to other records in the session, such as the records at the beginning of a session. This feature enables you to ensure that each session record has significant values. For more information, see the Help for the Complete Fill and Forward Fill options on the **Options** tab of Clickstream Sessionize transformation.

Enhanced Page Tag Link Tracking

You can now track clicks on links based the link name and other attributes, not just the file extension of

the link target as was the case in previous releases. You can also track clicks on links that leave the Web site. For more information, see "Configuring Link Tracking in Tagged Pages" in the **SAS Data Surveyor for Clickstream Data 2.1: User's Guide**.

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What's New in SAS Data Surveyor 4.3 for SAP

Overview

SAS Data Surveyor 4.3 for SAP has the following new features and enhancements:

- role-based access to the SAS Data Surveyor for SAP software in SAS Management Console
- scheduling the extract of SAP metadata
- enhanced authorization checks
- enhanced CallRFC transformation
- change data capture for extracting data from SAP
- SAS RFC server changes

For information about changes to SAS/ACCESS Interface to R/3, see the What's New section of *SAS/ACCESS Interface to R/3: User's Guide*.

New Role-Based Access to SAS Data Surveyor for SAP

SAS Data Surveyor for SAP consists of a series of plug-ins to SAS Management Console and SAS Data Integration Studio. In this release, access to SAS Management Console data extraction plug-ins is granted by associating the ExtractionTool capability with a role and then associating the role with users and groups.

Use SAS Management Console to access the Plug-In Manager so that you can associate the ExtractionTool capability with a role. Then, use SAS Management Console to access the User Manager and associate the role with users and groups. For SAS Data Integration Studio, access to the plug-ins is not restricted.

Scheduling the Extract of SAP Metadata

When performing an initial metadata extract from an SAP R/3 or SAP Business Information Warehouse (BW) System with SAS Management Console, you can save the generated SAS program. You can then use the SAS program in a job to schedule the extraction of SAP metadata.

Enhanced Authorization Checks

SAS provides a set of Business Add-Ins (BAI) that perform authorization checks for BW and business intelligence (BI) objects. The authorization checks are enabled or disabled by activating or deactivating the BAIs. The authorization check implementation depends on the SAP release:

- For SAP NetWeaver BI 7.0 and later, authorization checks are performed using the analysis authorization method. This provides an authorization check for the following items:
 - the infoProvider (infoCube, infoObject, DSO)
 - column-level restrictions on master data attributes and key figures
 - row-level restrictions on attributes
- For SAP Systems older than SAP NetWeaver BI 7.0, SAS supports checking user authorization with

the reporting authorization method. User authorization is checked at the InfoCubes, InfoObject, and ODS levels.

Enhanced CallRFC Transformation

You can use the SAP CallRFC transformation wizard to select and configure a function or Business Application Programming Interface (BAPI) from SAP RFC-enabled function modules. You can create jobs that use this transformation to extract data from SAP systems. You can then import that SAP data into SAS files, combine the SAP data with other data, or load it into an SAP System. In this release, the SAP CallRFC transformation wizard is enhanced to initialize the ports on the transform according to the expected parameters and tables that the selected function module uses. This enhancement makes the transform easier to use.

Schedule InfoPackage Transformation

This transformation was available in previous releases, but was not available on the Transformations tree. The transformation is now available under the SAP Transformations node. This transform can be added to a job, but it is used most often with the New SAP BW wizard. When the New SAP BW wizard is used and the infoPackage can be scheduled, the wizard includes the Schedule InfoPackage transformation automatically in the generated job.

Change Data Capture Options

The SAP BW Register Tables wizard generates SAS code for extracting data from your SAP System. Change data capture processing enables you to extract only the data that has changed since your last extraction. When the wizard generates loader jobs that use one of the following transformations, you can edit the Options tab on the properties for the transformation and enable change data capture:

- Load dimension table
 - Loading fact table
 - Loading ODS
-

SAS RFC Server Changes

A SAS RFC Server was needed in previous releases to enable communication between the SAP LIBNAME engine provided by SAS/ACCESS Interface to R/3 and the SAP System. The SAS RFC Server required administration to start and stop, as well as configuration.

In SAS/ACCESS 4.3 Interface to R/3 software, the SAP LIBNAME engine communicates directly with the SAP System. This change eliminates the need for a SAS RFC Server in all operating environments except z/OS. A SAS RFC Server is needed for the z/OS operating environment.

What's New in SAS Data Quality Server 9.2

Overview

The SAS Data Quality Server provides procedures and functions that enable you to administer and run jobs and services on DataFlux Integration Servers from DataFlux (a SAS company). The following enhancements were made in SAS 9.2:

- The SAS Data Quality Server has added support for grouping of clustering criteria, as well as a new CALL routine and new functions for parsing and version verification.
- A new SAS system option, DQOPTIONS, has options to increase data transfer rates and to control whether to terminate SAS execution if errors are encountered.
- New procedures, functions, and options have been added to support the DataFlux Integration Server.
- The DataFlux Integration Server now supports all the language elements that access DataFlux Integration Servers in the z/OS operating environment.

SAS Data Quality Server Enhancements

The DQMATCH procedure was enhanced to enable grouping of the clustering criteria into a series of conditions.

Starting in SAS 9.2 Phase 2, the DQPARSE function is complemented by the DQPARSE CALL routine. The new CALL routine returns a flag that indicates the status of the parse operation (success or failure).

In the third maintenance release for SAS 9.2, the SAS Data Quality Server was enhanced with several new functions:

- The DQOPTSURFACE function reveals or hides non-surfaced definitions.
- The DQPARSEINPUTLEN function specifies the input length for parsing functions.
- The DQPARSERESLIMIT function specifies the resource limit a parsing operation is allowed to consume.
- The DQPARSESCORDEPTH function specifies how deeply to search for the best parsing score.
- The DQVERQKB function returns the version of the currently loaded Quality Knowledge Base.
- The DQVERBF function returns the version of Blue Fusion.

SAS System Option

In SAS 9.2 Phase 2, the SAS system option DQOPTIONS was added. DQOPTIONS is available for use in the SAS start-up command and in the SAS configuration file. The value of the option is a series of option-value pairs.

- DQSRVPROTOCOL=WIRELINE increases data transfer performance to and from services.
- TRANSCODE=IGNORE|WARN tells SAS whether to terminate execution if errors are encountered during the translation of languages and character sets.

Support for the DataFlux Integration Server

The following procedures and functions support DataFlux Integration Servers:

- PROC DQSRVADM creates job status data sets after querying DataFlux Integration Servers.
- PROC DQSRVSVC runs real-time services on DataFlux Integration Servers. The services are created with DataFlux dfPower Architect software.
- The DQSRVARCHJOB function runs jobs on DataFlux Integration Servers. The jobs are created with DataFlux dfPower Architect software.
- The DQSRVCOPYLOG and DQSRVDELETEDLOG functions manage log entries on DataFlux Integration Servers.
- The DQSRVJOBSTATUS function reads log entries from DataFlux Integration Servers.
- The DQSRVKILLJOB function terminates jobs that are running on DataFlux Integration Servers.
- The DQSRVPROFJOBFILE function runs profile jobs on individual files on DataFlux Integration Servers. The jobs are created with the DataFlux dfPower Profile software.
- The DQSRVPROFJOBREP function runs profile jobs on repositories.
- The DQSRVUSER function authenticates users on DataFlux Integration Servers.

In SAS 9.2 Phase 2, the following options were added for the DQSRVSVC procedure:

- MISSINGVARSOK enables the continuation of processing when an input data set is missing one or more variables.
- TRIM removes blank spaces from the ends of input data sets that are processed by real-time services executed on DataFlux Integration Servers.

In the third maintenance release for SAS 9.2, the DQSRVVER function enables you to determine the version of the DataFlux Integration Server. The following options were added to the DQSRVSVC procedure.

- MACROS enable a series of name-value pairs to be passed to a service as macros.
- NOPRINT suppresses writing the SERVICEINFO information to an output data set.
- SERVICEINFO lists the input and output columns used by a given service.

Support for the z/OS Operating Environment

In SAS 9.2 Phase 2 all of the language elements that access DataFlux Integration Servers are enabled in the z/OS operating environment.

What's New for the SAS 9.2 Drivers for JDBC

Overview

In the third maintenance release for SAS 9.2, the SAS Table Server Driver for JDBC is deprecated. Information about the SAS Table Server Driver for JDBC is removed. This driver was identified by class `com.sas.tks.TKTSDriver`.

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What's New in SAS Enterprise Guide 4.3

Overview

SAS Enterprise Guide 4.3 includes the following new features and enhancements:

- [new program editor with autocomplete and integrated syntax help](#)
- [recently accessed program files are available from the File menu](#)
- [option to automatically add output data to the project tree](#)
- [ability to analyze SAS programs](#)
- [explicit SQL pass-through option](#)
- [more control over whether ODS statements are generated for the results](#)
- [autoexec process flow](#)
- [ability to send data files to JMP](#)
- [longer names and custom filters for SAS Information Maps](#)
- [automatic chart option for OLAP cubes](#)
- [ability to create OLAP cube slices that use SAS code instead of MDX code](#)
- [macro variables for conditional processing](#)
- [ability to open SAS Web Report Studio reports](#)
- [new and enhanced SAS tasks](#)

For information about the new features and enhancements in SAS Enterprise Guide 4.2, see [What's New in SAS Enterprise Guide 4.2](#).

New Program Editor with Autocomplete and Integrated Syntax Help

You can use the SAS Enterprise Guide program editor to create new programs and to edit existing SAS programs in your project. The program editor offers several features to help you reduce your programming time, including autocompletion for hundreds of SAS statements and procedures and options. The program editor also provides parenthesis matching, built-in syntax and function help, and automatic code formatting. SAS Enterprise Guide no longer includes the comprehensive SAS syntax files, but all of the syntax help is now built into the program editor.

Recently Accessed Program Files Are Available from the File Menu

You can use the File menu to easily open program files that you have recently viewed.

Option to Automatically Add Output Data to the Project Tree

A new option (**Automatically add output data to the project tree**) is available when you are setting options to manage results. When you select this option, SAS Enterprise Guide starts adding output data to the project tree after you run a task or program.

Analyzing SAS Programs

Using SAS Enterprise Guide, you can analyze the contents of a program. You might want to analyze a SAS program for the following reasons:

- to quickly identify the different parts of the program and see how each part is related.
 - to take advantage of grid computing.
-

Explicit SQL Pass-through Option

When a query uses data from an external database, you can use explicit pass-through mode to send the SQL statements to the database to be processed. If the data files are very large, this can improve your performance because the files do not have to be copied to the SAS server for processing. Once the statements are processed, the results are sent back to SAS Enterprise Guide.

More Control over ODS Statements

Two new options (**Generate ODS Statements** and **Generate ODS Macro Variables**) are available when you are specifying the general options for your results. With these options, you can specify whether to generate ODS statements or whether to save your ODS preferences as macro variables. Saving your preferences as macro variables enables you to submit programs from SAS Enterprise Guide to a SAS grid computing environment.

Autoexec Process Flow

There are several ways to do autoexec processing in SAS Enterprise Guide. You can create a process flow named "autoexec" that can be run automatically whenever you open your project. For example, you could use this process flow to define libraries or to assign macro variables for the project.

Sending Data Files to JMP

If you have JMP 7, JMP 8, or a later release of JMP installed on your computer, then you can send a data file from SAS Enterprise Guide to JMP. When sending a file to JMP, SAS Enterprise Guide creates a temporary copy of your selected data file and opens it in a new JMP session, where you can then use the visualization features of JMP.

Working with Information Maps

Using SAS Enterprise Guide, you can create a custom filter for an information map. This custom filter is available only during your SAS Enterprise Guide session and is not saved to the information map.

If you have applied the third maintenance release for SAS 9.2 at your site, the SAS Enterprise Guide can open information maps with names that are greater than 32 bytes in length.

Automatic Chart Option for OLAP Cubes

In the graph view of the OLAP Analyzer, you can select a chart type of Automatic Chart. This chart type enables the OLAP Analyzer to choose the best chart for the data based on the number of measures and whether or not the data includes a time dimension.

Create OLAP Cube Slices That Use SAS Code Instead of MDX Code

A new option for the slice type (**All on rows except measures**) is available when you are creating an OLAP cube slice. When you select this option, the slice is created using SAS code instead of by using MDX code. This means that a slice that is created using this option can be run from within a stored process.

Macro Variables for Conditional Processing

When defining the condition for conditional processing, you can now use macro variables in addition to input data sets, prompts, and the date and time.

Open SAS Web Report Studio Reports

You can use SAS Folders to find a report that is registered in metadata with SAS Web Report Studio.

New and Enhanced SAS Tasks

New Tasks

The following tasks are new for this release:

- Create Format from a Data Set enables you to create a SAS format by using data that is saved in a SAS data set.
- Map Chart creates a two-dimensional (choropleth) or three-dimensional (block and prism) color map that shows the variation in the value of a response variable for different geographical areas, such as counties, states, and countries.

The Create Map Chart task no longer requires specially prepared data ("feature tables") in order to create useful maps. This makes it easier to create map charts using only a map data set and your response values. The Create Map Feature Table task, provided with earlier versions of SAS Enterprise Guide, is no longer needed and so is marked as deprecated. Your existing projects that use this task will still run; however, you will not be able to create new steps that use the Create Map Feature Table task.

- Scatter Plot Matrix creates a paneled graph of scatter plots for multiple combinations of variables. You can use options to overlay fit plots and ellipses on your scatter plots.

Enhanced Tasks

- If the input data source for a SAS task is from a DBMS engine, then SAS uses the sort functionality on the database to sort the data before running the task. Using the database functionality rather than the SORT procedure, which is used for files that are not saved to a database, optimizes the performance of the SAS task.
- The following tasks now support the DTQTR, DTMONTH, and DTDAY datetime intervals:

- ARIMA Modeling and Forecasting
 - Basic Forecasting
 - Prepare Time Series Data
 - Regression Analysis with Autoregressive Errors
- In the Filter and Sort task, you can now specify how the name of the task appears in the SAS Enterprise Guide project. You can also specify where to save the output table.
 - In the Principal Component task, you can create these new plots:
 - a pattern profile plot. The value on the Y-axis is the correlation between the variable and the principal component.
 - pattern component plots. Each observation on the plot is the correlation between the variable and the two corresponding components on the plot. You can choose whether to plot the patterns in a vector.
 - The interface for the Random Sample task has been redesigned.
 - In the Tile Chart task, the following new functionality is available:
 - You can change the input data source after you open the task. You can also filter the input data source.
 - You can customize the color ramp for the tile chart. You can also use color points to specify how the colors should be distributed across the data. To specify color points, you must be running the third maintenance release for SAS 9.2 (TS2M3). For more information about this maintenance release, see <http://support.sas.com/software/maintenance/index.html>.

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What's New in SAS Enterprise Guide 4.2

Overview

SAS Enterprise Guide 4.2 includes the following new features and enhancements:

- [enhancements to the user interface and project flow](#)
 - [enhancements to results](#)
 - [enhancements to the Import Data task](#)
 - [enhancements to the Query Builder](#)
 - [enhancements to the OLAP Analyzer](#)
 - [new macro variables](#)
 - [new and enhanced SAS tasks](#)
-

Enhancements to the User Interface and Project Flow

- The SAS Enterprise Guide user interface has been simplified to include a context-sensitive toolbar in the workspace that changes based on what is displayed in the workspace.
 - You can now recover a project if SAS Enterprise Guide closes unexpectedly.
 - You can perform conditional processing with new condition nodes.
 - Parameters are now referred to as prompts, and the user interface has been updated to include many new prompt types.
-

Enhancements to Results

- SAS Report is the default output format.
 - You can now export results in the SAS Report format to HTML.
 - When you export a file as a step in a project, you can choose to replace any previous output or save the output with a time and date history.
 - When you e-mail a file as a step in a project, you can specify the name of the attached file.
 - You can now send a file to the SAS Add-In for Microsoft Office.
-

Enhancements to the Import Data Task

- The Import Data task user interface has been improved and now has better default settings.

- You can import Microsoft Excel data by using Microsoft Excel, if it is installed.
 - You can use SAS/ACCESS for PC File Formats, if it is installed.
 - You can now embed data as DATALINES, or you can use the traditional INFILE method.
-

Enhancements to the Query Builder

- You can change the relationship between filters directly on the Filter Data tab.
 - There is better detection of expressions that contain aggregations for use in computed columns.
 - The New Computed Column wizard has an improved user interface.
 - The interface to create a recoded column has been improved, and you can now specify replacement values based on a conditional expression.
 - The expression builder interface has been updated and provides better support for gathering data values.
 - You can now specify a title and footnote for your query output.
 - SQL Pass-Through statements are now validated when you are joining DBMS tables.
-

Enhancements to the OLAP Analyzer

- The OLAP Analyzer can now support multiple, independent views of a cube.
 - In addition to creating filters that are based on a ranking function or on a range of values, you can now filter by member caption and member property. You can also create filters that can be used by multiple queries.
-

New Macro Variables

The following macro variables are new:

- `_CLIENTPROJECTPATH` specifies the full path and filename for the project. In previous releases, the `_CLIENTPROJECTNAME` variable contained this information. Now, the `_CLIENTPROJECTNAME` variable specifies the filename for the project.
 - `_CLIENTTASKFILTER` specifies the filter that is defined for the task. You can use this macro variable in the titles and footnotes of the task, so that the filter information is displayed in the title or footnote of your results.
-

New and Enhanced SAS Tasks

General Enhancements

- When you open a task, the task uses the active data source as the input data source by default. Now,

from the **Data** panel for the task or the Verify Data step of the wizard, you can modify the data source in the following ways:

- select a different data source
- create a filter
- In the advanced tasks, you can now edit and view the properties of the task from the new **Properties** panel.
- Task templates enable you to save your settings for a specific task to a template. You can then run that template with any input data source. After they have been created, these templates are available to use in SAS Enterprise Guide and the SAS Add-In for Microsoft Office.

Enhanced Tasks

The following tasks have been enhanced:

- The Bar Chart task now supports multiple chart variables within a single group variable. Two new bar types, Multiple Measures Vertical Groups and Multiple Measures Horizontal Groups, have been added.
- In the Bar-Line Chart task, you can now create multiple line plots and specify the line statistics for each individual plot. You can also create multiple legends for the chart.
- In the Correlations task, you can now use the Fisher options for Pearson or Spearman correlations.
- The following tasks now support ODS statistical graphics. The tasks are listed by category.
 - ANOVA: Linear Models, One-Way ANOVA, t Test
 - Describe: Distribution Analysis, One-Way Frequencies, Summary Statistics
 - Multivariate: Cluster Analysis, Correlations, Factor Analysis, Mixed Models, Principal Components
 - Regression: Generalized Linear Models, Linear Regression, Logistic Regression
 - Survival Analysis: Life Tables, Proportional Hazards
 - Time Series: Create Time Series Data

New Tasks

The following tasks are new for this release:

- Download Data Files to PC enables you to select one or more SAS data sets (*.sas7bdat) from one or more SAS servers and copy them to your local Microsoft Windows file system.
- Filter and Sort enables you to select the variables to include when you open the data source in SAS Enterprise Guide, create a simple or advanced filter, and specify the sort order for the data.
- List Report Wizard enables you to create detail or summary reports. A detail report contains one row for every observation selected for the report. A summary report consolidates data so that each row represents multiple observations.
- Tile Chart enables you to create a tile chart. A tile chart is a rectangular tree map that enables you to view a large quantity of hierarchical data in a limited space. Each unique category combination is represented by a rectangular tile whose size and color are determined by response variables. These tiles are placed in a hierarchical arrangement.
- Update Library Metadata enables you to run a report on table definitions in the metadata repository or

to update these definitions.

- Upload Data Files to Server enables you to select one or more SAS data sets (*.sas7bdat) from your local Microsoft Windows file system and copy them to a SAS server.

The following tasks are available in a maintenance release of SAS Enterprise Guide 4.2:

- Forecast Studio Create Project enables you to create a new SAS Forecast Studio project. You can specify the forecasting variables, choose whether to forecast your data hierarchically, and specify the forecast horizon.
- Forecast Studio Open Project enables you to open the selected series from an existing SAS Forecast Studio project and specify how to display the results.
- Forecast Studio Override Project enables you to submit overrides for the forecast data in an existing SAS Forecast Studio project.

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What's New in SAS Enterprise Miner 6.2

Overview

SAS Enterprise Miner 6.2 delivers major new features targeted at specific business applications and complex information technology deployments. Rapid Predictive Modeling is a new feature for general business users that need to develop reliable models for predicting customer response and retention. The Interactive Decision Tree is enhanced to display more information about the nodes and leaves and to show more plots based on validation data. The credit scoring functions have been improved to provide more customization of bins and to provide more control over scorecard points.

SAS Enterprise Miner 6.2 provides enhanced support for working with databases, specifically Teradata v.13. New Enterprise Miner in-database functions can reduce data movement between the database system and the SAS system, improving overall solution efficiency.

SAS Enterprise Miner 6.2 also provides enhancements to several general purpose functions in response to both user feedback, as well as supporting the Rapid Predictive Modeling and In-Database projects.

For more information, see [What's New in SAS Enterprise Miner 6.1](#) and [What's New in SAS Enterprise Miner 6.1 Maintenance Release](#).

Extended Support for Teradata 13

Extended Support for Teradata 13 is targeted at users that work with large data sources that are stored in Teradata warehouses. SAS Enterprise Miner provides in-database processing during data access, summary, and sampling functions, which reduces the amount of data movement from the database system to the SAS System. Reducing data movement can enhance speed, efficiency, or improve resource allocation.

In-database computation is provided through a combination of SAS generated SQL queries and SAS provided embedded functions that were written for the database. These features take advantage of the database's ability to use parallel computing architecture.

The following functions in SAS Enterprise Miner 6.2 take advantage of in-database processing:

- The Explore Data function creates a sample of the data that is downloaded for interactive graphical exploration. This sample is computed in the database, which eliminates the need to move the contents of the entire selected table.

- The Data Source Wizard contains two new features that support in-database computing. The first feature is located in the Advanced Advisor function. The Advanced Advisor function that computes the distribution measures that are used to determine variable model roles is performed in the database. The second feature is located in the Data Source Wizard function. The Data Source Wizard has a new option that creates sample using in-database processing.
- The Input Data node has a new option for creating in-database samples from source tables. This function is useful when you create a Data Source using one table, but then use another table to build a model.
- The Code Export node creates a package of the score code and the necessary metadata that are needed to create in-database scoring functions using the SAS Scoring Accelerator.

Computing exploratory distribution statistics and creating training data samples using in-database technology reduces data movement to the minimum amount. Model building occurs using the highly optimized SAS system. Model scoring can then be performed on the full population in-database, which completes an efficient in-database modeling cycle.

SAS Rapid Predictive Modeler

SAS Rapid Predictive Modeler is a new feature for users who need to rapidly create prediction and classification models for common business problems. The modeling process is highly automated and the results may be integrated into SAS Enterprise Miner for scoring, analysis, and modification. SAS Rapid Predictive Modeler must be executed from either SAS Enterprise Guide or the SAS Add-In for Microsoft Office.

SAS Rapid Predictive Modeler is not installed with SAS Enterprise Miner 6.2. After you install Enterprise Miner 6.2, you can re-run the SAS Deployment Wizard if you want to install the SAS Rapid Predictive Modeler add-on.

Interactive Decision Tree Functionality

The Interactive Decision Tree now displays validation data statistics and multiple target statistics concurrently. The user interface has been revised to display more information for selected decision tree nodes. The enhanced information includes:

- The Interactive Decision Tree node outputs now include validation data along with the training data. The following Interactive Decision Tree plots and charts have been modified to integrate validation and training data: assessment plot, assessment table, tree statistics, classification matrix, leaf statistics bar chart, variable width bar chart, leaf statistics table, tree view, and tree map.
 - The Interactive Decision Tree node input and output structures now support multiple targets.
-

SAS Credit Scoring Node Changes

SAS Enterprise Miner 6.2 provides enhancements to the following credit scoring nodes:

Interactive Grouping: The Interactive Grouping node for SAS Enterprise Miner 6.2 provides the following enhancements:

- The Interactive Grouping node provides users with the ability to sort the Variables table while in the interactive mode. Users may now sort the table by values in any column.
- The combo box used to select variables in the Variables tab during interactive training no longer exists. Variable selection is now performed by highlighting rows in the variable table itself, and then clicking a Select button displayed on the Variables tab.
- Additional information such as variable labels and pre-defined grouping flags are added to the interactive training Variables tab. The pre-defined grouping column indicates grouping definitions that were created from frozen or imported groupings.
- The Fine Detail plot for Interactive Training has been enhanced to display the Weights of Evidence (WOE) distribution overlaid on the Event Rate plot.
- The ability to group class input variables across different training data sets has been made more robust. When new training data introduces new class variable values that were not seen in previous training data, the values are grouped in a new `_UNKNOWN_` category for nominal input variables, instead of grouping them with `_MISSING_` data values. The node also retains grouping definitions for variable values that are no longer found in the training data set.
- The ability to interactively group input interval variables with extreme values has been made more robust. Users can create cutoff values that are outside of the range of variable values in the training data.
- A new property called **Apply Saved WOE Value** lets users choose how to handle WOE values in the presence of frozen or imported grouping definitions. Settings for the new property permit users to use only the calculated WOEs for the imported or frozen grouping definition, or to use only the WOE values that were manually overwritten when the frozen or imported grouping definitions were created, or to use all WOE values that were created when the frozen or imported grouping definitions were created.

Scorecard: The Scorecard node for SAS Enterprise Miner 6.2 provides the following enhancements:

- A new property called **Freeze** lets users protect scorecard points so that they will not be recalculated and overwritten if the Scorecard node is flagged to re-run. Settings for the new property permit users to use only newly calculated scorecard points, or to use frozen group definitions for variables that were defined in a previous IGN node, or to use all frozen scorecard points from the original run.
- A new property called **Intercept Based Scorecard** allows users to generate

scorecards that contain points associated with the intercept term itself. This provides an easy way to adjust the entire scorecard with a single change to the intercept value. At the same time, intercept-based scorecards are also scaled in such a way that all non-intercept attributes are associated with positive scorecard points with a zero-basis value.

- Variable labels are displayed in the generated scorecard instead of variable names.
-

Enterprise Miner Node Changes

SAS Enterprise Miner 6.2 provides enhancements to the following nodes:

Input Data: The Input Data node for SAS Enterprise Miner 6.2 provides the following enhancements:

- The Explore table for the Input Data node has been enhanced to take advantage of in-database processing when the source table is located on a database system. In-database processing creates the Explore table data sample on the database system side instead of using Enterprise Miner resources to create the sample.
- Enterprise Miner 6.2 now can utilize the SAS option `VALIDVARNAME=ANY` to allow users to create Enterprise Miner Data Sources from data tables whose rows or columns use normally forbidden characters such as #, \$, %, &, and so on.
- A new Input Data node property called **DropMapVariables** lets users choose whether to drop remapped `VALIDVARNAME=ANY` variables from the exported score code.

Transform Variables: The Transform Variables node for SAS Enterprise Miner 6.2 provides the following enhancements:

- The Transform node now supports LOG10 (base 10 logarithm) as a standard transformation for interval input and target variables.

Reporter: The Reporter node for SAS Enterprise Miner 6.2 provides the following enhancements:

- Users can create summary style reporting for generated models within the Reporter node. A new Summary property in the Reporter node enables or disables summary reporting. A new grouping of **Summary Option** properties in the property sheet enables users to select the components of the summary report. A modeling node must be present in the process flow diagram before the summary reporting feature is available.

Filter: The Filter node for SAS Enterprise Miner 6.2 provides the following enhancements:

- The Filter node provides improved performance on large data sets.
- A new property called **Distribution Data Sets** lets users control whether intermediate summary data sets for interval and class variables are created. The summary data sets are used to generate histograms and bar charts in the interval and class variable editors during interactive filtering.

Score: The Score node for SAS Enterprise Miner 6.2 provides the following enhancements:

- A new Score node property called **Graphical Reports** lets users choose which graphical reports appear in the Score node Results.
-

SAS Enterprise Miner System Changes

SAS Enterprise Miner system changes include improvements made to the user interface and background processing algorithms, including Wizard templates, sampling strategies, metadata processing, and data visualization functions.

- [Data Source Wizard](#)
- [Explore Data Sample](#)
- [Support for SAS Option VALIDVARNAME=ANY](#)
- [Explore Metadata](#)

Data Source Wizard

You use the Data Source Wizard to configure data for use by SAS Enterprise Miner. When you use the Data Source Wizard to select data from a compatible Teradata database, the database performs all of the data access and summary functions, as well as creating an optional data sample.

When you select the Advanced Advisor option of the Data Source Wizard, the data summary that computes the data distribution metrics also sets data mining variable roles (such as ID, INPUT, and REJECTED) and data mining variable levels (such as INTERVAL, ORDINAL, and NOMINAL). When you select the Create A Sample option in the Data Source Wizard, Enterprise Miner creates a sample according to the proportion of the data or number of data rows that you specify. The SAS log provides notes to indicate when data manipulation, summary, and sampling work was performed by the database and not by SAS Enterprise Miner.

Explore Data Sample

When you use the SAS Library Explorer to select one of the Explore Data functions in SAS Enterprise Miner, the software performs a data sample. The sample is used to create

interactive graphics such as histograms and scatter plots. When you select data in a compatible Teradata database, the sample function is performed by the database, thus eliminating a large data transfer from the database to the SAS system.

Support for SAS Option VALIDVARNAME=ANY

Data tables that were created or saved using the SAS option VALIDVARNAME=ANY can now be processed by SAS Enterprise Miner. The SAS option VALIDVARNAME=ANY permits the use of normally forbidden characters (forbidden according to SAS V6 rules) used in naming data table columns. The Enterprise Miner Input Data node creates score code by renaming those columns. The metadata table in the Data Source Wizard and in the Input Data Source node will show the original variable names. However, subsequent nodes will show the remapped variable names in the metadata tables. If a variable has no assigned label, then a new label that corresponds to the original variable name is assigned and displayed in the metadata tables. If a label was already assigned, then that label is used.

The in-database sampling feature also supports the VALIDVARNAME=ANY option, so you can select column names that have special characters that are supported by both Teradata and SAS.

View Metadata

The Enterprise View Metadata function enables you to explore the data mining content of Enterprise Miner objects that reside in the SAS Metadata Server. The View Metadata function includes the ability to explore both Enterprise Miner projects and Enterprise Miner models. You can use the View Metadata function to view, rename, and delete Enterprise Miner projects and models in the SAS Metadata Server. To start a Metadata Explorer session, from the Enterprise Miner main menu, select View ➤ Metadata.

What's New in SAS Enterprise Miner 6.1 Maintenance Release

Overview

SAS Enterprise Miner 6.1 Maintenance Release supports the concurrent release of SAS Text Miner 4.2 and provides tool functionality improvements that were requested by our customers.

For information about the new features and enhancements in SAS Enterprise Miner 6.1, see [What's New in SAS Enterprise Miner 6.1](#).

Input Data Node

The Input Data node is modified to provide more control over changes in variables between successive runs of a process flow diagram. This ability is important when variables are added or removed from the input data. When the input data contains new variables, you can control their treatment by automatically rejecting the new variables, or by assigning the new variables measurement levels and variable roles, according to the Basic or Advanced input data Advisor functions. When the input data contains variables that have been deleted, you can arrange to have the analysis stop immediately, or to proceed with the set of remaining variables. This new functionality also helps automate interactive and batch model training processes.

Transform Node

Two new choices have been added to the list of available input variable transformations. If you choose the Best transformation value, then all available transformations are attempted, and the one that has the best correlation with the target variable is used. If you choose the Multiple transformation value, then all available transformations are created for the purpose of selection by a modeling function.

Impute Node

The Impute node has new options that enable you to create only a missing value indicator without imputing a replacement value. This capability is useful when a variable has a very high rate of missing values, or when the status of "Missing" is used to represent a real value.

Java 1.6 Support

The SAS Enterprise Miner 6.1 Maintenance Release client and mid-tier components have been tested and validated using Java Version 1.6.

Firewall

The client-server communication has been enhanced to work through stricter firewalls. Please contact SAS Technical Support for more details.

Software Improvements

SAS Enterprise Miner 6.1 Maintenance Release contains cumulative fixes for issues found since the release of SAS Enterprise Miner 6.1. Please contact SAS Technical Support for more details.

Base Version of SAS

SAS Enterprise Miner 6.1 Maintenance Release requires SAS 9.2 M2.

What's New in SAS Enterprise Miner 6.1

Overview

SAS Enterprise Miner 6.1 is a major new release of data mining tools for use with SAS 9.2. The scope of improvements includes many analytical and deployment functionality enhancements, as well as changes that were made to integrate the Enterprise Miner tool set with the SAS 9.2 system.

For information about the maintenance release for SAS Enterprise Miner 6.1, see [What's New in SAS Enterprise Miner 6.1 Maintenance Release](#).

SAS 9.2 Platform

The SAS 9.2 system is an improved platform for managing and deploying analytical and business intelligence applications for both single-user applications and multi-user enterprises. SAS Enterprise Miner 6.1 contains changes related to the SAS 9.2 system that improve SAS Enterprise Miner installation, security, and administration.

Software Versions and Migration

- SAS Enterprise Miner 6.1 requires the SAS 9.2 Platform release.
- SAS Enterprise Miner 5.3 will not operate with SAS 9.2.
- If you have existing SAS Enterprise Miner 5.3 project information stored in your SAS Metadata Server, the project information will be converted from SAS 9.1.3 format to SAS 9.2 format during the SAS 9.2 / SAS Enterprise Miner 6.1 installation.
- If you have existing SAS Enterprise Miner 5.3 project data folders that are stored on SAS Workspace Servers, the project data folders do not require conversion for use with SAS 9.2 and SAS Enterprise Miner 6.1. All SAS Enterprise Miner 5.3 project data folders, files, tables, views, and catalogs that are stored on SAS Workspace Servers are compatible for use with SAS 9.2 and SAS Enterprise Miner 6.1.
- SAS Enterprise Miner 6.1 users can open existing SAS Enterprise Miner 5.3 projects without any manual conversion process.
- SAS Enterprise Miner 6.1 projects cannot be converted for use with SAS Enterprise Miner 5.3.
- SAS Enterprise Miner 4.3 users who wish to upgrade project data for use with SAS Enterprise Miner 6.1 can use the SAS Enterprise Miner project conversion macro. The project conversion macro upgrades SAS Enterprise Miner 4.3 project structures to SAS Enterprise Miner 5.3 project structures. SAS Enterprise Miner 6.1 opens SAS Enterprise Miner 5.3 project structures by the SAS Enterprise Miner Project conversion macro.

Projects

- SAS Enterprise Miner 6.1 project information is now stored and managed in the SAS Metadata Folders. SAS Enterprise Miner 6.1 users create projects in a specific folder

location.

- The default location for new SAS Enterprise Miner 6.1 projects is **My Folder**. The **My Folder** location is unique for every user and is a private location. When a SAS Enterprise Miner 6.1 user creates a project, the user can accept the default project location, or specify a different folder of their own preference. For example, a user or group of users might store mining projects in a common folder where the projects can be shared.
- SAS Enterprise Miner 6.1 users will open projects by using a standard Open File window that displays the SAS Metadata Folders tree structure by default.
- When the SAS Metadata Server is upgraded from SAS 9.1.3 to SAS 9.2, existing SAS Enterprise Miner 5.3 project information that was stored in the SAS Metadata Server is migrated to the **shared Data** folder.
- SAS administrators can view SAS Enterprise 6.1 project information via the SAS Management Console.

Models

- SAS Enterprise Miner 6.1 models are stored and managed in the SAS Metadata Folders. SAS Enterprise Miner 6.1 users register models to a specific folder location.
- SAS Enterprise Miner 6.1 users may now open or import models by using a standard Open File window that displays the SAS Metadata Folders tree structure by default.
- When the SAS Metadata Server is upgraded from SAS 9.1.3 to SAS 9.2, existing SAS Enterprise Miner 5.3 models that were stored in the SAS Metadata Server are migrated to the **shared Data** folder.
- SAS administrators can view SAS Enterprise 6.1 model information via the SAS Management Console.

SAS Management Console Plug-in

- The SAS Enterprise Miner 6.1 Plug-in for the SAS Management Console is revised for SAS 9.2, but maintains the same range of functionality as in SAS 9.1.3. For more information, see the SAS Enterprise 6.1 Reference Help chapters on Installation and Configuration for more information.
- SAS administrators can use the SAS Management Console to view SAS Enterprise Miner project information.

Java Versions

- SAS administrators retain the ability to deliver SAS Enterprise Miner 6.1 to users via Java Web Start. Java Web Start users should have Java 1.5.12 or a compatible version.
- Installed versions of SAS 9.2 include Java 1.5.12. No further version of Java is required.

Usability

SAS Enterprise Miner 6.1 provides the following improvements in usability:

Summary Statistics in Variable List Tables

- The variable list tables that SAS Enterprise Miner users are familiar with have been improved in SAS Enterprise Miner 6.1. The variable view tables that surface in locations throughout the software now provide users with summary statistics for the table variables.

- The summary statistics are computed by the Advanced Advisor function in the Data Source Wizard, by the Input Data node, and by the Stat Explore node. Variable summary statistics are often used to make decisions about how to treat variables in data mining models.

Configurable Attributes in Variable List Tables

- SAS Enterprise Miner 6.1 is capable of displaying many different variable attribute columns in SAS Enterprise Miner variable list tables. Instead of displaying enormous tables that have many variable attribute columns, SAS Enterprise Miner 6.1 enables users to configure variable list table displays by selecting only the variable attributes that are important to their work.

Quick Text Search for SAS Code Editors and Text Viewers

- The SAS Code editors and text viewers have been enhanced with a quick text search toolbar that highlights and navigates between selected text search results. This is a great aid when searching for text in SAS Code, the SAS Log, and SAS Output listings.
- You can launch Quick Text Search from the SAS Enterprise Miner 6.1 main menu, or use <CTRL+T> to access the new tool bar.

Interactive Graphics Samples

- Previous versions of SAS Enterprise Miner provided interactive exploratory graphics that used a quick sample of the values in a variable list table. In SAS Enterprise Miner 6.1, the quick table sample that the software performs to generate interactive graphics has been improved.
- The new quick sample method scans only the attribute columns that the user selects, plus any additional Target, ID, Frequency, or Cost variables. This capability reduces the number of columns needed to perform interactive graphic sampling and increases the number of rows of data that are available for graphics.
- Variable table list sampling for interactive graphics can now be performed by using a sampling algorithm that is stratified by categorical target variables. This change improves the representation of the sample in the presence of skewed data.

Project Start and Stop Code

- The Project Start Code Editor window is modified to include the SAS log. Convenient access to the SAS log helps users who need to debug or modify their SAS Enterprise Miner project start code.
- The Project End Code Editor window has been eliminated.

SAS Library Explorer

- The SAS Library Explorer has been enhanced to view and edit (when appropriate) catalog entries of the types SOURCE, LOG, OUTPUT, and XML.

Model Import and Export

- SAS Enterprise Miner 6.1 users can register models directly to the SAS Metadata Folders tree structure. This feature provides users with more control over the security, access privileges, and organization of models.

- SAS Enterprise Miner 6.1 users can import a registered model into an existing data mining process flow diagram by using the Model Import node. The score code of the imported model is applied to the data in the process flow diagram, generating new model assessment statistics.
- The Model Repository window has been removed from SAS Enterprise Miner 6.1. The former flat list of registered models has been replaced by a hierarchical view of models in the SAS Metadata Folders. The Model Import node provides SAS Enterprise Miner 6.1 users with a list of available models.
- SAS Enterprise Miner 6.1 users can select **File ➤ Open Model** from the main menu to open a file utility window to browse the SAS Metadata Folders tree structure and choose a model for inspection.
- SAS Enterprise Miner 6.1 users can also use the Model Import tool to navigate the SAS Metadata Folders tree structure and choose a model for addition to the process flow diagram.

Interactive Decision Tree

- A switch-targets feature has been added to SAS Enterprise Miner 6.1 so that users can select a new dependent variable in a tree leaf and make new splits based on the new target. This is a powerful analytical feature for users who design decision trees for segmentation strategies.
- The Interactive Decision Tree is fully integrated into SAS Enterprise Miner 6.1 and requires no separate installation or documentation.
- SAS Enterprise Miner 6.1 gives users who start the software using Java Web Start users full use of the Interactive Decision Tree.
- The former Tree Desktop Application that was associated with prior releases of SAS Enterprise Miner is not distributed with SAS Enterprise Miner 6.1, but is available on the SAS downloads Web page for legacy purposes.
- The Tree Desktop Application will not work with a SAS 9.2 server.

New Nodes

SAS Enterprise Miner 6.1 includes two new data mining nodes. The new nodes are presented using the SEMMA functional groupings of Enterprise Miner.

- **Sample** — SAS Enterprise Miner 6.1 adds the following new node to the Sample tab of the Enterprise Miner tool bar:
 - **File Import node** — The File Import node enables users to directly integrate external data files into SAS Enterprise Miner 6.1 process flow diagrams. The external file types supported include dBase .DBF files, Stata .DTA files; Microsoft Excel .XLS files; SAS .JMP files; Paradox .DB files;

SPSS .SAV files; Lotus .WK1, .WK3, and .WK4 files; as well as tab-delimited .TXT files; comma-delimited .CSV files; and user-defined delimited .DLM files. Data files to be imported must be located either on the SAS Enterprise Miner client machine or in a network location that is accessible to the SAS Enterprise Miner server or the SAS server system.

- **Model** — SAS Enterprise Miner 6.1 adds the following new node to the Model tab of the Enterprise Miner tool bar:
 - **LARS** — The LARS node uses Least Angle Regression and LASSO algorithms from the SAS/STAT procedure GLMSELECT to perform model fitting tasks and sophisticated variable selection for interval target models.
-

Enhanced Nodes

The following nodes in SAS Enterprise Miner 6.1 were enhanced in functionality or reorganized into new Enterprise Miner tool groups. The enhanced and changed nodes are presented using the SEMMA functional groupings of Enterprise Miner.

- **Sample** — The following changes have been made to the Sample tools in Enterprise Miner 6.1:
 - **Append node** — The Append node enables you to concatenate two data sets together. In SAS Enterprise Miner 6.1, the Append node is able to combine training, validation, and test data sets into a single training data set for the purpose of computing full data statistics.
- **Explore** — The following changes have been made to the Explore tools in Enterprise Miner 6.1:
 - **Association node** — The Association node is used to identify frequently occurring association and sequence patterns in transactional data. In SAS Enterprise Miner 6.1, the Association node improves by using a new SAS data mining procedure called MBSCORE. MBSCORE produces faster and more accurate output than previous versions of the Association node.
 - **Stat Explore node** — The Stat Explore node is used to generate summary statistics for data exploration. In SAS Enterprise Miner 6.1, the Stat Explore node computes summary statistics on validation and test data as well as the train data. Most Stat Explore results plots have been updated to show validation and test results. Stat Explore provides new plots that can compare variable distributions across multiple categorical targets and by-group segments.
 - **Graph Explore node** — The Graph Explore node is an advanced visualization tool for interactive data exploration. In SAS Enterprise Miner 6.1, the Graph Explore node can generate samples that are stratified by categorical target variables.
- **Modify** — The following changes have been made to the Modify tools in Enterprise Miner 6.1:
 - **Drop node** — The Drop node is used to remove variables from metadata, SAS tables, and SAS views. In SAS Enterprise Miner 6.1, the Drop node works on data sources other than train tables. For example, in SAS Enterprise Miner 6.1, the Drop node can be used on transaction tables.
- **Model** — The following changes have been made to the Model node tools in Enterprise Miner 6.1:

- **AutoNeural node** — The AutoNeural node is used to automatically search for a Neural Network topology. The SAS Enterprise Miner 6.1 AutoNeural node adds a Target Layer Error Function property that permits a wider variety of distributions to be fitted. The AutoNeural node also adds a new final training phase that further refines the model after the topology has been selected.
- **Decision Tree node** — The Decision Tree node builds statistical decision trees for predictive modeling. The SAS Enterprise Miner 6.1 Decision Tree node contains a new integrated interactive Decision Tree model building utility. Multiple target variables are supported for Interactive Decision Tree designs. Only one target is be used for model assessment statistic calculations. You can also use a Model Import node to select a different target variable and to generate model assessment statistics. Lastly, the default value for the SAS Enterprise Miner 6.1 Decision Tree sample sizes has been changed to 20,000.
- **Model Assessment Statistics** — The model assessment statistics modules in SAS Enterprise Miner modeling nodes and in the model comparison node compute rank order statistics such as lift, captured response, and ROC. In SAS Enterprise Miner 6.1, a new algorithm provides faster and more accurate model assessment results. Some users might observe minor differences in the model assessment measurements when the analyzed data contains large proportions of observations that have tied probabilities. See the SAS Enterprise Miner Reference Help chapter on the Model Comparison node for more information about model assessment statistics.
- **Model Import node** — The Model Import node imports registered models and models that were not created using SAS Enterprise Miner into the SAS Enterprise Miner 6.1 environment. The score code of the saved model is applied to the data that is used in the process flow diagram and new model assessment statistics are generated.

You can use the Model Import node to compare registered models to newly developed models, or to apply registered model score code to new data sets. The Model Import node and the File Import node can be used together to enable users to compare models across different projects and data sources.

- **Neural Network node** — The Neural Network node creates feed forward networks for predictive models. The SAS Enterprise Miner 6.1 Neural Network node contains a new Weight Decay property that has an initial value of 0.0. Non-zero values for the Weight Decay property will penalize the growth of weights in the neural network, and sometimes they are used to limit overfitting in the absence of validation data. The Neural Network node Properties Panel has also been reorganized for improved usability.
- **Rule Induction node** — The Rule Induction node builds predictive models based on incrementally identifying true cases in the data. In SAS Enterprise Miner 6.1, the default maximum number of target levels to be modeled in the Rule Induction node is increased from 32 to 1024. The increase in the maximum number of target levels facilitates the modeling of problems with high cardinality.
- **Assess** — The following changes have been made to the Assessment node tools in Enterprise Miner 6.1:
 - **Model Comparison node** — The Model Comparison node generates comparative statistics and then automatically or manually selects a champion model from the contender models. In SAS Enterprise Miner 6.1, the Model Comparison node can compute or recompute statistics for train, validation, and test data sets. This capability is useful when model data has been modified and

new model fit statistics are needed. Use the Model Comparison node together with the Append node to partition training data in order to perform model selection, and then recombine the data and compute fit statistics for the full data. The full data fit statistics are useful for model comparison purposes.

- **Score node** — The Score node aggregates score code from the process flow diagram to create a single, deployable score code object. In SAS Enterprise Miner 6.1, the Score node scans and manipulates the SAS score code that the process flow diagram generates in order to eliminate intermediate code that produces terms that are not deployed in the final model function. The internally manipulated code is called optimized score code. The Score node now creates optimized score code by default. The Score node can also output the nonoptimized score code for comparison.

For example, the Imputation node can add SAS code that creates many new variables, but a subsequent model selection step may keep only a few of the new terms. The optimized code eliminates unused terms that were created by the Imputation node.

The optimized code will have a major positive impact on scoring and deployment processes. Fewer variables will need to be saved in the score input data sets in operational systems, which can save enterprises large amounts of resources and labor.

- **Utility** — The following changes have been made to the Utility node tools in Enterprise Miner 6.1:

- **Metadata node** — The Metadata node modifies the variable information, or metadata, that is passed on to subsequent tools in a process flow diagram. In SAS Enterprise Miner 6.1, you can select a single source of data and metadata for each variable table role. For example, if you have a process flow diagram with three branches, you can use the Metadata node to select a training table for one branch, a validation table for another branch, and a test table for the third branch.

The Metadata node improvements also let you modify the metadata for individual variables in each table role. This function is useful when creating jobs that process many tables. Metadata node users can also merge metadata from multiple sources. Merging metadata from multiple sources is useful when aggregating the results from multiple variable selection strategies.

For example, consider the task of combining the results of terms that were selected by a stepwise selection algorithm and a decision tree algorithm. You can retain terms that were selected by a single model, terms that were selected by a majority of models, or terms that were selected by all models. This capability provides users with a large degree of control over model creation strategies.

- **Reporter node** — The Reporter node generates PDF and RTF documents for archiving and reporting. In SAS Enterprise Miner 6.1, the Reporter node provides new SAS ODS (Output Delivery System) functions. The new functions create document graphs, process flow diagrams, and analytical plots that match the graphics that are displayed in the SAS Enterprise Miner user interface.

The SAS Enterprise Miner 6.1 Reporter node also provides new Decision Tree results plots for use in PDF and RTF documents. In Reporter node output, the properties list for each node tool indicates the property settings that have been changed from their default values. The Reporter results window now contains a standard external file viewer that you can use to view the PDF or RTF document that was produced.

- **Credit Scoring** — The following changes have been made to the add-on Credit Scoring node tools of

Enterprise Miner 6.1:

- **Interactive Grouping node** — The Interactive Grouping node creates and manages the grouping of raw values into modeling terms. In SAS Enterprise Miner 6.1, the Interactive Grouping node provides improved support for special code mappings; treats interval variables that have limited numbers of values as interval variables rather than categorical variables; and adds new properties that control the binning method and the number of fine detail bins.
 - **Scorecard node** — The Scorecard node builds predictive models from scorecard functions. In SAS Enterprise Miner 6.1, the Scorecard node contains several new configurable properties. The new Model Ordering property specifies the order of terms that were entered into the regression equation model selection search. New Stay, Stop, and Force properties have been added to enhance the model selection search.
-

Extension Tool Programming

In Enterprise Miner 6.1, the Extension Tool Programming interface has been updated and significantly enhanced. For more information about the SAS Enterprise Miner 6.1 Extension Tool Programming Guide, see the product documentation page for SAS Enterprise Miner at <http://support.sas.com>.

What's New in the SAS Enterprise Miner: Single-User Installation Guide

Overview

The **SAS Enterprise Miner: Single-User Installation Guide** explains how to install and initially configure SAS Enterprise Miner in single-user mode.

This document contains new material on the following enhancements and changes to the SAS Intelligence Platform:

- [inclusion of the SAS Add-In for Microsoft Office](#)
 - [new SAS deployment tools](#)
 - [new configuration management tool](#)
 - [deployment enhancements](#)
 - [port changes](#)
-

SAS Add-In for Microsoft Office Ships with SAS Enterprise Miner

SAS Add-In 4.3 for Microsoft Office is bundled with SAS Enterprise Miner 6.2.

New SAS Deployment Tools

SAS 9.2 has new deployment tools:

- SAS Download Manager enables you to download your SAS order by using an HTTP connection over the Internet.
 - SAS Deployment Wizard combines SAS installation and initial configuration into one wizard, replacing the SAS Software Navigator and the SAS Configuration Wizard.
-

New Configuration Management Tool

The new SAS Deployment Manager enables you to remove configuration information (including metadata definitions, configuration files, and Windows services) for one or more components of your installation.

Deployment Enhancements

SAS 9.2 has the following deployment enhancements:

- Automated initial SAS configuration eliminates most post-installation manual configuration scripts.
 - Up-front user input enables you to avoid having to monitor the entire wizard session.
 - The initial SAS installation data file is contained within the SAS Software Depot.
 - Automated deployment is possible across multiple machines (capture-replay feature).
-

Port Changes

The following port changes have been made:

- addition of three new SAS object spawner port banks: 8801, 8811, and 8821
- elimination of the SAS object spawner load balancing port
- addition of a metadata utilities SAS Workspace Server port: 8591

Note: In SAS 9.2, two or more workspace servers can share the same port even if they are running at the same time. ■

- addition of a SAS Deployment Tester server port: 10021

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What's New in SAS Text Miner 4.2

Overview

SAS Text Miner 4.2 includes the following new features and enhancements:

- New Text Mining Nodes
- New Supported Server Platform
- Additional Supported Languages
- New Add-on Support for Custom Entries
- New Supported Procedures

For information about the new features and enhancements in SAS Text Miner 4.1, see [What's New in SAS Text Miner 4.1](#).

New Text Mining Nodes

Three new nodes have been added in SAS Text Miner 4.2:

- Text Parsing Node
- Text Filter Node
- Text Topic Node

In SAS Text Miner 4.2 you have additional options for controlling how your text is mined by using nodes that focus on a particular text mining step. Note that you can still use the Text Miner node if you want to collapse all of the text mining steps into a single node in your process flow diagram.

Text Parsing Node

The Text Parsing node enables you to parse a document collection in order to quantify information about the terms that are contained therein. The Text Parsing node includes SAS Content Categorization, provides a standard parsing facility, and allows you to import custom entities, facts, and events as defined in SAS Content Categorization.

In addition to new functionality, the Text Parsing node offers improved parsing performance. By using a Text Parsing node in your process flow diagram, you now only need to parse a document collection once. This can lead to performance improvements beyond what you could obtain with the Text Miner node in SAS Text Miner 4.1. For example, modifications to filtering would require the Text Miner node in SAS Text Miner 4.1 to reparse all the documents again. Similarly, other nodes in SAS Text Miner 4.2 no longer reparse the document collection.

Text Filter Node

The Text Filter node enables you to reduce the total number of parsed terms or documents that are analyzed so that you can eliminate extraneous information from your analysis. The Text Filter node enables you to perform spell checking using PROC TMSPELL, Boolean and full text searches using integrated Teragram search capabilities, view and analyze results with concept linking, and conduct sub-setting management of terms and documents.

Text Topic Node

The Text Topic node enables you to combine terms into topics or provide your own topics that you want to analyze. With the Text topic node you can manage topics by mining for multiple topics per document, automatically create single and multi-word topics, edit automatically generated topics, and define your own topics. The Topic Viewer allows you to manage your topics with a GUI interface, and results from the Text Topic node provide charts and tables that allow you to analyze the number of documents by topics and the number of terms by topics, for example.

New Supported Server Platform

SAS Text Miner 4.2 now supports the SAX server platform.

Additional Supported Languages

Arabic, Dutch, Japanese, Korean, Polish, and Swedish are now directly supported in SAS Text Miner.

The complete list of directly supported languages in SAS Text Miner 4.2 includes Arabic, Chinese, Dutch, English, French, German, Italian, Japanese, Korean, Polish, Portuguese, Spanish, and Swedish.

All supported languages have built-in entity support.

New Add-on Support for Custom Entries

You must use *SAS Content Categorization* with *Teragram Contextual Extraction* to be able to define custom entities for use in SAS Text Miner. For more information on how to use custom entries in SAS Text Miner, see the *SAS Teragram TK240 User's Guide*.

New Supported Procedures

SAS Text Miner 4.2 supports the following new procedures:

- PROC TMSPELL
- PROC TMFACTOR
- PROC TMBELIEF

PROC TMSPELL

PROC TMSPELL performs integrated spell checking.

PROC TMFACTOR

PROC TMFACTOR performs rotated SVD.

PROC TMBELIEF

PROC TMBELIEF is an experimental procedure that can be used with hierarchical Bayesian Belief Networks.

What's New in SAS Text Miner 4.1

Overview

SAS Text Miner 4.1 includes the following new features and enhancements:

- Teragram integration
- Operating System Platforms
- New mechanism for automatic multi-word term processing
- Differences in text mining results from the previous version
- Languages that are not supported from the previous version

For information about the new features and enhancements in SAS Text Miner 4.2, see [What's New in SAS Text Miner 4.2](#).

Teragram Integration

SAS Text Miner 4.1 is integrated with Teragram.

Operating System Platforms

The following Operating Systems are new: 64-bit Linux, Windows Opteron, HP Itanium.

Automatic Multi-word Term Processing

PROC DOCPARSE no longer recognizes the NOMULTI option.

Differences in Results

Teragram is the new internal parser used by Text Miner. There will be differences in your text mining results.

Unsupported Languages

The following languages are not supported for this release: Danish, Dutch, Finnish, Japanese, Korean, Norwegian Bokmal, and, Swedish.

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What's New in SAS/ETS 9.22

Overview

This chapter summarizes the new features available in SAS/ETS 9.22.

If you have used SAS/ETS procedures in the past, you can review this chapter to learn about the new features that have been added. When you see a new feature that might be useful for your work, turn to the appropriate chapter to read about the feature in detail.

Highlights of Enhancements

The following new procedures have been added to SAS/ETS software:

- [The SEVERITY procedure](#) (Experimental)
- [The TIMEID procedure](#) (Experimental)

[The SIMILARITY procedure](#), which performs similarity analysis for sets of time series, was experimental in the previous release and is now production status.

A new Java application, called the [SAS/ETS Model Editor](#) (Experimental), provides a graphical user interface for editing nonlinear statistical models and provides a convenient way to use the MODEL procedure.

New features have been added to the following SAS/ETS components:

- [The AUTOREG procedure](#)
- [The COUNTREG procedure](#)
- [The MDC procedure](#)
- [The MODEL procedure](#)
- [The QLIM procedure](#)
- [SASEFAME interface engine](#)
- [SASEHAVR interface engine](#)
- [The TIMESERIES procedure](#)
- [The UCM procedure](#)
- [The X12 procedure](#)

New features for defining custom time intervals have been added to Base SAS software that might be of interest to SAS/ETS users. For more information, see *SAS Language Reference: Dictionary*.

Highlights of Enhancements in SAS/ETS 9.2

Users who are updating directly to SAS/ETS 9.22 from a release prior to SAS/ETS 9.2 can find information about the SAS/ETS 9.2 changes and enhancements in [What's New in SAS/ETS for SAS 9.2](#).

AUTOREG Procedure

The following new features have been added to the AUTOREG procedure:

- Three asymmetric GARCH models, namely quadratic GARCH, threshold GARCH, and power GARCH, are implemented to measure the impact of news on the future volatility. Power GARCH also considers the long memory property in the volatility.
 - Besides the existing two tests for the existence of ARCH effect, Lee and King's ARCH test and Wong and Li's ARCH test are implemented. Lee and King's ARCH test is a one-sided locally most mean powerful (LMMP) test; Wong and Li's ARCH test is robust to outliers. If the NLAG= option is specified, the statistics based on the final model residuals, along with the OLS residuals, can also be computed.
 - The Hannan-Quinn criterion (HQC) is implemented and included in the summary statistics.
 - Four statistical tests of independence are implemented: BDS test, runs test, turning point test, and rank version of the von Neumann ratio test. They are powerful tools for model selection and specification test.
 - The augmented Dickey-Fuller (ADF) test for unit root is implemented. This test accounts for some form of dependence between the innovations of the time series. The ADF formulation includes lags of the order P in the regression. When the lag is specified to be zero, it reduces to the standard Dickey-Fuller Unit root test. In the presence of regressors, the Engle-Granger cointegration test is performed using the augmented Dickey-Fuller test statistic.
 - The Elliott-Rothenberg-Stock (ERS) unit root and Ng-Perron (NP) unit root test are implemented. These tests also perform automatic lag length selection by using the information criterion. The Bayesian information criterion (BIC) is used in the ERS test, and the modified Akaike information criterion (AICc) is used in Ng-Perron test.
 - The CLASS statement is now supported. A CLASS statement enables you to declare classification variables for use as explanatory effects in a model. When a CLASS variable is used as a predictor in the MODEL statement, the procedure automatically creates a dummy regressor that corresponds to each discrete value or level of the CLASS variable.
 - The MODEL statement now supports the use of CLASS variables and interaction terms as predictors.
 - The AR, GARCH, and HETERO parameters can be specified in the TEST and RESTRICT statements.
 - The likelihood ratio (LR) test and the Lagrange multiplier (LM) test are supported in TEST statement when GARCH= option is specified.
-

COUNTREG Procedure

The following new features have been added to the COUNTREG procedure:

- The CLASS statement is now supported. A CLASS statement enables you to declare classification variables for use as explanatory effects in a model. When a CLASS variable is used as a predictor in the MODEL statement, the procedure automatically creates a dummy regressor that corresponds to each discrete value or level of the CLASS variable.

- The MODEL statement now supports the use of CLASS variables and interaction terms as predictors.
 - The FREQ statement is now supported. A FREQ statement specifies a variable whose values indicate the number of cases that are represented by each observation. That is, the procedure treats each observation as if it had appeared n times in the input data set, where n is the value of the FREQ variable.
 - The WEIGHT statement is now supported. A WEIGHT statement specifies a variable whose values supply weights for each observation in the dataset. These weights control the importance (weight) given to the data observations in fitting the model.
 - The NLOPTIONS statement enables you to specify options for the subsystem that is used for the nonlinear optimization.
-

MDC Procedure

The following new features have been added to the MDC procedure:

- The CLASS statement is now supported. A CLASS statement enables you to declare classification variables for use as explanatory effects in a model. When a CLASS variable is used as a predictor in the MODEL statement, the procedure automatically creates a dummy regressor that corresponds to each discrete value or level of the CLASS variable.
 - The MODEL statement now supports the use of CLASS variables and interaction terms as predictors.
 - The TEST statement is now supported to test linear equality restrictions on the parameters. Three tests are available: Wald, Lagrange multiplier, and likelihood ratio.
-

MODEL Procedure

The following feature has been added to the MODEL procedure:

- For the GMM estimation method, Hansen's J statistic for the test of overidentifying restrictions is reported along with its probability.
-

QLIM Procedure

The following new features have been added to the QLIM procedure:

- The TE1 and TE2 options output technical efficiency measures for each producer in stochastic frontier models as suggested by Battese and Coelli (1988) and Jondrow et al. (1982).
 - The WEIGHT statement is now supported. A WEIGHT statement identifies a variable to supply weights for each observation in the dataset. By default, the weights are normalized so that they add up to the sample size. If the NONNORMALIZE option is used, the actual weights are used without normalization.
-

SASEFAME Engine

The SASEFAME interface engine provides a seamless interface between Fame and SAS data to enable SAS

users to access and process time series, case series, and formulas that reside in a Fame database. The following enhancements have been made to the SASEFAME access engine for Fame databases:

- The INSET= option enables you to pass Fame commands through an input SAS data set and select your Fame input variables by using the KEEPLIST= clause or the WHERE= clause as selection input for BY variables.
- The DBVERSION= option displays the version number of the Fame Work data base in the SAS log. SASEFAME uses Fame 10, which does not allow version 2 databases. Use the Fame compress utility with the `-m` option to convert your version 2 databases to version 3 or 4. The default is version 4.
- The TUNEFAME= option tunes the Fame database engine's use of memory to reduce I/O times in favor of a bigger virtual memory for caching database objects. The default is 100 MB.
- The TUNECHLI= option tunes the C host language interface (CHLI) database engine's use of memory to reduce I/O times in favor of a bigger virtual memory for caching database objects. The default is 100 MB.
- The WILDCARD= option enables you to select series by using the new Fame 10 wildcarding capabilities which allow a longer 242-character wildcard to match data object series names within the Fame database.
- The interface uses the most current version of Fame 10 CHLI. The SAS log reports the version number of the Fame 10 CHLI:

NOTE: The SASEFAME engine is using Version 10.03 of the HLI.

SASEHAVR Engine

The SASEHAVR interface engine is a seamless interface between Haver and SAS data processing that enables SAS users to read economic and financial time series data that reside in a Haver Analytics DLX (Data Link Express) database. The following enhancements have been made to the SASEHAVR access engine for Haver Analytics databases:

- The AGGMODE= option enables you to specify a STRICT or RELAXED aggregation method. AGGMODE=RELAXED is the default setting. Aggregation is supported only from a more frequent time interval to a less frequent time interval, such as from weekly to monthly. The SAS log reports the status of AGGMODE.
- The SHORT= option enables you to specify the list of Haver short sources to be included in the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The DROPSHORT= option enables you to specify the list of Haver short sources to be excluded from the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The LONG= option enables you to specify the list of Haver long sources to be included in the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The DROPLONG= option enables you to specify the list of Haver long sources to be excluded from the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The GEOG1= option enables you to specify the list of Haver geography1 codes to be included in the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The DROPGEOG1= option enables you to specify the list of Haver geography1 codes to be excluded from the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
- The GEOG2= option enables you to specify the list of Haver geography2 codes to be included in the

output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".

- The DROPGEOG2= option enables you to specify the list of Haver geography2 codes to be excluded from the output SAS data set. This list is comma-delimited and must be surrounded by quotation marks "".
 - The OUTSELECT=ON option specifies that the output data set show values of selection keys such as geography codes, groups, sources, and short and long sources for each selected variable name (time series) in the database. The SAS log reports the status of OUTSELECT.
 - The OUTSELECT=OFF option specifies that the output data set show the observations in range for all selected time series. This is the default for this option.
 - The interface is now using the most current version of DLXAPI32. The SAS log reports the version number of the Haver DLX api.
-

New SEVERITY Procedure

(Experimental)

The new SEVERITY procedure fits models for statistical distributions of the severity (magnitude) of events. A couple of examples of the events typically modeled using the procedure are insurance loss payments and intermittent sales of products.

The SEVERITY procedure is experimental for this release. It provides the following features:

- The magnitude of events can be modeled as a random variable with a continuous parametric probability distribution. The SEVERITY procedure uses the maximum likelihood method to fit multiple specified distributions and identifies the best model based on a specified model selection criterion.
 - The SEVERITY procedure is delivered with a set of predefined models for several commonly used distributions. These include the Burr, exponential, gamma, inverse Gaussian, lognormal, Pareto, generalized Pareto, and Weibull distributions.
 - The SEVERITY procedure is can be extended to fit any continuous parametric distribution. You can specify the distribution's model by using a set of functions and subroutines that are defined by using the FCMP procedure. The model must include functions to provide the values of the probability density function (PDF) and the cumulative distribution function (CDF) of the distribution. The model can also optionally include functions or subroutines that provide the distribution's description, the number of parameters, initial values and bounds for the parameters, the scale parameter transform, and the gradient vector and the Hessian matrix of the PDF and the CDF with respect to the parameters.
 - Exogenous variables can be specified for fitting a model that has a scale parameter. The exogenous variables are modeled such that their linear combination affects the scale parameter via a specified link function. The regression coefficients that are associated with the variables in the linear combination are estimated along with the parameters of the distribution. Currently, only the exponential link function is supported.
 - Censoring and truncation can be specified for each observed value of the response variable. Global values can also be specified to override the individual values that are associated with each observed value. Currently, only censoring from above (that is, right-censoring) and truncation from below (that is, left-truncation) are allowed.
-

SIMILARITY Procedure

The SIMILARITY procedure was classified as experimental in SAS/ETS 9.2. PROC SIMILARITY is now

production status.

New TIMEID Procedure

(Experimental)

The new TIMEID procedure analyzes the sequence of ID values in a SAS data set to identify the time interval between observations and verifies that the observations in the data set represent a properly spaced time series.

The TIMEID procedure provides the following features:

- Specified time intervals and alignments can be used to evaluate a data set's time ID values in terms of the distributions of duplicated values, alignment offsets, and the gaps between adjacent observations.
 - The time interval's width, shift, and alignment can be inferred from a time ID variable. When either the interval or its alignment is specified, this information is used to guide the process of inferring the remaining quantity.
 - When multiple BY groups are present, detailed diagnostics for each BY group are reported in addition to summarized diagnostic information which applies to all BY groups in the data set.
-

TIMESERIES Procedure

Three features have been added to the TIMESERIES procedure for performing spectral analyses of the input time series and native database accumulation of data for a time series.

Singular Spectrum Analysis

Singular spectrum analysis (SSA) is a technique for decomposing a time series into additive components and categorizing these components based on the magnitudes of their contributions. SSA uses a single parameter, the window length, to quantify patterns in a time series without relying on preconceived notions about the structure of the time series. The window length represents the maximum lag considered in the analysis and corresponds to the dimensionality of the PCA (principle components analysis) on which the SSA is based.

In addition to SSA output options, an SSA statement has been added to explicitly control the window length parameter and the grouping of SSA series components.

Fourier Spectrum Analysis

Functionality similar to that available in PROC SPECTRA for analyzing periodograms of time series data has been incorporated into PROC TIMESERIES. Now ODS graphical representations of periodograms and spectral density estimates can be computed and displayed.

Database Accumulation

For Teradata-based input data sets, aggregation and accumulation can be performed using native facilities in

the database server. Most ACCUMULATE= options specified in the ID and VAR statements can be performed by the database server.

UCM Procedure

The ARMA model specification options in the IRREGULAR statement, which were experimental in SAS 9.2, are now production.

X12 Procedure

Many new features have been added to the X12 procedure.

- The CHECK statement produces statistics for diagnostic checking of residuals from the estimated regARIMA model. The following new tables are associated with the CHECK statement: "Autocorrelation of regARIMA Model Residuals," "Partial Autocorrelation of regARIMA Model Residuals," "Autocorrelation of Squared regARIMA Model Residuals," "Summary Statistics for the Unstandardized Residuals," "Normality Statistics for regARIMA Model Residuals," and "Table G Rs: 10*LOG(SPECTRUM) of the regARIMA Model Residuals." If ODS GRAPHICS ON is specified, the following new plots are associated with diagnostic checking output: the autocorrelation function (ErrorACF) plot of the residuals, the partial autocorrelation function (ErrorPACF) plot of the residuals, the autocorrelation function (SqErrorACF) plot of the squared residuals, a histogram (ResidualHistogram) of the residuals, and a spectral plot (SpectralPlot) of the residuals.
- The MAXLAG option of the IDENTIFY statement specifies the maximum number of lags for the sample ACF and PACF that are associated with model identification.
- The following tables are now available through the OUTPUT statement: E1, E2, E3, and E8.
- The SIGMALIM option of the X11 statement enables you to specify the upper and lower sigma limits that are used to identify and decrease the weight of extreme irregular values in the internal seasonal adjustment computations.
- The TYPE option of the X11 statement controls which factors are removed from the original series to produce the seasonally adjusted series (table D11) and also the final trend cycle (table D12).
- The OUTSTAT= option of the X12 statement specifies the optional output data set that contains the summary statistics related to each seasonally adjusted series. The data set is sorted by the BY-group variables, if any, and by series names.
- The PERIODOGRAM option of the X12 statement enables you to specify that the PERIODOGRAM rather than the SPECTRUM of the series be plotted in the G tables and plots.
- The PLOTS= option of the X12 statement controls the plots that are produced through ODS Graphics.
- The SPECTRUMSERIES option of the X12 statement specifies the table name of the series that is used in the spectrum of the original series (table G0). The table names that can be specified are A1, A19, B1, or E1. The default is B1.
- The following tables are now available through the TABLES statement: E1, E2, and E3.
- The following tables are now available through ODS: "Model Description for ARIMA Model Identification", "Model Description for ARIMA Model Estimation", "Final Seasonal Filter Selection via Global MSR", "Seasonal Filters by Period", and "Final Trend Cycle Statistics". The model description information was previously displayed in notes; an ODS table enables you to export the information to a data set. The seasonal filter and trend filter tables are new.

- Auxiliary variables have been added to ACF and PACF data sets that are available through ODS OUTPUT. The following variables have been added: `_NAME_`, Transform, Adjust, Regressors, Diff, and Sdiff. The purpose of the new variables is to help you identify the source of the data when multiple ACFs and PACFs are calculated.

The following new feature is experimental:

- The `AUXDATA=` option of the X12 specifies an auxiliary input data set that can contain user-defined variables specified in the INPUT statement, the `USERVAR=` option of the REGRESSION statement, or the `USERDEFINED` statement. The `AUXDATA=` option is useful when user-defined regressors are used for multiple time series data sets or multiple BY groups.

SAS/ETS Model Editor Application

(Experimental)

A new interactive application, the SAS/ETS Model Editor, enables you to define, fit, and simulate nonlinear statistical models using the MODEL procedure. The SAS/ETS Model Editor enables you to use the powerful features of PROC MODEL through a convenient and interactive graphical user interface.

Date Intervals, Formats, and Functions

The custom time intervals that are available in Base SAS software can be used in SAS/ETS procedures. Custom time intervals enable you to specify beginning and ending dates and seasonality for time intervals according to any definition. Such intervals can be used to define the following:

- fiscal intervals such as monthly intervals that begin on a day other than the first day of the month (for example, intervals that begin on the **10**th day of each month)
- fiscal intervals such as monthly intervals that begin on different days for different months (for example, March of 2000 can begin on March **10**, but April of 2000 can begin on April **12**)
- business days, such as banking days that exclude holidays
- hourly intervals that omit hours that the business is closed

What's New in SAS/ETS for SAS 9.2

Overview

Many SAS/ETS procedures now produce graphical output using the SAS Output Delivery System. This output is produced when you turn on ODS graphics with the following ODS statement:

```
ods graphics on;
```

Several procedures now support the PLOTS= option to control the graphical output produced. (See the chapters for individual SAS/ETS procedures for details on the plots supported.)

With SAS 9.2, SAS/ETS offers three new modules:

- The new ESM procedure provides forecasting using exponential smoothing models with optimized smoothing weights.
- The SASEHAVR interface engine is now production and available to Windows users for accessing economic and financial data residing in a HAVER ANALYTICS Data Link Express (DLX) database.
- The new SIMILARITY (experimental) procedure provides similarity analysis of time series data.

New features have been added to the following SAS/ETS components:

- PROC AUTOREG
- PROC COUNTREG
- PROC DATASOURCE
- PROC MODEL
- PROC PANEL
- PROC QLIM
- SASECRSP Interface Engine
- SASEFAME Interface Engine
- SASEHAVR Interface Engine
- PROC UCM
- PROC VARMAX
- PROC X12

AUTOREG Procedure

Two new features have been added to the AUTOREG procedure.

- An alternative test for stationarity, proposed by Kwiatkowski, Phillips, Schmidt, and Shin (KPSS), is implemented. The null hypothesis for this test is a stationary time series, which is a natural choice for many applications. Bartlett and quadratic spectral kernels for estimating long-run variance can be used. Automatic bandwidth selection is an option.

- Corrected Akaike information criterion (AICC) is implemented. This modification of AIC corrects for small-sample bias. Along with the corrected Akaike information criterion, the mean absolute error (MAE) and mean absolute percentage error (MAPE) are now included in the summary statistics.
-

COUNTREG Procedure

Often the data that is being analyzed take the form of nonnegative integer (count) values. The new COUNTREG procedure implements count data models that take this discrete nature of data into consideration. The dependent variable in these models is a count that represents various discrete events (such as number of accidents, number of doctor visits, or number of children). The conditional mean of the dependent variable is a function of various covariates. Typically, you are interested in estimating the probability of the number of event occurrences using maximum likelihood estimation. The COUNTREG procedure supports the following types of models:

- Poisson regression
 - negative binomial regression with linear (NEGBIN1) and quadratic (NEGBIN2) variance functions (Cameron and Trivedi 1986)
 - zero-inflated Poisson (ZIP) model (Lambert 1992)
 - zero-inflated negative binomial (ZINB) model
-

DATASOURCE Procedure

PROC DATASOURCE now supports the newest Compustat Industrial Universal Character Annual and Quarterly data by providing the new filetypes CSAUCY3 for annual data and CSQUCY3 for quarterly data.

New ESM Procedure

The ESM (Exponential Smoothing Models) procedure provides a quick way to generate forecasts for many time series or transactional data in one step. All parameters associated with the forecast model are optimized based on the data.

MODEL Procedure

The t copula and the normal mixture copula have been added to the MODEL procedure. Both copulas support asymmetric parameters. The copula is used to modify the correlation structure of the model residuals for simulation.

Starting with SAS 9.2, the MODEL procedure stores MODEL files in SAS datasets using an XML-like format instead of in SAS catalogs. This makes MODEL files more readily extendable in the future and enables Java-based applications to read the MODEL files directly. More information is stored in the new format MODEL files; this enables some features that are not available when the catalog format is used.

The MODEL procedure continues to read and write old-style catalog MODEL files, and model files created by previous releases of SAS/ETS continue to work, so you should experience no direct impact from this change.

The CMPMODEL= option can be used in an OPTIONS statement to modify the behavior of the MODEL when

reading and writing MODEL files. The values allowed are CMPMODEL= BOTH | XML | CATALOG. For example, the following statements restore the previous behavior:

```
options cmpmodel=catalog;
```

The CMPMODEL= option defaults to BOTH in SAS 9.2; this option is intended for transitional use while customers become accustomed to the new file format. If CMPMODEL=BOTH, the MODEL procedure writes both formats; when loading model files, PROC MODEL attempts to load the XML version first and the CATALOG version second (if the XML version is not found). If CMPMODEL=XML the MODEL procedure reads and writes only the XML format. If CMPMODEL=CATALOG, only the catalog format is used.

PANEL Procedure

The PANEL procedure expands the estimation capability of the TSCSREG procedure in the time-series cross-sectional framework. The new methods include: between estimators, pooled estimators, and dynamic panel estimators using GMM method. Creating lags of variables in a panel setting is simplified by the LAG statement. Because the presence of heteroscedasticity can result in inefficient and biased estimates of the variance covariance matrix in the OLS framework, several methods that produce heteroscedasticity-corrected covariance matrices (HCCME) are added. The new RESTRICT statement specifies linear restrictions on the parameters. New ODS Graphics plots simplify model development by providing visual analytical tools.

QLIM Procedure

Stochastic frontier models are now available in the QLIM procedure. Specification of these models allows for random shocks of production or cost along with technological or cost inefficiencies. The nonnegative error-term component that represents technological or cost inefficiencies has half-normal, exponential, or truncated normal distributions.

SASECRSP Engine

The SASECRSP interface now supports reading of CRSP stock, indices, and combined stock/indices databases by using a variety of keys, not just CRSP's primary key PERMNO.

In addition, SASECRSP can now read the CRSP/Compustat Merged (CCM) database and fully supports cross-database access, enabling you to access the CCM database by CRSP's main identifiers PERMNO and PERMCO, as well as to access the CRSP Stock databases by Compustat's GVKEY identifier.

A list of other new features follows:

- SASECRSP now fully supports access of fiscal CCM data members by both fiscal and calendar date range restrictions. Fiscal to calendar date shifting has been added as well.
- New date fields have been added for CCM fiscal members. Now fiscal members have three different dates: a CRSP date, a fiscal integer date, and a calendar integer date.
- An additional date function has been added which enables you to convert from fiscal to calendar dates.
- Date range restriction for segment members has also been added.

SASEFAME Engine

The SASEFAME interface enables you to access and process financial and economic time series data that resides in a FAME database. SASEFAME for SAS 9.2 supports Windows, Solaris, AIX, Linux, Linux Opteron, and HP-UX hosts. You can now use the SAS windowing environment to view FAME data and use the SAS viewtable commands to navigate your FAME data base. You can select the time span of data by specifying a range of dates in the RANGE= option. You can use an input SAS data set with a WHERE clause to specify selection of variables based on BY variables, such as tickers or issues stored in a FAME string case series. You can use a FAME crosslist to perform selection based on the crossproduct of two FAME namelists. The new FAMEOUT= option now supports the following classes and types of data series objects: FORMULA, TIME, BOOLEAN, CASE, DATE, and STRING.

It is easy to use a SAS input data set with the INSET= option to create a specific view of your FAME data. Multiple views can be created by using multiple LIBNAME statements with customized options tailored to the unique view that you want to create. See *Selecting Time Series Using CROSSLIST= Option with INSET= and WHERE=TICK* in Chapter 34, *The SASEFAME Interface Engine*.

The INSET variables define the BY variables that enable you to view cross sections or slices of your data. When used in conjunction with the WHERE clause and the CROSSLIST= option, SASEFAME can show any or all of your BY groups in the same view or in multiple views. The INSET= option is invalid without a WHERE clause that specifies the BY variables you want to use in your view, and it must be used with the CROSSLIST=option.

The CROSSLIST= option provides a more efficient means of selecting cross sections of financial time series data. This option can be used without using the INSET= option. There are two methods for performing the crosslist selection function. The first method uses two FAME namelists, and the second method uses one namelist and one BY group specified in the WHERE= clause of the INSET=option. See *Selecting Time Series Using CROSSLIST= Option with a FAME Namelist of Tickers* in Chapter 34, *The SASEFAME Interface Engine*.

The FAMEOUT= option provides efficient selection of the class and type of the FAME data series objects you want in your SAS output data set. The possible values for **fame_data_object_class_type** are FORMULA, TIME, BOOLEAN, CASE, DATE, and STRING. If the FAMEOUT=option is not specified, numeric time series are output to the SAS data set. FAMEOUT=CASE defaults to case series of numeric type, so if you want another type of case series in your output, then you must specify it. Scalar data objects are not supported. See *Reading Other FAME Data Objects with the FAMEOUT= Option* in Chapter 34, *The SASEFAME Interface Engine*.

SASEHAVR Engine

The SASEHAVR interface engine is now production, giving Windows users random access to economic and financial data that resides in a Haver Analytics Data Link Express (DLX) database. You can now use the SAS windowing environment to view HAVERDLX data and use the SAS viewtable commands to navigate your Haver database. You can use the SQL procedure to create a view of your resulting SAS data set. You can limit the range of data that is read from the time series and specify a desired conversion frequency. Start dates are recommended in the LIBNAME statement to help you save resources when processing large databases or when processing a large number of observations. You can further subset your data by using the WHERE, KEEP, or DROP statements in your DATA step. New options are provided for more efficient subsetting by time series variables, groups, or sources. You can force the aggregation of all variables

selected to be of the frequency specified by the `FREQ=` option if you also specify the `FORCE=FREQ` option. Aggregation is supported only from a more frequent time interval to a less frequent time interval, such as from weekly to monthly.

A list of other new features follows:

- You can see the available data sets in the SAS LIBNAME window of the SAS windowing environment by selecting the SASEHAVR libref in the LIBNAME window that you have previously used in your LIBNAME statement. You can view your SAS output observations by double clicking on the desired output data set libref in the libname window of the SAS windowing environment. You can type `Viewtable` on the SAS command line to view any of your SASEHAVR tables, views, or librefs, both for input and output data sets.
- By default, the SASEHAVR engine reads all time series in the Haver database that you reference by using your SASEHAVR libref. The `START=` option is specified in the form `YYYYMMDD`, as is the `END=` option. The start and end dates are used to limit the time span of data; they can help you save resources when processing large databases or when processing a large number of observations.
- It is also possible to select specific variables to be included or excluded from the SAS data set by using the `KEEP=` or the `DROP=` option. When the `KEEP=` or the `DROP=` option is used, the resulting SAS data set keeps or drops the variables that you select in that option. There are three wildcards currently available: `*`, `?`, and `#`. The `*` wildcard corresponds to any character string and will include any string pattern that corresponds to that position in the matching variable name. The `?` means that any single alphanumeric character is valid. The `#` wildcard corresponds to a single numeric character.
- You can also select time series in your data by using the `GROUP=` or the `SOURCE=` option to select on group name or on source name. Alternatively, you can deselect time series by using the `DROPGROUP=` or the `DROPSOURCE=` option. These options also support the wildcards `*`, `?`, and `#`.
- By default, SASEHAVR selects only the variables that are of the specified frequency in the `FREQ=` option. If this option is not specified, SASEHAVR selects the variables that match the frequency of the first selected variable. If no other selection criteria are specified, the first selected variable is the first physical DLXRecord read from the Haver database. The `FORCE=FREQ` option can be specified to force the aggregation of all variables selected to be of the frequency specified by the `FREQ=` option. Aggregation is supported only from a more frequent time interval to a less frequent time interval, such as from weekly to monthly. The `FORCE=` option is ignored if the `FREQ=` option is not specified.

New SIMILARITY Procedure (Experimental)

The new SIMILARITY procedure provides similarity analysis between two time series and other sequentially ordered numeric data. The SIMILARITY procedure computes similarity measures between an input sequence and target sequence, as well as similarity measures that "slide" the target sequence with respect to the input sequence. The "slides" can be by observation index (sliding-sequence similarity measures) or by seasonal index (seasonal-sliding-sequence similarity measures).

UCM Procedure

The following features are new to the UCM procedure:

- The new RANDOMREG statement enables specification of regressors with time-varying regression coefficients. The coefficients are assumed to follow independent random walks. Multiple RANDOMREG statements can be specified, and each statement can specify multiple regressors. The

regression coefficient random walks for regressors specified in the same RANDOMREG statement are assumed to have the same disturbance variance parameter. This arrangement enables a very flexible specification of regressors with time-varying coefficients.

- The new SPLINEREG statement enables specification of a spline regressor that can optionally have time-varying coefficients. The spline specification is useful when the series being forecast depends on a regressor in a nonlinear fashion.
- The new SPLINESEASON statement enables parsimonious modeling of long and complex seasonal patterns using the spline approximation.
- The SEASON statement now has options that enable complete control over the constituent harmonics that make up the trigonometric seasonal model.
- It is now easy to obtain diagnostic test statistics useful for detecting structural breaks such as additive outliers and level shifts.
- As an experimental feature, you can now model the irregular component as an autoregressive moving-average (ARMA) process.
- The memory management and numerical efficiency of the underlying algorithms have been improved.

VARMAX Procedure

The VARMAX procedure now enables independent (exogenous) variables with their distributed lags to influence dependent (endogenous) variables in various models, such as VARMAX, BVARX, VECMX, BVECMX, and GARCH-type multivariate conditional heteroscedasticity models.

Multivariate GARCH Models—New GARCH Statement

Multivariate GARCH modeling is now a production feature of VARMAX.

To enable greater flexibility in specifying multivariate GARCH models, the new GARCH statement has been added to the VARMAX procedure. With the addition of the GARCH statement, the GARCH= option is no longer supported on the MODEL statement.

The OUTHT= option can be specified in the GARCH statement to write the estimated conditional covariance matrix to an output data set. See GARCH Statement in Chapter 30, The VARMAX Procedure, for details.

The VARMAX Model

The VARMAX procedure provides modeling of a VARMAX(P, Q, S) process which is written as

$$\mathbf{y}_t = \boldsymbol{\delta} + \sum_{i=1}^p \Phi_i \mathbf{y}_{t-i} + \sum_{i=0}^q \Theta_i^* \mathbf{x}_{t-i} + \boldsymbol{\epsilon}_t - \sum_{i=1}^s \Theta_i \boldsymbol{\epsilon}_{t-i}$$

where $\Phi(B) = I_k - \sum_{i=1}^p \Phi_i B^i$, $\Theta^*(B) = \Theta_0^* + \Theta_1^* B + \dots + \Theta_s^* B^s$, and $\Theta(B) = I_k - \sum_{i=1}^s \Theta_i B^i$.

If the Kalman filtering method is used for the parameter estimation of the VARMAX(P, Q, S) model, then the dimension of the state-space vector is large, which takes time and memory for computing. For convenience, the parameter estimation of the VARMAX(P, Q, S) model uses the two-stage estimation method, which computes the estimation of deterministic terms and exogenous parameters and then maximizes the log-likelihood function of the VARMA(P, Q) model.

Some examples of VARMAX modeling are:

```
model y1 y2 = x1 / q=1;  
nloptions tech=qn;
```

```
model y1 y2 = x1 / p=1 q=1 xlag=1 nocurrentx;  
nloptions tech=qn;
```

The BVARX Model

Bayesian modeling allows independent (exogenous) variables with their distributed lags. For example:

```
model y1 y2 = x1 / p=2 prior=(theta=0.2 lambda=5);
```

The VECMX Model

Vector error correction modeling now allows independent (exogenous) variables with their distributed lags. For example:

```
model y1 y2 = x1 / p=2 ecm=(rank=1);
```

The BVECMX Model

Bayesian vector error correction modeling allows independent (exogenous) variables with their distributed lags. For example:

```
model y1 y2 = x1 / p=2 prior=(theta=0.2 lambda=5) ecm=(rank=1);
```

The VARMAX-GARCH Model

VARMAX modeling now supports an error term that has a GARCH-type multivariate conditional heteroscedasticity model. For example:

```
model y1 y2 = x1 / p=1 q=1;  
garch q=1;
```

New Printing Control Options

The PRINT= option can be used in the MODEL statement to control the results printed. See the description of the PRINT= option in Chapter 30, The VARMAX Procedure, for details.

X12 Procedure

The X12 procedure has many new statements and options. Many of the new features are related to the regARIMA modeling, which is used to extend the series to be seasonally adjusted. A new experimental input and output data set has been added which describes the times series model fit to the series.

The following miscellaneous statements and options are new:

- The NOINT option on the AUTOMDL statement suppresses the fitting of a constant term in automatically identified models.
- The following tables are now available through the OUTPUT statement: A7, A9, A10, C20, D1, and D7.
- The TABLES statement enables you to display some tables that represent intermediate calculations in the X11 method and that are not displayed by default.

The following statements and options related to the regression component of regARIMA modeling are new:

- The SPAN= option on the OUTLIER statement can be used to limit automatic outlier detection to a subset of the time series observations.
- The following predefined variables have been added to the PREDEFINED option on the REGRESSION statement: EASTER(*value*), SCEASTER(*value*), LABOR(*value*), THANK(*value*), TDSTOCK(*value*), SINCOS(*value* ...).
- User-defined regression variables can be included on the regression model by specifying them in the USERVAR=(*variables*) option in the REGRESSION statement or the INPUT statement.
- Events can be included as user-defined regression variables in the regression model by specifying them in the EVENT statement. SAS predefined events do not require an INEVENT= data set, but an INEVENT= data set can be specified to define other events.
- You can now supply initial or fixed parameter values for regression variables by using the B=(*value* <F> ...) option in the EVENT statement, the B=(*value* <F> ...) option in the INPUT statement, the B=(*value* <F> ...) option in the REGRESSION statement, or by using the MDLINFOIN= data set in the PROC X12 statement. Some regression variable parameters can be fixed while others are estimated.
- You can now assign user-defined regression variables to a group by the USERTYPE= option in the EVENT statement, the USERTYPE= option in the INPUT statement, the USERTYPE= option in the REGRESSION statement, or by using the MDLINFOIN= data set in the PROC X12 statement. Census Bureau predefined variables are automatically assigned to a regression group, and this cannot be modified. But assigning user-defined regression variables to a regression group allows them to be processed similarly to the predefined variables.
- You can now supply initial or fixed parameters for ARMA coefficients using the MDLINFOIN= data set in the PROC X12 statement. Some ARMA coefficients can be fixed while others are estimated.
- The INEVENT= option on the PROC X12 statement enables you to supply an EVENT definition data set so that the events defined in the EVENT definition data set can be used as user-defined regressors in the regARIMA model.
- User-defined regression variables in the input data set can be identified by specifying them in the USERDEFINED statement. User-defined regression variables specified in the USERVAR=(*variables*) option of the REGRESSION statement or the INPUT statement do not need to be specified in the USERDEFINED statement, but user-defined variables specified only in the MDLINFOIN= data set need to be identified in the USERDEFINED statement.

The following new experimental options specify input and output data sets that describe the times series model:

- The MDLINFOIN= and MDLINFOOUT= data sets specified in the PROC X12 statement enable you to store the results of model identification and use the stored information as input when executing the X12 Procedure.
-

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What's New in SAS/Genetics 9.2

Overview

SAS/Genetics includes two new experimental procedures, the BTL procedure and the GENESELECT procedure.

Several enhancements have been made to the ALLELE procedure, and a format of genotype columns not previously supported can now be accommodated by the ALLELE, CASECONTROL, FAMILY, and HAPLOTYPE procedures.

Accommodating a New Data Format

If your genotypes are represented by one character for each of their two alleles with no delimiting character separating them (such as "AB"), the GENOCOL and DELIMITER=" options allow the inclusion of such columns in the VAR statement of the ALLELE, CASECONTROL, FAMILY, and HAPLOTYPE procedures. Note that there is no space between the two quotation marks in the DELIMITER= option.

ALLELE Procedure

The new POP statement enables you to specify a variable that defines populations. Various F statistics can be computed that serve to describe the genetic structure of the population hierarchy.

The MAXDIST= option of the PROC ALLELE statement can now be specified in terms of the unit used to define markers' locations. A LOCATION variable can be included in the NDATA= data set, containing a numeric value that represents each marker's location, and the MAXDIST= option is applied to the distance between markers (the absolute value of the difference of the two LOCATION values) for determining whether linkage disequilibrium (LD) measures are to be calculated for that particular pair. When the NDATA= option is not specified or the data set does not contain a LOCATION variable, the MAXDIST= option functions as it did previously, calculating the distance between markers as the number of markers apart they are.

The upper bound for the LD measure D , used in the denominator of the D' measure, is now calculated according to Hamilton and Cole (2004) and Zaykin (2004) when HAPLO=NONE or NONEHWD.

The new RHO option in the PROC ALLELE statement requests that the LD measure ρ and its information $K\rho$ (Morton et al. 2001) be included in the "Linkage Disequilibrium Measures" table. This table now also includes a column containing the number of individuals genotyped at each pair of markers.

BTL Procedure

The experimental BTL procedure performs mixed model analysis of variance and maximum likelihood estimation on genetic marker data from experimental populations in order to find and characterize binary trait loci (BTL).

GENESELECT Procedure

The experimental GENESELECT procedure creates a model to predict a qualitative or quantitative phenotype from interactions of genetic and environmental variables. The procedure generates useful interactions from a potentially large number of candidates.

References

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What's New in SAS/GRAPH 9.2

Overview

The changes and enhancements for SAS/GRAPH 9.2 are very extensive. Highlights include the following:

- The new SAS/GRAPH statistical graphics suite provides a new set of procedures, a new language, and a graph editor specifically designed for creating and editing statistical graphics.
- All SAS/GRAPH procedures now support ODS styles for all devices.
- SAS/GRAPH now automatically selects an appropriate device and style for all open destinations.
- SAS/GRAPH now provides TrueColor support, which allows over 16 million colors in a single image.
- The new Network Visualization Workshop enables you to visualize and investigate the patterns and relationships hidden in network data (node-link data).
- The new GKPI procedure generates several key performance indicators.
- The new GTILE procedure generates tile charts.
- The new GEOCODE procedure enables you to add geographic coordinates to data sets that contain location information such as mailing addresses or to perform geolocation with non-address location data.
- The new GINSIDE procedure determines which polygon in a map data set contains the geographic coordinates in your input data set.
- All procedures now support graphics output filenames up to 256 characters long.
- Many procedures have significant enhancements and new options. See [Procedures](#) for a complete list.
- The new Scalable Vector Graphics devices enable you to generate SVG output.
- Several new map data sets, as well as new feature data sets, have been added to the MAPS library. Several existing map data sets have been updated.

The SAS/GRAPH Statistical Graphics Suite

ODS Statistical Graphics (referred to as ODS Graphics for short) is major new functionality for creating statistical graphics that is available in a number of SAS software products, including SAS/STAT, SAS/ETS, SAS/QC, and SAS/GRAPH. Many statistical procedures have been enabled to use this functionality, and these procedures now produce graphs as automatically as they produce tables. In addition, the new statistical graphics (SG) family of SAS/GRAPH procedures use this functionality to produce plots for exploratory data analysis and customized statistical displays.

ODS Graphics includes the new SAS/GRAPH statistical graphics suite. This suite provides the following new features:

SAS/GRAPH statistical graphics procedures

provide a simple syntax for creating graphics commonly used in exploratory data analysis and for creating customized statistical displays. These new procedures include the SGPANEL, SGPLOT, and SGSCATTER procedures. In addition, the SGRENDER procedure provides a SAS procedure interface to the new Graph Template Language. For more information, including changes and enhancements for SAS 9.2 Phase 2, see **SAS/GRAPH: Statistical Graphics Procedures Guide**.

Graph Template Language (GTL)

is the underlying language for the default templates that are provided by SAS for procedures that use ODS Statistical Graphics. You can use the GTL either to modify these templates or to create your own highly customized graphs. Templates written with the GTL are built with the `TEMPLATE` procedure. For more information about Graph Template Language, see the **SAS/GRAPH: Graph Template Language Reference** and the **SAS/GRAPH: Graph Template Language User's Guide**.

ODS Graphics Editor

is an interactive editor that enables you to edit and enhance graphs that are produced by procedures that use ODS Statistical Graphics. You can use the ODS Graphics Editor to modify the existing elements of a graph such as titles and labels, or to add features such as text annotation for data points. For more information, including changes and enhancements for SAS 9.2 Phase 2, see **SAS/GRAPH: ODS Graphics Editor User's Guide**.

ODS Graphics Designer

provides a point-and-click interface for creating ODS graphics. Using the ODS Graphics Designer does not require knowledge of ODS templates or the Graph Template Language. With the ODS Graphics Designer, you can easily create multi-cell graphs, classification panels, scatter plot matrices, and more. You can save your output as an image file or as an ODS Graphics Designer file (SGD file) that you can edit later.

The ODS Graphics Designer is available beginning with SAS 9.2 Phase 2. For more information, including information about changes and enhancements for the third maintenance release of SAS 9.2, see **SAS/GRAPH: ODS Graphics Designer User's Guide**.

Note: For additional information on the ODS Statistical Graphics functionality, see **SAS Output Delivery System: User's Guide** and **SAS/STAT User's Guide**. ■

The SAS/GRAPH Network Visualization Workshop

The Network Visualization (NV) Workshop application enables you to visualize and investigate the patterns and relationships hidden in network data (node-link data). Some common applications that use network data include supply chains, communication networks, Web sites, database schema, and software module dependencies. NV Workshop is designed for visualizing large networks. Using a combination of data tables, statistical graphs, and network graphs, NV Workshop enables you to extract information that would otherwise remain hidden. Help is available from the menu within the product. To start NV Workshop, select **Start** ➤ **Programs** ➤ **SAS** ➤ **SAS GRAPH NV Workshop 2.1**.

For more information, including changes and enhancements for SAS 9.2 Phase 2, see **SAS/GRAPH: Network Visualization Workshop User's Guide**.

Support for Multiple Open ODS Destinations

If you have multiple ODS destinations open, SAS/GRAPH automatically selects the appropriate device for each destination. In addition, each graph uses the ODS style associated with each destination. You do not need to specify a device or style to get optimal results. For example, if you do not specify a device, then SAS/GRAPH automatically selects the PNG device for the HTML destination if it is open and the SASEMF device for the RTF destination.

Also, if you have multiple ODS destinations open and you are using a device other than the Java or ActiveX devices (ACTIVEX, JAVA, ACTXIMG, or JAVAIMG), a different GRSEG is created for each open destination. The GRSEGs for the first destination are stored in WORK.GSEG. The GRSEGs for any other open destinations are stored in catalogs named according to the destinations, for example, WORK.HTML.

Support for ODS Styles

All SAS/GRAPH procedures and devices now support ODS styles. By default, all colors, fonts, symbols, and graph sizes are derived from the current style. Procedure statement options and SAS/GRAPH GOPTIONS override individual elements of the style, so you can easily customize the appearance of any graph.

Additionally, the colors used by the styles have been updated to enhance the appearance of your graphics output.

The use of ODS styles by default is controlled by the GSTYLE system option.

Devices

- The new Scalable Vector Graphics devices enable you to create SVG graphs. The SVG devices (SVG, SVGZ, SVGView, and SVGT) are supported for the LISTING, HTML, and PRINTER destinations.
- The default device for the ODS HTML destination has changed from GIF to PNG, which provides TrueColor support. Using the PNG device might result in graphs that have spacing or size differences, such as slightly narrower bars in bar charts.
- Data tips are now supported by the JAVAIMG device.
- Several devices have been added for compatibility with previous releases of SAS/GRAPH. These devices are named *Zdevice*, where *device* is the name of the device in previous releases.
 - The following devices ignore the FONTRENDERING= system option and force host font rendering (see [Fonts and Font Rendering](#)): ZGIF, ZGIF733, ZGIFANIM, ZJPEG, ZPNG, ZSASBMP, ZTIFFB, ZTIFFBII, ZTIFFBMM, ZTIFFG3, ZTIFFG4, and ZTIFFP.
 - The following devices support printer-resident fonts only: ZPCL5, ZPDF, ZPDFC, ZPSCOLOR, ZPSEPSFC, ZPSL, and ZPSLEPSF. They will not work well with ODS styles (see [Support for ODS Styles](#)) because they do not support TrueType fonts, which are used by the styles.
 - Several Universal Printing shortcut devices have been added. The UPCL5, UPCL5E and UPCL5C devices have been added for printing support. The UPDF and UPDFC devices have been added for PDF support. The UPSL and UPSLC devices have been added for PostScript support. See also Using Universal Printer Shortcut Devices.

Colors

- SAS/GRAPH now provides TrueColor support, which allows over 16 million colors in a single image.
 - The number of colors in the default color list has been increased to 38.
-

Fonts and Font Rendering

- The following fonts are now obsolete: DAVID, NHIRA, NKATA.
- Some of the characters in the Hebrew font are mapped differently to the Roman character set than they were previously.
- Fonts are now rendered using the FreeType engine. This new font rendering might result in fonts appearing larger than they did in previous versions of SAS/GRAPH. See also [Changing the Appearance of Output to Match That of Earlier SAS Releases](#).
- Many new TrueType fonts have been added. These new fonts are listed in [TrueType Fonts Supplied by SAS](#).

TrueType Fonts Supplied by SAS

| | | |
|--|--------------------------|------------|
| Albany AMT* | Thorndale Duospace WT SC | GungsuhChe |
| Cumberland AMT* | Thorndale Duospace WT TC | Dotum |
| Thorndale AMT* | Arial Symbol* | DotumChe |
| Symbol MT | Times New Roman Symbol* | Gulim |
| Monotype Sorts | MS PMincho | GulimChe |
| Monotype Sans WT J | MS Mincho | NSimSun |
| Monotype Sans WT K | MS PGothic | SimHei |
| Monotype Sans WT SC | MS UI Gothic | SimSun |
| Monotype Sans WT TC | Batang | PMingLiU |
| Thorndale Duospace WT J | BatangChe | MingLiU |
| Thorndale Duospace WT K | Gungsuh | HeiT |
| * Albany AMT, Cumberland AMT, Thorndale AMT, Arial Symbol, and Times New Roman Symbol are font families. Normal, bold, italic, and bold italic versions of these fonts are provided. | | |

Changing the Appearance of Output to Match That of Earlier SAS Releases

SAS/GRAPH 9.2 introduces many new features that significantly change the default appearance of your SAS/GRAPH output. To produce output that looks as if it was produced with previous versions of SAS/GRAPH, do the following:

- Specify the NOGSTYLE system option. This option turns off the use of ODS styles. See Turning Off Styles.
- Specify the FONTRENDERING=HOST_PIXELS system option. This option specifies whether devices that are based on the SASGDGIF, SASGDTIF, and SASGDIMG modules render fonts by using the operating system or by using the FreeType engine. This option applies to certain native SAS/GRAPH devices (see Device Categories And Modifying Default Output Attributes). For example, this option works for GIF, TIFFP, JPEG, and ZPNG devices, but it is not applicable to PNG, SVG, or SASPRT* devices.

- Specify DEVICE=ZGIF on the GOPTIONS statement when you are sending output to the HTML destination.
 - In other cases where your application specifies a device, specify a compatible Z device driver, if applicable. See [Devices](#) for more information.
-

Procedures

Support for Long Filenames

The NAME= option for each procedure has been enhanced to allow you to specify filenames up to 256 characters long for graphics output files (PNG files, GIF files, and so on). See the documentation for the specific SAS/GRAPH procedures for more information.

GAREABAR Procedure

The GAREABAR procedure has the following new options and enhancements:

- The GAREABAR procedure now supports the BY and LEGEND statements.
- The CONTINUOUS option enables you to display a range of numeric values along the width axis.
- The DESCRIPTION= option specifies the description of the catalog entry for the plot.
- The LEGEND= option assigns the specified LEGEND definition to the legend generated by the SUBGROUP= option.
- The NOLEGEND option suppresses the legend automatically generated by the SUBGROUP= option.

GBARLINE Procedure

The GBARLINE procedure has the following new options and enhancements:

- The PLOT statement supports the creation of multiple plot lines on a single bar chart.
- The SUBGROUP= option divides the bar into segments according to the values of the SUBGROUP variable values.
- The HTML= option on the PLOT statement supports data tips and drill-down links on the markers of the line plot.
- The HTML_LEGEND= option supports data tips and drill-down legend links.
- The IMAGEMAP= option enables you to generate an image map with drill-down functionality in an HTML file.
- The LEGEND= option enables you to generate both BAR and PLOT legends.
- The LEVELS=ALL option has been enhanced to display any number of midpoints.
- The ASCENDING and DESCENDING options now join plot points from left-to-right by default when the bars are reordered.
- The PLOT statement now supports several options for reference lines on the plot (right) response axis.
 - The AUTOREF option draws a reference line at each major tick mark.
 - The REF= option draws reference lines at the specified positions.

- The CREF=, LREF=, and WREF= options enable you to specify the color, line style, and width of user-defined reference lines.
- The CAUTOREF=, LAUTOREF=, and WAUTOREF= options enable you to specify the color, line style, and width of AUTOREF lines.
- The WREF= and WAUTOREF= options on the BAR statement enable you to specify the width of reference lines on the bar (left) response axis.
- The PLOT statement now supports the following options:

CAXIS= specifies a color for the tick marks and the axis area frame

CTEXT= specifies a color for all text on the plot response axis and legend

NOAXIS suppresses the right PLOT response axis

GCHART Procedure

The GCHART procedure has the following new options and enhancements:

- The COUTLINE= option has been enhanced to include outlines on cylinder-shaped bars.
- The GAXIS= option is now supported by the ACTIVEX, ACTXIMG, JAVA, and JAVAIMG devices.
- The MAXIS= option is now supported by the ACTIVEX, ACTXIMG, JAVA, and JAVAIMG devices.
- The NOPLANE option enables you to remove walls from three-dimensional bar charts.
- The PCTSUM option in the HBAR statement displays a column of percentages for the sum variable values.
- The new PCTSUMLABEL= option enables you to specify the text for the column label for the PCTSUM statistic in the table of statistics.
- The PLABEL= option enables you to specify the font, height, and color of pie slice labels.
- The NOZERO option on the BAR statement is now supported by the JAVA and JAVAIMG devices.
- The RADIUS= option on the PIE statement enables you to specify the radius of the pie chart.
- The RAXIS= option is now supported by the ACTIVEX, ACTXIMG, JAVA, and JAVAIMG devices.
- The SHAPE= option on BLOCK statement is now supported by the ACTIVEX, ACTXIMG, JAVA, and JAVAIMG devices.
- The WREF= and WAUTOREF= options enable you to specify the width of reference lines.
- The pie and bar name variable now support up to 256 characters.

GCONTOUR Procedure

The GCONTOUR procedure has the following changes and enhancements.

- When used with the Java and ActiveX devices, the LJOIN option displays filled contour areas with separated by contour lines.
- When used with the Java and ActiveX devices, the SMOOTH option produces smooth gradient areas between levels.
- The WAUTOHREF= and WAUTOVREF= options specify the line width for reference lines generated with the AUTOHREF and AUTOVREF options, respectively.
- The WHREF= and WVREF= options specify the line width for reference lines generated with the HREF= and VREF= options, respectively.

GEOCODE Procedure

The new GEOCODE procedure enables you to add geographic coordinates (latitude and longitude) to data sets that contain location information such as mailing addresses. You can also perform geolocation, which is adding geographic coordinates to non-address locations such as sale territories.

For SAS 9.2 Phase 2 and later, the new RANGE geocoding method enables you to perform geolocation for IP addresses.

For the third maintenance release of SAS 9.2, the new STREET geocoding method enables you to perform geolocation for street addresses.

GINSIDE Procedure

The new GINSIDE procedure determines which polygon in a map data set contains the X and Y coordinates in your input data set. For example, if your input data set contains coordinates within Canada, you can use the GINSIDE procedure to identify the province for each data point.

GKPI Procedure

The new GKPI procedure generates key performance indicators, including sliders, bullet graphs, speedometers, dials, and traffic lights. This GKPI procedure is supported by the JAVAIMG device only.

GMAP Procedure

The GMAP procedure has the following new features:

- The AREA statement enables you to control the appearance of regions in block maps and prism maps.
- The CDEFAULT= option specifies the color for empty map areas.
- The DENSITY= option enables you to reduce the number of map points that are drawn.
- The RELZERO= option specifies that the heights of bars and regions are relative to zero, rather than the minimum value.
- The STATISTIC= option specifies a statistic to use for the response variable.
- The STRETCH option stretches the extents of a map to fill the output device.
- The UNIFORM option specifies that each map that is created when you use the BY statement uses the same colors and legend.
- The WOUTLINE= option on the BLOCK and CHORO statements is now supported by the JAVA and JAVAIMG devices.

GPLOT Procedure

The GPLOT procedure has the following new options and enhancements:

- The BFILL= option enables you to generate gradient, solid-filled bubble plots.
- The FRONTREF= option specifies that reference lines are drawn in front of filled areas.
- The OVERLAY option is no longer required to display a legend when the PLOT (or PLOT2) statement specifies only one plot.
- The WAUTOHREF= and WAUTOVREF= options specify the line width for reference lines generated with the AUTOHREF and AUTOVREF options, respectively.
- The WHREF= and WVREF= options specify the line width for reference lines generated with the HREF= and VREF= options, respectively.
- Enhanced features in box plots enable you to click on the interior of the boxes for simple drill-down functionality. Previously, you could click only on visible box elements. Now, you can click anywhere inside the box to drill down to more detailed data.

GPROJECT Procedure

The NODATELINE option enables contiguous projections when projecting maps that cross the line between 180 degrees and -180 degrees longitude.

The following options for the GPROJECT procedure have been renamed:

| Old Name | New Name |
|----------|-----------|
| DEGREE | DEGREES |
| PARALEL1 | PARALLEL1 |
| PARALEL2 | PARALLEL2 |

GRADAR Procedure

The GRADAR procedure has the following new options and enhancements:

- The CALENDAR option produces a chart showing twelve equal-sized segments, one for each month of the year.
- The NLEVELS= option specifies the number of colors to use in calendar charts.
- The NOLEGEND option turns off the automatically generated legend.
- The SPOKESCALE= option specifies whether every spoke is drawn to the same scale or each spoke is drawn to a different scale.
- The WINDROSE option produces a windrose chart, which is a type of histogram.
- The FREQ= option now supports only non-zero integers. Zero and negative values are dropped. Decimal values are truncated to integers.
- The WEIGHT= option is no longer supported.
- The GRADAR procedure now draws missing overlay values to the center. Previously, missing values were drawn to zero.

GREMOVE Procedure

The GREMOVE procedure has the following new options:

- The FUZZ= option specifies an error tolerance for the point matching algorithm.
- The NODECYCLE option enables some types of polygons to be closed properly.

GTILE Procedure

The new GTILE procedure enables you to create and display tile charts using the Java or ActiveX device drivers. Tile charts are designed for visualizing a large quantity of hierarchical-type data and are sometimes referred to as rectangular tree maps. Tile charts display rectangles of varying sizes and colors based on the magnitude of the variables specified and provides drill-down links to more detailed data.

MAPIMPORT Procedure

The ID statement for the MAPIMPORT procedure enables you to group related polygons.

Global Statements

- The REPEAT= option on the LEGEND statement enables you to specify the number of times a plot symbol is displayed in a single legend item in the legend.
- The VALUE=EMPTY option on the PATTERN statement is now supported by three-dimensional bar charts.
- The STAGGER option offsets the axis values on a horizontal axis.
- The TICK= suboption on the VALUE= option of the LEGEND statement is now supported by the Java Map Applet.
- The ROWMAJOR and COLMAJOR options on the LEGEND statement enable you to control whether legend entries are listed by row or by column.

Graphics Options

- The ACCESSIBLE graphics option generates descriptive text and the summary statistics that are represented by the graph. This option is valid for the Java and ActiveX devices only.
- The ALTDESC option enables you to specify whether the text specified in the DESCRIPTION= option is used as the data tip text.
- The TRANSPARENCY option is supported by the ACTIVEX and ACTXIMG devices when the output is used in a PowerPoint presentation.

Transparent Overlays

Transparent overlays from GIF files are now supported in SAS/GRAPH output. You can use transparent GIFs with the IMAGE function in the Annotate facility and with the IBACK and IFRAME graphics options.

ActiveX Control

The following are enhancements for the ActiveX Control:

- The ActiveX control now displays calendar and windrose charts generated by the GRADAR procedure.
 - The control also displays tile charts created by the new GTILE procedure.
 - Support for UNICODE fonts has been added.
 - A new field in the user interface enables you to provide interactive graphs in Microsoft Powerpoint slideshows.
 - The user interface now enables you to specify the properties of scroll bars in your graph.
 - Data tips are supported for scatter plots generated with the GCONTOUR procedure.
 - Enhanced support of the Annotate Facility listed under [The Annotate Facility](#).
-

Java Map Applet

The Java Map Applet user interface enables you to change block sizes.

Support has been added for the MENUREMOVE parameter, which enables you to remove menu items from the applet user interface.

Java Tilechart Applet

The new Java Tile Chart applet creates and displays tile charts. Tile charts are designed for visualizing a large quantity of hierarchical-type data and are sometimes referred to as rectangular tree maps. They display rectangles of varying sizes and colors based on the magnitude of the variables specified and provide drill-down links to more detailed data. You can generate the applet with the GTILE procedure and the JAVA device.

The Annotate Facility

The following new features are available for the Annotate facility:

- The ANGLE, CBORDER, CBOX, LINE, and ROTATE variables are now supported by the ACTIVEX and ACTXIMG devices.
 - The ARROW function and %ARROW macro enable you to draw arrows.
 - A new value for the HSYS= option, 'D', specifies points as the unit of measurement for font sizes.
 - The IMAGE function is now supported by the JAVA and JAVAIMG devices.
 - The WIDTH variable for the PIE function specifies the thickness of the outline around the pie slice.
-

New Map Data Sets

New map data sets are provided for Antarctica (ANTARCTI, ANTARCT2), Montenegro (MONTENEG, MONTENE2), Romania (ROMANIA, ROMANIA2), Rwanda (RWANDA, RWANDA2), and Serbia (SERBIA, SERBIA2).

The continent map data sets now have corresponding feature data sets (ANTARCT2, AFRICA2, EUROPE2, OCEANIA2, NAMERIC2, SAMERIC2).

Note: Antarctica uses the new continent code 97. ■

Updated Map Data Sets

Some of the map data sets in the MAPS library have been updated. [Changes to the Map Data Sets](#) contains a list of the changes.

Changes to the Map Data Sets

| Data Set(s) | Changes |
|---|---|
| Continent data sets (ASIA, AFRICA, EUROPE, NAMERICA, OCEANIA, SAMERICA) | updated to include new geographic features. Each data set includes a new DENSITY variable. Brunei, Indonesia, and the Philippines have moved from OCEANIA to ASIA. The continent code for these countries has changed from 96 to 95. OCEANIA replaces SPACIFIC as continent 96. Tasmania has been added to the OCEANIA data set. |
| CHINA, CHINA2 | updated with new province names and ID numbers. The new OLDID and OLDIDNAME variables in the CHINA2 data set contain the old ID numbers and province names. Because the ID numbers and province names have changed, you might need to change your response data in any existing SAS programs that use these data sets. |

| | |
|----------------------|--|
| GERMANY, GERMANY2 | <p>updated with new districts and states. The following new variables have been added:</p> <ul style="list-style-type: none"> • AREA • DISTNAME • DISTRICT • ID2 <p>The IDNAME variable contains the values that were previously in IDNAME2. The IDNAME2 variable has been removed.</p> |
| INDIA, INDIA2 | <p>updated with new states and new ID numbers. The new OLDID variable in the INDIA2 data set contains the old ID numbers. Additionally, the IDNAME2 variable in the INDIA2 data set contains alternate spellings for the state names. The INDIA data set contains a new DENSITY variable.</p> <p>Because the ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| ITALY, ITALY2 | <p>updated with new provinces and ID numbers. The new OLDID variable in the ITALY2 data set contains the old ID numbers. The ITALY data set contains new DENSITY, NUTS, and REGNAME2 variables.</p> <p>Because the ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| | |

| | |
|---|--|
| JAOSAKA, JAOSAKA2 | updated with new ID values. The new TYPE variable in JAOSAKA2 contains feature types. |
| JATOKYO, JATOKYO2 | updated with new ID values. The new TYPE variable in JATOKYO2 contains feature types. |
| LUXEMBOU, LUXEMBO2 | <p>updated with more detail and new variables. The LUXEMBOU data set has a new DENSITY variable. The LUXEMBO2 data set has the following new variables:</p> <ul style="list-style-type: none"> • DISTNAME • DISTRICT • IDNAME2 • NUTS4 |
| NAMES (feature table for the WORLD data set) | <p>contains three new variables:</p> <p>ID2 for territories, specifies the ID values for the countries that the territory is associated with. For example, Greenland has an ID2 value of 315 because it is a territory of Denmark.</p> <p>If a territory is claimed by more than one country, its ID2 value might consist of several three-digit ID values to identify each country.</p> <p>_REGION_ specifies a geographic region for each country or</p> |

territory. For example, Panama belongs to the **Central America** region.

TERRITORY

for territories, describes the association between the territory and the country or countries that are identified by ID2. For example, Togo is described as **Overseas territory of France**.

PHILIPPI,
PHILIPP2

updated with more detail and new variables. The PHILIPPI data set has a new DENSITY variable. The PHILIPP2 data set has the following new variables:

- ISLANDG
- ISLAND_GROUP
- OLDDID
- PROVINCE
- PSGC_PROV
- PSGC_REG
- REGION
- REGNAME
- REGNAME2

The ID numbers for these data sets have changed. You might need to change your response data in any existing SAS programs that use these data sets.

| | |
|--------------------|---|
| POLAND, POLAND2 | updated with new values and variables. The POLAND data set has a new DENSITY variable. The POLAND2 data set has new PROVNAME and PROVNAME2 variables. |
| SPACIFIC | renamed to OCEANIA. |
| SPAIN, SPAIN2 | <p>updated with values and new variables. The SPAIN data set contains a new DENSITY variable. The new OLDDID variable in the SPAIN2 data set contains the old ID numbers. The new REGION and REGNAME variables identify regions. The new IDNAME2 and REGNAME2 variables contain alternate spellings for the province and region names.</p> <p>Because the ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| SWEDEN, SWEDEN2 | <p>updated with new provinces and ID numbers. The SWEDEN data set contains a new DENSITY variable. The new OLDDID variable in the SWEDEN2 data set contains the old ID numbers. The new REGNAME variable contains region names. Because the ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| | |

| | |
|-----------------------|--|
| SWITZERL, SWITZER2 | <p>updated with new province names and ID numbers, and new variables. The new OLDID and OLDNAME variables in the SWITZER2 data set contains the old names and ID numbers. The SWITZERL data set contains new DENSITY and LAKE variables. Because the province names and ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| THAILAND, THAILAN2 | <p>updated with more detail and new variables. The THAILAND data set has a new DENSITY variable. The THAILAN2 data set has the following new variables:</p> <ul style="list-style-type: none">• IDNAME2• OLDID• REGION• REGNAME <p>The provinces have new ID numbers. The new OLDID variable in the THAILAN2 data set contains the old ID numbers.</p> <p>Because the ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.</p> |
| | |

UKRAINE,
UKRAINE2

updated with more detail and new variables. The UKRAINE data set has a new DENSITY variable. The UKRAINE2 data set has the following new variables:

- IDNAME2
- OLDID
- OLDIDNAME

The provinces have new names and ID numbers. The new OLDIDNAME and OLDID variables in the UKRAINE2 data set contain the old province names and ID numbers.

Because the province names and ID numbers have changed, you might need to change your response data in any existing SAS programs that use these data sets.

US,
USCENTER,
USCITY

Puerto Rico added as state 72. The new STATECODE variable in the US and USCITY data sets contains two-letter state abbreviations.

The USCITY data set has new cities, and some city names have been standardized. The PLACE variable now includes the state FIPS code as the first two digits.

Note: The projected X and Y values might be different due to the need to re-project the data sets with the addition of more cities in USCITY. ■

| | |
|----------------------|--|
| VIETNAM, VIETNAM2 | <p>updated with more detail and new variables. The VIETNAM data set has a new DENSITY variable. The VIETNAM2 data set has the following new variables:</p> <ul style="list-style-type: none">• PROVINCE• REGION• REGNAME <p>The ID numbers for these data sets have changed. You might need to change your response data in any existing SAS programs that use these data sets.</p> |
| WORLD | <p>simplified to use fewer observations. In addition, the following changes have been made:</p> <ul style="list-style-type: none">• The values are now projected using the CYLINDRI algorithm.• Continent 96 has been renamed from South Pacific to Oceania.• Antarctica has been added as continent 97.• Brunei, Indonesia, and the Philippines have been reassigned from continent 96 to continent 95.• French Southern Territories and Heard & McDonald Islands have been reassigned from continent 96 to continent 97.• St. Helena has been reassigned from continent 91 to continent 94. |

| | |
|-------------------|---|
| | <ul style="list-style-type: none"> • The former country of Yugoslavia has been split into Serbia and Montenegro. • Newfoundland has been added to Canada (ID 260). • Tasmania has been added to Australia (ID 160). • More data points are included for Cuba (ID 300). • The Galapagos Islands have been added to Ecuador (ID 325). • Hong Kong is now included as part of China. |
| YUGOSLA, YUGOSLA2 | replaced by the new SERBIA, SERBIA2, MONTENEG, MONTENE2 data sets. |

Map Data Set Descriptions

Descriptive labels have been added to the map data sets in the MAPS library.

New Data Set for Military ZIP Codes

The new ZIPMIL data set in the SASHELP library contains ZIP codes for U.S. military post offices.

Changes in SAS/GRAPH Documentation

- Information about the DS2CSF macro has been removed. The functionality of the DS2CSF macro is available through the new GKPI procedure.
- Information about the META2HTM macro has been removed. To generate the Metaview applet, use the JAVAMETA device.

What's New in SAS/GRAPH Statistical Graphics Procedures 9.2

Overview

In the third maintenance release for SAS 9.2, SAS/GRAPH Statistical Graphics Procedures include a production release of the SGDESIGN procedure.

In addition, the procedures have the following changes and enhancements for SAS 9.2 Phase 2:

- A new VECTOR plot type is available for the SGPLOT and SGPANEL procedures.
- A new JOIN plot type is available for the COMPARE and PLOT statements for the SGSCATTER procedure.
- New panel layout types are available for the SGPANEL procedure.
- New options are available for the PANELBY statement of the SGPANEL procedure.
- The COMPARE, PLOT, and MATRIX statements for the SGSCATTER procedure now support transparency.

Production Release of the SGDESIGN Procedure

The production release of the SGDESIGN procedure is available with the third maintenance release for SAS 9.2. The SGDESIGN procedure renders graphs (SGD files) that have been created by using the SAS/GRAPH ODS Graphics Designer application.

The preproduction version of ODS Graphics Designer stored graphs as two separate files: one for the actual graph (SGD), and a second file (SGN) for the graph's icon. For convenience, in the production version both files are packaged in an archive file with the SGD extension. To render an SGD file that was created with the preproduction version of ODS Graphics Designer, use the OLDSGD option.

New VECTOR Plot Type for the SGPLOT and SGPANEL Procedures

A new VECTOR statement for the SGPLOT and SGPANEL procedures enables you to create vector plots. Vector plots create arrows between two points.

New JOIN Plot Type for the SGSCATTER Procedure

A new JOIN option for the COMPARE and PLOT statements of the SGSCATTER procedure enables you to create a join plot.

New Panel Layout Types

The SGPANEL procedure supports two new layout types. The LAYOUT= option in the PANELBY statement

enables you to specify the COLUMNLATTICE and ROWLATTICE layout types.

New Options for the SGPANEL PANELBY Statement

The PANELBY statement for the SGPANEL procedure has the following new options:

- BORDER | NOBORDER specifies whether borders are displayed around each cell.
 - COLHEADERPOS= specifies the location of the column headings.
 - ONEPANEL disables automatic paging for panels.
 - ROWHEADERPOS= specifies the location of the row headings.
 - START= specifies the order in which data crossings are assigned to the panel.
-

New Axis Options for the SGPANEL and SGPLOT Procedures

The axis control statements for the SGPANEL and SGPLOT procedures contain the following new options:

- INTERVAL= specifies the tick interval for time axes.
 - OFFSETMAX= specifies the spacing between the last tick value on the axis and the edge of the plot area.
 - OFFSETMIN= specifies the spacing between the first tick value on the axis and the edge of the plot area.
 - TICKVALUEFORMAT= specifies the data format for the axis tick values.
-

Transparency for Output from the SGSCATTER Procedure

The COMPARE, MATRIX, and PLOT statements for SGSCATTER now support the TRANSPARENCY= option. You can use the TRANSPARENCY option to specify the amount of transparency for your plot elements.

What's New in SAS/GRAPH 9.2: ODS Graphics Editor

Overview

The following changes are new for the SAS 9.2 Phase 2 release:

- enhancements to the behavior of graph annotations
 - changes to the editing process
-

Annotation Enhancements

Here are several enhancements to graph annotations:

- You can draw an arrow annotation head-to-tail.
 - After you create a line or arrow, you can rotate the line or arrow in 15-degree increments.
 - After you create an oval or rectangle, you can resize the oval or rectangle while maintaining the aspect ratio of the original annotation.
 - If a line or arrow annotation is attached to the data, then you can specify data values to position the line or arrow.
-


Editing Process Changes

A new `SGE=ON` option added to the ODS LISTING statement is used to create editable ODS graphs. When you run a graph procedure with this option, the ODS Graphics Editor generates an ODS Graphics Editor file (with the extension `.sge`). SGE files can be opened from the Results window or from an installed stand-alone ODS Graphics Editor (Windows and Linux hosts only). If you later change and rerun the SAS program, SAS creates a new SGE file. The original SGE file remains in the SAS Results window.

This change results in the following benefits:

- Editable graphics can be created in batch mode.
- SGE files can be created on z/OS systems. Though you cannot run the editor on z/OS systems, you can generate files on z/OS and then move those files to another system on which you can run the editor.
- SAS performance is improved because SGE files are created only when you use the `SGE=ON` option. When the ODS LISTING destination is closed or when `SGE=OFF`, SGE files are no longer created. (In the past, you issued an `SGEDIT ON` command in the SAS Results window to configure SAS to create editable graphs. This setting persisted across SAS sessions, so SGE files were always created until you issued an `SGEDIT OFF` command.)

Note: For backward compatibility, ODS Graphics Editor continues to honor the `SGEDIT ON` and `SGEDIT OFF` commands.

- SGE files are easy to identify because they are associated with a specific new icon ().

On Windows and Linux systems, the stand-alone editor must be installed even when you plan to invoke the editor from SAS. You cannot open SGE files without the stand-alone editor on Windows and Linux systems.

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What's New in SAS/GRAPH Network Visualization Workshop 2.1

Overview

SAS/GRAPH Network Visualization Workshop includes a number of general enhancements, improvements to the user interface, graph enhancements, new samples, and product Help.

General Enhancements

- Project files enable you to save the style, the data tables, and the graphs that are associated with a node-link project. SAS/GRAPH Network Visualization Workshop retrieves these items when you reopen the project.
 - The following improvements affect performance and operation:
 - use of a robust statistical graph drawing engine that is also used by SAS/GRAPH, SAS Enterprise Guide, and other SAS applications
 - performance improvements to the force-directed network layout (starting with Phase 2)
-

Improvements to the User Interface

- You can enable automatic scrolling to an observation that is selected in a table. When you select observations in network or statistical graphs, the corresponding observations are also selected in one or more of the data tables. This feature eliminates the need to scroll down manually to the selected observations.
 - The right-click menus for the different views have been expanded with more options.
 - Selection mode usage has been changed to be more consistent with other SAS applications. Local selection mode is configured using the **Data** menu, and table views have the same behavior as graphs.
 - Additional icons in the toolbar facilitate the use of the SAS/GRAPH Network Visualization Workshop tools.
 - A new Welcome dialog box appears when users first start SAS/GRAPH Network Visualization Workshop. From this dialog box, users can create a new project, open an existing project, or view a Getting Started topic.
 - The dialog boxes that are used for specifying variables and variable attributes are easier to use. These improvements make it easier to do the following:
 - select the data variables to be used to create a statistical graph
 - specify various node and link attributes (for example, the variables used for node identification, link origin, and link termination) for a network graph
-

Graph Enhancements

- Support has been added for several new graph styles, which enhance the appearance of graphs. (The default style from the last release is available as the **NV Classic** style.)
 - The following have been added to the list of statistical graphs that you can create in SAS/GRAPH Network Visualization Workshop:
 - pie charts
 - 3D scatter plots
-

Samples and Help

- Several sample projects and data sets are included with SAS/GRAPH Network Visualization Workshop. The samples are located in the `samples` directory of your installation. You can explore the samples and create network graphs to investigate the data.
- Product Help is available from the **Help** menu. A user guide has been incorporated with the Help to provide complete instructions for visualizing network data. The user guide also explains how to use the sample data and describes several sample use cases.

What's New in SAS Grid Manager 9.2

Overview

SAS Grid Manager has the following new features and enhancements:

- A SAS code analyzer is added to automatically add syntax to existing SAS programs in order to enable parallel processing on a grid.
 - High availability capabilities are provided as part of SAS Grid Manager.
 - A method for submitting batch SAS jobs to the grid has been added.
 - The capability for SAS Grid Manager to provide load balancing for SAS Workspace Servers has been added.
 - Job control has been enhanced.
 - Enhancements to the Grid Manager plug-in for SAS Management Console provide improved grid monitoring and control.
 - Enhancements to the Schedule Manager plug-in for SAS Management Console provide improved control and monitoring for jobs and flows scheduled to run on the grid.
 - Support is added for other grid middleware providers.
-

SAS Code Analyzer

The SAS Code Analyzer is a procedure that executes an existing SAS program and identifies the dependencies of the procedures and job steps. SAS Code analyzer then uses this information to create a new version of the program that contains the syntax required for the sub-tasks to be executed in parallel on a grid.

High Availability Capabilities

High availability capabilities are incorporated into Platform Suite for SAS 4.1. This capability provides high availability for any of the critical components running in a grid (such as the SAS Metadata Server) and eliminates the need for a hot stand-by machine and third-party tools.

A New Way to Submit Batch SAS Jobs to the Grid

The second maintenance release after SAS 9.2 adds the SAS Grid Manager Client Utility. This utility enables batch SAS jobs to be submitted to the grid without the need to have SAS installed on the machine that is used to submit the jobs. The utility provides the capability to submit jobs, end jobs, check job status, and retrieve job output.

Grid Algorithm for Load Balancing

SAS Grid Manager can be used to provide load balancing for Workspace servers running in a grid. This capability provides a robust way to enable load balancing for any clients that use SAS Workspace Servers.

Enhanced Job Control

The following enhancements improve control for jobs processed on a SAS grid:

- A job name can be specified through a macro variable specified by the JOBNAME option of the GRDSVC_ENABLE statement.
 - Job options can be specified through a macro variable specified by the JOBOPTS option of the GRDSVC_ENABLE statement.
 - Job options can be specified in metadata for grid logical server definitions. These options override user-specified options.
 - SAS startup options can be specified in metadata for grid logical server definitions.
-

Enhancements to the Grid Manager Plug-In

The following enhancements to the Grid Manager plug-in for SAS Management Console provide improved grid monitoring and control:

- The plug-in provides Gantt charts to display job information by status or host.
 - Capabilities are provided to:
 - suspend and resume jobs
 - open and close hosts
 - open, close, activate, and deactivate queues
-

Enhancements to the Schedule Manager Plug-In

The following enhancements to the Schedule Manager plug-in for SAS Management Console provide improved control for jobs and flows that are scheduled to run on a SAS grid:

- Enhancements to the table view provide more information about scheduled jobs, and the ability to filter the contents and view the SAS log.
 - A new visual editor improves the process of creating and editing flows to be scheduled.
 - Enhancements to the management of deployed flows provide the ability to create and edit trigger events and execution attributes.
 - The ability to redeploy a job for scheduling has been added.
 - Management of deployed jobs has been enhanced, including the ability to change the batch server and specifying the associated job.
-

Support for Other Grid Middleware Providers

Support is added for DataSynapse GridServer and Univa UD Grid MP as grid middleware providers. Platform Suite for SAS remains the middleware provider that is packaged with SAS Grid Manager. DataSynapse and Univa UD support includes multi-user load balancing and parallel load balancing. It does not include an interface to the schedule manager framework.

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What's New in SAS High-Performance Forecasting 3.1

Overview

SAS High-Performance Forecasting has implemented a new release numbering scheme. Both SAS High-Performance Forecasting 2.3 and SAS High-Performance Forecasting 3.1 have been released since SAS 9.1.3. Each release provides new features while maintaining all the capabilities of previous releases.

In SAS High-Performance Forecasting 3.1, new features have been added to the following procedures:

- HPFDIAGNOSE procedure enhancements enable you to better control model generation.
- HPFRECONCILE procedure enhancements enable you to better reconcile forecast generation.

In SAS High-Performance Forecasting 2.3, new features were added to the following procedures:

- HPF procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- HPFDIAGNOSE procedure enhancements enable you to better control model generation.
- HPFENGINE procedure enhancements provide statistics of fit that are related to scaled and relative errors and enable you to specify an output data set.
- HPFEVENTS procedure enhancements add new predefined date keywords.
- HPFRECONCILE procedure enhancements enable you to better reconcile forecast generation.

HPF Procedure Enhancements

New features related to the forecast model selection enable you to better monitor forecast generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by HPF Procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- statistics of fit related to scaled and relative errors.

HPFDIAGNOSE Procedure Enhancements

New features have been added to each release to enable you to better control model generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The DELAYEVENT= option specifies the delay lag for the events. If the option is not specified, the delay lag for the events is set to zero by default.
- The DELAYINPUT= option specifies the delay lag for the inputs. If the option is not specified, the delay lag for the inputs is chosen appropriately by the procedure.
- The ENTRYPCT= option specifies a threshold to check the percentage increment of the criterion between two candidate models. The ENTRYPCT=value should be in the range (0,100); the default is ENTRYPCT=0.1 (0.1%).
- The NODIAGNOSE option specifies that the series is not to be diagnosed. If the INSELECTNAME= option and OUTEST= option are specified, the existing model specification files are written to the OUTEST data set.
- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by the HPFDIAGNOSE procedure. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- The OUTLIER=(ENTRYPCT=) option specifies a threshold to check the percentage increment of the criterion between two candidate models. The ENTRYPCT=value should be in the range (0,100); the default is ENTRYPCT=0.1 (0.1%). The value of the OUTLIER=(ENTRYPCT=) option overrides the value of the ENTRYPCT= option in the HPFDIAGNOSE statement.
- The REFINEPARMS= option specifies that insignificant parameters of the final model are to be refined, identifies the factors to refine, and identifies the order of factors.
- The RETAINCHOOSE option specifies that the PROC HPFSELECT CHOOSE= option is respected when re-diagnosing series.
- The POSITIVE or NEGATIVE option is specified in the INPUT statement followed by the REQUIRED= option such as REQUIRED=YES(POSITIVE) and REQUIRED=MAYBE(NEGATIVE). When the REQUIRED=YES(POSITIVE) option is specified, if its coefficient is negative, then the input variable drops out from the model.

SAS High-Performance Forecasting 3.1 introduces the following new features:

- The NOINT option in the ARIMAX statement suppresses the intercept (constant) term in the ARIMA model.
- The INPUTMISSINGPCT option in the PROC HPFDIAGNOSE statement specifies the size of the missing observation as a percentage of the length of the input time series.
- The TYPE=TLS option in the OUTLIER option specifies temporary level shift outliers in the ARIMA model.
- The RETAINCHOOSE=YES|NO option in the PROC HPFDIAGNOSE statement specifies that the CHOOSE= option in the HPFSELECT procedure be respected when rediagnosing series.

HPFENGINE Procedure Enhancements

New features related to the forecasting engine enable you to better monitor forecast generation.

SAS High-Performance Forecasting 2.3 introduced the following new features:

- The OUTPROCINFO= option specifies the output data set to contain the summary information of the processing done by the HPFENGINE procedure. This option is particularly useful for easy

programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.

- statistics of fit related to scaled and relative errors.

HPFEVENTS Procedure Enhancements

SAS High-Performance Forecasting 2.3 added new predefined date keywords to the HPFEVENTS procedure:

Table 1.1 New Holiday Date Keywords and Definitions

| Date Keyword | Definition |
|--------------|--|
| COLUMBUS | 2nd Monday in October |
| MLK | 3rd Monday in January |
| USPRESIDENTS | 3rd Monday in February (since 1971) |
| VETERANS | November 11 |
| VETERANSUSG | date observed by U.S. government for Monday-Friday schedule |
| VETERANSUSPS | date observed by U.S. government for Monday-Saturday schedule (U.S. Post Office) |

HPFRECONCILE Procedure Enhancements

New options have been added in each release.

SAS High-Performance Forecasting 2.3 introduced the following new options:

- The FORCECONSTRAINT option specifies whether the user-specified constraints should be forced on the PREDICT variable in the OUTFOR= data set when the problem is infeasible because the constraints are incompatible with the aggregation constraint. The default is to leave the input unmodified.
- The OUTPROCINFO= SAS-data-set specifies the output data set to contain the summary information of the processing done by PROC HPFRECONCILE. This option is particularly useful for easy programmatic assessment of the status of the procedure's execution via a data set instead of looking at or parsing the SAS log.
- The WEIGHTED option specifies that the loss function for top-down reconciliation be weighted by the inverse of the variance of the input forecasts.

- The OUTINFEASIBLE= data set specifies the output data set that contains summary information.
- The ALIGN= option controls the alignment of SAS dates used to identify output observations. Internal processing uses aligned versions of the values of START= and END= options (if specified) and values of ID variable in input observations. The ALIGN= option accepts the following values: BEGIN, MIDDLE, and END. BEGIN is the default.

SAS High-Performance Forecasting 3.1 introduces the following new options:

- The IGNOREMISSF option in the PROC HPFRECONCILE statement specifies that '. F' missing values in the PREDICT variable be treated as regular '.' missing values. If the IGNOREMISSF option is not specified, a '. F' missing value is interpreted as a failed forecast, and PROC HPFRECONCILE generates '. F' missing values for all forecasting variables in the OUTFOR= data set if that value is needed for computing the reconciled forecasts. If the IGNOREMISSF option is specified, observations that correspond to '. F' missing values are considered to belong to inactive series and therefore are not included in the reconciliation process.
- The LOCKZERO option in the PROC HPFRECONCILE statement specifies that zero values of the PREDICT variable in the DISAGGDATA= data be considered locked equalities. This option is available only when DIRECTION=TD. When the LOCKZERO option is active, a zero value for PREDICT in the DISAGGDATA= set implies a zero value for the corresponding observation in the OUTFOR= data set. However, if constraints are specified in the CONSTRAINT= data set for that observation, these constraints have precedence over the LOCKZERO option. Note that an unlocked equality constraint in the CONSTRAINT= data also has precedence over the LOCKZERO option. Similarly, an unlocked equality whose value is zero is not converted to a locked equality, even though the LOCKZERO option is specified.
- The MAXITER= k option in the PROC HPFRECONCILE statement specifies the maximum number of predictor-corrector iterations performed by the interior point algorithm. The value k is an integer between 1 and the largest four-byte, signed integer, $2^{31} - 1$. The default value is MAXITER=100.
- The BYVARSSORTED option in the DISAGGDATA statement specifies that the DISAGGDATA= data set be sorted by the BY variables. This option improves input/output performance when there is an index defined on the BY variables. Use of an index degrades the performance as compared to processing a sorted data set. If the BYVARSSORTED option is not specified, PROC HPFRECONCILE uses only the index for processing and disregards the sorting order. If you specify the BYVARSSORTED option in the DISAGGDATA statement, PROC HPFRECONCILE exploits the sorting order to achieve better performance and uses the index minimally.

What's New in SAS/IML 9.22

Overview

SAS/IML 9.22 includes two new features and many new functions and subroutines. The following features are new:

- the ability to call SAS procedures and DATA steps from within the IML procedure.
- the ability to call functions and packages in the R statistical programming language from within the IML procedure. You can use new SAS/IML subroutines to transfer data between SAS data formats and R data formats.

For more information about the new features and enhancements in SAS/IML 9.2, see [What's New in SAS/IML 9.2](#).

New Features

SAS/IML 9.22 supports the SUBMIT and ENDSUBMIT statements. These statements delimit a block of statements that are sent to another language for processing.

The SUBMIT and ENDSUBMIT statements enable you to call SAS procedures and DATA steps without leaving the IML procedure. This feature has been very popular in SAS/IML® Studio since it was introduced in 2002, and it is now available in PROC IML.

You can use SAS data sets to transfer data between SAS/IML matrices and SAS procedures. SAS procedures require that data be in a SAS data set.

The SUBMIT and ENDSUBMIT statements also provide an interface to the R statistical programming language, so that you can submit R statements from within your SAS/IML program. To submit statements to R, specify the R option in the SUBMIT statement.

You can transfer data from SAS/IML matrices and SAS data sets into R matrices and R data frames, and vice versa. Specifically, the subroutines shown in Table 1.1 are available to transfer data from a SAS format into an R format.

The interface to R is supported only on computers that run the Windows or Linux operating systems.

Table 1.1 Transferring from a SAS Source to an R Destination

| Subroutine | SAS Source | R Destination |
|------------------|----------------|---------------|
| ExportDataSetToR | SAS data set | R data frame |
| ExportMatrixToR | SAS/IML matrix | R matrix |

In addition, the subroutines shown in Table 1.2 are available to transfer data from an R format into a SAS format.

Table 1.2 Transferring from an R Source to a SAS Destination

| Subroutine | R Source | SAS Destination |
|--------------------|--------------|-----------------|
| ImportDataSetFromR | R expression | SAS data set |
| ImportMatrixFromR | R expression | SAS/IML matrix |

In Table 1.2, an "R expression" can be the name of a data frame, the name of a matrix, or an expression that results in either of these data structures.

New Functions and Subroutines

SAS/IML 9.22 provides the new functions and subroutines described in the following sections.

CORR Function

The CORR function computes a sample correlation matrix for data. The function supports Pearson product-moment correlations, Hoeffding's D statistics, Kendall's tau- b coefficients, and Spearman correlation coefficients based on the ranks of the variables. The function supports two different methods for dealing with missing values in the data.

COV Function

The COV function computes a sample variance-covariance matrix for data. The function supports two different methods for dealing with missing values in the data.

COUNTN Function

The COUNTN function counts the number of nonmissing values in a matrix.

COUNTMISS Function

The COUNTMISS function counts the number of missing values in a matrix.

COUNTUNIQUE Function

The COUNTUNIQUE function counts the number of unique values in a matrix.

CUPROD Function

The CUPROD function computes the cumulative product of elements in a matrix.

DIF Function

The DIF function computes the differences between data values and one or more lagged (shifted) values for time series data.

FULL Function

The FULL function converts a matrix stored in a sparse format into a matrix stored in a dense format. See the SPARSE function for a description of how sparse matrices are stored.

LAG Function

The LAG function computes one or more lagged (shifted) values for time series data.

MEAN Function

The MEAN function computes a sample mean of data. The function can compute arithmetic means, trimmed means, and Winsorized means.

PROD Function

The PROD function computes the product of elements in one or more matrices.

QNTL Call

The QNTL subroutine computes sample quantiles for data.

SPARSE Function

The SPARSE function converts a matrix that contains many zeros into a matrix stored in a sparse format which suitable for use with the ITSOLVER subroutine or the SOLVELIN subroutine.

VAR Function

The VAR function computes a sample variance for each column of a data matrix.

Changes to the IMLMLIB Library

The CORR module has been removed from the IMLMLIB library. In its place is the built-in CORR function.

The MEDIAN, QUARTILE, and STANDARD modules now support missing values in the data argument.

Documentation Enhancements

The first six chapters of this documentation have been completely rewritten in order to provide new users with a gentle introduction to the SAS/IML language. Two new chapters have been written: Chapter 10, Submitting SAS Statements, describes how to call SAS procedures from within PROC IML, and Chapter 11, Calling Functions in the R Language, describes how to call R functions from within PROC IML.

Highlights of Enhancements in SAS/IML 9.2

The following are some of the major enhancements that were introduced in SAS/IML 9.2:

- A new programming syntax to specify vector-matrix operations was introduced.
 - New modules for sampling from multivariate distributions were added to the IMLMLIB library.
 - The following functions and subroutines were introduced:
 - the ODSGRAPH subroutine, which provides an interface with ODS Statistical Graphics and the TEMPLATE procedure
 - the BSPLINE function, which computes a B-spline basis for a given numeric input vector, degree, and knot specification
 - the GEOMEAN and HARMEAN functions, which compute the geometric mean and the harmonic mean, respectively, of a matrix of positive numbers
-

Related Software

SAS/STAT and SAS/IML users might be interested in SAS/IML Studio, which is software for data exploration, model building, simulation, and analysis. SAS/IML Studio is distributed with the SAS/IML product.

SAS/IML Studio provides a highly flexible programming environment in which you can create and run programs and display the results with dynamically linked graphics and data tables. SAS/IML Studio is intended for data analysts who write SAS programs to solve statistical problems but need more versatility for data exploration and model building. The programming language in SAS/IML Studio, which is called IMLPlus, is an enhanced version of the SAS/IML programming language. IMLPlus extends the SAS/IML language to provide new features, including the ability to create and manipulate statistical graphics, call SAS procedures as functions, call functions in the R language, and call computational programs written in C, C++, Java, and Fortran. SAS/IML Studio runs on a PC in the Microsoft Windows operating environment.

For more information about SAS/IML Studio, see the *SAS/IML Studio User's Guide* and *SAS/IML Studio for SAS/STAT Users*.

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What's New in SAS/IML 9.2

New Features

New to SAS/IML are the following:

- a set of new modules for sampling from multivariate distributions
- a set of general performance improvements
- a new call to interface with ODS Statistical Graphics
- a new function to compute B-splines
- a new programming syntax to specify vector-matrix operations
- a set of new functions to compute the geometric and harmonic means

For more information about the new features and enhancements in SAS/IML 9.22, see [What's New in SAS/IML 9.22](#).

Modules for Multivariate Random Sampling

New modules have been added to the IMLMLIB library. These modules generate random samples of N observations from multivariate distributions in P variables. See the Module Library documentation for details.

The modules and associated multivariate distributions are as follows:

RANDDIRICHLET

generates a random sample from a Dirichlet distribution (a multivariate generalization of the beta distribution).

RANDMULTINOMIAL

generates a random sample from a multinomial distribution (a multivariate generalization of the binomial distribution)

RANDMVT

generates a random sample from a multivariate Student's t distribution.

RANDNORMAL

generates a random sample from a multivariate normal distribution.

RANDWISHART

generates a random sample from a Wishart distribution (a multivariate generalization of the gamma distribution).

Performance Improvements

Several optimization methods have been implemented to speed up basic matrix operations and improve the efficiency of memory management in SAS/IML. These changes result in faster-running SAS/IML programs.

ODS Statistical Graphics Interface

A new ODSGRAPH call has been introduced that enables you to render graphs created with the new graphics commands that have been added to PROC TEMPLATE. This addition is designed to make it easier for you to create standard graphs and save them in a format of your choice. See the Language Reference chapter for full details about this new call.

BSPLINE Function

A new BSPLINE function has been introduced that computes a B-spline basis for a given numeric input vector, degree, and knot specification. See the Language Reference chapter for a full description of the function and its inputs.

Vector-Matrix Operations

SAS/IML elementwise operations now permit you to specify conforming vector-matrix operations. For example, if \mathbf{V} is a 1 by n row vector, and \mathbf{S} is an m by n matrix, then the expression $\mathbf{V} + \mathbf{S}$ evaluates to the addition of \mathbf{V} to each row of \mathbf{S} . This change was introduced to reduce the need for explicit loops and increase the efficiency of this type of calculation. See the Language Reference chapter for full details of this change.

GEOMEAN and HARMEAN Functions

Two new functions have been added to compute the geometric mean and the harmonic mean of a matrix of positive numbers. See the Language Reference chapter for full details.

New Related Software

SAS/STAT® users will be interested in SAS/IML® Studio, formerly known as SAS® Stat Studio, which is new software for data exploration and analysis. SAS/IML Studio provides a highly flexible programming environment in which you can run SAS/STAT® or SAS/IML® analyses and display the results with dynamically linked graphics and data tables. SAS/IML Studio is intended for data analysts who write SAS® programs to solve statistical problems but need more versatility for data exploration and model building. The programming language in SAS/IML Studio, which is called IMLPlus, is an enhanced version of the SAS/IML programming language. IMLPlus extends SAS/IML to provide new language features, including the ability to create and manipulate statistical graphics, call SAS procedures as functions, and call computational programs written in C, C++, Java, and Fortran. SAS/IML Studio runs on a PC in the Microsoft Windows operating environment.

SAS/IML Studio also includes an experimental interface to the R language. The IMLPlus language includes functions that transfer data between SAS data sets and R data frames, and between SAS/IML matrices and R matrices.

SAS/IML Studio also provides similar interactive functionality to the SAS/INSIGHT® product. It is distributed with the SAS/IML product.

What's New in SAS/IML 9.2

New Features

New to SAS/IML are the following:

- a set of new modules for sampling from multivariate distributions
- a set of general performance improvements
- a new call to interface with ODS Statistical Graphics
- a new function to compute B-splines
- a new programming syntax to specify vector-matrix operations
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For more information about the new features and enhancements in SAS/IML 9.22, see [What's New in SAS/IML 9.22](#).

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SAS/IML Studio also includes an experimental interface to the R language. The IMLPlus language includes functions that transfer data between SAS data sets and R data frames, and between SAS/IML matrices and R matrices.

SAS/IML Studio also provides similar interactive functionality to the SAS/INSIGHT® product. It is distributed with the SAS/IML product.

What's New in SAS Information Delivery Portal 4.3

Overview

The SAS Information Delivery Portal 4.3 includes a number of general enhancements and a new report portlet.

For information about the new features and enhancements in the SAS Information Delivery Portal 4.2, see [What's New in SAS Information Delivery Portal 4.2](#).

General Enhancements

- A new **Customize** menu is available from the banner. Some options from the **Options** menu have been moved to the **Customize** menu to improve usability.
 - The **Options** menu has been modified to improve usability. Some of the selections have been reordered, and others have been moved to the new **Customize** menu.
 - Depending on the software that has been installed, the portal now uses SAS Web Report Studio or SAS Web Report Viewer to display SAS Information Maps.
 - Data explorations are no longer available from the portal. As part of the migration from a previous release of SAS Information Delivery Portal, an administrator might have converted your data explorations to SAS reports.
 - The Information Map Viewer portlet is no longer available. You can use the new report portlet to display data from information maps. As part of the migration from a previous release of SAS Information Delivery Portal, an administrator might have converted your Information Map Viewer portlets to report portlets.
 - Publishing SAS information maps is no longer supported.
-

New Report Portlet

A new report portlet displays the output from SAS reports.

What's New in SAS Information Delivery Portal 4.2

Overview

The SAS Information Delivery Portal 4.2 includes a number of general enhancements, a new user preference, and changes to navigator portlets.

For information about the new features and enhancements in the SAS Information Delivery Portal 4.3, see [What's New in SAS Information Delivery Portal 4.3](#).

General Enhancements

- The Alerts portlet has been renamed the Stored Process Alerts portlet. This change avoids possible confusion with a new general-purpose alerts portlet that is included with the SAS Enterprise BI Server package.
 - To comply with a stronger security model, the portal no longer has a Public Kiosk. All portal users must be authenticated.
 - Some user interface elements, such as icons and the logon page, have been modified for uniformity with other SAS applications.
 - The **Options** menu has been modified. Various portal tools have been cascaded under the **Tools** menu item to make the **Options** menu smaller and easier to use.
 - The portal uses a new default theme that is consistent with the theme used by other Web applications, such as SAS Web Report Studio.
 - Depending on the software that has been installed, the portal uses SAS Web Report Studio instead of SAS Web Report Viewer to display reports. When the portal displays reports with SAS Web Report Studio, users who are authorized can edit reports from the portal.
 - By default, the portal uses a new SAS Content Server instead of the Xythos WebFile Server to manage files.
 - Sticky pages are now called Persistent pages.
 - Default values for package sort order and page navigation can be set by your administrator.
-

New User Preference for Sorting Packages

- Users can set a preference to sort publication packages in either ascending or descending order by creation date.
 - Users can also specify the sort order for packages in a publication channel that has been added to a Collection portlet. The setting here overrides the user preference setting.
-

Changes to Navigator Portlets

- In compliance with the new SAS metadata model, navigator portlets show a default location that points to a new SAS Folders tree. Reports, information maps, and other SAS content can be stored in this folder or in its subfolders.
- The Personal Repository, Results, and WebDAV navigator portlets display a WebDAV location for their contents. These portlets do not show the SAS Folders location.
- The Tree Navigator portlet shows both the SAS Folders and the WebDAV locations.

What's New in SAS Information Map Studio 4.2



Overview

SAS Information Map Studio has the following new features and enhancements:


- user interface enhancements
 - new bulk editing capabilities
 - enhanced data item features
 - enhanced filter features
 - enhanced prompt features
 - a new resource replacement feature
 - enhanced data source management features
 - enhanced information map management
 - application administration updates
 - deprecated features
 - documentation enhancements
-

Enhancements to the User Interface

The following enhancements have been made to the user interface:

- The new **Resources** pane has the following tabs:
 - The new **Information Map Folders** () tab enables you to manage your information maps and provides a new **Copy to Folder** feature that replaces the **Move to Folder** feature for information maps and folders. This tab replaces the **Metadata Repository** pane.
 - The new **Application Servers** () tab enables you to add data sources and stored processes. This tab replaces the Insert Table, Insert Cube, and Stored Processes dialog boxes.
- The **Design** tab (formerly called the **Presentation** tab) has the following enhancements:
 - The **Selected Resources** pane (formerly called the **Physical Data** pane) now displays the application server and libraries that data sources are associated with. This pane also displays the stored process (if any) that is associated with the information map.
 - The **Information Map Contents** pane (formerly called the **Information Map** pane) provides a new **Copy to Folder** feature that combines the ease of **Move to Folder** with the functionality of copy and paste. A standard drag-and-drop feature is also available for moving items.
- The **Relationship** tab has the following enhancements:
 - You can use the new toolbar on the tab to resize or automatically rearrange the data sources on the tab.
 - You can reposition the updated Venn diagram icons along the relationship line to improve visibility.
 - You can view tooltips about the relationships when you position your mouse pointer over the relationships.
- The new **Properties** pane enables you to view all of the properties of a selected item at a glance.

Certain properties can be modified directly in the pane. You can also use this pane to simultaneously update multiple data items or multiple custom properties.

- The Table Properties dialog box has been redesigned. You can now set aggregation options for a data source that references an information map table, view more information about the resources that a data source references, and manage the columns for a data source.
 - The application's icons have been redesigned and improved:
 - New icons have been added that distinguish between the following items:
 - non-calculated data items and calculated data items
 - numeric columns and date, time, and timestamp columns
 - STANDARD, TIME, and GEO dimensions and their associated hierarchies, levels, and members
 - Unresolved resources and unusable items are now marked with a red x ().
 - The unique key indicator has been removed.
 - The icons in the user interface no longer indicate that you are denied WriteMetadata access to an information map or folder.
-

Bulk Editing

You can now simultaneously modify multiple data items and custom properties.

Enhanced Data Item Features

The following enhancements are available for data items:

- Data values that are hyperlink tags can now be rendered as hyperlinks in query results.
 - Support is now available for the totaling of non-additive expressions.
 - In the second maintenance release for SAS Information Map Studio 4.2, you can designate that a data item be used in the default query for SAS Web Report.
-

Enhanced Filter Features

The following enhancements are available for filters:

- You can now designate that a filter be hidden so that end users do not use a filter (for example, a prefilter) that you don't want them to use.
 - You can now select multiple (non-prompted) filters for a test query.
 - You can use the new browse-and-search feature to locate the values (or members) for any of the following items:
 - a character data item whose value-generation method provides a dynamically generated list of values
 - a character expression
 - an OLAP data item
 - You can use the new identity-driven property **SAS.IdentityGroups** to return the names of the user groups and roles that a requesting user belongs to.
-

Enhanced Prompt Features

The following enhancements are available for prompts:


- Prompts have been redesigned to provide more functionality. For example, you can now create prompts that use dynamically generated value lists.
 - You can now establish dependencies between prompts in a filter expression.
 - You can create prompts for OLAP filters.
 - Prompts that are created for a stored process and made globally available (shared) can be used by filters. For more information about creating a shared prompt, see the Help for stored processes in SAS Management Console.
 - Unique unformatted values are no longer required for a prompt's static (custom) list of values.
-

Resource Replacement

The new resource replacement feature enables you to replace resources that are unresolved or no longer relevant. This feature replaces the **XML** tab and the XML editor.

Data Source Management

The following enhancements have been made to data source management:

- You can now add data sources and stored processes from the  tab in the main window. You can add an item by double-clicking it, using its pop-up menu option, or dragging it to the **Selected Resources** pane.
 - The new auto-arrange feature on the **Relationships** tab in the main window enables you to rearrange the data sources on the tab so that they more closely resemble a star schema. An undo feature is also available.
 - The new zoom feature on the **Relationships** tab in the main window enables you to see more of your data sources in a single view.
 - You can now select specific columns to use or omit from a data source by using the new **Columns** tab in the Table Properties dialog box.
 - You can now use information map tables as data sources.
-

Information Map Management

You can now store your personal copies of information maps in a personal folder (My Folder). For more information about the personal folder, see the section on working with SAS folders in the *SAS Intelligence Platform: System Administration Guide*.

Application Administration

The following application administration updates have been implemented:

- You can now clear the default connection profile setting by clicking **Clear** on the **General** tab in the Options dialog box.
- You can now specify what to use for a default data item description on the **Data Items** tab in the Options dialog box.

- Log files and application property files have been moved to the following locations:
 - On Windows Vista systems: C:\Users\user-ID\AppData\Roaming\SAS\SASInformationMapStudio\4.2
 - On Windows XP systems: C:\Documents and Settings\user-ID\Application Data\SAS\SASInformationMapStudio\4.2

Note: The CopyPaste.log file that is generated by the **Copy to Folder** feature is created in the following locations:

- On Windows Vista systems: C:\Users\user-ID\AppData\Roaming\SAS\Logs
- On Windows XP systems: C:\Documents and Settings\user-ID\Application Data\SAS\LOGS
- You can access the Diagnostic Settings dialog box by adding the -loggingSetupDialog parameter to the application's .ini file.
- The application now supports independent metadata repositories. For more information about SAS Metadata Repositories, see the *SAS Intelligence Platform: System Administration Guide*.
- The application now supports Citrix servers.
- If your metadata server runs on Windows, you can select **Use Integrated Windows authentication** in the Connection Profile wizard to seamlessly launch SAS Information Map Studio. For more information, see the section about single sign-on in the *SAS Intelligence Platform: Security Administration Guide*.
- If your configuration supports server-side pooling for workspace servers, then queries against relational information maps will now run on those pooled servers. For information about using pooled workspace servers, see the *SAS Intelligence Platform: Security Administration Guide*.

Deprecated Features

The following features have been deprecated:

- You can no longer export information maps as XML files. To import previously exported information maps, use the **Open from XML** menu option.

Note: To import and export information maps as packages, use the import and export features that are available from the **Folders** tab in SAS Management Console.

- When you create a prompt, you can no longer use a data item's value-generation method for that prompt. In SAS Information Map Studio 4.2, you can specify a similar method within the prompt itself. Any prompt that was created before this release and that relies on the value-generation method of a data item will be converted to use the prompt's own corresponding method.
- SAS Information Map Studio 4.2 does not provide the ability to automatically convert prompt values to uppercase before a query is run. Any prompt that was created before SAS Information Map Studio 4.2 but that is saved in this release will also lose that ability.

Documentation Enhancements

SAS Information Map Studio: Getting Started with SAS Information Maps (previously *SAS Information Map Studio: Creating Your First Information Map*) was updated and reorganized. This document provides step-by-step instructions for creating an information map that uses SAS sample data.

What's New in SAS 9.2 Integration Technologies

Overview

New features for SAS Integration Technologies in SAS 9.2 include a number of general product enhancements and documentation enhancements.

General Product Enhancements

The following enhancements have been added to SAS Integration Technologies:

- SAS Stored Processes provides enhancements to the SAS Stored Process Web Application and to stored process metadata, as well as several general enhancements.
 - SAS 9.2 BI Web Services provide generated Web services, as well as general enhancements.
 - The Publishing Framework provides enhancements to security and to the support of the HTTPS protocol and IPV6 addresses.
 - The following software components are obsolete:
 - Integration Technologies Administrator (IT Administrator)
 - SAS Publisher
 - SAS Subscription Manager
 - The Lightweight Directory Access Protocol (LDAP) is no longer supported as a metadata store for SAS applications. For example, using LDAP to configure publication channels, Integrated Object Model (IOM) servers, and SAS Information Delivery Portal is no longer supported. You must use the SAS Metadata Server. The SAS Metadata Server can still use LDAP as an authentication provider, and LDAP connection from SAS is still supported for data loading and extraction.
-

Documentation Enhancements

The following enhancements have been made to the SAS Integration Technologies documentation:

- The **SAS Integration Technologies: Developer's Guide** has been divided into the following books, which are available in the SAS online documentation, as well as in PDF form:
 - **SAS Stored Processes: Developer's Guide**
 - **SAS BI Web Services: Developer's Guide**
 - **SAS Publishing Framework: Developer's Guide**
 - **Application Messaging with SAS**
 - **SAS Integration Technologies: Java Client Developer's Guide**
 - **SAS Integration Technologies: Windows Client Developer's Guide**
 - **SAS Integration Technologies: Directory Services Reference**
- The **SAS Integration Technologies: Administrator's Guide** has been divided. SAS Stored Process and Publishing Framework topics have been incorporated into the **SAS Stored Processes: Developer's Guide** and **SAS Publishing Framework: Developer's Guide**, respectively. SAS Foundation Services topics are covered in the **SAS Foundation Services: Administrator's Guide**.

- Information from the **SAS Integration Technologies: Server Administrator's Guide** has been incorporated into the **SAS Intelligence Platform: Application Server Administration Guide**.
- The **SAS Integration Technologies: Administrator's Guide (LDAP Version)** has been discontinued.

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What's New in SAS 9.2 Stored Processes

Overview

SAS 9.2 Stored Processes provides enhancements to the SAS Stored Process Web Application and stored process metadata, as well as general enhancements.

SAS Stored Process Web Application Enhancements

The following enhancements have been added to the SAS Stored Process Web Application:

- You can select a stored process in the tree view in order to run the stored process. If there are no parameters or input forms, then the stored process will execute immediately and the results will be displayed. If there are parameters or input forms, then you will be taken to the custom input form or prompt page.
- You can use the SAS Stored Process Web Application to upload files.
- Samples have been enhanced to use ODS styles and to include prompts that enable the samples to be executed from a variety of clients. There is a new sample called Server Test, which can be used by any client to ping a server. Samples are installed with the SAS Web Infrastructure Platform.
- Execution options are no longer included by default. If you want to include execution options, they are available as a shared prompt group that is installed along with the sample stored processes.
- The SAS Stored Process Web Application is now delivered in EAR files.
- Response pages can be customized.
- Initialization parameters are now set with the Configuration Manager in SAS Management Console.

The following initialization parameters are now supported:

- ActionMask
- AllowEncodedPassword
- AllowGuest
- BannerRows
- Domain
- GuestUsername
- GuestPassword
- ShowLogButton
- UploadDirectory
- UploadMaxSize
- ValidatePromptValues

The following initialization parameters are obsolete:

- AuthMechanism
- InputEncoding
- OutputEncoding
- PrivilegedUser

- The appearance of the SAS Stored Process Web Application has changed in the following ways:
 - The prompt framework is used to display parameters to users.
 - SAS Logon Manager is used by default for user authentication. Users can also run stored processes without having to log on. A guest user name can be defined to run stored processes under a fixed account.
 - Error messages and the welcome page have a new appearance.
 - There is now a standard banner with themes.
-

Metadata Enhancements

The following enhancements have been added to the Stored Process Properties dialog box and the New Stored Process Wizard in SAS Management Console:

- Result capabilities are now specified, rather than result types. The prompt framework can be used to develop a stored process with package results.
 - Input parameters are defined using the prompt framework in SAS Management Console, which can be accessed from the **Parameters** tab in the Stored Process Properties dialog box, or in the New Stored Process Wizard.
 - Output parameters can be defined on the **Parameters** tab or in the Stored Process Properties dialog box, or in the New Stored Process Wizard.
 - Data sources and data targets can be defined on the **Data** tab in the Stored Process Properties dialog box, or in the New Stored Process Wizard. Streams can be used to send data that is too large to be passed in parameters between the client and the executing stored process. Definitions for data sources and data targets can also include an XML schema specification.
-

General Enhancements

The following general enhancements have been added to SAS Stored Processes:

- The following new reserved macro variables are supported:

`_BASEURL`

overrides the default value for `_URL`.

`_CLIENT`

identifies the client and version number.

`_METAFOLDER`

contains the name and path of the folder for the stored process that is being executed.

`_PATH`

specifies the starting level for the `_ACTION=INDEX` display.

`_STATUS_MESSAGE`

returns debugging information or a message to the user.

The `_ACTION` macro variable now supports the following additional values:

- LOGOFF

- NEWWINDOW
- NOBANNER
- The following programs are now supported: REQUEST INIT (runs at request initialization), REQUEST TERM (runs at request termination), REQUEST LOGIN (only on the middle tier), SESSION INIT (runs at session initialization), and SESSION TERM (runs at session termination).
- Prompts can be shared between stored processes or applications to perform common prompting tasks.
- In the second maintenance release after SAS 9.2, the following enhancements were made to the macro variables that are generated from prompts:
 - The *PROMPT-NAME_LABEL* macro variable is generated for date prompts.
 - The *PROMPT-NAME_MIN_LABEL* and *PROMPT-NAME_MAX_LABEL* macro variables are generated for date range prompts.
 - For time and timestamp prompts, the format of the *PROMPT-NAME_LABEL* macro variable has changed.
 - For time range and timestamp range prompts, the format of the *PROMPT-NAME_MIN_LABEL* and *PROMPT-NAME_MAX_LABEL* macro variables have changed.

What's New in SAS 9.2 BI Web Services

Overview

SAS 9.2 BI Web Services provide generated Web services, as well as general enhancements.

Generated Web Services

SAS BI Web Services now provides two services: the XMLA Web services (as provided in SAS 9.1) and the new generated Web services. Generated Web services enable you to define and create your own customized Web services. The following new features are available with generated Web services:

- The Deploy As Web Service wizard enables you to select a set of stored processes in SAS Management Console and deploy them as a generated Web service.
 - The Web Service Maker is a Web service that generates new Web services from stored processes.
 - Generated Web services have a unique WSDL for the stored processes that are used in that Web service. This feature makes generated Web services easier for clients to call than the XMLA Web services, which use a generic, fixed WSDL for all stored processes.
 - More output options are supported. XMLA Web services support only a single, inline XML output stream. Generated Web services support an inline XML output stream, multiple output streams (which can have XML or binary content), and output parameters. Binary content uses Web service attachments.
 - Attachments (binary or text) are supported. Attachments enable you to send non-xml (binary) data with a SOAP request or response.
 - Contract-first programming is supported by associating schemas with input and output streams. The schemas can be included in the generated WSDL. Contract-first is a technique that enables organizations to standardize on the XML formats they exchange between services. In SAS, the XML libname engine and XML maps are used to interpret the XML described by these schemas.
 - Generated Web services are represented as objects in SAS Management Console, and they can be exported and imported by using the promotion wizards.
-

General Enhancements

The following general enhancements have been added to SAS BI Web Services:

- XMLA Web services have been enhanced to use the new prompting framework.
- JBoss and IBM WebSphere are now supported (in addition to Oracle WebLogic) J2EE Application Servers. Apache Tomcat is no longer supported.

What's New in SAS 9.2 Publishing Framework

Overview

SAS 9.2 Publishing Framework provides enhancements to security, and support of the HTTPS protocol and IPV6 addresses.

General Enhancements

The following enhancements have been made to the Publishing Framework:

- Write permission is required for publishing to channels. This enables you to restrict who can publish by administering permissions.
- The HTTPS protocol and IPV6 addresses are supported when publishing to a WebDAV server.
- The following Publishing Framework components are obsolete:
 - SAS Publisher
 - SAS Subscription Manager

What's New in SAS 9.2 Intelligence Platform

Overview

The SAS Intelligence Platform is a comprehensive, end-to-end infrastructure for creating, managing, and distributing enterprise intelligence. Information about the SAS Intelligence Platform applies to the following software:

- SAS software offerings for SAS BI Server, SAS Enterprise BI Server, SAS Data Integration Server, SAS Enterprise Data Integration Server, and SAS Intelligence Storage
- SAS solutions for customer intelligence and financial intelligence
- turnkey solutions for specialized markets such as life sciences, health care, retail, and manufacturing

Therefore, if your SAS deployment plan includes a SAS solution, the administration documentation for SAS Intelligence Platform also pertains to you.

Documentation Enhancements to the Administration Library

- For documentation about how to deploy and administer the SAS Intelligence Platform, see the following Web sites:
 - <http://support.sas.com/92administration>

From this Web site, you can also get more information about the SAS offerings and how certain offerings serve as the platform for solutions.

- <http://support.sas.com/cdlsearch?ct=80000>

This Web site has expanded searching, bookmarking, and e-mailing capabilities.

- The following related documents are new in SAS 9.2:
 - ***SAS 9.2 Intelligence Platform: 9.1.3 to 9.2 Migration Guide***
 - ***Special Considerations for Customers Upgrading to SAS 9.2***
 - ***SAS 9.2 Management Console: Guide to Users and Permissions***
 - ***SAS 9.2 Logging: Configuration and Programming Reference***
 - ***Scheduling in SAS 9.2***
 - ***Grid Computing in SAS 9.2***
 - ***SAS 9.2 Table Server: Administrator's Guide***
- The following related Web sites have been expanded and enhanced for SAS 9.2. Both have new information and easier access to SAS deployment plans and documentation about configuring your Web application servers, such as the Oracle WebLogic Server, for use with SAS Web applications.
 - SAS Install Center: <http://support.sas.com/installcenter/>
 - Third-Party Software Support: <http://support.sas.com/thirdpartysupport/>

- Migration Focus Area: <http://support.sas.com/migration/>
 - The **SAS Intelligence Platform: Troubleshooting Your Initial Installation** guide is discontinued. The **SAS Intelligence Platform: Installation and Configuration Guide** now includes troubleshooting information for your initial SAS deployment.
 - The 9.2 version of the **SAS Intelligence Platform: Single-User Guide** is not yet available.
-

Software and Documentation Enhancements

See the What's New topics in the individual administration guides for details about changes and enhancements to the software and documentation: <http://support.sas.com/92administration>.

- ***Installation and Configuration Guide***
- ***System Administration Guide***
- ***Security Administration Guide***
- ***Application Server Administration Guide***
- ***Data Administration Guide***
- ***Desktop Administration Guide***
- ***Web Application Administration Guide***

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What's New in 9.1.3 to 9.2 Migration for the SAS 9.2 Intelligence Platform

Overview

The **SAS Intelligence Platform: 9.1.3 to 9.2 Migration Guide** describes the migration approach for upgrading your SAS Intelligence Platform 9.1.3 content and configuration to SAS 9.2. It describes the various phases of design, execution, and validation of your migration using the SAS migration tools.

This document contains new material about changes to the automated migration tools in the second maintenance release for SAS 9.2.

Data Explorations Are Now Maintained as Reports

In the November 2010 release of SAS 9.2, (which contains the release of SAS Web Report Studio 4.3), data explorations are now maintained as reports. When you upgrade or migrate, the SAS deployment tools automatically convert each bookmark in the data exploration into a report that you can view and edit using SAS Web Report Studio 4.3.

General Enhancements

- The ExportCubes and ImportCubes batch tools are new. These tools provide a simplified method of promoting OLAP cubes from SAS 9.1.3 to SAS 9.2.
- New product-specific migration utility properties have been introduced for SAS Marketing Automation and SAS Marketing Optimization.
- Support is provided for changing ports and host names.
- In the third maintenance release for SAS 9.2, support is provided for the following:
 - migrating within families of operating systems
 - using SAS internal accounts
- In the November 2010 release of SAS 9.2, the following major documentation enhancements were made:
 - manually converting data explorations to SAS Web Report Studio reports
 - manually changing ports

What's New in Installation and Configuration for the SAS 9.2 Intelligence Platform

Overview

The **SAS Intelligence Platform: Installation and Configuration Guide** explains how to install and initially configure the SAS Intelligence Platform.

This document contains new material on the following enhancements and changes to the SAS Intelligence Platform:

- [new SAS deployment tools](#)
- [security enhancements](#)
- [deployment enhancements](#)
- [SAS port changes](#)
- [third-party software port changes](#)
- [changes to groups for third-party software](#)

New SAS Deployment Tools

SAS 9.2 has new deployment tools:

- The SAS Download Manager enables you to download your SAS order by using an HTTP connection over the Internet.
- The SAS Deployment Wizard combines SAS installation and initial configuration into one wizard, replacing the SAS Software Navigator and the SAS Configuration Wizard.
- In the second maintenance release for SAS 9.2, the SAS Update File Cleanup Utility removes backup copies of SAS software that the deployment wizard automatically creates when in update mode.

Security Enhancements

SAS 9.2 has the following security enhancements:

- Fewer operating system accounts are required to run SAS 9.2.
- Internal accounts are new to SAS 9.2 and are used by default for some of the required users (such as sastrust and sasadm).
- Integrated Windows authentication (IWA) provides single sign-on functionality for Windows desktop users.

- You no longer have to manually grant the Windows user right Log on as a batch job to the sassrv user account. The SAS Deployment Wizard automatically does this for you.
 - On Windows platforms supported by SAS 9.2, the Windows permission Act as part of the operating system is no longer required for SAS server users or the Platform Suite for SAS administrator.
-

Deployment Enhancements

SAS 9.2 has the following deployment enhancements:

- Automated, initial SAS configuration eliminates most post-installation manual configuration scripts.
 - Up-front user inputs enable you to avoid having to monitor the entire wizard session.
 - Installation includes an automated check for required third-party software.
 - An electronic product registration feature sends customer installation data to SAS in order to better assist customers if they call SAS with problems or questions. Electronic registration is optional and secure, and does not impact the licensing or use of the software. For more information, see:
<http://support.sas.com/legaldocs/eregistration.html>.
 - The initial SAS installation data file is contained within the SAS Software Depot.
 - Automated deployment is possible across multiple machines (capture-replay feature).
 - Space and time estimates are provided for SAS software depot creation.
 - You can create disc images of your SAS order, so that you can burn to CDs or DVDs at a later time.
 - On z/OS, you no longer need to define a SAS/C executable library to be program controlled.
 - In the October 2009 release, the ability to renew your software license for SAS solutions with the SAS Deployment Manager is new.
-

SAS Port Changes

The following SAS port changes have been made:

- A SAS Pooled Workspace Server port has been added: 8701.
- A SAS Table Server port has been added: 2171.
- Three new SAS Object Spawner port banks have been added: 8801, 8811, and 8821.
- The SAS Remote Services Application port has been changed from 5099 to 5091.
- The SAS Object Spawner load balancing port has been removed.
- A metadata utilities SAS Workspace Server port has been added: 8591.
- A SAS Deployment Tester Server port has been added: 10021.

In the November 2010 release of SAS 9.2, the following SAS port changes have been made:

- The RMI port for the BI Portlets registry has been removed: 9000.
 - Three UDP ports for SAS Web Report Studio IP Scheduling have been added: 7570, 7571, and 7572.
-

Third-Party Software Port Changes

The following Platform LSF ports in the Platform Suite for SAS have been added or changed: 6878, 6881, 6882, 7869, 7870, 7871, 7872.

The following changes have been made to JBoss Web application server ports:

- RMI ports for managed servers have been added: 1099, 1199, (additional managed servers increment by 100).
- Listen ports for managed servers have been added: 8080, 8180, (additional managed servers increment by 100).
- Secure listen ports for managed servers have been added: 8443, 8543, (additional managed servers increment by 100).

The following changes have been made to Oracle WebLogic Web application server ports:

- A WebLogic Nodemanager port has been added: 5556.
- Secure listen ports for managed servers have been added: 7002, 7102, (additional managed servers increment by 100).

The following changes have been made to IBM WebSphere Web application server ports:

- A SOAP port for administrative console has been added: 8879.
- SOAP ports for application servers have been added: 8880, 8881, (additional application servers increment by one).
- Secure HTTPS port for administrative console has been added: 9043.
- A non-secure HTTP port for administrative console has been added: 9060.
- Secure HTTPS ports for application server administrative console have been added: 9044, 9045, (additional administrative consoles increment by one).
- An RMI port for administrative console has been added: 9809.
- RMI ports for application servers have been added: 9811, 9812, (additional application servers increment by one).

In the November 2009 release of SAS 9.2, the IBM WebSphere Portal Server listening port 10040 was added.

Changes to Groups for Third-Party Software

In the third maintenance release for SAS 9.2, for UNIX and z/OS it is recommended that the SAS Installer and the WebSphere Application Server installer be in the same operating system group in order to have the necessary permissions for writing to installation directories.

Documentation Enhancements

SAS deployment troubleshooting information is now contained in the **SAS Intelligence Platform: Installation and Configuration Guide**.

In the November 2010 release of SAS 9.2, the following major documentation enhancements were made:

- Data direction was documented for SAS and required third-party software ports.
- Instructions were added for how to install SAS Web Parts for Microsoft SharePoint.
- Instructions were added for how to deploy SAS BI Lineage when LSF Scheduler is on a separate machine from the workspace server.

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What's New in System Administration for the SAS 9.2 Intelligence Platform

Overview

The SAS Intelligence Platform includes new and enhanced system administration tools, new features for server logging and management, new server components, changes to metadata repositories, and new documentation for administrators. The enhancements and changes include the following:

- [a new logging facility for SAS servers](#)
 - [new server management and monitoring features](#)
 - [new SAS server components](#)
 - [enhancements and changes pertaining to metadata server administration](#)
 - [enhancements and changes pertaining to metadata administration](#)
 - [a new configuration management tool](#)
 - [new documentation for administrators](#)
-

New Logging Facility for SAS Servers

A new standard logging facility is provided for SAS servers. The facility supports problem diagnosis and resolution, performance and capacity management, and auditing and regulatory compliance. The logging facility provides the following capabilities for servers:

- Log events can be directed to multiple destinations, including files, operating system facilities, and client applications.
 - For each log destination, you can configure the message layout, including the contents, the format, the order of information, and literal text.
 - For each log destination, you can configure a filter to include or exclude events based on levels and message contents.
 - For the metadata server, security-related events are captured, including authentication events, client connections, changes to user and group information, and permission changes.
 - You can generate performance-related log events in a format that can be processed by an Application Response Measurement (ARM) 4.0 server.
 - You can adjust logging levels dynamically by using the Server Management features of SAS Management Console.
 - You can use SAS Management Console and third-party monitoring tools to view the contents of logs.
-

New Server Management and Monitoring Features

The following new features are provided to help you manage and monitor your SAS server components, including the SAS Metadata Server, SAS OLAP Server, SAS Stored Process Server, SAS Workspace Server, SAS Pooled Workspace Server, SAS object spawner, and SAS Table Server:

- You can use the new Server Manager features of SAS Management Console to perform the following tasks:
 - quiesce, stop, pause, resume, and validate servers
 - test connections to servers
 - view information about current connections and processes
 - view performance counters that provide statistics about activity that has occurred since a server was last started
 - view server logs
 - change logging levels dynamically
 - refresh servers, so that metadata changes take effect without the need to restart

Server monitoring can also be performed using third-party enterprise systems management products.

- On UNIX and z/OS systems, you can use the new `sas.servers` script to start, stop, or restart all of your SAS servers in the correct order with a single command. You can also use the script to display the status of servers and to create a UNIX boot script that is tailored to your platform.

New SAS Server Components

The initial configuration of your system includes these new server components:

- a server context for the metadata server called `SASMeta`. In multiple-machine installations, this server context includes a workspace server and other servers that are needed to run metadata utilities, including the Replication Wizard and the Backup Wizard.
- a SAS Pooled Workspace Server, which is configured to use **server-side pooling**. In this new configuration, the SAS object spawner maintains a collection of workspace server processes that are available for clients. This server configuration is intended for use by query and reporting tools such as SAS Information Map Studio, SAS Web Report Studio, and the SAS Information Delivery Portal.
- a SAS Deployment Tester Server, which processes validation tasks that are requested either by the SAS Deployment Tester plug-in or by a SAS Deployment Tester batch client.

Depending on which SAS offerings you have installed, your configuration might also include the following new server components:

- a SAS Content Server, which is included with some offerings. This server stores digital content (such as documents, reports, and images) that is created and used by SAS Web applications. For example, the SAS Content Server stores report definitions that are created by users of SAS Web Report Studio, as well as images and other elements that are used in reports. In addition, the SAS Content Server stores documents and other files that are to be displayed in the SAS Information Delivery Portal or in SAS solutions.

To interact with the SAS Content Server, client applications use WebDAV-based protocols for access, versioning, collaboration, security, and searching. Administrative users can use the browser-based SAS Web Management Console to create, delete, and manage permissions for folders on the SAS Content Server.

- a SAS Table Server, which is used by the SAS Shared Services component of the middle tier.
- a DataFlux Integration Server, which executes DataFlux jobs and real-time services that cleanse data or analyze data quality. The jobs and services are created using DataFlux applications (dfPower Architect and dfPower Profile) and are executed on the server through job flows that are created in SAS Data Integration Studio.
- a SAS In-Process Server, which provides the ability to schedule jobs from certain Web-based SAS applications without using a separate scheduling server. The scheduling functions run as a process within the application.

Enhancements and Changes Pertaining to Metadata Server Administration

The following enhancements and changes pertain to administration of the SAS Metadata Server:

- Users can be assigned to administrator roles that enable them to have unrestricted access to metadata, act as metadata server operators, or perform user administration tasks.
- The metadata server can be paused to an Administration state, enabling unrestricted users (but not other users) to continue to perform tasks that require access to the server.
- The Backup and Restore Wizard in SAS Management Console enables you to create backup and restore jobs and execute them or deploy them for scheduling. In addition, SAS now provides customized backup and restore programs that you can launch from the command line. Metadata server configuration files are included in backups.
- Metadata server journaling is turned on by default.
- New options for internal user authentication have been added to the metadata server configuration file omaconfig.xml.

Enhancements and Changes Pertaining to Metadata Administration

The following enhancements pertain to the administration of metadata and metadata repositories:

- Content is stored in a hierarchy of SAS folders that are visible in the **Folders** tab of SAS Management Console and in other client applications, as applicable. The folders segregate system information from business information, provide personal folders for individual users, and provide an area for shared data.
- BI Manager import and export wizards have been replaced with the Export SAS Package and Import SAS Package wizards. The wizards have been expanded to handle a larger number of object types. In addition, new batch tools enable you to export and import folders, objects, or groups of folders and objects from an operating system command line or from a batch script.
- In the second maintenance release for SAS 9.2, the ExportCubes and ImportCubes batch tools are new. These tools provide a simplified method of promoting OLAP cubes from SAS 9.1.3 to SAS 9.2.

- Custom repositories are supported by all applications.
- It is not necessary to define dependencies between repositories. If a repository dependency was defined in SAS 9.1.3, then the dependency relationship is eliminated during the SAS 9.1.3 to SAS 9.2 migration process. However, the existing associations between metadata objects still remain in effect.

The October 2010 release includes these features:

- The new BI Lineage plug-in for SAS Management Console identifies connections between BI objects in the SAS Folders tree. The lineage information is stored in a repository called the BILineage repository.
- The Export SAS Package and Import SAS Package wizards can be used to promote dashboard objects (including dashboards, indicators, indicator data, ranges, indicator configurations, and dashboard components). For important details, see "Promoting SAS BI Dashboard 4.3 Content" in the **SAS Intelligence Platform: Web Application Administration Guide**.
- The new content promotion tool for the SAS Information Delivery Portal 4.3 can be used to promote portal pages, page templates, portlet instances, and the portal's application and user permissions trees. See "Promoting Portal Content" in the **SAS Intelligence Platform: Web Application Administration Guide**.

The following features have been removed:

- The Replication Wizard in SAS Management Console has been deprecated. This wizard includes the functions of the Replication Wizard and the Promotion Wizard that were available in SAS 9.1.3. The documentation for this feature was removed effective with the November 2010 edition of the **SAS 9.2 Intelligence Platform: System Administration Guide**. For more information, see SAS Note 40834 or contact SAS Technical Support.
- The use of third-party database management systems to store the repository manager and metadata repositories is no longer supported.
- The repository auditing feature provided in previous releases has been removed.

New Configuration Management Tool

The new SAS Software Deployment Manager enables you to remove configuration information (including metadata definitions, configuration files, and Windows services) for one or more components of your installation. You can use this feature to remove a component that you will no longer be using, or to move a component from one machine to another. You can also use the SAS Software Deployment Manager to rebuild SAS Web applications and to update a service account password that is included only in metadata.

In the October 2009 release, the SAS Deployment Manager includes a new option to renew software licenses for some SAS solutions that depend on a SAS middle tier.

In the third maintenance release for SAS 9.2, the SAS Deployment Manager includes a new option to change the host names (including the network domains to which they belong) of server machines in your deployment.

New Documentation for Administrators

SAS 9.2 includes these changes to system administration documentation:

- All information about scheduling has been moved to **Scheduling in SAS**.
- Detailed information about configuring logging for SAS servers is now available in the **SAS Logging: Configuration and Programming Reference**.

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What's New in Security Administration for the SAS 9.2 Intelligence Platform

Overview

New and enhanced features in the following areas increase security and manageability:

- roles and permissions
 - authentication and user management
 - auditing, reporting, and encryption
 - documentation
-

Roles and Permissions

- Expanded support for roles enables you to easily customize the user interface in applications including SAS Web Report Studio, SAS Enterprise Guide, the SAS Add-In for Microsoft Office, and SAS Management Console.
 - New administrative roles enable you to manage unrestricted access to metadata, user administration capabilities, the ability to operate the metadata server, and the visibility of plug-ins in SAS Management Console.
 - The authorization interface always displays effective permissions (a calculation of the net effect of all applicable metadata layer permission settings).
 - All applications share a single folder tree. Access control inheritance for most items flows through that tree. Inheritance can cross repository boundaries. Each schema, cube, library, and table inherits permissions from only its parent folder. These inheritance paths are discontinued:
 - **application server ➔ OLAP schema ➔ cube**
 - **application server ➔ library ➔ table**
 - **DBMS server ➔ DBMS schema ➔ DBMS table**
 - A new permission, WriteMemberMetadata, enables you to separate the ability to interact with items in a particular folder from the ability to make changes to the folder itself.
 - When you define member-level access to OLAP data, you can use a graphical query-builder to build the permission conditions.
 - The SAS.IdentityGroups identity-driven property enables you to make row-level or member-level distinctions based on metadata group memberships.
 - In BI row-level permissions, an empty string is substituted into the query for an identity who has no value for the identity-driven property that is in use. Previously, a missing value caused the query to fail.
 - You can set permissions from within SAS OLAP Cube Studio, SAS Data Integration Studio, SAS Management Console, and SAS Information Map Studio.
 - A new **Advanced** button on each item's **Authorization** tab enables unrestricted users to trace the item's inheritance and look up the permissions that any identity has to the item.
 - DATA step functions enable you to programmatically define (and query) metadata layer authorization settings. See the **SAS Language Interfaces to Metadata**.
-

Authentication and User Management

- Users who are logged on to their Windows desktop can seamlessly launch SAS desktop clients (if the metadata server runs on Windows). This feature, Integrated Windows authentication, is particularly useful for sites that use smart cards, biometrics, or other forms of multi-factor authentication.
- Users who have authenticated to the metadata server access most SAS servers seamlessly. SAS token authentication causes the OLAP server, the table server, the stored process server, and, in some configurations, the workspace server to accept users who have authenticated to the metadata server.
- You don't have to create external accounts for SAS internal purposes. Instead, you can use internal accounts that exist only in the metadata. It is appropriate to use internal accounts for administrators and some service identities.
- For greater security, you can limit use of trusted peer connections.
- Membership in a new user administration role enables you to manage most users, groups, and roles. You can still use permissions to delegate administration of an existing identity.
- If you have user administration capabilities, you can directly manage authentication domains from the User Manager and Server Manager plug-ins in SAS Management Console.
- Regular users can't change their own user definitions. Regular users can still manage their own personal logins.
- If a user's group memberships make more than one login available in an authentication domain, the highest priority login is used. Priority is determined by identity precedence. This is an aspect of credential management.
- You can use logins on the PUBLIC and SASUSERS groups. This enables you to provide single sign-on to a third-party server using one account that is shared by all users. This is an aspect of credential management.
- You can add, modify, and remove external identity values for users, groups, and roles in SAS Management Console. These values support the identity synchronization process.
- You can give each user, group, and role a display name. For an identity that doesn't have a display name, the name serves as the display name.
- You can use the OMA_SASSEC_LOCAL_PW_SAVE option in the metadata server's omaconfig.xml file to control whether the **Save user ID and password in this profile** check box is available to users. This is an aspect of password management.
- You can load identity information into the metadata in blocks by using the MDUIMPLB and MDUCHGLB macros. This is a performance enhancement to the user import process. The corresponding macros from the previous release (MDUIMPL and MDUCHGL) are still supported.
- You don't have to give users the Windows privilege `log on as a batch job` unless they access a standard workspace server using credential-based host authentication.

Auditing, Reporting, and Encryption

- You can use system-wide logging features to audit security events.
- You can use the MDSECDs macro to create authorization data sets for security reporting purposes.
- Configuring encryption of data in transit among SAS clients and servers is no longer a post-installation task. You select an over-the-wire encryption level (what gets encrypted in transit) and algorithm (what type of encryption or encoding is used) during installation.
- By default, passwords in the metadata are encrypted using an industry-standard algorithm (AES fixed key). If you don't have SAS/SECURE, SASProprietary encoding is used instead.
- By default, the PWENCODE procedure uses SASProprietary encoding (sas002). If you have SAS/SECURE, you can choose to use AES encryption (sas003) instead.

Documentation Enhancements

- This document has been reorganized and rewritten for this release.
- A new document, **SAS Management Console: Guide to Users and Permissions**, provides step-by-step instructions for performing selected tasks in SAS Management Console.
- **SAS Intelligence Platform: Web Application Administration Guide** documents security features of the SAS Content Server.

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What's New in Data Administration for the SAS 9.2 Intelligence Platform

Overview

The **SAS Intelligence Platform: Data Administration Guide** focuses on the SAS Intelligence Platform and third-party products that you need to install and the metadata objects that you need to create in order to establish connectivity to your data sources (and data targets). It also contains information about setting up shared access to SAS data and explains how using different data-access engines affects security.

New Data Surveyors

In previous releases, SAS integrated data from ERP and CRM systems by accessing the underlying database with SAS/ACCESS software. In this release, SAS has partnered with Composite Software to provide data integration with ERP and CRM systems from PeopleSoft, Oracle Applications, Siebel, and Salesforce.com. These new Data Surveyors access data by using the vendor API and certified interfaces, and they comply with the security of the application. A detailed example of connecting to Salesforce.com is provided.

Documentation Enhancements

The following enhancements were made for this release:

- added more information about SPD Server and dynamic clusters.
- added information about Change Data Capture.
- added information about application response monitoring logging.
- added more information about establishing connectivity to Oracle.
- removed information about registering database schemas because the SAS Management Console no longer has a database schema wizard. Schemas are associated with a data library by typing the schema name in a text field.
- removed the task for making column labels available for drill-through tables on an OLAP server. This task is not necessary in this release.
- added information about setting libraries to be read-only for reporting applications.

What's New in Application Server Administration for the SAS 9.2 Intelligence Platform

Overview

The **SAS Intelligence Platform: Application Server Administration Guide** explains how to administer a SAS Application Server.

This document contains new material about the following enhancements and changes to the SAS Intelligence Platform:

- [server-based pooling mechanism](#)
- [change to OBJECTSERVERPARMS system option](#)
- [new configuration tools](#)
- [security enhancements](#)
- [load-balancing changes](#)
- [grid algorithm for load balancing](#)
- [new SAS logging facility](#)
- [automated SAS server tier configuration](#)
- [port changes](#)

Server-based Pooling Mechanism

The SAS Pooled Workspace Server is a new SAS server type that exploits server-based pooling.

Change to OBJECTSERVERPARMS System Option

You no longer need to specify the OBJECTSERVERPARMS option, METAUTOINIT, because it is on by default in SAS 9.2. (You can turn this option off by using the NOMETAUTOINIT option.)

New Configuration Tools

These are the new SAS configuration tools:

- SAS Deployment Wizard that is used to add new software and configurations
- SAS Deployment Manager that is used to remove configurations

Security Enhancements

SAS contains these security changes:

- server access security in which the SAS Metadata Server verifies that a user has permission to use a server before the server grants the user access, enabling SAS to know the actual identity of the client user
 - Integrated Windows Authentication (IWA) for single sign-on functionality for Windows desktop users
 - fewer operating system accounts are required to run SAS 9.2
 - internal accounts that SAS uses by default for some of the required user accounts (such as sastrust and sasadm)
-

Load-Balancing Changes

SAS contains these changes to server load balancing:

- The stored process server and new pooled workspace server have load balancing enabled by default.
 - The object spawner uses its operator connection for load balancing out-of-the-box. Administrators no longer have to create a separate load-balancing connection.
-

Grid Algorithm for Load Balancing

SAS has a new load-balancing algorithm that supports Workspace servers running in a grid.

New SAS Logging Facility

SAS has a new logging facility controlled by the LOGCONFIGLOC system option. The traditional SAS log option LOGPARM= is ignored. The traditional SAS log option LOG= is recognized only when the %S{App. Log} conversion character is specified in the logging configuration file. For more information, see The SAS Logging Facility in **SAS Logging: Configuration and Programming Reference**.

Automated SAS Server Tier Configuration

SAS has eliminated most post-install manual configuration scripts for the SAS server tier initial configuration through its new deployment tool, the SAS Deployment Wizard.

Port Changes

The following SAS default ports have changed:

- The object spawner's managed ports can now share the same port.
 - The new SAS Pooled Workspace Server uses port 8701.
 - The new SAS Object Spawner port banks use ports 8801, 8811, and 8821.
 - The object spawner load balancing port, 8571, is no longer used.
-

Documentation Enhancements

The **SAS Intelligence Platform: Application Server Administration Guide** has been reorganized to reflect the new SAS features.

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What's New in Desktop Application Administration for the SAS 9.2 Intelligence Platform

Overview

The **SAS Intelligence Platform: Desktop Application Administration Guide** contains new and updated administrative tasks that are associated with seven client applications.

Documentation Enhancements

For SAS 9.2, the **SAS Intelligence Platform: Desktop Application Administration Guide** contains the following enhancements:

- A new Common Elements chapter addresses administrative tasks that are common to all or most of the desktop applications.
- The SAS Data Integration Studio chapter contains new material that addresses data server connections, message queue administration, Web service support, bulk loading of data, and external file wizard configuration.
- The SAS Enterprise Miner chapter contains revised information for the model viewer, the Analytics Platform, and the Tomcat WebDAV server.
- The SAS Management Console chapter introduces new administrative capabilities and describes how to start the client using a symbolic link.
- In the second maintenance release for SAS 9.2, the SAS Enterprise Guide chapter has been updated to document the registration of custom tasks as capabilities.
- In the second maintenance release for SAS 9.2, the chapters for SAS Management Console, SAS Add-In for Microsoft Office, and SAS Enterprise Guide have been updated to document default roles and capabilities.
- In the third maintenance release for SAS 9.2, the following chapters have been updated:
 - the SAS Enterprise Miner chapter, to include SAS Enterprise Miner 6.2
 - the SAS Data Integration Studio chapter, to include SAS Data Integration Studio 4.2

Other chapters received minor updates, corrections, and additions.

What's New in Web Application Administration for the SAS 9.2 Intelligence Platform

Overview

The middle tier of the SAS Intelligence Platform provides an execution environment for business intelligence Web applications such as SAS Web Report Studio and SAS Information Delivery Portal.

The middle tier has the following changes and enhancements:

- common Web administration
- better integration with third-party security products
- SAS Content Server
- SAS Web Application Themes
- SAS Information Delivery Portal administration
- SAS Web Report Studio administration
- SAS BI Dashboard administration

The middle tier and its applications are supported on Windows and UNIX. JBoss, WebLogic, and WebSphere application servers are supported on Windows and UNIX. Beginning with the third maintenance release for SAS 9.2 and later, the WebSphere application server is supported on the z/OS platform.

Common Web Administration

A common Web infrastructure provides consistent and cohesive Web applications that are well integrated. This infrastructure layer results in the following enhancements:

- A new SAS Web Infrastructure Platform provides basic services and applications that are used by all Web applications that run in the middle tier of the intelligence platform. The SAS Web Infrastructure Platform contains some of the technology that the SAS Web Infrastructure Kit contained in previous releases, such as the SAS Services Application and the SAS Stored Processes Web Application. However, the SAS Web Infrastructure Platform technologies are used not only by the SAS Information Delivery Portal, but also by other SAS Web applications. The SAS Web Infrastructure Kit no longer exists.
- You can customize SAS themes in a single place. The Web applications can then be configured to use the theme that you customize.
- All Web authentication occurs through a central authentication service. This change simplifies the task of configuring Web authentication.
- SAS Web Administration Console enables you to log on from a remote site and view information

that is normally available in the SAS Management Console. You can view authenticated users and system users that are logged on to a SAS Web applications, as well as the current configuration of Web applications deployed at your site.

- In the second maintenance release for SAS 9.2 and later, the Restart Maintenance Wizard provides the following features:
 - Enables you to send e-mail to users to log off from their sessions within a specified deadline.
 - Logs off users after the specified deadline.
 - Prohibits new users from logging in to their user applications.
- The second maintenance release for SAS 9.2 and later also includes the Quiesce System. The Quiesce System feature is useful when you want to enable existing users to stay logged on to their user sessions, but you want to quiesce the system by preventing new users from logging on to SAS Web applications. You can also access the SAS Content Server page to manage folders and permissions for content in the SAS Content Server.
- With the SAS Deployment Manager, you can either remove an existing configuration or rebuild SAS Web applications. Beginning with the second maintenance release for SAS 9.2 and later, when you rebuild Web applications by using the SAS Deployment Manager, the EAR files for the Web applications are automatically exploded and placed in two different directories.
- The SAS Configuration Manager, which is available in the SAS Management Console, enables you change settings or specify property names and values for several applications, including SAS Information Delivery Portal, SAS Web Report Studio, and SAS BI Dashboard.
- Logging for all SAS applications is accomplished by using the Logging Service Configuration dialog box within the Configuration Manager in SAS Management Console.
- System folders are not accessible to SAS Web application users, and can be accessed only through SAS Management Console. For example, `system` and `users` folders are both system folders, and are not visible from within SAS Web Report Studio 4.2.
- Beginning with the second maintenance release for SAS 9.2 and later, the `sas-environment.xml` file is used to define the available set of SAS environments for SAS client applications. You use this file to configure multiple environments by customizing and deploying this file to an HTTP server.
- Beginning with the third maintenance release for SAS 9.2 and later, you can alert users by displaying a warning message before they are logged out of their inactive sessions. This feature is supported for SAS Web Report Studio, SAS Package Viewer, SAS Shared applications, SAS Preferences, SAS Web Infrastructure Platform administration, and SAS Stored Processes. However, if the SAS Information Delivery Portal 4.2 is configured at your site, this feature should not be enabled. SAS Information Delivery Portal 4.3 supports this feature.
- Beginning with the third maintenance release for SAS 9.2 and later, the JVM command for the bind address is enabled by default to ensure that the Web application server and the JGroups software use the same bind address:
- Beginning with the November 2010 Release, you can manually load and update content in the SAS Content Server.

Better Integration with Third-Party Security Products

The following enhancements have been added:

- Web authentication is supported for JBoss, Oracle WebLogic, and IBM WebSphere application servers.
 - The middle-tier software supports interaction with WebSeal and SiteMinder.
 - Administrators can configure client certification for one-way and two-way SSL authentication.
-

SAS Content Server

The SAS Content Server is a content repository that stores digital content (such as documents, reports, and images) that is created and used by SAS client applications. The Web-based Distributed Authoring and Versioning (WebDAV) protocol is used to access the SAS Content Server. The SAS Web Administration Console enables you to access the SAS Content Server to view directories, change permissions to directories, and create and delete directories.

Beginning with the second maintenance release for SAS 9.2 and later, multiple folders in the SAS Content Server can be deleted concurrently within the SAS Web Administration Console.

Beginning with the third maintenance release for SAS 9.2 and later, the SAS Content Server supports database persistence. By default, the SAS Content Server is configured to use the file system for persistence and need not be changed. In special cases, the SAS Content Server can be reconfigured to share and use the database that is used by SAS Shared Services. By default, SAS Shared Services uses the SAS Table Server, but it can be configured to use a different database such as Oracle, MySQL, PostgreSQL, DB/2, or SQL Server.

Also, in the third maintenance release for SAS 9.2, the manual setting of JAVA_HOME variable to point to Java 5 is not required.

Beginning with the November 2010 release and later, content for the SAS Content Server can be loaded or updated manually by running a batch file or a script. In addition, directive URLs can be updated manually.

SAS Web Application Themes

SAS Web Application Themes contain definitions for themes that are used by several SAS Web applications. Themes enable you to create and apply consistent, visual customization and company branding that is applied to all theme-enabled SAS Web Applications.

SAS Web applications such as SAS Web Report Studio, SAS Information Delivery Portal, and SAS BI Dashboard can be configured to facilitate a common look and feel across SAS applications. In SAS Web Report Studio, themes apply to the user interface, including the dialog boxes that are used to view, create, edit, and share reports. Themes contain images, HTML templates, and cascading style sheets (CSS).

SAS Flex Application Themes

Beginning with the November 2010 release, SAS BI Dashboard 4.3 and SAS BI Portlets are displayed with the Flex interface that is provided by SAS Flex Application Themes 2.2. At start-up time, Flex applications load Flex themes automatically. A theme consists of ShockWave Flash (SWF) files that include cascading style sheets (CSS) files. The theme content is downloaded to the client, and is cached by the user's Web browser. As a result, subsequent uses of the Web application result in quicker loading of theme content than it is at initial loading. The SAS Corporate theme is the default theme for all Flex applications.

SAS Information Delivery Portal Administration

SAS Information Delivery Portal 4.3

SAS Information Delivery Portal 4.3 offers these new features for administration:

- A content promotion tool is provided. This tool consists of stand-alone batch scripts, shell scripts, and metadata extraction templates. These scripts and templates use the metadata server's import and export capabilities to promote portal metadata from a SAS 9.1.3 or SAS 9.2 deployment to another SAS 9.2 deployment.
- SAS Flex Application Themes 2.2 is available in the November 2010 release, and SAS BI Portlets display with the Flex interface.
- You can alert users by displaying a warning message before they are logged out of their inactive sessions.
- You can choose to enable unchallenged access to the portal. Users can then access the portal and interact with selected content without providing a user ID and password. The option is similar to the Public Kiosk feature in the SAS 9.1.3 release of the SAS Information Delivery Portal. You can either enable the option in an existing deployment, or you can enable it during the process of a new installation or a migration from SAS 9.1.3.
- A Diagnostics Portlet enables you to view information about the portal's environment.

The SAS Web OLAP Viewer for Java is no longer supported. It has been replaced by functionality that is available in SAS Web Report Studio 4.3. Therefore, SAS Information Delivery Portal 4.3 contains the following changes:

- Bookmarks and data explorations are not supported.
- All data explorations are migrated to SAS Web Report Studio 4.3 reports. However, users can still use the search capabilities within SAS Information Delivery Portal 4.3 to find those reports, as well as information maps.
- SAS Information Delivery Portal 4.3 includes a new Report Portlet that displays SAS Web Report Studio 4.3 reports.
- During software updates, the SAS Information Delivery Portal converts instances of the Information Map Viewer portlet to the new Report Portlet.
- Visual Data Explorer is not available to display information maps.

If SAS Information Delivery Portal 4.3 runs on a JBoss Web application server, and Secure Sockets Layer is configured in your environment, the `server.xml` file should be edited to specify the `emptySessionPath` parameter within the section on SSL Connector. This is necessary to enable the SAS BI Portlets to run in this environment.

SAS Information Delivery Portal 4.2

The following enhancements pertain to the administration of SAS Information Delivery Portal 4.2 and later:

- The portal uses the SAS Web Infrastructure Platform for authentication, security, and other common Web infrastructure services. The portal uses a common framework that provides consistency among all SAS Web applications for configuration:
 - message logging within Configuration Manager
 - WebDAV content access
 - logon and authentication methods
 - themes and branding specifications
- For managing portal content, a group content administrator is recommended. The group content administrator can share personal content with the group, and can edit or remove content that has been shared with the group.
- STICKY pages are referred to as PERSISTENT pages.
- The Portal Admins group, which existed in SAS Information Delivery Portal 2.0, is not created in the current version. Instead, the Portal ACT is created and used to set permissions on the Permissions trees.
- The SAS Trusted User, who is also the portal administrator, is responsible for administering the portal, and is a member of the Portal ACT.
- The public kiosk does not exist anymore. The content administrator shares content with the PUBLIC group to ensure that all users have access to the content.
- By default, PUBLIC users have restricted access. In order to enable PUBLIC users to access content in the SAS Information Delivery Portal, you need to enable permissions.
- In SAS 9.1.3, the portal created permission trees for identity groups that defined the roles. In SAS 9.2, the portal does not create the permission trees associated with the roles.

SAS BI Portlets Administration

The October 2009 release and later provides SAS BI Portlets that are based on JSR 168 and available in the SAS Enterprise BI Server offering. These portlets are seamlessly integrated into the SAS Information Delivery Portal. SAS BI Portlets are also compatible with the WebSphere Portal 6.1.0.

The November 2010 release consists of the following new features and changes:

- The SAS BI Dashboard portlet is a new addition to the suite of SAS BI Portlets.
- The Diagnostics portlet is a new portlet that enables you to determine the current status of the portal's environment.
- The SAS Collection Portlet, which is included in the suite of SAS BI Portlets and is compliant with JSR 168, does not allow users to search for data explorations. All data explorations are migrated to SAS Web Report Studio 4.3 reports. Users can, however, search for information maps in SAS BI Portlets.
- SAS Flex Application Themes 2.2 provides the Flex interface, which displays SAS BI Portlets.

If SAS Information Delivery Portal 4.3 runs on a JBoss Web application server, and Secure Sockets Layer is configured in your environment, the `server.xml` file should be edited to specify the `emptySessionPath` parameter within the section on SSL Connector. This is necessary to enable the SAS BI Portlets to run in this environment.

Promotion of Portal Content

Using the content promotion tool provided in SAS Information Delivery Portal 4.3, you can promote the following types of portal content to SAS 9.2 deployments:

- Portal Application Tree
- User Permissions Tree
- Portal page template
- Portal content object
- Portlet instance
- Portal page

Batch files and scripts are available to promote portal content.

Typically, organizations develop and test portal content on one system before deploying the content to a production system. The content promotion tool enables you to move portal content from a development system to a production system, and the tool eliminates the need to regenerate the content manually.

SAS Web Report Studio Administration

SAS Web Report Studio 4.3

SAS Web Report Studio 4.3 consists of the following enhancements and changes:

- Folders for images, templates, and items for report distribution for users now reside within the /

`SASWebReportStudio/Common` folder. Previously, these folders were located within the `/ SAS Folders/System/Applications/SAS Web Report Studio/Web Report studio 4.2` folder. When you upgrade to SAS Web Report Studio 4.3, report templates and report distribution items are copied to the new location. Existing banner images and conditional highlighting images remain in the old location (so that referencing reports continue to work) and are also copied to the new location.

- By default, clustering is enabled.
- By default, in-process scheduling is supported in a clustered environment. An in-process scheduling server runs as a process inside SAS Web Report Studio, which eliminates the need to send jobs to an external scheduling server. The in-process server is installed as part of the SAS Web Report Studio installation, which eliminates the need to install, maintain, and license separate scheduling servers.
- SAS Web Report Studio 4.3 has 30 UDP ports available for use by the application. These ports are in the range of 7560 to 7589.
- An event is logged in the `WebReportStudio_KeyActions.log` file when a user creates, edits, or deletes a distribution list.
- Details about SAS Web Report Studio users' logon and logoff from sessions can be viewed conveniently in the `WebReportStudio_KeyActions.log` file.
- You can specify a different directory (other than the default directory) where the Key User Action log files can be saved.
- You can specify whether the display of the left pane in SAS Web Report Studio window should depend on the user's preferences during the previous logon session. By specifying the value of user for the `wrs.ReportViewPrefs.LeftPanelOpenState` property, you can ensure that SAS Web Report Studio retrieves the user's action from the previous logon session, and accordingly displays or eliminates the left pane in the application.
- Two new capabilities have been added to SAS Web Report Studio 4.3 and SAS Web Report Viewer 4.3: Allow Direct Access to Cubes and Allow Direct Access to Tables. The Allow Direct Access to Cubes capability is included by default in the following roles: Web Report Studio: Report Creation, Web Report Studio: Advanced, and Web Report Viewer: Advanced.
- The Open Maps as Reports capability has been renamed to Allow Direct Access to Information Maps. In addition, the Repair Report capability has been renamed to Update Resources. For sites that upgrade from SAS Web Report Studio 4.2, the names of these capabilities will remain the same.
- New styles are available for reports.
- The Distribute Report Wizard includes new features.
- SAS Web Report Studio reports can be scheduled only by regular users with a SAS identity. SAS internal accounts cannot be used to schedule reports.
- The optional `trusted` parameter is not available in the Report Output Generation tool.
- To distribute reports with the Report Output Generation tool in environments with multihomed machines, the `Outputgen.ini` file should be updated to include the `-Djgroups.bind_addr` command.
- Reports can be scheduled only by regular users with a metadata identity. SAS internal accounts such as the SAS Trusted User cannot be used to schedule reports.

SAS Web OLAP Viewer for Java

The SAS Web OLAP Viewer for Java application is no longer supported. It has been replaced by functionality that is available in SAS Web Report Studio 4.3. SAS Web Report Studio 4.3 contains the following changes:

- Bookmarks and data explorations are not supported.
- All data explorations are migrated to SAS Web Report Studio 4.3 reports. You can still use the search capabilities within SAS Information Delivery Portal 4.3 to find those reports, as well as, the information maps.
- The migration tool creates a copy of the original data explorations and bookmarks, and places them in the same location where the original content resided.
- Visual Data Explorer is not available to display information maps in SAS Information Delivery Portal 4.3.
- In Edit mode within the portal, users can select a SAS Web Report Studio report instead of a data exploration.
- The SAS Collection Portlet, which is included in the suite of SAS BI Portlets and is compliant with JSR 168, does not allow users to search for data explorations. All data explorations are migrated to SAS Web Report Studio 4.3 reports. Users can, however, search for information maps.

SAS Web Report Studio 4.2

The following enhancements pertain to SAS Web Report Studio 4.2 administration:

- In SAS Web Report Studio 4.2, you have the flexibility to choose the location of the SAS Web Report Studio user folders anywhere below the SAS Folders directory in the **Folders** tab window in SAS Management Console. Previously, in SAS Web Report Studio 3.1, you were required to use predefined storage folders. This is no longer the case.
- The `/BIP Tree/ReportStudio/Shared/Reports` folder path does not exist in SAS Web Report Studio 4.2. However, if your organization migrated from SAS 9.1.3 to SAS 9.2, the legacy path is automatically enabled in the Web Report Studio 4.2 Properties dialog box within SAS Management Console. As a result, the legacy folder paths are available to users on the SAS Web Report Studio **Location** drop-down menu.
- SAS Web Report Studio 4.2 offers three predefined roles with certain capabilities that are assigned to these roles initially. These predefined roles include Report Viewing, Report Creation, and Advanced. You are not required to use predefined roles. You have the ability to create roles and capabilities that meet the needs of your organization. You can determine the number of roles to create, which features are available for each role, and control other aspects of role-based behavior.
- The Report Distribution Wizard has been significantly enhanced to enable you to create and edit recipient lists by specifying recipient names and e-mail addresses, and channel information within the wizard's dialog boxes.
- When users need to view a report, and are transferred by an external application such as the SAS Information Delivery Portal, those users are transferred to SAS Web Report Studio (if the application is installed). The functionality offered by the SAS Web Report Studio is determined by the roles and capabilities that are assigned to these users.

- You can set security measures to limit SAS Web Report Studio to interact only with information maps that are in designated locations. For example, you might limit the availability of all relational information maps because some of those information maps include row-level permissions.
- The **DefaultLoggerProperties.xml** file is not used. Logging for all applications is now accomplished by using the Logging Service Configuration dialog box within Configuration Manager in SAS Management Console.
- Previously, if client-side pooling was configured, SAS Web Report Studio 3.1 required that the pooling administrator's user name and password be stored in the metadata. This requirement has been waived in SAS Web Report Studio 4.2.
- In previous versions of SAS Web Report Studio, the **LocalProperties.xml** file offered the only practical method to override properties and their values. Although this file is available and supported in SAS Web Report Studio 4.2, it is recommended that you use the Configuration Manager in SAS Management Console to configure and set properties for SAS Web Report Studio. The Configuration Manager offers a consistent interface to set properties for all SAS applications.
- SAS Web Report Studio 4.2 enables you to add disclaimer text to graphs and tables.
- The report output generation tool enables you to create pre-generated, static versions of reports from the command line. This tool has been updated with the **rptbatch.bat** file, which calls upon the **outputgen.exe** file. In addition, new parameters have been added to the report output generation tool.
- The **WebReportStudioProperties.xml** file is no longer used in SAS Web Report Studio 4.2. Instead, the **Advanced** tab in Web Report Studio Properties 4.2 is used to specify property names and property values.
- Previous users of SAS Web Report Studio can locate their home folders in the new SAS 9.2 home folders. These new folders have restricted metadata permissions.
- SAS Web Report Studio 4.2 maintains a working area that is hidden from users. This working area, which is located at **/System/Applications/SAS Web Report Studio/Web Report Studio 4.2**, is accessed by using the SAS Management Console. This location might store shared content such as images.
- Banner images are stored in the **/Web Report Studio 4.2/BannerImages** folder. Sample conditional highlighting image files are deployed in the **/Web Report Studio 4.2/ConditionalHighlightingImages** folder.
- In SAS Web Report Studio 4.2, PUBLIC users do not have personal home folders. In addition, PUBLIC users do not have a location to store their history and preferences. As a result, PUBLIC users' report history is not retained.
- By default, PUBLIC users have restricted access. In order to enable PUBLIC users to access SAS Web Report Studio, you need to enable permissions.
- Beginning with the third maintenance release for SAS 9.2 and later, the log file, **SASBIReportServices4.2.1.log**, is created when you first run the report output generation tool with default permissions.
- In the third maintenance release for SAS 9.2, if you run the commands for the report output generation tool on a z/OS system with WebSphere, retrieve the fully qualified pathname to the generated file. Then, locate the generated .in file or .jcl file, and copy the relevant contents into the command line text used to run the distribution job.
- In the third maintenance release for SAS 9.2, you can change the location of the temporary

SAS BI Dashboard Administration

SAS BI Dashboard 4.3

SAS BI Dashboard 4.3 offers several new features and enhancements that make administration easier, flexible, and convenient. These enhancements are as follows:

- Storage folders for SAS BI Dashboard 4.3 now exist in both the foundation SAS Metadata Repository and the SAS Content Server or the file system.
- Users' folders for SAS BI Dashboard 4.3 can be located anywhere below the **SAS Folders** directory on the **Folders** tab of SAS Management Console. Previously, in SAS BI Dashboard 4.2, you were required to use predefined storage folders. This is no longer the case.
- Configuration files for SAS BI Dashboard 4.3 are stored on the SAS Content Server. Previously, all files were stored in a file system.
- You can use the SAS Content Server Administration Console to manage SAS BI Dashboard 4.3 files and WebDAV folders in the SAS Content Server.
- You can enable users to log on, view, and interact with a dashboard by creating metadata identities for the users.
- As with all SAS applications, logging is accomplished by using the Logging Service Configuration dialog box within the Configuration Manager in SAS Management Console.
- You can register a stored process and make it available to SAS BI Dashboard 4.3 users.
- Three types of caching are available: data caching, content caching, and client caching.
- Data caching was available previously in SAS BI Dashboard 4.2. Beginning with SAS BI Dashboard 4.3, files for data caching are stored in the SAS Content Server.
- Content caching, which is a new type of caching, is enabled by default in SAS BI Dashboard 4.3.
- Client browsers that display dashboards with SAS BI Dashboard 4.3 use Flash in the Rich Internet Application (RIA) architecture. Client caching is enabled by default.
- Image files are no longer cached.
- SAS BI Dashboard 4.3 supports the SAS Comment Manager.
- DSX files are stored in the SAS Content Server.
- DSX files are modified by exporting the DSX file from SAS Management Console, making necessary changes to the files, and importing the files.
- The standard logging facility used by the SAS 9.2 Intelligence Platform is supported. In SAS Management Console, the Logging Service dialog box enables you to manage performance, track security enforcement, and analyze specific situations.
- The SAS BI Dashboard Portlet is installed along with the other SAS BI Portlets. This portlet allows users to display a dashboard that is created with the SAS BI Dashboard application. The configuration of this portlet is identical to the configuration of the SAS BI Portlets for the WebSphere Portal.
- Partial promotion is supported for SAS BI Dashboard 4.3. However, there are special considerations that apply to the promotion process.

- You can specify a session time-out interval for inactive user sessions.
- You can alert users by displaying a warning message before they are logged out of their inactive sessions.

SAS BI Dashboard 4.2

In SAS BI Dashboard 4.2, an alert can be set up to enable Event Generation Framework to regularly poll BI Dashboard indicators, determine whether an event qualifies for an alert, and generate an alert for the user. In order to minimize the impact of constant polling on BI Dashboard's performance, you can customize and set parameters for alert latency.

SAS Web Parts for Microsoft SharePoint

In the November 2010 release, SAS Web Parts for Microsoft Sharepoint is a new product that includes:

- SAS BI Dashboard Web Part that displays dashboards and KPIs to enable users to monitor organizational performance
- SAS Stored Process Web Part that enables users to view the results of a stored process at the SharePoint site

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What's New in SAS/IntrNet 9.2

Overview

New programming and configuration capabilities are provided.

- [Application Dispatcher](#)

The Application Dispatcher provides background processing, support for 64-bit hosts and IPv6-based hosts, Load Manager enhancements, new options for the PROC APPSRV statement, new parameters for the _REPLAY program, and improved documentation.

- SAS/IntrNet Monitor

The SAS/IntrNet Monitor is a desktop application that displays the current running status of configured load-managing Application Servers and stand-alone Application Servers. It enables a SAS/IntrNet system administrator to detect server failures at a glance and resolve problems quickly. See the product help for more information.

- SAS Design-Time Controls

SAS Design-Time Controls are no longer being released. You can download release 9.1 of SAS Design-Time Controls from the Software Downloads page at <http://support.sas.com/techsup/download/>. Documentation for Release 9.1 of SAS Design-Time Controls is available in SAS OnlineDoc 9.1.3.

What's New in SAS/IntrNet 9.2

Application Dispatcher

Overview

Application Dispatcher provides background processing, support for 64-bit hosts and IPv6-based hosts, Load Manager enhancements, new options for the PROC APPSRV statement, new parameters for the _REPLAY program, and improved documentation.

General Enhancements

SAS/IntrNet Application Dispatcher includes the following enhancements:

- Long-running SAS/IntrNet programs can now run in the background to avoid problems with common timeouts for the Application Broker, Web server, and Application Server. The Web browser does not have to wait for a job to complete. The results are returned via e-mail or stored for subsequent retrieval. The following new APPSRVSET parameters are available:

- `APPSRVSET('background', request_timeout);`
- `APPSRVSET('disconnect');`

- SAS/IntrNet now runs on 64-bit hosts and IPv6-based hosts. Any fields in the broker.cfg file that are specified with **host:port** have to be changed to [**host**]:**port** if **host** contains a colon.
- SAS/IntrNet supports the following additional parameters for starting the Load Manager:

`-background=n`

specifies the number of Application Servers that can be run in the background at one time.

`-delete=service-name`

removes a previously installed Load Manager as a system service on Windows. This is useful if you are running multiple Load Managers. If the *service_name* is not specified, the name defaults to `SAS IntrNet Load Manager`.

`-install=service-name`

installs the Load Manager on Windows as a system service. This is useful if you want to run multiple Load Managers. If the *service_name* is not specified, the Load Manager is installed as `SAS IntrNet Load Manager`.

`-localhost=hostname`

forces the Load Manager to use the specified string as the local host name for all system host name comparisons.

- SAS/IntrNet Application Dispatcher supports the following additional options for the PROC APPSRV

statement:

CHARSET= and NOCHARSET options

enable the PROC APPSRV statement to append a specified character set name to the HTTP content-type header and to disable any special content-type processing, respectively.

AUTH=META option

enables the PROC APPSRV statement to use a metadata server.

- SAS/IntrNet Application Dispatcher now supports additional parameters for the _REPLAY program. The _OUTPUTAPP= parameter enables you to replay output to a Microsoft Office application. The _CONTDISP parameter enables you to control the filename of the replayed content.

What's New in SAS Management Console 9.2

Overview

SAS Management Console has the following new features and enhancements:

- The Folders view enables you to view and manage folders and the metadata objects contained in the folders.
 - Server monitoring functions enable you to view server logs and other information about server operation (such as sessions, spawned server activity, and clients).
 - Functions are provided to validate server definitions.
 - Functions are provided to stop and resume servers and spawners.
 - Functions are provided to analyze and repair the metadata definitions in a SAS Metadata Repository.
 - Resource templates have been added and revised for server and library definitions.
 - The Schedule Manager plug-in provides a visual editor for creating and managing deployed flows.
 - The new Plug-in Manager plug-in enables you to control which plug-ins are available to users based on the roles that you assign to the users.
 - The User Manager plug-in adds support for roles.
 - The BI Lineage plug-in has been added.
-

Folders View

The Folders view displays the folders that are used to store SAS metadata objects. The objects that are contained in the folders are the same objects that are displayed in the **Plug-Ins** tab under individual plug-ins. Folders are provided for individual users, for shared data, for system use, and for specific SAS products. The **Folders** view also enables you to export and import SAS packages and to create new stored processes.

Server Monitoring

When you connect to server objects in the **Plug-Ins** view, additional tabs might appear in the display area for the object you select. These tabs enable you to access the server monitoring functions for the connected server or spawner. These functions provide information about the server or server component (for example, displaying the log for a server or the clients for a metadata server). The

server monitoring tabs that are available differ depending on the type of server and server component to which you are connected.

Server Validation

Selecting the Validate action for a logical server definition attempts to establish a connection to the server. If a connection is established, additional actions (such as submitting SAS code to the sever, retrieving the metadata repositories, or accessing a database) are performed, depending on the server type.

Server Control

You can stop, resume, pause, and quiesce some types of servers and spawners. You must first connect to the server or spawner.

Metadata Analysis and Repair

The Metadata Analysis and Repair function analyzes your metadata for problems and repairs the problems that are found. The analysis tools provided are:

- Verify Associations
 - Verify Metadata Files
 - Orphaned ACEs
 - Orphaned Properties
 - Orphaned Property Groups
 - Orphaned Property Types
 - Verify Authentication Domains
 - Verify Permissions
-

New and Revised Resource Templates

Resource templates have been added for these library and server types:

- Netezza servers and libraries
- Neoview servers and libraries

- SAS Information Map library
- SAS Table Server library
- Queue Manager for Microsoft Message Queuing server
- Queue Manager for WebSphere Message Queue server
- SAS Table Server
- SAS In-Process Services scheduling server

Other library and server resource templates have been revised. For details about the information required for each resource template, see the online Help for the resource template.

Visual Flow Editor

The visual flow editor in the Schedule Manager plug-in enables you to visualize the structure of a flow and see how the dependencies and jobs connect with one another. You can use the editor to:

- add file events, time events, or job events as dependencies
 - add additional deployed jobs
 - add sub-flows
 - add gate nodes for conditional processing
 - schedule the flow
-

Plug-In Manager

The Plug-In Manager plug-in enables you to select which plug-ins use role-based access. Role-based access enables you to specify which plug-ins are available for each SAS Management Console user, based on the user's role. You can also specify that the default behavior is to not load plug-ins unless the user's role specifically allows it.

Role Support

The User Manager plug-in adds support for roles. A role manages the availability of application features such as menu items, and any user who is a member of a role has all of that role's capabilities.

Stored Processes and Prompts

In the second maintenance release for SAS 9.2, the following enhancements were made to the macro variables that are generated from prompts:

- The PROMPT-NAME_LABEL macro variable is generated for date prompts.
- The PROMPT-NAME_MIN_LABEL and PROMPT-NAME_MAX_LABEL macro variables are generated for date-range prompts.
- For time and timestamp prompts, the format of the PROMPT-NAME_LABEL macro variable has changed.
- For time-range and timestamp-range prompts, the format of the PROMPT-NAME_MIN_LABEL and PROMPT-NAME_MAX_LABEL macro variables have changed.

For more information, see *SAS Stored Processes: Developer's Guide*.

BI Lineage Plug-In

In the October 2010 release of SAS Management Console, the new BI Lineage plug-in was added. This plug-in scans the BI objects in a selected subset of the SAS Folders Tree and determines the connections between these objects. You can choose any object in the scan and view the lineage or the reverse lineage for the object. A lineage consists of other objects that contribute to the selected BI object. These objects could cause a change in the selected object if any of them change. A reverse lineage consists of other objects within the scope of the scan that use information from the selected BI object. These are objects that could be affected if the selected object changes. You can view a lineage or reverse lineage as a tree view or in a process flow diagram.

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What's New in SAS 9.2 National Language Support (NLS) Reference Guide

Overview

In this release, SAS has expanded the scope and capabilities of National Language Support (NLS). NLS is a set of features that enable a software product to function properly in every global market for which the product is targeted. SAS contains NLS features to ensure that you can write SAS applications that conform to local language conventions. Typically, software that is written in the English language works well for users who use the English language and data that is formatted using the conventions that are observed in the United States. However, without NLS, these products might not work as well for users in other regions of the world. NLS in SAS enables users in regions such as Asia and Europe to process data successfully in their native languages and environments.

This topic describes the changes and enhancements that have been made to the NLS documentation and features.

- [additional autocall macros](#)
- [macro functions](#)
- [additional encodings](#)
- [additional functions and a new directive for selected functions](#)
- [additional locales](#)
- [additional system options](#)
- [formats that now support Arabic and new formats](#)
- [documentation enhancements such as revising the collating sequence topic and moving the EUR language elements to another section](#)
- [informats that now support Arabic and new informats](#)
- [internationalization compatibility for SAS string functions](#)
- [language switching](#)

Documentation Enhancements

- The title of this document was changed for SAS 9.2 NLS. The new title is **SAS National Language Support (NLS): Reference Guide**.
- The Collating Sequences section, which describes the orders in which characters are sorted, has been revised.
- SAS recommends that users use the NL language elements instead of the EUR language elements. The EUR language elements are in an appendix titled Additional Language Elements.

Internationalization Compatibility for SAS String Functions

The Internationalization Compatibility for SAS String Functions section specifies the level of

internationalization compatibility for SAS string functions.

National Collating Sequences of Alphanumeric Characters

The National Collating Sequences of Alphanumeric Characters table has been updated to reflect current collating sequences.

Language Switching

The Language Switching section describes how you can view SAS messages in another language using a Unicode server.

Locales

The following locales have been added in SAS 9.2 NLS. Information on how locales work in SAS programming is provided in [Overview of Locale Concepts for NLS](#):

- Afrikaans_SouthAfrica
- Albanian_Albania
- Arabic_India
- Arabic_Iraq
- Arabic_Libya
- Arabic_Sudan
- Arabic_Syria
- Arabic_Yemen
- Bengali_India
- Bosnian_BosniaHerzegovina
- Catalan_Spain
- Cornish_UnitedKingdom
- Croatian_BosniaHerzegovina
- English_Belgium
- English_Botswana
- English_Caribbean
- English_Philippines
- English_Zimbabwe
- Faroese_Faroelands
- Greenlandic_Greenland
- Hindi_India
- Indonesian_Indonesia
- Macedonian_Macedonia
- Malay_Malaysia

- Maltese_Malta
 - ManxGaelic_UnitedKingdom
 - Marathi_India
 - NorwegianBokmal_Norway
 - NorwegianNynorsk_Norway
 - Persian_India
 - Persian_Iran
 - Russian_Ukraine
 - Serbian_BosniaHerzegovina
 - Serbian_Montenegro
 - Serbian_Serbia
 - SerboCroatian_Montenegro
 - SerboCroatian_Serbia
 - Tamil_India
 - Telugu_India
-

Encodings

In the third maintenance release for SAS 9.2, the SBCS, DBCS, and Unicode Encoding Values Used to Transcode Data table was updated to reflect current values.

In the third maintenance release for SAS 9.2, the following encodings were removed from the Double-Byte Encodings for UNIX table:

- Traditional Chinese HP15
- Simplified Chinese PCMS
- Korean PCMS

The following encodings have been added in SAS 9.2 NLS. Information on how encodings work in SAS programming is provided in Overview of Encoding for NLS:

- e097 - Farsi Bilingual - EBCDIC
- e0fa - Farsi Bilingual - EBCDIC
- e137 - Devanagari - EBCDIC
- e0in - Devanagari - EBCDIC
- e153 - EBCDIC Latin 2 Multilingual with euro
- e053 - EBCDIC Latin 2 Multilingual with euro
- e154 - EBCDIC Cyrillic Multilingual with euro
- e054 - EBCDIC Cyrillic Multilingual with euro
- e155 - EBCDIC Turkey with euro
- e055 - EBCDIC Turkey with euro
- e156 - EBCDIC Baltic Multi with euro
- e056 - EBCDIC Baltic Multi with euro
- e157 - EBCDIC Estonia with euro

- e057 - EBCDIC Estonia with euro
 - e158 - EBCDIC Cyrillic Ukraine with euro
 - e058 - EBCDIC Cyrillic Ukraine with euro
 - e905 - Latin 3 - EBCDIC
 - e013 - Latin 3 - EBCDIC
 - lat8 - ISO 8859/14-latin8
 - p806 - PC Indian Script Code (ISCII-91)
 - p098 - Farsi - Personal Computer
-

Autocall Macros

The following SAS 9.2 NLS autocall macros are new:

- %KLOWCASE and %QKLOWCAS
 - %KTRIM and %QKTRIM
 - %KVERIFY
-

Macro Functions

The following SAS 9.2 NLS macro functions are new:

- %KINDEX
 - %KLEFT and %QKLEFT
 - %KLENGTH
 - %KSCAN and %QKSCAN
 - %KSUBSTR and %QKSUBSTR
 - %KUPCASE and %QKUPCASE
-

Formats

- The following SAS 9.2 NLS formats have been enhanced and now support Arabic:
 - \$BIDI
 - \$LOGVS
 - \$LOGVSR
 - \$VSLOG
 - \$VSLOGR
- In the third maintenance release for SAS 9.2, the following formats have been enhanced to support date-time values:
 - NLTIMAP
 - NLTIME
- The following numeric formats are new for SAS 9.2 NLS.

NLBEST writes the best numerical notation, based on the locale.

NLSTRMON writes a numeric value as a day-of-the-month in the specified locale.
NLSTRQTR writes a numeric value as the quarter-of-the-year in the specified locale
NLSTRWK writes a numeric value as the day-of-the-week in the specified locale
NLPVALUE writes p-values of the local expression in the specified locale

- The following date and time formats are new for SAS 9.2 NLS. These formats write locale-specific dates and times.

NLDATEYQ converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the quarter.

NLDATEYR converts the SAS date value to the date value of the specified locale, and then writes the date value as the year.

NLDATEYW converts the SAS date value to the date value of the specified locale, and then writes the date value as the year and the week.

NLDATMDT converts the SAS datetime value to the datetime value of the specified locale. This format writes the value as the name of the month, day of the month, and year.

NLDATMMN converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the name of the month.

NLDATMWN converts a SAS datetime value to the datetime value of the specified locale, and then writes the value as the day of the week.

NLDATMYQ converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the quarter of the year.

NLDATMYR converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year.

NLDATMYW converts the SAS datetime value to the datetime value of the specified locale, and then writes the value as the year and the name of the week.

- The following currency formats are new for SAS 9.2 NLS. These formats write the international monetary expression.

- NLMNIAUD - Australia
- NLMNICADw.d - Canada
- NLMNICHFW.d - Liechtenstein
- NLMNICNYw.d - China
- NLMNIDKKw.d - Denmark, Faroe Island, and Greenland
- NLMNIEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
- NLMNIGBPw.d - United Kingdom
- NLMNIILSw.d - Israel
- NLMNIJPYw.d - Japan
- NLMNIKRWw.d - South Korea
- NLMNIMYRw.d - Malaysia
- NLMNINOKw.d - Norway
- NLMNINZDw.d - New Zealand

- NLMNIPLNw.d - Poland
- NLMNIRUBw.d - Russia
- NLMNISEKw.d - Sweden
- NLMNISGDw.d - Singapore
- NLMNITWDw.d - Thailand
- NLMNIUSDw.d - Puerto Rico, and United States
- NLMNIZARw.d - South Africa
- The following currency formats for SAS 9.2 NLS are new. These formats write the local monetary expression.
 - NLMNLAUDw.d - Australia
 - NLMNLCADw.d - Canada
 - NLMNLCHFw.d - Liechtenstein
 - NLMNLCNYw.d - China
 - NLMNLDDKKw.d - Denmark, Faroe Island, and Greenland
 - NLMNLEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
 - NLMNLGPBw.d - United Kingdom
 - NLMNLHKDw.d - Hong Kong
 - NLMNLILSw.d - Israel
 - NLMNLJPYw.d - Japan
 - NLMNLKRWw.d - South Korea
 - NLMNLMYRw.d - Malaysia
 - NLMNLNOKw.d - Norway
 - NLMNLNZDw.d - New Zealand
 - NLMNLPLNw.d - Poland
 - NLMNLRUBw.d - Russia
 - NLMNLSEKw.d - Sweden
 - NLMNLSGDw.d - Singapore
 - NLMNLTWDw.d - Taiwan
 - NLMNLUSDw.d - Puerto Rico and the United States
 - NLMNLZARw.d - South Africa

Informats

- The following SAS 9.2 NLS informats have been enhanced and now support Arabic:
 - \$LOGVS
 - \$LOGVSR
 - \$VSLOG
 - \$VSLOGR
- The following currency informats are new for SAS 9.2 NLS. These informats read the international monetary expression.
 - NLMNIAUDw.d - Australia
 - NLMNICADw.d - Canada
 - NLMNICHFW.d - Liechtenstein and Switzerland

- NLMNICNYw.d - China
 - NLMNIDKKw.d - Denmark, Faroe Island, and Greenland
 - NLMNIEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
 - NLMNIGBPw.d - United Kingdom
 - NLMNIHKDw.d - Hong Kong
 - NLMNIILSw.d - Israel
 - NLMNIJPYw.d - Japan
 - NLMNIKRWw.d - South Korea
 - NLMNIMYRw.d - Malaysia
 - NLMNINOKw.d - Norway
 - NLMNINZDw.d - New Zealand
 - NLMNIPLNw.d - Poland
 - NLMNIRUBw.d - Russia
 - NLMNISEKw.d - Sweden
 - NLMNISGDw.d - Singapore
 - NLMNITWDw.d - Taiwan
 - NLMNIUSDw.d - Puerto Rico, and the United States
 - NLMNIZARw.d - South Africa
 - The following currency informats are new for SAS 9.2 NLS. These informats read the local monetary expression.
 - NLMNLAUDw.d - Australia
 - NLMNLCADw.d - Canada
 - NLMNLCHFw.d - Liechtenstein and Switzerland
 - NLMNLCNYw.d - China
 - NLMNLDDKKw.d - Denmark, the Faroe Island, and Greenland
 - NLMNLEURw.d - Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Slovenia, and Spain
 - NLMNLGBPw.d - United Kingdom
 - NLMNLHKDw.d - Hong Kong
 - NLMNLILSw.d - Israel
 - NLMNLJPYw.d - Japan
 - NLMNLKRWw.d - South Korea
 - NLMNLMYRw.d - Malaysia
 - NLMNLNOKw.d - Norway
 - NLMNLNZDw.d - New Zealand
 - NLMNLPLNw.d - Poland
 - NLMNLRUBw.d - Russia
 - NLMNLSEKw.d - Sweden
 - NLMNLSGDw.d - Singapore
 - NLMNLTWDw.d - Taiwan
 - NLMNLUSDw.d - Puerto Rico and the United States
 - NLMNLZARw.d - South Africa
-

Functions

- The following functions are new for SAS 9.2 NLS:

| | |
|---------------|--|
| GETPXLANGUAGE | displays a transcoding error when illegal data is read from a remote application |
| GETPXLOCALE | returns the POSIX locale value for a SAS locale |
| GETPXREGION | returns the current, two-letter region code |
| KPROPCASE | converts Chinese, Japanese, Korean, Taiwanese (CJKT) characters |
| KPROPCHAR | converts special characters to normal characters |
| KPROPDATA | removes or converts unprintable characters |
| SORTKEY | creates a linguistic sort key |
| UNICODE | converts Unicode characters to the current SAS session encoding |
| UNICODEC | converts characters in the current SAS session encoding to Unicode characters |
| UNICODELEN | creates a linguistic sort key |
| UNICODEWIDTH | specifies the length of a display unit for the Unicode data |

- A new directive, "#", was added to the following functions:
 - NLDATE
 - NLDATM
 - NLTIME

System Options

In the third maintenance release for SAS 9.2, the NLSCOMPATMODE option has been modified. A note has been added to the Details section notifying the user that a warning will be generated when NLSCOMPATMODE is set.

The following system options are new for SAS 9.2 NLS:

| | |
|-------------------|---|
| BOMFILE | specifies whether to write the Byte Order Mark (BOM) prefix on Unicode-encoded external files |
| LOCALELANGCHG | determines whether the language of the text of the ODS output can be changed |
| RSASIoTTRANSERROR | displays a transcoding error when illegal data is read from a remote application |

What's New in SAS 9.2 Drivers for ODBC

Overview

This document has a new title for SAS 9.2. Its title in previous releases was **SAS ODBC Driver: User's Guide and Programmer's Reference**.

In this release, SAS provides the following enhancements to the SAS ODBC Driver:

- three new SQL options that affect the interaction between the SAS ODBC Driver, SAS, and the ODBC application
- the driver prompts for user ID and password when authenticating to SAS Scalable Performance Data (SPD) Server
- documentation enhancements for **SAS 9.2 Drivers for ODBC: User's Guide**

The SAS Table Server Driver for ODBC, which enables access to the SAS Table Server, is deprecated in the third maintenance release for SAS 9.2.

New SQL Options

SQL option **Use client code page** tells the driver to use the client's code page information when transcoding multi-byte characters to and from WideChar. The option **Infer type in min/max functions** tells the driver to attempt to determine the format of a column that is used as input to a MIN or MAX function, and to use that format to infer the SQL type of the column.

In the second maintenance release for SAS 9.2, the option **Quote Char is NULL** is available. This option tells the driver to use an empty string for the SQL_IDENTIFIER_QUOTE_CHAR InfoType of the SQLGetInfo method.

Authentication to SPD Server

In the second maintenance release for SAS 9.2, the SAS ODBC Driver has improved authentication to SPD Server. If an authentication attempt fails, the SAS ODBC Driver provides a real-time prompt for user ID and password credentials. The SAS ODBC Driver permits three authentication attempts.

Documentation Enhancements

- A note has been added about support for Unicode UTF-8 encoding.
- The list of systems on which SAS/ACCESS software is available has been updated.

- Obsolete information about manually converting DDE servers to TCP servers has been removed because the conversion happens automatically.
 - Information about how the SAS ODBC Driver supports direct connections to SPD Server has been added. (Connections to SPD SNET are not supported with SAS 9 and later versions of the SAS ODBC Driver.)
 - If the client machine has a server form of Microsoft Windows, such as Windows Server 2003, then SAS/SHARE software must be licensed on the client machine. This license requirement applies even if you want to access local data only.
 - In the second maintenance release for SAS 9.2, information and examples about creating DATE, TIME, and DATETIME values are added. Information and examples are in Chapter 4, “Programmer's Reference.”
 - In the second maintenance release for SAS 9.2, obsolete information about unencrypted passwords is removed. The obsolete information described how the SAS ODBC Driver encrypts passwords in server definitions that were created by SAS ODBC Driver versions older than Release 8.1 of SAS. When the SAS 9.2 Drivers for ODBC are installed, the installation software deletes all SAS server definitions, which removes all password information. When the SAS ODBC Driver Configuration dialog box is used to add or modify data sources, passwords are stored in encrypted form.
 - In the second maintenance release for SAS 9.2, Chapter 2, “Defining Your Data Sources,” is revised. The chapter provides procedural information for configuring connections to local data, a SAS/SHARE server, and SPD Server.
-

SAS Table Server Driver for ODBC

In the third maintenance release for SAS 9.2, the SAS Table Server Driver for ODBC is deprecated. As a result, information about the SAS Table Server Driver for ODBC is removed.

What's New in the SAS 9.2 OLAP Server

Overview

The SAS OLAP Server contains various new functions, tools, and features for SAS 9.2.

- OLAP cube building features
- OLAP cube maintenance features
- cube aggregation tuning features
- incremental cube update features
- security for cubes
- SAS tree view features
- OLAP procedure options

These functions are accessed from SAS OLAP Cube Studio. In addition, some of these functions have equivalent OLAP procedure statements or options.

OLAP Cube Building Features

- The data table selection process in the Cube Designer wizard has been simplified and reorganized into an easier and more intuitive order. Tables are now grouped based on the libraries that the tables are registered to. The table selection pages also contain functions that enable you to access the properties for a table and view the data for a table.
- You can now create multiple hierarchies for a dimension with the Define a Hierarchy dialog box in the Dimension Designer. You can also designate one of the hierarchies as a default hierarchy.
- You can now build a time dimension with user-supplied time hierarchies that auto-populate the levels and formats for the Time dimension. The Add-Supplied dialog box enables you to select from suggested time hierarchies that are based on a single date-formatted column.

The COLUMN= option is used on the LEVEL statement when the Add-Supplied function is used.

- If the metadata server connection is lost during a SAS OLAP Cube Studio session, a new metadata server connection is automatically attempted during the same SAS OLAP Cube Studio session. This enables you to continue your work in that same session without losing any data changes you are making.
-

OLAP Cube Maintenance Features

- The Calculated Members Wizard is now fully integrated into SAS OLAP Cube Studio. The addition of the advanced expression builder enables you to specify user-defined formats, set the solve order, and build a custom MDX formula for a calculated member.
- The View Cube function enables you to verify the cube build process and visualize the data structure of a cube.

- SAS OLAP cube metadata can now be exported and imported as part of a SAS package or in batch mode. Cubes built with SAS OLAP Cube Studio 4.2 can be copied or moved between SAS 9.2 systems with the Export SAS Package and Import SAS Package functions that are part of SAS OLAP Cube Studio 4.2. Cubes that were built with a version of SAS that is earlier than 9.2 can also be moved to the SAS 9.2 environment by using the ExportCubes and ImportCubes batch tools.

Note: The ExportCubes batch tool is supported in a hot fix that is applied to SAS 9.1.3 SP4. Cube metadata that is exported with the ExportCubes tool can then be imported in the second maintenance release after SAS 9.2 with the ImportCubes batch tool. ■

- The Synchronize Column Changes function enables you to synchronize a cube when the input table for an existing cube has encountered a column name change. This function finds the name differences between the cube and its input table. It then changes the internal cube files to match the input table column names.
- The Refresh Cube function enables the SAS OLAP Server to access calculated members that were created or updated since the cube was last accessed by the SAS OLAP Server. This notifies running OLAP Server instances to capture calculated member changes made to the cube since it was last loaded by those instances.
- You can now quickly change the OLAP schema for a cube from within SAS OLAP Cube Studio.
- Cubes can now be disabled to make necessary changes and updates and then enabled again. Disabling a cube makes it transparent to the users connected to any active OLAP Server instances. A cube is disabled in order to make edits to the cube or to perform administrative tasks on the cube. Enabling a cube brings it back into production.
- You can now choose to export the code generated by PROC OLAP in either a long form or short form. The Export Code function enables you to store in a text file the PROC OLAP code that is used to edit or build the cube. The long form contains all PROC code that is used to create a cube. The short form text file contains only the PROC OLAP statement, the cube name, and the METASVR statement and obtains the remainder of the cube structure from an existing registration on the metadata server.
- You can now perform impact analysis for a cube. This function enables you to view the relationship of a cube to the objects that it is associated with. Impact analysis shows the potential impact of changes that you might make to a cube.
- A cube or cube-related object can now have documents and notes attached to provide additional information about the cube or object.
- Cube jobs are now automatically generated when a cube is built. A cube job is a collection of SAS tasks that create output. When you deploy a cube job, the code needed to create the cube is generated.
- You can now change the name of a cube or other object (such as a job, document, or note) by selecting that object in the tree view and then selecting the Rename function.

Cube Aggregation Tuning Features

- The newly designed Aggregation Tuning wizard enables you to build, edit, and customize aggregations for a cube. You can generate new aggregations for a cube based on the ARM log or cardinality, or you can use the manual aggregation builder.

Incremental Cube Update Features

- You can now add data and members to a cube without having to rebuild the cube. To support this feature, new PROC OLAP statements and options have been added. Within SAS OLAP Cube Studio, the Incremental Update wizard has been added.

- The Coalesce Aggregations function is part of the Incremental Update function. It enables you to combine all of the individual rack tables that result from incremental updates into a single aggregation table. The COALESCE_AGGREGATIONS option has been added to support this function. In SAS OLAP Cube Studio, the Coalesce Aggregations wizard has been added.
-

Security For Cubes

- You can now define member-level security in SAS OLAP Cube Studio. The Add Authorization dialog box enables you to add MDX expressions that limit access to a cube dimension. This ensures that only designated portions of the data are visible to a user or group of users.

Starting in the third maintenance release for SAS 9.2, you can use the Add Authorization dialog box to grant or deny Read permissions for a member only or for a member and its descendents.

The SECURITY_SUBSET= option is now available in the OLAP procedure. The option determines whether security totals will be used. The subset that is defined is then applied when calculating the cell values.

- Identity-driven security enables you to substitute identity values in a permission condition. It enables you to insert a placeholder into the permission condition that, at query time, gets resolved to a string that represents the user identity.
 - Starting in the third maintenance release for SAS 9.2, you can specify batch security in SAS OLAP Cube Studio with the Manage Permission Tables function. The Manage Permission Tables function enables you to create a special SAS data set known as a permission table that contains cube access controls for submitting in bulk. A permission table is a table of access control information that can later be applied to a cube with batch SAS code. The Manage Permission Tables dialog box enables you to create and modify permission tables as well as import access controls (permissions) from a cube or an OLAP schema. You can also execute the code interactively or export the code to a file for use in a stored process or deployed job flow.
-

SAS Tree View Features

- The tree view is now divided into two tabs, the **Folders** tab and **Inventory** tab. The **Inventory** tab lists the cubes and their components, such as schemas, tables, and libraries. The **Folders** tab displays a folder view of the components of the cube. This view shows which folders a cube, source tables, and libraries are located in.
 - You can now access functions that are specific to an object in the tree view. The functions that are listed in the context menu are specific to that object and the current status of that object. You can access the context menu by right-clicking an object.
 - In SAS OLAP Cube Studio, you can now copy or move objects between folders. You can also find the folder location of an object in the **Inventory** tab with the Find In Folders function.
-

New OLAP Procedure Options

The following OLAP procedure options are new for SAS OLAP 9.2:

PROC OLAP Statement Options

- ADD_DATA
- ASYNCINDEXLIMIT=

- COALESCE_AGGREGATIONS
- ESRI_MAP_SERVER=
- ESRI_REPLACE
- MAX_RETRIES=
- MAX_RETRY_WAIT=
- MIN_RETRY_WAIT=
- NONUPDATEABLE
- OUTCUBE=
- OUTSCHEMA=
- RENAME
- SECURITY_SUBSET= YES|NO
- SYNCHRONIZE_COLUMNS (replacing SYNCHRONIZE_LEVELS)
- UPDATE_DISPLAY_NAMES
- UPDATE_IN_PLACE

Dimension Statement Options

- MAP_SERVICE=
- UPDATE_DIMENSION=

LEVEL Statement Options

- COLUMN=
- ESRI_MAP_LAYER=
- FORMAT=

MEASURE Statement Options

- INCLUDE_CALCULATED_MEMBERS
- NOINCLUDE_CALCULATED_MEMBERS

PROPERTY Statement Options

- ESRI_MAP_FIELD=

What's New in the SAS 9.2 Open Metadata Interface: Reference and Usage

Overview

The SAS Open Metadata Interface documentation has been reorganized. You need information about this reorganization to successfully use this book.

The SAS 9.2 Open Metadata Interface software has been enhanced to provide improved metadata access, authorization, and server control functionality. It also offers a new security administration interface.

See the following topics for information about specific enhancements in each area:

- Documentation Changes
 - Metadata Access Enhancements
 - Authorization Enhancements
 - Server Control Enhancements
 - New Security Administration Server Interface
-

Documentation Changes

- The content of **SAS 9.1.3 Open Metadata Interface: Reference**, the **SAS 9.1.3 Open Metadata Interface: User's Guide**, and the **SAS 9.1.3 Java Metadata Interface: User's Guide** has been merged into one document. The new document is the **SAS 9.2 Open Metadata Interface: Reference and Usage**. For information about the reorganization, see *About This Book*.
- Documentation about SAS Metadata Model metadata types is not included in the **SAS 9.2 Open Metadata Interface: Reference and Usage**. This information is provided in a separate document: the *SAS 9.2 Metadata Model: Reference*.
- Documentation about PROC METADATA and SAS metadata DATA step functions is not included in **SAS 9.2 Open Metadata Interface: Reference and Usage**. It is provided in *SAS 9.2 Language Interfaces to Metadata*.
- **SAS 9.2 Open Metadata Interface: Reference and Usage** and **SAS 9.2 Metadata Model: Reference** are available only online. See Product Documentation in the Knowledge Base, available at <http://support.sas.com>.

This **What's New** section describes enhancements to the SAS Open Metadata Interface. For information about enhancements to the SAS 9.2 Java Metadata Interface, see [What's New in the SAS 9.2 Java Metadata Interface](#). For information about enhancements to the SAS 9.2 Metadata Model and SAS language interfaces to metadata, see their documentation.

Metadata Access Enhancements

The SAS Open Metadata Interface provides the IOMI server interface for creating and accessing metadata in a SAS Metadata Repository. The IOMI server interface has been enhanced to improve functionality in several areas. The areas and specific enhancements are as follows:

- Simplify creating and querying cross-repository references between objects in the foundation and custom repositories.
 - Dependency associations are no longer required to be defined between the foundation and custom repositories before cross-repository references can be created between objects in the repositories. Cross-repository references can now be created between objects in the foundation repository and custom repositories without preparation or restriction.
 - The foundation repository and custom repositories, which contain metadata for general use, are now referred to as public repositories. Project repositories, which serve as development playpens, are now referred to as private repositories.
 - Clients no longer need to set directionality flags in a GetMetadata request that is issued in a public repository to get information about cross-repository references in other public repositories. A GetMetadata request returns cross-repository references from all public repositories by default.
- Better separate metadata in public and private repositories.
 - Because dependencies are no longer required, a project repository can serve as a development playpen for any public repository. However, a user needs CheckinMetadata permission in the public repository's default ACT to update the repository with information from a project repository.
 - The OMI_DEPENDENCY_USED_BY (16384) flag, which used to specify directionality for queries in SAS 9.1, has been repurposed. In SAS 9.2, specify OMI_DEPENDENCY_USED_BY in the GetMetadata method only if you want to include associated objects from private repositories in a request that is issued in a public repository.

Specify OMI_DEPENDENCY_USED_BY in the GetMetadataObjects method to include objects of the specified metadata type from all private repositories in the method results.

- The OMI_DEPENDENCY_USES (8192) flag has been repurposed. In SAS 9.2, set OMI_DEPENDENCY_USES in the GetMetadataObjects method to include objects of the specified metadata type from all public repositories in the method results.
- Improve repository management and reporting.
 - A repository's persisted availability is now controlled by using the value in its Access= attribute. The Access= attribute accepts new values to support online, read-only, administrative, and offline states for a repository. The Access= attribute is set with the AddMetadata method and modified with the UpdateMetadata method.
 - The AddMetadata method creates the file system directory for a new repository when the <CREATEREPOSCONTAINER/> option is used. For more information, see AddMetadata.
 - The GetRepositories method now returns repository format, current access, name, path, type, and pause state values when the OMI_ALL (1) flag is set.
- Improve metadata searching capabilities and selection criteria. The GetMetadataObjects XMLSELECT search syntax has been enhanced by the following features:
 - GE (greater than or equal to), NE (not equal to), and LE (less than or equal to) operators have been added for specifying selection criteria.
 - GT (greater than) and LT (less than) operators have been extended to operate on character string values and numeric values.
 - Concatenated association paths are supported as selection criteria.
 - An object qualifier is supported on search strings that are specified on association names to filter the associated objects that are selected.
- Support a consistent user interface to metadata in client user interfaces through the following new

methods:

AddUserFolders

Creates a home folder and subfolders for a Person. For more information, see AddUserFolders.

GetUserFolders

Gets the home folder or specified subfolder for a Person.

- Support metadata ownership through the following new methods:

AddResponsibleParty

Creates a ResponsibleParty object for a Person or IdentityGroup in the repository that contains the Person or IdentityGroup object, even if the caller does not have WriteMetadata permission to the repository. For more information, see AddResponsibleParty.

GetResponsibleParty

Gets the ResponsibleParty object associated with a Person or IdentityGroup and responsibility, even if the caller does not have ReadMetadata permission to the repository.

- Improve metadata delete functionality. The DeleteMetadata method has been enhanced to delete the specified object and associated objects that are defined in a user-defined template.
- Return information about supported values for metadata type properties from the SAS Metadata Model.

Other changes in the IOMI server interface include:

- The CopyMetadata method is deprecated.
- The CheckinMetadata, CheckoutMetadata, FetchMetadata, and UndoCheckoutMetadata methods are retired.
- SAS Metadata Repository auditing is no longer supported. Client requests to store values for AuditPath=, AuditType=, AuditEngine=, and AuditOptions= attributes while adding a repository with the AddMetadata method or updating a repository definition with the UpdateMetadata method are ignored.
- The SAS Metadata Server class factory number has been changed to prevent SAS 9.1.3 clients from accessing a SAS 9.2 Metadata Server without first being updated to SAS 9.2.

Authorization Enhancements

The SAS Open Metadata Interface provides the ISecurity server interface for requesting authorizations on metadata. The ISecurity server interface has been enhanced as follows:

- The IsAuthorized method now supports a Uniform Resource Name (URN) in the form REPOSID: *_reposID* in the RESOURCE parameter.
- Several new methods have been added that support authorization based on roles, multiple authorizations, and internal user authentication.
 - The GetApplicationActionsAuthorizations method returns authorizations for the ApplicationActions in a SoftwareComponent object.
 - The IsInRole method returns the TRUE value when the user indicated in the CREDHANDLE

parameter is in a role.

- The GetAuthorizationsOnObject method returns the permissions that apply to a resource for all identities or specified identities.
- The GetInfo method gets information, depending on the value in the INFOTYPE parameter, including the origin of a specified identity's privileges, the value of active enterprise policies, and so on.
- The GetLoginsforAuthDomain method gets the logins for the connected user for the specified authentication domain in order of identity precedence.
- New internal user authentication methods include:

GetInternalLoginSitePolicies

Returns the active server-level internal authentication policies.

SetInternalPassword

Creates an InternalLogin object for the specified user.

SetInternalLoginUserOptions

Customizes internal authentication policies for the specified user.

GetInternalLoginUserInfo

Gets availability information and internal authentication settings for the specified user.

DeleteInternalLogin

Deletes the InternalLogin object that is associated with the specified user.

- New functionality is available in the ISecurity 1.1 interface. Clients that do not want the new SAS 9.2 methods and functionality should call the ISecurity server interface as they did in SAS 9.1.3.

Server Control Enhancements

The SAS Open Metadata Interface provides the IServer server interface for controlling the SAS Metadata Server and getting server status information. The IServer server interface has been enhanced as follows:

- The Pause method can no longer be used to downgrade the availability of a specified SAS Metadata Repository.
- The Pause method operates exclusively on the SAS Metadata Server and can downgrade the SAS Metadata Server to an ADMIN state (only users who have administrative user status on the SAS Metadata Server can access repositories) or the OFFLINE state (the SAS Metadata Server is not available to any users).
- The Pause method now supports a <PAUSECOMMENT> element to enable callers to include a user-defined text message that specifies the reason for a server pause for clients. The element is passed to the SAS Metadata Server in the OPTIONS parameter.
- The Status method has been enhanced to poll the SAS Metadata Server for the content of the <PAUSECOMMENT> option.
- The Status method has been enhanced to poll the SAS Metadata Server for the SAS platform version, which includes the repository level, and the server locale.
- The Status method has been enhanced to optionally poll the SAS Metadata Server for the values of

omaconfig.xml options and to provide journaling statistics.

- The Refresh method has been enhanced to support an `<OMA JOURNALPATH="file-name"/>` option. This option can change the location of the journal file on a running SAS Metadata Server.
-

New Security Administration Server Interface

A new server interface, ISecurityAdmin, provides three categories of methods:

- Transaction context methods enable programmers of interactive clients to record user interactions and return correct effective permissions for authorization changes, factoring in group memberships, before applying the changes to authorization metadata on the SAS Metadata Server. The `BeginTransactionContext` method creates a transaction context by returning a handle for a specified object. General authorization administration methods reference this handle in their requests. The transaction context is closed by using the `EndTransactionContext` method, which can commit or discard the changes.
- General authorization administration methods provide a programmatic way to assign and get permissions for identities on resources, to list authorized identities, and to apply and remove access control templates (ACTs) from resources.
- ACT administration methods create ACTs, modify the attributes of ACTs, list ACTs, and destroy ACTs.

What's New in the SAS 9.2 Java Metadata Interface

Overview

The SAS 9.2 Java Metadata Interface was enhanced to be more efficient in a multi-user environment. In addition, it surfaces new metadata access functionality that was added to the SAS Open Metadata Interface in a Java environment.

General Enhancements

Specific changes and enhancements are as follows:

- The static and remote versions of the SAS Java Metadata Interface have been reconciled to use the same methods to perform the same actions. Use of the remote version is recommended over the use of the static version. This document addresses the use of the remote version. For more information about the remote and static versions, see [SAS Java Metadata Interface Overview](#).
- The `MdServerStore` class is deprecated. Clients should no longer interact directly with the `ServerStore`.
- Two new utility classes are available in the `MdFactory` interface. The `MdSecurityUtil` class contains methods that return quick authorizations on the caller's ability to read a metadata object, write a metadata object, and add a metadata object to a folder. The `MdRepositoryUtil` class contains methods for getting the repository type, name, and metadata object identifier using the inverse information.
- The `MdObjectFactoryListener` is deprecated and replaced by `MdFactoryListener`. `MdFactoryListener` can be used to notify all users of a factory when objects are added, updated, or deleted on the SAS Metadata Server.
- A new `getServerModelVersion()` method replaces the `getServerVersion()` method, which was used to return the SAS Metadata Model version number in use by the SAS session.
- A new `getPlatformVersion()` method returns the version number of the active SAS Metadata Server.
- Several new methods were added to the `MdOMIUtil` interface:
 - The `getFoundationRepository()` and `getFoundationReposID()` methods get the foundation repository.
 - The `getMetadataNoCache()` and `getMetadataObjectsNoCache()` methods provide quick retrieval of metadata object attributes and associations in a map. These two methods do not cache any data within an object store.
 - The `getObjectPath()` method returns the path of an object that resides in the SAS folder tree.
 - The `getResponsibleParty()` method gets the `ResponsibleParty` object associated with the specified Identity and Responsibility.
 - The `getUserHomeFolders()` method retrieves the home folder or specific subfolder for the specified user, or creates the folder if it cannot be found.
- The `MdOMRConnection` interface supports a new method, `makeISecurityAdminConnection`, to connect to the SAS Metadata Server with the new SAS 9.2 Open Metadata Interface `ISecurityAdmin` interface. The `MdOMRConnection` interface has methods to connect with the `ISecurity` and `IServer` server interfaces. For information about the `makeISecurityAdminConnection` method, see [Security Administration \(ISecurityAdmin Interface\)](#).

To use the SAS 9.2 Java Metadata Interface effectively, you should be familiar with enhancements to the

SAS Open Metadata Interface and SAS 9.2 Metadata Model. See [What's New in the SAS 9.2 Open Metadata Interface: Reference and Usage](#) and [What's New in the SAS 9.2 Metadata Model](#) for this information.

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What's New in the SAS 9.2 Language Interfaces to Metadata

Overview

Changes and enhancements in the SAS language interfaces to metadata include the following:

- a new system option METASPN= and defaults for METAREPOSITORY=, METAENCRYPTALG, and METAENCRYPTLEVEL system options
- read-only access to metadata with the metadata LIBNAME engine, and enhancements for data processing
- several new arguments in the METALIB procedure
- changes to what the METAOPERATE procedure can control, including the SAS Metadata Server's pause state and the metadata server journal file
- new arguments and values for some DATA step functions
- a new set of DATA step functions for security administration and reporting
- new syntax in the metadata LIBNAME engine, PROC METALIB, and the new METADATA_PATHOBJ function for the pathname where metadata is stored in SAS folders
- documentation enhancements

System Options

- The system option METASPN= is new. This option specifies the service principal name (SPN) for the metadata server. The SPN is a feature of Integrated Windows authentication (IWA).
- The default for the METAREPOSITORY= system option is Foundation.
- The default for the METAENCRYPTALG is SASPROPRIETARY.
- The default for the METAENCRYPTLEVEL system option is CREDENTIALS.

Metadata LIBNAME Engine

The metadata LIBNAME engine has the following changes and enhancements:

- Metadata is read-only. If you want to update metadata, use PROC METALIB.
- The argument METAOUT=DATAREG is new. This argument specifies that you can read, update, and delete only the tables and columns that are defined in the metadata. The other values of METAOUT= have been changed to reflect the fact that metadata is read-only.
- The LIBRARY= value can specify a pathname where metadata is stored in SAS folders.
- The metadata LIBNAME engine supports SAS views.
- SAS file passwords can be passed to the underlying engine.

Procedures

The METALIB procedure has the following changes and enhancements:

- In the third maintenance release for SAS 9.2, column names in metadata are updated to match the case of the column names in the data source.
- The LIBRARY=, FOLDER=, or FOLDERID= value can specify a pathname where metadata is stored in SAS folders. In the third maintenance release for SAS 9.2, a table can be defined in more than one folder.
- The IMPACT_LIMIT statement limits the number of Job or Transformation objects that can be changed.
- The PREFIX= statement adds a text string to the beginning of all new metadata object names.
- Arguments in the REPORT statement determine the level of detail in the output report.
- The READ= argument in the SELECT statement enables PROC METALIB to read password-protected data sets.
- PROC METALIB updates WorkTable objects.

The METAOPERATE procedure has the following changes and enhancements:

- The PAUSE and RESUME actions affect the metadata server, not an individual SAS Metadata Repository or the repository manager. The pause state is still a property of each repository. However, a repository's pause state is not set directly; it is computed from both the metadata server state and the repository's registered access mode.
- The PURGE action is no longer supported.
- XML strings in the OPTIONS statement can specify a pathname for the metadata server journal file and provide a comment to users about the metadata server's pause state.

The METADATA procedure has the following changes and enhancements:

- The input and output XML strings might differ from previous releases. This change is a result of enhancements to the SAS 9.2 Metadata Model, with new metadata types, modifications to existing metadata types, and modifications to the object hierarchy. See **SAS Metadata Model: Reference**.

DATA Step Functions

- An argument in the DATA step functions METADATA_GETPROP and METADATA_SETPROP provides the Uniform Resource Identifier (URI) of the Property object.
- The METADATA_SETASSN function can perform replace, modify, and merge.
- The METADATA_PATHOBJ function is new. This function returns the attributes of an object that you specify by its pathname in SAS folders.
- A new set of DATA step functions can define and query the authorization settings for the metadata server. You can use macros with the functions to create reports.
- The DATA step functions' input and output parameters might differ from previous releases. This change is a result of enhancements to the SAS 9.2 Metadata Model, with new metadata types, modifications to existing metadata types, and modifications to the object hierarchy. See **SAS Metadata Model: Reference**.

Documentation Enhancements

This book is new. **SAS Language Interfaces to Metadata** is a reference to the language elements that you can submit in a SAS session (in batch or from the SAS windowing environment) to use, query, and maintain

the metadata server. Most of these language elements were previously documented in several other books. This book brings the documentation together, adds new language elements and new features, and expands the conceptual information.

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What's New in SAS 9.2 Metadata Model: Reference

Overview

The SAS 9.2 Metadata Model has been enhanced to make it easier to create and manage metadata definitions, to support new SAS Metadata Server functionality described in [What's New in the SAS 9.2 Open Metadata Interface](#), and to improve the modeling of properties, cubes, transformations, prompts, and other application resources. Several metadata types were also deprecated.

General Enhancements

Specific changes and enhancements are as follows:

- The Root metadata type has a new attribute named UsageVersion=.
- The SAS Metadata Model has two new abstract metadata types, PrimaryType and SecondaryType, which categorize the 9.2 SAS namespace metadata types.
- A new metadata type, TypeDefinition, describes members of a SAS type dictionary. TypeDefinition and the SAS type dictionary are reserved for internal use in SAS 9.2.
- Several enhancements were made for modeling identities:
 - The ResponsibleParty association, Responsibilities, has moved from the Person metadata type to its supertype, Identity, to support defining responsibilities for a Person or IdentityGroup. The Role= attribute, which supports a string up to 100 characters, specifies what the responsibility is.
 - The Identity metadata type has a new AssociatedHomeFolder association to the Tree metadata type to support user home folders. Conversely, the Tree metadata type has a new AssociatedIdentity association to the Identity metadata type to support user home folders.
 - A DisplayName= attribute was added to the Person and IdentityGroup metadata types. DisplayName= specifies the name of the person or group as it should be displayed in client graphical user interfaces.
 - A new metadata type, InternalLogin, enables support for internal user authentication. InternalLogin has a ForIdentity association to a Person or IdentityGroup. Conversely, Person and IdentityGroup have an InternalLoginInfo association to InternalLogin.
- The RepositoryBase metadata type was modified:
 - It has a new attribute named RepositoryFormat=.
 - The Access= attribute supports the new values OMS_ADMIN (2) and OMS_OFFLINE (4).
 - The AuditPath=, AuditType=, AuditEngine=, and AuditOptions= attributes are no longer supported. Client requests to store values for these attributes with the AddMetadata or UpdateMetadata method are ignored.
 - The Engine= attribute no longer supports the values ORACLE and DB2.
 - The DependencyUses and DependencyUsedBy associations are no longer supported. It is no longer necessary to create an association between two repositories to create cross-repository references between the objects in the repositories.
- New attributes and associations in the Property metadata type affect how properties are modeled:
 - The OwingType association in Property is now optional. Instead of creating an OwingType

association to a PropertyType object, which contains information about a property's data type, application developers can store the SQL data type directly with the Property object in the SQLType= attribute. SQLType= has a default value of INT 12, which is the SQL integer value for VARCHAR.

- The PropertySet metadata type has a new attribute named PropertySetName=.
- Several enhancements were made for modeling cubes:
 - Four new metadata types are available for modeling the components of a cube, including CalculatedMeasure, GlobalFormula, HierarchyLevel, and SharedDimension.
 - NextGeneration and PreviousGeneration associations were added to the Cube metadata type to enable references to be created to more recent or previous versions of the cube.
- Several enhancements were made for modeling transformations:
 - Three new metadata types were added to the Transformation submodel: Action, Condition, and ConditionActionSet store information about conditions that must be met before a set of actions can be performed.
 - The cardinality of the TransformationActivity metadata type's Steps association has changed. The cardinality changed from 1..n to 0..n.
 - The cardinalities of the StepPrecedence metadata type's Predecessors and Successors associations have changed from 1..n to 0..n.
- New metadata types AbstractPrompt, Prompt, and PromptGroup support a new SAS Prompt Interface.
- The cardinality of the ITSubscriber metadata type's SubscriberEmail and ProfileOwner associations have changed. The SubscriberEmail association changed from 0..1 to 0..*, allowing an email to belong to more than one ITSubscriber. The ProfileOwner association changed from 1..1 to 0..1 to make the association to a Person optional.
- The ITFilter metadata type no longer requires a FilterSubscriber association to be defined to an ITSubscriber.
- The Directory metadata type has a new attribute and a new association. The new attribute, DirectoryRole=, specifies the context in which the directory is used. The new association, Dimensions, references SharedDimension objects that are defined in the directory.
- A new AnalyticContext metadata type references a location that has SAS analytic content. An associated server context should be a SAS server that can reference this location and interpret the content.
- The IsURL= and Value= attributes of the LocalizedResource metadata type were modified. IsURL= is a Boolean value instead of a string value. Value= can store either the localized value of the property or a URL that points to the localized value.
- The following modifications were made to the Change metadata type. The Change metadata type is updated by the change management subsystem:
 - The cardinality of the Objects association has changed from 0..n to 1..n to force deletion of the Change object if there are no more associated objects.
 - The cardinality of the Changeldentity association has changed from 1..1 to 0..1 to prevent the Change object from being deleted when the identity is deleted. Identity information is now stored in the Change object.
- The URI= attribute on the Document metadata type was modified to support more than 256 characters. The URI= attribute is no longer a required attribute for some usages. For example, a public note does not require a URI value.
- The Password= attribute on the Login and SASPassword metadata types has a maximum length of 128 characters.
- The MiningResult metadata type has two new attributes: ModelKey= and SourceCodeKey=. ModelKey= is the universal unique identifier (UUID) or name of the model that is used to score the table. SourceCodeKey= stores "DATA STEP" for DATA step fragment code, or "SAS PROGRAM" for SAS program code.

- The length of the TCPIPConnection metadata type's Service= attribute has changed from 32 to 128 characters.
- The cardinality of key associations has changed:
 - The Key metadata type's KeyColumn association changed from 1..n to 0..n.
 - The KeyAssociation metadata type's ForeignKeyColumn and UniqueColumn associations changed from 1..n to 0..n.
 - The ForeignKey metadata type's PartnerUniqueKey association changed from 1..n to 0..n.
- The default value of the Column metadata type's IsNullable= attribute has been changed from "0" (do not allow missing values) to "1" (support missing values).
- The SoftwareComponent metadata type has new DependentComponents and DependsOnComponents associations for storing information about product dependencies.
- The AggregateAssociation, EMModel, EMRules, ITMap, ITModel, ITmsmqModel, ITQueueAlias, ITRendModel, ITTransportAlias, PSGridLayoutComponent and SummaryStats metadata types were removed from the SAS 9.2 Metadata Model.

What's New in SAS/OR 9.22

Overview

SAS/OR 9.22 continues the improvements that were delivered starting with SAS/OR 9.2. Several new and enhanced features expand the scale and scope of problems that SAS/OR software can address. These enhancements also make it easier for you to use the SAS/OR capabilities. Brief descriptions of these new features are presented in the following sections.

Highlights of Enhancements in SAS/OR 9.22

Highlights of the changes include the following:

- You can customize the format of the time axis on the Gantt chart.
- You can import and convert Microsoft Project data that has been saved in XML format.
- The CLP procedure is now production and has enhanced scheduling capabilities.
- The OPTMODEL procedure supports named problems to enable easy manipulation of multiple subproblems.
- The IPNLP and NLP solvers support new techniques for large-scale optimization.

More information about the changes and enhancements is provided in this chapter. Details can be found in the documentation for the individual procedures in the relevant volumes of the *SAS/OR 9.22 User's Guide*.

Highlights of Enhancements in SAS/OR 9.2

Some users are moving directly from SAS/OR 9.1.3 to SAS/OR 9.22. The following are some of the major enhancements that were introduced in SAS/OR 9.2:

- The MPSOUT= option directs procedures to save input problem data in an MPS-format SAS data set. The MPSOUT= option is available in the LP, NETFLOW, and OPTLP procedures.
- The IIS= option for the LP solver enables you to identify, for an infeasible linear program, constraints and variable bounds that form an irreducible infeasible set (IIS). The IIS= option is available in the OPTLP and OPTMODEL procedures.
- The value "2" for the PRINTLEVEL= option directs procedures to produce an ODS table called "ProblemStatistics" in addition to the "ProblemSummary" and "SolutionSummary" ODS tables that are produced for PRINTLEVEL=1. The PRINTLEVEL=2 option is available in the INTPOINT, OPTLP, and OPTMILP procedures.
- The %SASTOMSP macro converts data sets that are used by the CPM and PM procedures into an MDB file that is readable by Microsoft Project.
- Several call routines in the GA procedure were replaced by new call routines.
- The CLP procedure features improved algorithms for the "all-different" constraint in addition to several extensions to the edge-finder algorithm for resource-constrained scheduling.

For more information, see [What's New in SAS/OR 9.2](#).

SAS/OR Documentation

SAS/OR software is documented in the following volumes:

- ***SAS/OR User's Guide: Bills of Material Processing***
- ***SAS/OR User's Guide: Constraint Programming***
- ***SAS/OR User's Guide: Local Search Optimization***
- ***SAS/OR User's Guide: Mathematical Programming***
- ***SAS/OR User's Guide: Project Management***
- ***SAS/OR User's Guide: QSIM Application***
- ***SAS Simulation Studio 1.5: User's Guide***

Online help can also be found under the corresponding classification.

The GANTT Procedure

The GANTT procedure produces a Gantt chart, which is a graphical tool for representing schedule-related information. PROC GANTT provides support for displaying multiple schedules, precedence relationships, calendar information, milestones, reference lines, labeling, and so on. New in SAS/OR 9.22 is the TIMEAXISFORMAT= option in the CHART statement which provides the capability to customize the format of the time axis on the Gantt chart for up to three rows. Each row can be formulated using a predefined SAS format or a user-defined format.

Microsoft Project Conversion Macros

The SAS macro %MSPTOSAS converts Microsoft Project 98 (and later) data into SAS data sets that can be used as input for project scheduling with SAS/OR software. This macro generates the necessary SAS data sets, determines the values of the relevant options, and invokes the SAS/OR PM procedure with the converted project data. The %MSPTOSAS macro enables you to use Microsoft Project for the input of project data and still take advantage of the excellent SAS/OR project and resource scheduling capabilities. New in SAS/OR 9.22 is the capability to import and convert Microsoft Project data that has been saved in XML format. This feature is experimental.

The experimental %SASTOMSP macro converts data sets that are used by the CPM and PM procedures into a Microsoft Access Database (MDB) file that is readable by Microsoft Project. The macro converts information that is common to PROC CPM, PROC PM, and Microsoft Project; this information includes hierarchical relationships, precedence relationships, time constraints, resource availabilities, resource requirements, project calendars, resource calendars, task calendars, holiday information, and work-shift information. In addition, the early and late schedules, the actual start and finish times, the resource-constrained schedule, and the baseline schedule are also extracted and stored as start-finish variables.

Execution of the %MSPTOSAS and %SASTOMSP macros requires SAS/ACCESS® software.

The CLP Procedure

The CLP procedure is a finite-domain constraint programming solver for solving constraint satisfaction problems (CSPs) with linear, logical, global, and scheduling constraints. The CLP procedure is production in SAS/OR 9.22 with the exception of the scheduling-related constraints.

New in SAS/OR 9.22 are the GCC and ELEMENT statements for defining global cardinality constraints (GCC) and element constraints, respectively. The GCC statement enables you to bound the number of times that a specific value gets assigned to a set of variables. The ELEMENT statement enables you to define dependencies, not necessarily functional, between variables and to define noncontiguous domains.

The USECONDATAVARS= option enables you to implicitly define numeric variables in the CONDATA= data set. The TIMETYPE= option enables you to set the units (real time or CPU time) of the MAXTIME= parameter. The _ORCLP_ macro variable has been enhanced to provide more information about procedure status and solution status.

There are also several changes and enhancements to the scheduling capabilities in SAS/OR 9.22. Support for multiple-capacity resources has been added in the RESOURCE statement and the Activity data set. The REQUIRES statement syntax for specifying multiple resource requirements has changed. The format of the Activity data set has changed to a more compact form with a fixed number of variables. A new Resource data set, specified with the RESDATA= option, enables you to define resources, resource pools, and resource attributes in compact form. The format of the Schedule data set has been enhanced to separate time and schedule related observations. Two new schedule-related output data sets, SCHEDTIME= and SCHEDRES=, have been added; they contain time assignment and resource assignment information, respectively.

The OPTMODEL Procedure

The OPTMODEL procedure provides a modeling environment that is tailored to building, solving, and maintaining optimization models. This makes the process of translating the symbolic formulation of an optimization model into PROC OPTMODEL virtually transparent, because the modeling language mimics the symbolic algebra of the formulation as closely as possible. PROC OPTMODEL also streamlines and simplifies the critical process of populating optimization models with data from SAS data sets. All of this transparency produces models that are more easily inspected for completeness and correctness, more easily corrected, and more easily modified, whether through structural changes or through the substitution of new data for old data.

The OPTMODEL procedure consists of the powerful OPTMODEL modeling language and access to state-of-the-art solvers for several classes of mathematical programming problems.

Seven solvers are available to OPTMODEL, as listed in [Table 1.1](#).

Table 1.1 List of OPTMODEL Solvers

| Problem | Solver |
|--------------------------------------|---------------|
| Linear programming | LP |
| Mixed integer programming | MILP |
| Quadratic programming (Experimental) | QP |
| Nonlinear programming, unconstrained | NLPU |
| General nonlinear programming | NLPC |
| General nonlinear programming | SQP |
| General nonlinear programming | IPNLP |

In SAS/OR 9.22, the OPTMODEL procedure adds several new features. First, PROC OPTMODEL supports named problems to enable easy manipulation of multiple subproblems. The PROBLEM declaration declares a named problem and the USE PROBLEM statement makes it active. Objectives can now be declared as arrays, so they can provide separate objectives for arrays of named problems.

Implicit variables, created via the IMPVAR declaration, allow optimization expressions to be referred to by name in a model. Implicit variables can be evaluated more efficiently than by repeating the same complex expression in multiple places.

Problem components can be accessed with aliases such as `_VAR_` and `_CON_`, which respectively aggregate all of the variables and constraints in a problem. This allows convenient processing of all of the problem components of a given kind for printing, model expansion, and other purposes. The new suffixes `.NAME` and `.LABEL` can be used to track the identity of problem components.

Function and subroutine calls can use the "OF array-name[*]" syntax to pass an OPTMODEL array to a called routine for uses such as sorting.

The NUMBER, STRING, and SET declarations allow initial values for arrays to be supplied using an INIT clause with a list of initialization values.

The SOLVE statement supports the RELAXINT keyword to solve a problem while temporarily relaxing the integrality restriction on variables.

Analytic derivatives are now generated for most SAS library functions. The OPTMODEL procedure can use threading on systems with multiple processors to speed up evaluation of nonlinear Hessian models.

Starting with SAS/OR 9.22, the IPNLP and NLPU solvers support new techniques for large-scale optimization. The nonlinear solver IPNLP has been equipped with two new techniques. The first technique, `TECH=IPKRYLOV`, is appropriate for large-scale nonlinear optimization problems that can contain many thousands of variables or constraints or both. It uses exact second derivatives to calculate the search directions. Its convergence is achieved by using a trust-region framework that guides the algorithm towards the solution of the optimization problem. The second technique, `TECH=IPQN`, uses a quasi-Newton method and line-search framework to solve the optimization problem. As such it needs to calculate only the first derivatives of the objective and constraints. This method is more appropriate for problems where the second derivatives of the objective and constraints either are not available or are expensive to compute.

The unconstrained solver NLPU has been equipped with a new technique called TECH=CGTR. This technique uses the conjugate gradient method to solve large-scale unconstrained and bound constrained optimization problems.

The OPTMILP Procedure

The OPTMILP procedure solves mixed-integer linear programming problems with a linear-programming-based branch-and-bound algorithm that has been improved for SAS/OR 9.22. The algorithmic improvements result from incorporating new techniques in the presolver and cutting planes, better application of primal heuristics, an improved branch-and-bound strategy, and an improved strategy for handling feasibility problems. Improvements to the presolver include variable and constraint reductions based on logical implications among binary variables and generalized variable substitutions. Two new cutting plane routines (mixed 0-1 lifted inequalities and zero-half cuts) have been added, and improvements have been made to clique, Gomory mixed integer, and mixed integer rounding (MIR) cutting plane routines.

The resulting improvements in efficiency enable you to use PROC OPTMILP to solve larger and more complex optimization problems in a shorter time than with previous SAS/OR releases.

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What's New in SAS/OR 9.2

Overview

SAS/OR 9.2 continues the improvements delivered starting with SAS/OR 9.1.3 release 3.1 and release 3.2. Several new and enhanced features expand the scale and scope of problems that SAS/OR can address. These enhancements also make it easier for you to use the capabilities of SAS/OR. Brief descriptions of these new features are presented in the following sections. For more information, see the SAS/OR documentation, available in the following volumes:

- ***SAS/OR User's Guide: Bills of Material Processing***
- ***SAS/OR User's Guide: Constraint Programming***
- ***SAS/OR User's Guide: Local Search Optimization***
- ***SAS/OR User's Guide: Mathematical Programming***
- ***SAS/OR User's Guide: Project Management***
- ***SAS/OR User's Guide: The QSIM Application***

Online help can also be found under the corresponding classification.

The NETFLOW Procedure

The NETFLOW procedure for network flow optimization contains a new feature that enables you to specify and solve generalized network problems. In generalized networks, the amount of flow that enters an arc might not equal the amount of flow that leaves the arc, signifying a loss or a gain as flow traverses the arc. A new PROC NETFLOW option, GENNET, indicates that the network is generalized. Generalized networks have a broad range of practical applications, including the following:

- transportation of perishable goods (weight loss due to drying)
- financial investment account balances (interest rates)
- manufacturing (yield ratios)
- electrical power generation (loss during transmission along lines)

Another new option, EXCESS=, enables you to use PROC NETFLOW to solve an even wider variety of network flow optimization problems for both standard and generalized networks. As a result, PROC NETFLOW is equipped to deal with many frequently encountered challenges to successful network flow optimization, such as the following:

- networks with excess supply or demand
- networks that contain nodes with unknown supply and demand values
- networks with nodes that have range constraints on supply and demand

In SAS/OR 9.2, the MPSOUT= option directs the NETFLOW procedure to save input problem data in an MPS-format SAS data set. Invoking the MPSOUT= option causes the NETFLOW procedure to output the data and halt without attempting optimization. The MPS-format SAS data set corresponds closely to the MPS-format text file (commonly used in the optimization community). Problems that are specified in this format can be solved by using the OPTLP procedure.

The INTPOINT Procedure

In SAS/OR 9.2, the MPSOUT= option directs the INTPOINT procedure to save input problem data in an MPS-format SAS data set. Invoking the MPSOUT= option causes the INTPOINT procedure to output the data and halt without attempting optimization. The MPS-format SAS data set corresponds closely to the MPS-format text file (commonly used in the optimization community). Problems that are specified in this format can be solved by using the OPTLP procedure.

The LP Procedure

In SAS/OR 9.2, the MPSOUT= option directs the LP procedure to save input problem data in an MPS-format SAS data set. Invoking the MPSOUT= option causes the LP procedure to output the data and halt without attempting optimization. The MPS-format SAS data set corresponds closely to the MPS-format text file (commonly used in the optimization community). Problems that are specified in this format can be solved by using the OPTLP or OPTMILP procedure.

The OPTLP Procedure

The OPTLP procedure enables you to choose from three linear programming solvers: primal simplex, dual simplex, and interior point (experimental). The simplex solvers implement a two-phase simplex method, and the interior point solver implements a primal-dual predictor-corrector algorithm.

The TIMETYPE= option enables you to specify the type of time (real time or CPU time) that can be limited via the MAXTIME= option and reported via the `_OROPTLP_` macro variable.

PROC OPTLP accepts linear programming problems that are submitted in an MPS-format SAS data set. The MPS-format SAS data set corresponds closely to the MPS-format text file (commonly used in the optimization community). Problem data in formats that are used by the LP, INTPOINT, and NETFLOW procedures can be converted into MPS-format SAS data sets by using the new MPSOUT= option in each of these procedures.

New in SAS/OR 9.2, the experimental IIS= option enables you to identify, for an infeasible problem, constraints and variable bounds that form an irreducible infeasible set (IIS). Identifying an IIS can be very helpful in diagnosing and remedying infeasibility in a linear program. Information about the IIS is contained in the PRIMALOUT= and DUALOUT= data sets.

Also new in SAS/OR 9.2, the value "2" for the PRINTLEVEL= option directs the OPTLP procedure to produce an ODS table called "ProblemStatistics" in addition to the "ProblemSummary" and "SolutionSummary" ODS tables that are produced for PRINTLEVEL=1.

The OPTMILP Procedure

The OPTMILP procedure solves mixed-integer linear programming problems with an LP-based branch-and-bound algorithm that has been completely rewritten for this release. The algorithm also implements advanced techniques including presolvers, cutting planes, and primal heuristics. The resulting improvements in efficiency enable you to use PROC OPTMILP to solve larger and more complex optimization problems than you could solve with previous releases of SAS/OR.

PROC OPTMILP accepts mixed-integer linear programming problems that are submitted in an MPS-format SAS data set.

New in SAS/OR 9.2, the value "2" for the PRINTLEVEL= option directs the OPTMILP procedure to produce an ODS table called "ProblemStatistics" in addition to the "ProblemSummary" and "SolutionSummary" ODS tables that are produced for PRINTLEVEL=1.

The OPTMODEL Procedure

The OPTMODEL procedure provides a modeling environment that is tailored to building, solving, and maintaining optimization models. This makes the process of translating the symbolic formulation of an optimization model into PROC OPTMODEL virtually transparent, since the modeling language mimics the symbolic algebra of the formulation as closely as possible. PROC OPTMODEL also streamlines and simplifies the critical process of populating optimization models with data from SAS data sets. All of this transparency produces models that are more easily inspected for completeness and correctness, more easily corrected, and more easily modified, whether through structural changes or through the substitution of new data for old.

The OPTMODEL procedure comprises the powerful OPTMODEL modeling language and state-of-the-art solvers for several classes of mathematical programming problems.

Seven solvers are available to OPTMODEL as listed in Table 1:

Table 1.1: List of OPTMODEL Solvers

| Problem | Solver |
|--------------------------------------|---------------|
| linear programming | LP |
| mixed integer programming | MILP |
| quadratic programming (experimental) | QP |
| nonlinear programming, unconstrained | NLPU |
| general nonlinear programming | NLPC |
| general nonlinear programming | SQP |

New in SAS/OR 9.2, the experimental IIS= option for the LP solver enables you to identify, for an infeasible linear program, constraints and variable bounds that form an irreducible infeasible set (IIS). Identifying an IIS can be very helpful in diagnosing and remedying infeasibility in a linear program.

The OPTQP Procedure

The OPTQP procedure solves quadratic programming problems with a new infeasible primal-dual predictor-corrector interior point algorithm. Performance is excellent for both sparse and dense quadratic programming problems, and PROC OPTQP excels at solving large problems efficiently.

PROC OPTQP accepts quadratic programming problems that are submitted in a QPS-format SAS data set. The QPS-format SAS data set corresponds closely to the format of the QPS text file (a widely accepted extension of the MPS format).

Earned Value Management Macros

The set of earned value management macros complements the current SAS/OR procedures for project and resource scheduling (PROC CPM and PROC PM) by providing diagnostic information about the execution of scheduled projects. Earned value management (EVM) is growing in prominence and acceptance in the project management community due to its ability to turn information about partially completed projects into valid, early projections of overall project performance. EVM measures current project execution against the project execution plan on a cost and schedule basis.

SAS/OR provides two sets of EVM macros: a set of four analytical macros to compute EVM metrics, and a set of six macros to create graphical reports based on these metrics. A wide variety of EVM metrics and performance projections, for both task-by-task and project-wide evaluations, are supported.

Microsoft Project Conversion Macros

The SAS macros %MDBTOPM and %MP2KTOPM have been used in previous releases of SAS/OR to convert files saved by Microsoft Project 98 and Microsoft Project 2000 (and later), respectively, into SAS data sets that can be used as input for project scheduling with SAS/OR. Now these two macros are combined in the SAS macro %MSPTOSAS, which converts Microsoft Project 98 (and later) data. This macro generates the necessary SAS data sets, determines the values of the relevant options, and invokes PROC PM in SAS/OR with the converted project data. The %MSPTOSAS macro enables you to use Microsoft Project for the input of project data and still take advantage of the excellent project and resource scheduling capabilities of SAS/OR.

In SAS/OR 9.2, the experimental %SASTOMSP macro converts data sets used by the CPM and PM procedures into an MDB file that is readable by Microsoft Project. The macro converts information that is common to both PROC CPM / PROC PM and Microsoft Project, including hierarchical relationships, precedence relationships, time constraints, resource availabilities, resource requirements, project calendars,

resource calendars, task calendars, holiday information, and work-shift information. In addition, the early and late schedules, the actual start and finish times, the resource-constrained schedule, and the baseline schedule are also extracted and stored as start-finish variables.

Execution of the %MSPTOSAS and %SASTOMSP macros requires SAS/ACCESS software.

The GA Procedure

The GA procedure solves optimization problems through the use of genetic algorithms. The procedure uses functions and call routines to set parameters such as crossover operators and mutation probabilities for genetic algorithm optimization. In SAS/OR 9.2, the routines that are used to specify procedure-supplied mutation and crossover operators (SetMut and SetCross), objective functions (SetObj), and selection options (SetSel) have been revised to a more flexible and readable form. The operator type is now specified as a parameter in these routines instead of being incorporated into the name of a separate call routine. Parameters for each operator type are now specified as property name-value pairs.

Note: Several call routines that were available in SAS/OR 9.1.3 have been replaced by new call routines and are not available in SAS/OR 9.2. Table 2 lists the routines and their replacements.

Table 1.2: PROC GA Routines Replaced in SAS/OR 9.2

| New Routine | Routines Replaced |
|---------------|---|
| Cross call | CrossSimple call, Cross2Point call, CrossUniform call, |
| | CrossArithmetic call, CrossHeuristic call, CrossOrder call, |
| | CrossPMatch call, CrossCycle call |
| Mutate call | MutDelta call, MutUniform call, MutSwap call, MutInvert call |
| SetCross call | SetCrossSimple call, SetCross2Point call, SetCrossUniform call, |
| | SetCrossArithmetic call, SetCrossHeuristic call, |
| | SetCrossOrder call, SetCrossPMatch call, SetCrossCycle call |
| SetMut call | SetMutRoutine call, SetMutDelta call, SetMutUniform call, |
| | SetMutSwap call, SetMutInvert call |
| SetObj call | SetObjTSP call |
| SetSel call | SetSelTournament call, SetSelDuel call |

In addition, the following new routines are provided:

- Objective function
- ReadCompare call

- SetCompareRoutine call
- SetObjFunc call
- SetProperty call
- ShellSort call
- Shuffle call

The Boolean encoding has been modified so that 0/1 values can be read from and written to solution segments directly, instead of requiring the PackBits and UnpackBits routines. In addition, each Boolean value is represented by one variable in a LASTGEN= or FIRSTGEN= data set, similar to the other encodings.

If the FIRSTGEN= data set has a field named "OBJECTIVE," then in the Initialize call, the value of that field (if nonmissing) is used as the initial objective value for the solution represented by that observation.

The default crossover and mutation probabilities have been changed to 0.

New options have been implemented for the Initialize call and the ReEvaluate call.

New in SAS/OR 9.2, the option LIBRARY= specifies an external library of routines. The NOVALIDATE= and NOVALIDATEWARNING= options control the level of feasibility checks performed by the GA procedure.

The CLP Procedure (Experimental)

The CLP procedure features improved algorithms for the "alldifferent" constraint as well as several extensions to the edgfinder algorithm for resource-constrained scheduling. The EDGEFINDER option can now determine whether an activity must be the first (last) to be scheduled from among a set of activities, while the NF= and NL= options specify the level of propagation for the "not first" and "not last" extensions. A new activity selection strategy RJRAND and a corresponding activity assignment strategy MAXTW have been added; these strategies tend to favor right-justified schedules. The MAXTIME= option enables you to specify a time limit on the CPU time for controlling execution times.

What's New in the SAS 9.2 Providers for OLE DB

Overview

The SAS Providers for OLE DB have the following changes and enhancements:

- a new data provider provides access to a local installation of Base SAS
 - an enhanced Data Link Properties dialog box
 - three new properties for managing SAS code before a data source is initialized
 - support for reading multilingual data from a data set with UTF-8 encoding
 - 64-bit versions of providers
 - references to 64-bit programming tips
 - a new property for the IOM provider
 - new properties for the local provider
-

A New Data Provider Provides Access to a Local Installation of Base SAS

The new Base SAS data provider provides access to Base SAS data sets that are available through a local installation of Base SAS. In this context, the Base SAS installation functions as a local, single-user server. Access to third-party relational data sources (with licensed SAS/ACCESS engines) is also supported. Previously, this capability was available through the SAS/SHARE provider.

An Enhanced Data Link Properties Dialog Box

The version of the Data Link Properties dialog box that is used with the IOM and OLAP providers now enables you to make the following choices:

- specify any SAS Metadata Server
- select from a list of workspace and OLAP servers that are defined in that metadata server

Previously, only the default metadata server could be used. No list of available OLAP and workspace servers was provided.

Three New Properties for Managing SAS Code Before a Data Source Is Initialized

The IOM provider supports three new properties for managing SAS code before a data source is initialized.

- "SAS Workspace Init Script" (DBPROP_SAS_INIT_WORKSPACE_INIT_SCRIPT) enables you to

specify SAS code to be submitted to a SAS Workspace Server immediately after a connection to the server is established.

- "SAS Workspace Init List" (DBPROP_SAS_WORKSPACE_INIT_LIST) enables you to capture the SAS listing from the SAS code that you submitted using the "SAS Workspace Init Script" property.
 - "SAS Workspace Init Log" (DBPROP_SAS_WORKSPACE_INIT_LOG) enables you to capture the SAS log from the SAS code submitted using the "SAS Workspace Init Script" property.
-

Support for Reading Multilingual Data from a Data Set with UTF-8 Encoding

The SAS/SHARE provider and local provider now support reading multilingual data from a data set with UTF-8 encoding.

64-bit Versions of the Providers

In the third maintenance release for SAS 9.2, SAS offers the SAS/SHARE provider and OLAP provider in 64-bit versions. You can use a 64-bit provider to read SAS data sets from 64-bit applications. Both the 32-bit and 64-bit versions are installed at install time. In addition to these two providers, the IOM and Local providers were offered in 64-bit versions during the second maintenance release for SAS 9.2.

References to 64-bit Programming Tips

The interfaces to the 64-bit providers remain the same as the interfaces to the 32-bit versions. Applications that are 32-bit can continue to run on Windows 64-bit operating systems by using the 32-bit providers. However, 32-bit applications must be migrated to 64-bit in order to run natively in Windows for x64. In the second maintenance release for SAS 9.2, this document includes a section that provides references to 64-bit programming tips.

New Property for the IOM Provider

In the second maintenance release for SAS 9.2, this document provides information for the SAS Data Set Options property, DBPROPS_SAS_DATASETOPTS. This property is used to specify SAS data set options.

New Properties for the Local Provider

In the third maintenance release for SAS 9.2, this document provides information for the following properties:

- DBPROP_SAS_DATASET_ENCODING
- DBPROP_SAS_DATASET_LABEL
- DBPROP_SAS_DATASET_TYPE
- DBPROP_SAS_GET_MISSING_VALUES
- DBPROP_SAS_USE_TKMANAGER_SEARCHPATH

What's New in SAS/QC

Overview

The ANOM, CAPABILITY, CUSUM, MACONTROL, PARETO, RELIABILITY, and SHEWHART procedures now produce graphs that conform to ODS styles, so that creating consistent output is easier. Also, you now have two alternative methods for producing graphs. With traditional graphics you can control every detail of a graph through familiar procedure syntax and GOPTION and SYMBOL statements. With ODS Graphics (experimental in SAS/QC 9.2), you can obtain the highest quality output with minimal syntax and full compatibility with graphics produced by SAS/STAT and SAS/ETS procedures.

ADX Interface for Design of Experiments

The SAS ADX Interface for Design of Experiments includes enhancements related to response surface designs, mixture designs, general factorial designs, and split-plot designs. Furthermore, ADX can now import data from SAS data sets or external file formats, and it can export design information to SAS data sets or external file formats.

The SAS 9.2 ADX Interface now enables you to do the following:

- create general factorial designs with factors having up to nine levels
- construct and analyze two-level full factorial and fractional factorial split-plot designs
- choose a mixed-level design from a new expanded design selection
- analyze unstructured experimental data that is imported from external sources
- analyze fitted models by using the new graphical ANOVA
- construct a lambda plot to evaluate the need for a response transformation
- add center points to a design before or after replication
- add replicated points in a new block
- apply a user-specified alpha value for the graphical techniques that are used to fit and optimize a model
- delete inactive factors and project a fractional-factorial design to a higher-resolution design
- join the means in a box plot
- show clear and aliased effects in the alias structure
- display confidence intervals in the response calculator and experiment report
- honor block structure in a blocked design during design randomization

The ADX interface is documented in *Getting Started with the SAS 9.2 ADX Interface for Design of Experiments*.

CAPABILITY Procedure

The new CLASS statement enables you to group the data into classification levels. You can specify one or two class variables. Results are computed separately for each classification level, and any chart statements you specify produce comparative charts that are analogous to the comparative histograms produced by the COMPHISTOGRAM statement in previous releases. The COMPHISTOGRAM statement continues to be supported in SAS 9.2, but you cannot specify a CLASS statement together with a COMPHISTOGRAM statement.

You can now superimpose more than one fitted distribution from a given family (two normal curves, for example) on a histogram.

FACTEX Procedure

The new BLOCK and UNITEFFECT statements enable you to construct designs for experiments with multiple stages, such as split-plot (Huang, Chen, and Voelkel 1998) and split-lot designs (Butler 2004).

References

Butler, N.A. (2004), "Construction of Two-Level Split-Plot Fractional Factorial Designs for Multistage Processes," *Technometrics*, 46, 445 - 451.

Huang, P., Chen, D., and Voelkel, J.O. (1998), "Minimum-Aberration Two-Level Split-Plot Designs," *Technometrics*, 40, 314 - 326.

What's New in SAS Scoring Accelerator 1.6 for DB2 under UNIX

Overview

The SAS Scoring Accelerator 1.6 for DB2 under UNIX has the following new features.

- availability of the Score Code Export node software in SAS Enterprise Miner
 - the values for the %INDB2_PUBLISH_MODEL macro's MODE argument are now FENCED and UNFENCED
 - support for SAS Model Manager
-

Score Code Export Node Software Availability

In the December 2009 release, the Score Code Export node software is available in SAS Enterprise Miner. In previous versions of the SAS Scoring Accelerator for DB2 under UNIX, the software was provided in a ZIP file.

MODE Argument Values

In the May 2010 release, the values for the %INDB2_PUBLISH_MODEL macro's MODE argument changed from PROTECTED and UNPROTECTED to FENCED and UNFENCED.

Support for SAS Model Manager

In the October 2010 release, you can use the SAS Scoring Accelerator for DB2 under UNIX in conjunction with SAS Model Manager 2.3 to manage and deploy scoring models in DB2 under UNIX.

What's New in SAS Scoring Accelerator 1.6 for Netezza

Overview

The SAS Scoring Accelerator 1.6 for Netezza has the following new features.

- availability of the Score Code Export node software in SAS Enterprise Miner
 - ability to determine the case of variables in the generated sample SQL code
 - ability to specify an install database for the SAS_COMPILEUDF function
 - support for Netezza TwinFin Systems
 - file transfer with Netezza external table interface
 - support for SAS Model Manager
-

Score Code Export Node Software Availability

In the December 2009 release, the Score Code Export node software is available in SAS Enterprise Miner. In previous versions of the SAS Scoring Accelerator for Netezza, the software was provided in a ZIP file.

Ability to Determine the Case of Variables in the Generated Sample SQL Code

In the May 2010 release, a new argument, IDCASE, was added to the %INDNZ_PUBLISH_MODEL macro. The IDCASE argument specifies whether the variable names in the generated sample SQL code (SampleSQL.txt file) appear in uppercase or lowercase characters.

Ability to Specify an Install Database for the SAS_COMPILEUDF Function

In the May 2010 release, a new argument, COMPILEDB, was added to the %INDNZ_PUBLISH_MODEL macro. The COMPILEDB argument specifies the name of the database where the SAS_COMPILEUDF function is published.

Support for Netezza TwinFin Systems

In the June 2010 release, the SAS/ACCESS Interface to Netezza and the SAS Scoring Accelerator for

Netezza support the Netezza TwinFin system. The new Netezza TwinFin system adds supports for shared libraries. The shared library technology makes the scoring functions more efficient and robust.

A new publishing macro %INDNZ_PUBLISH_JAZLIB was added to register the SAS 9.2 Formats Library as a shared library in a database. This new macro is supported only on the Netezza TwinFin system.

A new argument, DBJAZLIB, was added to the %INDNZ_PUBLISH_MODEL macro. The DBJAZLIB argument specifies the name of the database where the SAS 9.2 Formats Library for Netezza is published as a shared library. This new argument is supported only on the Netezza TwinFin system.

File Transfer with Netezza External Table Interface

In the June 2010 release, the use of SFTP for file transfer during the publishing process has been replaced with the Netezza External Table Interface. As a result, the SERVERUSERID= parameter for the INDCONN macro variable and the INITIALWAIT and FTPTIMEOUT arguments for the %INDNZ_PUBLISH_MODEL macro are no longer needed.

Support for SAS Model Manager

In the October 2010 release, you can use the SAS Scoring Accelerator for Netezza in conjunction with SAS Model Manager 2.3 to manage and deploy scoring models in Netezza.

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What's New in SAS Scoring Accelerator 1.7 for Teradata

Overview

Starting with SAS Scoring Accelerator 1.7 for Teradata, the Score Code Export node software is available in SAS Enterprise Miner. In previous versions of the SAS Scoring Accelerator for Teradata, the software was provided in a ZIP file.

For information about the new features and enhancements in SAS Scoring Accelerator 1.6 for Teradata, see [What's New in SAS Scoring Accelerator 1.6 for Teradata](#).

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What's New in SAS Scoring Accelerator 1.6 for Teradata

Overview

The SAS Scoring Accelerator 1.6 for Teradata has the following new features:

- support for Teradata V2R6.2 on MP-RAS
- availability of the Score Code Export node software on the SAS Software Depot
- ability to use SAS Model Manager 2.2 to score models

For information about the new features and enhancements in SAS Scoring Accelerator 1.7 for Teradata, see [What's New in SAS Scoring Accelerator 1.7 for Teradata](#).

MP-RAS Support

The SAS Scoring Accelerator 1.6 for Teradata now supports Teradata V2R6.2 on MP-RAS.

Note: If you are using Teradata version V2R6 on MP-RAS, the MAKEPKG stored procedure is required to create the scoring functions. For more information about downloading and installing the MAKEPKG stored procedure, see the *Configuration Guide for SAS 9.2 Foundation* for your operating environment.

Score Code Export Node Software Availability

Starting with version 1.6, you download the ZIP file that contains the Score Code Export node software from the SAS Software Depot. In previous versions of the SAS Scoring Accelerator for Teradata, the ZIP file was included in the SAS Formats Library for Teradata.

SAS Scoring Accelerator and SAS Model Manager

The SAS Scoring Accelerator 1.6 for Teradata can now be used with SAS Model Manager. From project initiation to retiring a model, SAS Model Manager supports score code projects that you run on your Teradata Enterprise Data Warehouse (EDW). SAS Model Manager enables you to publish classification and prediction models to the Teradata EDW. When you publish your champion model, the SAS Scoring Accelerator for Teradata converts and exports your champion model score code to scoring functions that you can deploy inside Teradata. A scoring application (for example, a call center application that uses the SAS Model Manager Java Scoring API) can then execute the scoring functions in the Teradata EDW.

For more information, see the *SAS Model Manager: User's Guide*.

What's New in SAS/SHARE 9.2

Overview

SAS/SHARE has the following changes and enhancements in this release:

- an introduction to the role of SAS/SHARE in a SAS Intelligence Platform environment, a new system option, and a new option in the LIBNAME statement
 - several new or improved options and a new value for an option in the PROC SERVER statement
 - a method to free a library that contains a locked data set
 - relocated information about SAS data security technologies
-

SAS/SHARE and the SAS Intelligence Platform Environment

- The SAS/SHARE server and server libraries can be configured and made available for access in a SAS Intelligence Platform environment. A SAS/SHARE server's metadata can be managed in a SAS Metadata Repository, but an instance of a running server is managed using the SAS/SHARE OPERATE procedure.
 - In a SAS Intelligence Platform environment, the SHARESESSIONCNTL= system option is used to specify the number of connections between SAS clients and a SAS/SHARE server via a SAS server. There can be a single connection for all SAS clients or a separate connection for each SAS client.
 - The AUTHDOMAIN= option in the LIBNAME statement is a convenient way to obtain the SAS metadata-based user credentials rather than having to explicitly supply them when accessing a server library.
-

Changes to PROC SERVER

- The WORKTASKS= option in the PROC SERVER statement specifies the initial and maximum number of work tasks for the SAS/SHARE server to execute.
 - The value REM can be assigned to the LOG= option in the PROC SERVER statement, which causes the server to log the total number of connections and maximum concurrent number of connections from thin clients that access the SAS/SHARE server.
 - Experimental option THREADEDTCP in the PROC SERVER statement now enables threaded TCP to be compatible with the collection of active-time usage statistics.
 - The FILELOCKWAITMAX= system option is set to zero, by default, when the PROC SERVER statement is used. A SAS session will not wait to access a SAS file that is currently locked by another process.
 - The NOXCMD system option is enabled, by default, when the PROC SERVER statement is used to invoke a SAS session. NOXMCD prevents operating system commands from being executed during a SAS session.
-

A Method to Free a Library That Contains a Locked Data Set

If the administrator needs to free a server library that contains a locked data set, the administrator can perform a series of steps that will ultimately free the library so that the lock can be cleared.

Relocated Information about SAS Data Security Technologies

All information relating to SAS Proprietary, SAS/SECURE, and SSL, including SAS system options, is relocated to **Data Security Technologies in SAS**.

The following SAS system options are relocated:

- NETENCRYPT
- NETENCRYPTALGORITHM=
- NETENCRYPTKEYLEN=
- SSLCALISTLOC=
- SSLCERTISS=
- SSLCERTLOC=
- SSLCERTSERIAL=
- SSLCERTSUBJ=
- SSLCLIENTAUTH=
- SSLCRLCHECK
- SSLCRLLOC=
- SSLPVTKEYLOC=
- SSLPVTKEYPASS=

What's New in SAS/STAT 9.22

Overview

SAS/STAT 9.22 includes two new procedures and many new enhancements.

New Procedures

The experimental SURVEYPHREG procedure performs regression analysis based on the Cox proportional hazards model for sample survey data. Cox's semiparametric model is widely used in the analysis of survival data to estimate hazard rates when explanatory variables are available. The procedure provides design-based variance estimates, confidence intervals, and hypothesis tests concerning the parameters and model effects.

The PLM procedure takes model results that are stored from SAS/STAT linear modeling procedures and performs additional postfitting inferences without your having to repeat your original analysis. The PLM procedure can perform tasks such as testing hypotheses, computing confidence intervals, producing prediction plots, and scoring new data sets by using familiar statements such as the ESTIMATE, LSMEANS, LSMESTIMATE, and SLICE statements. It can handle model results that are stored from the following SAS/STAT procedures: GENMOD, GLIMMIX, GLM, LOGISTIC, MIXED, ORTHOREG, PHREG, SURVEYLOGISTIC, SURVEYPHREG, and SURVEYREG.

Highlights of Enhancements

Additional statements for least squares means, scoring, and other advanced postfitting inferences have been added to several modeling procedures, including the LOGISTIC, MIXED, and ORTHOREG procedures. Other highlights include:

- The EFFECT statement is now available in the HPMIXED, GLIMMIX, GLMSELECT, LOGISTIC, ORTHOREG, PHREG, PLS, QUANTREG, ROBUSTREG, SURVEYLOGISTIC, and SURVEYREG procedures.

This statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement. Effect types include splines for semiparametric modeling, multimember effects for situations in which measurements can belong to more than one class, lag effects, and polynomials.

- Exact Poisson regression is now available with the GENMOD procedure.
- The MCMC procedure can create samples from the posterior predictive distribution.
- The zero-inflated negative binomial model is now available with the GENMOD procedure.
- The HPMIXED procedure is now production.
- The CALIS procedure has been completely revised and includes enhancements that were formerly available in the experimental TCALIS procedure.

More information about the changes and enhancements follow. Details can be found in the documentation for

the individual procedures in the *SAS/STAT 9.22 User's Guide*.

Documentation Enhancements

In recent releases, this documentation has grown to contain chapters that apply to many SAS/STAT procedures, such as "Using the Output Delivery System" and "Statistical Graphics Using ODS." "Shared Concepts and Topics" is another such chapter, and it is greatly expanded in this edition to include information about the postfitting statements that now are common to many linear modeling procedures.

Highlights of Enhancements in SAS/STAT 9.2

Some users are moving directly from SAS/STAT 9.1.3 to SAS/STAT 9.22. The following are some of the major enhancements that were introduced in SAS/STAT 9.2:

- ODS Statistical Graphics became production and over 60 procedures in SAS/STAT, SAS/ETS®, SAS/QC®, and Base SAS® software have been modified to use it. Many new plots are now produced by these procedures, either by default or with the specification of procedure options.
- The GENMOD, LIFEREG, and PHREG procedures now include facilities for Bayesian analysis.
- The MCMC procedure is a flexible simulation-based procedure that is suitable for fitting a wide range of Bayesian models.
- The SEQDESIGN procedure designs interim analyses for clinical trials. The SEQTEST procedure performs the interim analyses based on design information produced by the SEQDESIGN procedure.

For more information, see [What's New in SAS/STAT 9.2](#).

CALIS Procedure

The CALIS procedure now includes updates that were previously surfaced in the experimental TCALIS procedure. These capabilities include:

- new modeling languages such as LISMOD, MSTRUCT, and PATH
- multiple group analysis
- improved mean structure analysis
- general parametric function testing
- improved effect analysis

In addition, PROC CALIS introduces several experimental features, including the full information likelihood method (FIML), mean structure analysis with the COSAN model, unnamed free parameter specification, and an extended path modeling language.

FACTOR Procedure

The output now includes a table with the number of observations used in the analysis.

FREQ Procedure

Exact p -values are available for tests of the following measures: Kendall's tau- b , Stuart's tau- c , Somers' $D(C|R)$, and Somers' $D(R|C)$. The GAILSIMON option in the TABLE statement specifies the Gail-Simon test for qualitative interactions, and the MANTELFLEISS suboption of the CMH option requests the Mantel-Fleiss criterion for the Mantel-Haenszel statistic for stratified 2×2 tables.

Relative risk plots and risk difference plots are now available.

GAM Procedure

The LOESS smoother in the MODEL statement is now production.

GENMOD Procedure

The EFFECTPLOT statement produces a display of the fitted model. The LSMESTIMATE and the SLICE statements provide additional postprocessing inferences. The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure. The LSMEANS statement has been updated to include options such as the AT, ADJUST=, STEPDOWN, and PLOTS= options.

The zero-inflated negative binomial model is now available through the ZEROMODEL statement.

New sampling methods are available with the Bayesian analysis offered in PROC GENMOD. For the normal distribution with a conjugate prior, the closed form for the posterior distribution is now used by default. The ARMS algorithm is otherwise the default, but you can now specify the Gamerman algorithm or the independent Metropolis algorithm with the SAMPLING= option in the BAYES statement.

You can now perform exact Poisson regression and exact logistic regression by using the EXACT statement in PROC GENMOD.

GLIMMIX Procedure

The SLICE statement enables you to perform inferences on model effects that consist entirely of classification variables. These effects must be higher-order effects of at least two classification variables. The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure. The CPSEUDO option in the OUTPUT statement changes the way in which marginal

residuals are computed when model parameters are estimated by pseudo-likelihood methods.

You can now perform a joint test under one-sided restrictions with the LSMESTIMATE statement (Silvapulle and Sen 2004); for example, you can test ordered alternatives. The GLIMMIX procedure computes a simulation-based chi-bar-square statistic and produces a p -value for the constrained joint test.

GLM Procedure

The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

GLMSELECT Procedure

The GLMSELECT procedure now provides model averaging with the experimental MODELAVERAGE statement, which requests model selection on resampled subsets of the input data. An average model is produced by averaging the parameter estimates of the selected models that are obtained for each resampled subset of the input data.

The ADAPTIVE option of the SELECTION=LASSO method specifies adaptive lasso selection, which is a modification of lasso selection where weights are applied to each of the parameters in forming the lasso constraint.

HPMIXED Procedure

The HPMIXED procedure is production with this release.

The experimental EFFECT statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement. The BLUP= option in the PROC HPMIXED statement creates a data set that contains the BLUE and BLUP solutions. This option is designed for users who need BLUP/BLUE solutions for random effects with many levels, up to tens of millions.

The SLICE and DIFF options are now supported in the LSMEANS statement.

KRIGE2D Procedure

The RESTORE statement specifies an item store that provides spatial correlation model input for the PROC KRIGE2D prediction tasks. The KRIGE2D procedure can use only item stores that are created by PROC VARIOGRAM.

The ID statement specifies which variable to include for identification of the observations in the OUTNBHD= output data set. The ID statement variable is also used for the labels and tool tips in the observations plot and the tool tips in the prediction plot.

You can now request plots of the semivariogram model used for prediction tasks. You can also produce plots for prediction at individual points or in grids in one dimension. The LABEL= option in the GRID statement enables you to identify the prediction locations for grids in one dimension.

LIFEREG Procedure

Fit criteria based on the distribution of the response on the original scale, rather than the log of the response, are reported if you specify the Weibull, exponential, lognormal, log-logistic, or gamma distribution.

LIFETEST Procedure

You can now request the Breslow and Fleming-Harrington estimates of the survivor function with the METHOD= option in the PROC LIFETEST statement. The number of subjects at risk can be displayed with the product-limit estimates, the Breslow estimates, and the Fleming-Harrington estimates.

LOGISTIC Procedure

The experimental EFFECT statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement. The EFFECTPLOT statement produces a graphical display of the fitted model.

The ESTIMATE, LSMEANS, LSMESTIMATE, and SLICE statements provide additional postfitting inferences. The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

MCMC Procedure

The PREDDIST statement creates random samples from the posterior predictive distribution of the response variable and saves the samples to a SAS data set. The posterior predictive distribution is the distribution of unobserved observations (prediction) conditional on the observed data.

MIXED Procedure

The LSMESTIMATE and SLICE statements provide additional postfitting inferences. The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

ORTHOREG Procedure

The ORTHOREG procedure fits general linear models by the method of least squares. Other SAS/STAT software procedures, such as GLM and REG, fit the same types of models, but PROC ORTHOREG can produce more accurate estimates than other regression procedures when your data are ill-conditioned.

PROC ORTHOREG has been greatly expanded in this release to provide postfitting inferences with the inclusion of the ESTIMATE, LSMEANS, LSMESTIMATE, SLICE, and TEST statements. In addition, the EFFECTPLOT statement produces a graphical display of the fitted model.

PROC ORTHOREG also includes the experimental EFFECT statement, which enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement.

The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

PHREG Procedure

The PHREG procedure now supports the ESTIMATE, LSMEANS, LSMESTIMATE, and SLICE statements for additional postfitting inferences.

The experimental EFFECT statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement. The STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

The ATRISK option in the PROC PHREG statement displays a table that contains the number of units at risk at each event time and the corresponding number of events in the risk sets.

You can now specify the Zellner g-prior for the regression coefficients in the BAYES statement. You can also request the random walk Metropolis (RWM) algorithm to sample an entire parameter vector from the posterior distribution in a Bayesian analysis.

Likelihood ratio tests of model parameters are available with the TYPE1 and TYPE3 options in the MODEL statement except when the robust sandwich estimate for the covariance matrix is specified.

PLM Procedure

The PLM procedure performs postfitting inferences for model results that are stored by one of the following SAS/STAT procedures: GENMOD, GLIMMIX, GLM, LOGISTIC, MIXED, ORTHOREG, PHREG, SURVEYLOGISTIC, SURVEYPHREG, and SURVEYREG. These procedures now include the STORE statement, which produces item stores that can then be used as input for the PLM procedure.

PROC PLM can perform tasks such as testing hypotheses, computing confidence intervals, producing prediction plots, and scoring new data sets. This enables you to separate common postfitting inferences, such as testing for treatment differences and predicting new observations under a fitted model, from the process of model building and fitting. PROC PLM offers the most advanced postfitting inference techniques available in SAS/STAT software, including new techniques such as step-down multiplicity adjustments for p -values, F tests with order restrictions, analysis of means (ANOM), and sampling-based linear inference based on Bayes posterior estimates.

The PLM procedure supports the EFFECTPLOT, ESTIMATE, FILTER, LSMEANS, LSMESTIMATE, SCORE, SHOW, SLICE, TEST, and WHERE statements.

PLS Procedure

The PLS procedure now supports the experimental EFFECT statement, which enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement.

POWER Procedure

You can now parameterize computations for survival analysis in terms of the expected number of events, in addition to sample size. See the EVENTSPERGROUP=, EVENTSTOTAL=, and GROUPEVENTS= options in the TWOSAMPLESURVIVAL statement. Parameterization in terms of sample size accrued per unit time is also available in this statement with the ACCRUALRATEPERGROUP=, ACCRUALRATETOTAL=, and GROUPACCRUALRATES= options.

QUANTREG Procedure

If you specify multiple quantiles in a MODEL statement, additional analyses, such as those specified in the TEST statement, are now produced for each quantile specified.

The RANKSCORE option in the TEST statement enables you to perform rank tests. Available score functions provide normal scores, Wilcoxon scores, and sign scores, which are asymptotically optimal for the Gaussian, logistic, and Laplace location shift models, respectively.

ROBUSTREG Procedure

You can specify classification effects with the LTS, S, and MM methods. PROC ROBUSTREG now computes a robust version of the Mahalanobis distance by using the generalized minimum covariance determinant (MCD) method. Leverage point analysis is updated to reflect the inclusion of classification variables.

The experimental EFFECT statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement.

SIM2D Procedure

The RESTORE statement specifies an item store that provides spatial correlation model input for the PROC SIM2D simulation tasks. The SIM2D procedure can use only item stores that are created by PROC VARIOGRAM. You can request scatter plots, simulation plots, and plots of the semivariogram models.

The ID statement specifies which variable to include for identification of the observations in labels and tool tips for the observations plot and in tool tips for the simulation plot. The ID variable is used only when you perform conditional simulation.

You can now produce plots for simulation at individual points or in grids in one dimension. The LABEL= option in the GRID statement enables you to identify the simulation locations for grids in one dimension.

SURVEYFREQ Procedure

The SURVEYFREQ procedure now provides plots created with ODS Graphics, including a weighted frequency plot, an odds ratio plot, a relative risk plot, and a risk difference plot. The CL option now offers additional confidence limit types, including the modified Clopper-Pearson (exact), modified Wilson (score), and logit confidence limits.

If you specify the DEFF option in the TABLES statement, PROC SURVEYFREQ computes design effects for the overall proportion estimates in the frequency and crosstabulation tables.

SURVEYLOGISTIC Procedure

The SURVEYLOGISTIC procedure now includes the experimental EFFECT statement, which enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement.

PROC SURVEYLOGISTIC also includes the ESTIMATE, LSMEANS, LSMESTIMATE, and SLICE statements for additional postfitting inferences. The new STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

SURVEYMEANS Procedure

The SURVEYMEANS procedure now performs analysis for domain ratios. Variance estimation based on replication methods is available for domain means, totals, and ratios.

SURVEYPHREG Procedure

The experimental SURVEYPHREG procedure performs regression analysis based on the Cox proportional hazards model for sample survey data. Cox's semiparametric model is widely used in the analysis of survival data to estimate hazard rates when explanatory variables are available. The procedure provides design-based variance, confidence intervals, and tests for the estimated parameters in the model.

SURVEYREG Procedure

The SURVEYREG procedure now includes the LSMEANS, LSMESTIMATE, SLICE, and TEST statements for additional postfitting inferences. The new STORE statement enables you to save the context and results of the statistical analysis for further processing with the PLM procedure.

The experimental EFFECT statement enables you to construct a much richer family of linear models than you can traditionally define with the CLASS statement.

SURVEYSELECT Procedure

The SAMPLINGUNIT statement names variables that identify the sampling units as groups of observations (clusters). The combinations of categories of SAMPLINGUNIT variables define the sampling units. If there is a STRATA statement, sampling units are nested within strata. The NMIN= option in the PROC SURVEYSELECT statement specifies the minimum stratum sample size for the SAMPRATE= option.

TPSPLINE Procedure

The TPSPLINE procedure now provides plots created with ODS Graphics, including residual plots, diagnostic plots, and fit plots. You can now request confidence bands for the expected value of the dependent variables by using the UCLM and LCLM keywords in the SCORE statement.

VARCOMP Procedure

You can now request generalized confidence limits for the parameters with the CL=GCL option in the MODEL statement.

VARIOGRAM Procedure

The STORE statement requests that the procedure save the context and results of the semivariogram model fitting analysis in an item store. The contents of item stores produced by PROC VARIOGRAM can be processed only with the KRIGE2D or the SIM2D procedure. After you save results in an item store, you can use them at a later time without having to refit the model.

The ID statement specifies which variable to include for identification of the observations in the OUTPAIR= and the OUTACWEIGHTS= output data sets. The ID statement variable is also used for labels and tool tips in the observations plot.

PROC VARIOGRAM now provides a Moran plot, which is a scatter plot of standardized observed values against weighted averages.

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What's New in SAS/STAT 9.2

Overview

SAS 9.2 brings many new procedures and new enhancements to existing procedures to SAS/STAT software.

ODS Statistical Graphics

Prior to SAS 9.1, creating graphics with statistical procedures generally required additional programming. SAS 9.1 introduced an experimental extension to the Output Delivery System (ODS), which was used by over two dozen SAS/STAT and SAS/ETS procedures to create statistical graphics as automatically as they create tables. This new functionality, referred to as ODS Statistical Graphics (or ODS Graphics for short), requires minimal additional syntax, and it provides displays commonly needed for data analysis and statistical modeling, including scatter plots, histograms, and box-and-whisker plots.

In SAS 9.2, ODS Graphics is production, and over 50 procedures in SAS/STAT, SAS/ETS, SAS/QC, and Base SAS have been modified to use it. Many new plots are now produced by these procedures, either by default or with the specification of procedure options.

The functionality of ODS Graphics has been extended with the addition of new graph types, ODS styles designed for statistical work, and a point-and-click editor for enhancing titles, labels, and other graph features. You can also modify graphs by changing their underlying templates, which are supplied by SAS and are written in the Graph Template Language (GTL). The LISTING destination is now supported by ODS Graphics. A new family of SAS/GRAPH procedures uses ODS Graphics to create standalone plots, such as scatterplots overlaid with smoothers, which are particularly useful for exploratory data analysis. The new SGRENDER procedure provides a way to create customized displays by writing your own templates with the GTL.

See Chapter 21, Statistical Graphics Using ODS, for an introduction to ODS Graphics and general information about ODS Graphics. The syntax for requesting plots with statistical procedures is described in the procedure chapters.

Note that a SAS/GRAPH license is now required to use ODS Graphics.

New Related Software

SAS/STAT users will be interested in SAS/IML® Studio, formerly known as SAS®Stat Studio, which is new software for data exploration and analysis. SAS/IML Studio provides a highly flexible programming environment in which you can run SAS/STAT or SAS/IML® analyses and display the results with dynamically linked graphics and data tables. SAS/IML Studio is intended for data analysts who write SAS programs to solve statistical problems but need more versatility for data exploration and model building. The programming language in SAS/IML Studio, which is called IMLPlus, is an enhanced version of the SAS/IML programming

language. IMLPlus extends SAS/IML to provide new language features, including the ability to create and manipulate statistical graphics, call SAS procedures as functions, and call computational programs written in C, C++, Java, and Fortran. SAS/IML Studio runs on a PC in the Microsoft Windows operating environment.

SAS/IML Studio also includes an experimental interface to the R language. The IMLPlus language includes functions that transfer data between SAS data sets and R data frames, and between SAS/IML matrices and R matrices.

SAS/IML Studio is also the successor to the SAS/INSIGHT® product and provides the same interactive functionality. It is distributed with the SAS/IML product. For more information about SAS/IML Studio, see the *SAS/IML Studio User's Guide* and *SAS/IML Studio for SAS/STAT Users*.

New Procedures

SAS 9.2 brings a number of new procedures to SAS/STAT software. Several of these procedures have been previously available as Web downloads for SAS 9.1.3: GLIMMIX, GLMSELECT, and QUANTREG. The GLMSELECT procedure performs effect selection in the framework of general linear models. The QUANTREG procedure performs quantile regression. The GLIMMIX procedure analyzes generalized linear mixed models. All of these procedures are production with SAS 9.2 and are available on all platforms.

In addition, Bayesian capabilities were introduced to three procedures via Web downloads for SAS 9.1.3. The BGENMOD, BLIFEREG, and BPHREG procedures were experimental versions of the GENMOD, LIFEREG, and PHREG procedures that used the Gibbs sampler to produce posterior distributions while also providing trace plots and convergence diagnostics. These capabilities have been rolled into the GENMOD, LIFEREG, and PHREG procedures for SAS 9.2 and are now production software.

The MCMC, SEQDESIGN, and SEQTEST procedures were introduced as experimental procedures in SAS 9.2, and they became production in SAS 9.2M2.

The MCMC procedure is a general purpose Markov chain Monte Carlo (MCMC) simulation procedure that is designed to fit a variety of Bayesian models. You specify a likelihood function for the data and a prior distribution for the parameters. PROC MCMC obtains samples from the corresponding posterior distributions, produces summary and diagnostic statistics, and saves the posterior samples in an output data set.

The SEQDESIGN and SEQTEST procedures are tools for group sequential analysis. The SEQDESIGN procedure designs interim analyses for clinical trials, and the SEQTEST procedure performs interim analyses.

The experimental HPMIXED procedure uses a number of specialized high-performance techniques to fit linear mixed models with variance component structure. The HPMIXED procedure is specifically designed to cope with estimation problems that involve a large number of fixed effects, a large number of random effects, or a large number of observations. The models supported by the HPMIXED procedure are a subset of the models that you can fit with the MIXED procedure, and PROC HPMIXED can provide substantial performance improvements in terms of memory requirements and computational speed.

The experimental TCALIS procedure updates the CALIS procedure for structural equation modeling. It will become the CALIS procedure in the next release of SAS/STAT software.

Highlights of Enhancements

The Power and Sample Size application (PSS), previously available as a Web application, has been rewritten as a Java client. Its documentation is now included here; see Chapter 69, The Power and Sample Size Application.

In addition, over two hundred enhancements have been added to existing procedure in SAS/STAT. For example,

- The TTEST procedure provides simple crossover analysis as well as equivalence tests.
- Jackknife and BRR variance estimation and domain analysis are now provided by all of the survey data analysis procedures.
- The POWER procedure now provides power for a number of additional analyses.
- The GENMOD procedure fits zero-inflated Poisson regression models. PROC GENMOD also provides deletion and diagnostics statistics for its GEE models and provides graphics for these statistics.
- The PHREG procedure adds a HAZARDRATIO statement for computing hazard ratios, including hazard ratios in the presence of interactions.
- The GLIMMIX procedure introduces the COVTEST statement for inference about covariance parameters. In addition, PROC GLIMMIX provides new estimation methods: Laplace and adaptive quadrature.
- An experimental EFFECT statement can be found in the GLIMMIX, GLMSELECT, and QUANTREG procedures. It enables you to construct special collections of columns for design matrices (for example, splines and multimember effects).

Finally, note that this documentation contains several new introductory chapters. See Chapter 3, Introduction to Statistical Modeling with SAS/STAT Software, Chapter 6, Introduction to Mixed Modeling Procedures, Chapter 19, Introduction to Power and Sample Size Analysis, and Chapter 18, Shared Concepts and Topics.

More information about the changes and enhancements follow. The details can be found in the documentation for the individual procedures.

CALIS Procedure

Standardized root mean square residuals (SRMSR) are now listed in the fit summary table, and PROC CALIS now offers residual plots. See below for more information on the TCALIS procedure.

CLUSTER Procedure

The PLOTS option in the PROC CLUSTER statement produces plots of the cubic clustering criterion (CCC), the pseudo F (PSF) statistic, and the pseudo t^2 (PST2) statistic, all plotted against the number of clusters.

CORRESP Procedure

The correspondence analysis plot is produced by default when ODS Graphics is enabled.

FACTOR Procedure

You can produce a number of graphs with the PLOTS= option in the PROC FACTOR statement. These include various factor pattern plots, reference structures, and scree and variance explained plots. You can now use the OUT= option in conjunction with a PARTIAL statement. The PARPREFIX= option in the PROC statement specifies the prefix for the residual variables in the output data sets.

FREQ Procedure

The FREQ procedure can now produce frequency plots, cumulative frequency plots, deviation plots, odds ratio plots, and kappa plots. You can now request equivalence and noninferiority tests for the binomial proportion and proportion difference. New confidence limits for the binomial proportion (such as Agresti-Coull, Jeffreys, and Wilson) are now available, as well as unconditional exact confidence limits for the proportion difference. You can request Zelen's exact test for equal odds ratios by specifying the EQOR option in the EXACT statement.

GAM Procedure

The GAM procedure is production with SAS 9.2. PROC GAM now produces graphs, including smoothing component plots and additive component plots. The target for an additive logistic model no longer has to be numeric; PROC GAM offers the same types of options for response and classification variables that are available in procedures such as PROC LOGISTIC and PROC GENMOD. The ANODEV=NOREFIT option in the MODEL statement enables a fast approximation analysis of deviance.

GENMOD Procedure

The BAYES statement produces Bayesian analysis via Gibbs sampling for most of the statistical analyses provided by the GENMOD procedure. This release also includes deletion diagnostics and plots for GLMs and GEEs, zero-inflated Poisson regression models, and AIC and QIC model fit statistics. Martingale residuals are now production. The LSMEANS statement now produces inverse link estimates.

GLIMMIX Procedure

The GLIMMIX procedure fits statistical models to data with correlations or nonconstant variability and where the response is not necessarily normally distributed. These generalized linear mixed models (GLMM), like linear mixed models, assume normal (Gaussian) random effects. Conditional on these random effects, data can have any distribution in the exponential family. The binary, binomial, Poisson, and negative binomial distributions, for example, are discrete members of this family. The normal, beta, gamma, and chi-square distributions are representatives of the continuous distributions in this family. The GLIMMIX procedure was first made available for SAS 9.1.3 as a Web download.

In SAS 9.2, the GLIMMIX procedure provides Laplace and adaptive quadrature estimation methods, and, with them, a likelihood-based empirical estimator. In addition, a new bias-corrected estimator is available. The experimental EFFECT statement provides for the creation of splines as well as other special effects. The COVTEST statement enables likelihood-based inference about the covariance parameters. A number of additional covariance structures have been added, including heterogeneous AR(1), heterogeneous compound symmetry, linear structures, heterogeneous Toeplitz, penalized B-spline, spatial anisotropic, and the Matérn covariance structure. Step-down multiplicity adjustments are now supported for all ADJUST= methods in the LSMEANS, ESTIMATE, and LSMESTIMATE statements, except for ADJUST=NELSON in the LSMEANS statement.

The DDFM=KR(FIRSTORDER) option drops the second-derivative term in the KR calculations. The OUTDESIGN= option in the PROC GLIMMIX statement enables you to write the \mathbf{X} and \mathbf{Z} matrix to an output data set. New graphics include boxplots of data and/or residuals with respect to classification effects as well as plots of odds ratios and their confidence limits. The diffogram, meanplot, anomplot, and controlplot have been enhanced.

GLM Procedure

New graphics are now produced for means and for LS-means comparisons. The experimental EFFECTSIZE option in the MODEL statement adds measures of effect size to many analysis of variance tables. The PLOTS=DIAGNOSTICS and the PLOTS=RESIDUAL options in the PROC GLM statement produce summary diagnostics and residual plots, respectively.

GLMPOWER Procedure

The new ORDER= option in the PROC GLMPOWER statement specifies the sorting order for the levels of all of the classification variables specified in the CLASS statement. Continuous variables are now supported, and the noncentrality parameter is computed.

GLMSELECT Procedure

The GLMSELECT procedure performs effect selection in the framework of general linear models. A variety of model selection methods are available, including the LASSO method of Tibshirani (1996) and the related LAR method of Efron et al. (2004). The procedure offers extensive capabilities for customizing the selection with a

wide variety of selection and stopping criteria, from traditional and computationally efficient significance-level-based criteria to more computationally intensive validation-based criteria. The procedure also provides graphical summaries of the selection search.

Enhancements in SAS 9.2 include an OUTDESIGN= option to obtain the design matrix, a PARMLABELSTYLE= option to control the style of the parameter labels, and an experimental EFFECT statement that you can use to create splines, polynomials, multimember, and collection effects.

HPMIXED Procedure (Experimental)

The experimental HPMIXED procedure uses a number of specialized high-performance techniques to fit linear mixed models with variance component structure. The HPMIXED procedure is specifically designed to cope with estimation problems that involve a large number of fixed effects, a large number of random effects, or a large number of observations. While the HPMIXED procedure fits only a subset of the models fit by the MIXED procedure and it does not provide the breadth of confirmatory inference that is available with the MIXED procedure, it can have considerably better performance in terms of memory requirements and computational speed.

KRIGE2D Procedure

ODS Graphics has been added to the KRIGE2D procedure, which now can produce scatter plots and prediction plots.

LIFEREG Procedure

The BAYES statement provides Bayesian analysis via Gibbs sampling.

LIFETEST Procedure

The LIFETEST procedure now produces the Nelson-Aalen estimates of the cumulative hazard function. The number of subjects at risk can be displayed for the Kaplan-Meier survival curves. Comparison methods are available for the k -sample test, and you can now specify a smoother hazard function using the kernel method.

LOGISTIC Procedure

The LOGISTIC procedure performs Firth's penalized maximum likelihood. The MULTIPASS option forces the procedure to reread the input data set as needed rather than requiring its storage in memory or in a

temporary file on disk. Estimated cumulative probabilities have been added to the SCORE statement output. The CONTRAST statement now includes the inverse link. The ROCCONTRAST statement compares different ROC models. Odds ratios in the presence of interactions are now computed, and odds ratio plots are provided. Note that the GRAPHICS statement has been replaced with the PLOTS= option in the PROC statement. The EFFECT plot can now handle multiple CLASS and continuous variables. Standard errors are now produced for the exact parameter estimates.

LOESS Procedure

The LOESS procedure includes a PRESEARCH option that uses a preliminary grid search to improve the chance of finding a global optimum of the selection criterion when a golden section search is used.

Macros

The %POWTABLE macro renders the output of the POWER and GLMPOWER procedures in rectangular form, and it optionally produces simplified results by using weighted means across chosen variables. The %ModStyle macro modifies the colors, line styles, and marker symbols displayed in ODS Graphics plots.

MCMC Procedure

The MCMC procedure is a flexible simulation-based procedure that is suitable for fitting a wide range of Bayesian models. To use the procedure, you need to specify a likelihood function for the data and a prior distribution for the parameters. You might also need to specify hyperprior distributions if you are fitting hierarchical models. PROC MCMC then obtains samples from the corresponding posterior distributions, produces summary and diagnostic statistics, and saves the posterior samples in an output data set that can be used for further analysis. You can analyze data that have any likelihood, prior, or hyperprior with PROC MCMC, as long as these functions are programmable using the SAS DATA step functions. The parameters can enter the model linearly or in any nonlinear functional form. The default algorithm that PROC MCMC uses is an adaptive blocked random-walk Metropolis algorithm that uses a normal proposal distribution.

MDS Procedure

ODS Graphics has been added to the MDS procedure, which now can produce fit plots, coefficient plots, and configuration plots.

MIXED Procedure

The RESIDUAL and INFLUENCE options in the MODEL statement are now production. The PLOTS= option

in the PROC MIXED statement is now available to specify graphics.

MULTTEST Procedure

The MULTTEST procedure now provides the adaptive Holm, adaptive Hochberg, adaptive FDR, bootstrap FDR, pFDR, and permutation FDR P -value adjustments. ODS Graphics has been added to PROC MULTTEST, and plots of adjusted P -value plots, raw P -values by rank and histogram, and P -values by test are now available. Satterthwaite degrees of freedom are now provided for the t test. The EPSILON= option in the PROC MULTTEST statement specifies the comparison value.

NLIN Procedure

The ALPHA= option has been added to the PROC NLIN and OUTPUT statements. The PDATA= option in the PARAMETERS statement enables you to assign starting values for parameters through a SAS data set. The DER option in the OUTPUT statement saves the first derivatives of the model with respect to the parameters to the OUTPUT data set.

NLMIXED Procedure

The EMPIRICAL option in the PROC NLMIXED statement requests that the covariance matrix of the parameter estimates be computed as a likelihood-based empirical ("sandwich") estimator (White 1982). Subject-specific gradients can be added to a SAS data set with the SUBGRADIENT option in the PROC NLMIXED statement.

NPAR1WAY Procedure

ODS Graphics has been added to the NPAR1WAY procedure, and you can request boxplots, a median plot, and an empirical distribution plot with the PLOTS= option in the PROC NPAR1WAY statement. PROC NPAR1WAY now computes the Hodges-Lehmann estimate of location shift for two-sample data with the HL option. Confidence limits are provided, and you can request exact confidence limits by specifying the HL option in the EXACT statement. Tests based on Conover scores are now available, including exact tests.

PHREG Procedure

The CLASS statement, previously available only in the TPHREG procedure, is now included with the PHREG procedure. The BAYES statement provides Bayesian analysis via Gibbs sampling. PROC PHREG now fits the piecewise exponential model, which is specified in the BAYES statement. Bayesian baseline survival

prediction becomes available with SAS 9.2 as well. The HAZARDRATIO statement provides a new facility for computing hazard ratios, including hazard ratios in the presence of interactions. The PLOTS option in the PROC PHREG statement produces baseline survival function plots. Profile-likelihood confidence limits are now available for hazard ratios produced in classical analyses. Firth's penalized likelihood method is provided as well.

PLS Procedure

The PLS procedure now produces more graphics, including a correlation loadings plot. The MISSING option for handling missing values with imputation is now production.

POWER Procedure

The new LOGISTIC statement performs power and sample size analyses for the likelihood ratio chi-square test of a single predictor in binary logistic regression, possibly in the presence of one or more covariates (where all predictors are independent of each other). The new TWOSAMPLEWILCOXON statement performs power and sample size analyses for the Wilcoxon-Mann-Whitney test for two independent groups. The ONESAMPLEFREQ statement now covers equivalence, noninferiority, and confidence interval precision for a proportion. The PAIREFREQ statement offers new input parameterizations, including raw proportions and correlation.

PRINCOMP Procedure

The PRINCOMP procedure now produces more graphics, including an ellipse plot. It includes an ID statement and incorporates ID variables as tips in its scatter plots. The PARPREFIX= option in the PROC PRINCOMP statement specifies a prefix for naming the residual variables in the OUT= data set and the OUTSTAT= data set.

PRINQUAL Procedure

The PRINQUAL procedure now produces graphs. These include a multidimensional preference analysis plot and a variable transformation plot.

PROBIT Procedure

The PROBIT procedure now offers a predicted probability plot.

PSS Application

The PSS application has been converted to a Java client application and no longer requires a Web server. It now offers a relative risk parameterization for the two proportions analysis. New analyses covered include equivalence and noninferiority for proportions, confidence interval for one proportion, Wilcoxon-Mann-Whitney for two distributions, logistic regression, and GLM contrasts for interactions.

QUANTREG Procedure

Quantile regression extends the regression model to conditional quantiles of the response variable, such as the 90th percentile. Quantile regression is particularly useful when the rate of change in the conditional quantile, expressed by the regression coefficients, depends on the quantile. The main advantage of quantile regression over least squares regression is its flexibility for modeling data with heterogeneous conditional distributions. The QUANTREG procedure was first made available as a Web download for SAS 9.1.3.

With SAS 9.2, the QUANTREG procedure becomes production. In addition, it now includes the experimental EFFECT statement for generating splines and the ability to output results for multiple quantiles in the OUTPUT statement.

REG Procedure

The REG procedure now includes a lack-of-fit test. The PARTIAL option in the MODEL statement requests partial regression plots for each regressor; the PARTIALDATA option displays partial regression data. Heteroscedasticity-consistent (White) standard errors are now available, and you can obtain a heteroscedasticity-consistent covariance matrix for use with the ACOV, HCC, or WHITE option in the MODEL statement and for heteroscedasticity-consistent tests with the TEST statement.

RSREG Procedure

ODS Graphics has been added to the RSREG procedure. New graphs include diagnostic plots, ridge plots, and surface plots.

SEQDESIGN Procedure

The SEQDESIGN procedure designs interim analyses for clinical trials. PROC SEQDESIGN computes the boundary values and required sample sizes for the trial. The boundary values are derived in such a way that the overall Type I and Type II error probability levels are maintained at the levels specified in the design. Available methods include fixed boundary shape methods (which include unified family methods such as the

O'Brien-Fleming method), Whitehead methods, and error spending methods. In addition to the boundary values, the SEQDESIGN procedure computes a variety of quantities such as average sample sizes and stopping probabilities.

SEQTEST Procedure

The SEQTEST procedure is used in conjunction with the SEQDESIGN procedure to carry out interim analyses for clinical trials. At each stage, you analyze all the data available at that point with a statistical procedure and compute a test statistic and its information level. You then use the SEQTEST procedure to compare the test statistic with the boundary values for that stage. If the information levels of the data do not match the levels specified in the design, the SEQTEST procedure modifies the boundary levels appropriately. In addition, the SEQTEST procedure computes quantities such as average sample sizes, stopping probabilities, and conditional power. At the conclusion of the trial, the SEQTEST procedure computes parameter estimates, p -values, and confidence limits.

SIM2D Procedure

ODS Graphics has been added to the SIM2D procedure. Means plots and scatter plots of the observed data are now available.

SIMNORMAL Procedure

The SIMNORMAL procedure becomes production with this release.

STDIZE Procedure

The NOTRUNCATE option in the FREQ statement specifies that frequency values are not truncated to integers. Quantile methods now accept noninteger frequencies and handle weights. In order to improve numerical precision, PROC STDIZE now creates double-precision values for output variables instead of inheriting the length of the variables in the analysis.

SURVEYFREQ Procedure

The SURVEYFREQ procedure now provides variance estimation by balanced repeated replication (BRR) and the jackknife methods, in addition to the Taylor series method. You can provide replicate weights for the new replication methods with a REPWEIGHTS statement, or the procedure can construct the replicate weights. PROC SURVEYFREQ now computes odds ratio and relative risk estimates. The new NOMCAR option in the PROC SURVEYFREQ statement requests a subpopulation analysis of the set of respondents for Taylor

series variance estimation.

SURVEYLOGISTIC Procedure

The SURVEYLOGISTIC procedure now provides variance estimation by balanced repeated replication (BRR) and the jackknife methods, in addition to the Taylor series method. You can provide replicate weights for the new replication methods with a REPWEIGHTS statement, or the procedure can construct the replicate weights. The OUTPUT and DOMAIN statements are now available. The new NOMCAR option in the PROC SURVEYLOGISTIC statement requests a subpopulation analysis of the set of respondents for Taylor series variance estimation.

SURVEYMEANS Procedure

The SURVEYMEANS procedure now provides variance estimation by balanced repeated replication (BRR) and the jackknife methods, in addition to the Taylor series method. You can provide replicate weights for the new replication methods with a REPWEIGHTS statement, or the procedure can construct the replicate weights. The new NOMCAR option in the PROC SURVEYMEANS statement requests a subpopulation analysis of the set of respondents for Taylor series variance estimation. PROC SURVEYMEANS now computes percentiles (Woodruff variance estimation only).

SURVEYREG Procedure

The SURVEYREG procedure now provides variance estimation by balanced repeated replication (BRR) and the jackknife methods, in addition to the Taylor series method. You can provide replicate weights for the new replication methods with a REPWEIGHTS statement, or the procedure can construct the replicate weights. In addition, PROC SURVEYREG also includes a DOMAIN statement, for domain analysis. The OUTPUT statement enables you to produce predicted values and residuals and put them into a SAS data set. The ORDER= option has been added to the PROC SURVEYREG statement. The new NOMCAR option in the PROC SURVEYREG statement requests a subpopulation analysis of the set of respondents for Taylor series variance estimation.

SURVEYSELECT Procedure

The SURVEYSELECT procedure now provides methods to allocate the total sample size among the strata. Allocation methods include proportional, Neyman, and optimal allocation.

TCALIS Procedure (Experimental)

The TCALIS procedure is experimental in SAS 9.2. It enables you to perform the same kind of statistical analyses that you can do with PROC CALIS. In addition, PROC TCALIS provides functionality such as multiple-group analysis, enhanced mean structure analysis, path-like model specification, support of LISREL-type models, customizable effect analysis, general parametric function testing, customizable Lagrange multiplier tests, and so on. Currently, you can specify COSAN models only in PROC CALIS, but not in PROC TCALIS.

TRANSREG Procedure

The TRANSREG procedure include new options for existing splines to make exterior knot specification easier and more flexible. PROC TRANSREG now includes the penalized B-spline. A number of plots are now produced, including Box-Cox plots, preference mapping, regression residuals, and scatter plots.

TTEST Procedure

The TTEST procedure now performs TOST equivalence analyses, analyses of treatment and period in AB/BA crossover designs, weighted Satterthwaite tests and confidence intervals, analyses of ratios, and one-sided analyses. It supports both normal and lognormal data. Sasabuchi tests and Fieller confidence intervals are computed for normal ratios. PROC TTEST now provides graphs, including histograms, densities, box plots, profiles, agreement plots, Q-Q plots, and interval plots. The new ORDER= option in the PROC TTEST statement specifies the sorting order for the levels of classification variables (specified in the CLASS statement) and crossover treatment variables (specified in the CROSSOVER option in the VAR statement).

VARCOMP Procedure

The METHOD=GRR option has been added to provide gauge repeatability and reproducibility analysis. The CL option has been added to the MODEL statement to compute confidence limits for all of the parameters of interest. This applies to the balanced one-way or two-way designs for METHOD=TYPE1 or GRR. Autocorrelation statistics and tests are now available.

VARIOGRAM Procedure

Autocorrelation statistics are now available. In addition, PROC VARIOGRAM produces graphics, including a scatter plot of the observed data, histogram of the pairwise distance distribution, plots of the empirical classical and robust semivariograms, and panels of the empirical classical and robust semivariogram plots.

What's New in SAS Web OLAP Viewer for Java 4.2

Overview

SAS Web OLAP Viewer has the following new features and enhancements:

- general viewer enhancements
- enhanced detail data
- browsing and searching for filters
- new display options for totals and members

SAS Web OLAP Viewer for Java will have no new releases. It has been replaced by functionality that is available in SAS Web Report Studio 4.3. For more information, see [What's New in SAS Web Report Studio 4.3](#).

General Viewer Enhancements

The following enhancements are available for the Table viewer and Color-Mapped Table viewer:

- A new drag-and-drop operation is now supported for moving data items. You can drag data from the Query panel onto a table, and between levels and axes within a table.
- Data from the table viewers can now be exported as a Microsoft Word document.
- A new **Isolate Member** menu item enables you to isolate a specific member of a hierarchy.
- Context menus in the table viewers are now accessed by a right-click rather than a left-click.

The ESRI map viewer contains a new rectangular selection tool that enables you to subset geographic data by making a rectangular selection.

Enhanced Detail Data

The Detail Data dialog box has the following enhancements:

- A new export dialog box enables you to export the detailed data table as an external file.
 - A new **Column headers** drop-down list enables you to select whether the column names or the column labels are displayed in the column headings.
-

Browsing and Searching for Filters

The Filters dialog box contains new Browse and Search panes. The Browse pane enables you to browse the hierarchy as a tree. The Search pane enables you to search for members within the hierarchy.

New Display Options for Totals and Members

The Totals dialog box contains the following new options:

- **Display** specifies the side of the table where totals and subtotals should be displayed.
- **Type** specifies whether the totals are based on the source data or on the data that is currently visible.
- **Itemize values across hierarchies** specifies whether itemized totals are displayed for each hierarchy member.

A new **Show ALL Member** option in the Preferences dialog box enables the ALL member to be displayed in your data viewers.

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What's New in SAS Web Report Studio 4.3

Overview

New and enhanced features in SAS Web Report Studio include the following:

- enhanced graph features
- new report capabilities
- enhanced productivity for users
- improved report administration
- enhanced printing capabilities

For information about the new features and enhancements in SAS Web Report Studio 4.2, see [What's New in SAS Web Report Studio 4.2](#).

Enhanced Graph Features

The following enhancements were made to graphs:

- A bubble plot has been added. This new graph type is a variation of a scatter plot in which the markers are replaced with bubbles.
 - Skins are available for graphs, so that you can change the appearance.
 - You can control the size of the “other” slice in a pie chart.
 - You can drag and drop a second measure for a bar-line chart or a scatter plot.
-

New Report Capabilities

The following new capabilities are available for reports:

- For prompts, a default value is no longer required.
 - Measure filters and rankings are now allowed on some synchronized objects.
 - You can add row numbers to list tables using the Properties dialog box.
 - Count distinct, which is a function that returns the number of distinct values for a specified column, is available in crosstabulation tables.
 - The layout for the report header and footer has improved.
-

Enhanced Productivity for Users

The following productivity enhancements are available:

- You can copy report sections.
 - Authorized users can open cubes and tables directly.
 - You can now insert rows and columns between existing rows and columns in the layout grid using the vertical toolbar.
 - Information map data item name changes are propagated automatically.
 - The state of the left pane (either hidden or displayed) is saved between sessions.
 - A new find option is available for multidimensional crosstabulation tables.
 - You can now select multiple publication channels when you schedule a report.
-

Improved Report Administration

The following improvements have been made to report administration:

- Multiple schedules for a single report can be made by multiple users.
 - Authorized users can update reports where referenced data items have been removed from an information map.
 - You can pass hidden data items to a destination report for relational data.
 - You can link a report to another SAS application that is passing parameters.
-

Enhanced Printing Capabilities

The following enhancements were made for printing:

- You can now specify that you want to print to the A3 paper size.
- Comments can be appended to printed report content.

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What's New in SAS Web Report Studio 4.2

Overview

New and enhanced features in SAS Web Report Studio include the following:

- improved user interface
- improved prompts and filters
- enhanced role-based settings
- updated report features
- updated graph features
- enhanced ability to distribute reports via e-mail
- improved support for totals based on multidimensional data
- enhanced multidimensional data source capabilities
- improved printing capabilities
- enhanced geographical map functionality

For information about the new features and enhancements in SAS Web Report Studio 4.3, see [What's New in SAS Web Report Studio 4.3](#).

Improved User Interface

The following enhancements were made to the user interface:

- The updated user interface provides users with a more traditional desktop-like experience in the browser.
- You can drag a data source item from the new Data Source pane and drop it on tables and graphs. This new drag-and-drop support is also available in the Assign Data dialog box (for visual elements) and when you are re-sizing graphs.
- Support for partial Web page refresh has been added.
- Object menus are available by right-clicking, instead of having a toolbar attached to the top of the object.
- The Logon screen and Welcome window have been redesigned.
- The new left-side panel lets you select data and navigate the Table of Contents.
- A small progress indicator to the right of the **View** tab is visible until the last element in a report is rendered on a page.
- The **File** menu has replaced the **Reports** menu.

- Users can open data sources (information maps) directly from the Open dialog box and the File Management window for a quick view of data.
 - In View mode, depending on your assigned role, you might be able to add group breaks, change the data items used in the section query, and delete objects (for example, tables and graphs). You can also interact with invalid objects to make them valid.
 - A calendar is available in view and design mode for prompting, filtering, and report scheduling.
 - Support is available for chart tips, tooltips, and hyperlinks from rendered stored process graph output (previously stored process output was static).
-

Improved Prompts and Filters

The following enhancements were made for prompts and filters:

- Prompts can now be cascading and hierarchical for relational data.
 - Prompts can now be dependent on other prompts so that selection lists are dynamic.
 - Search is available in the Filter dialog box for prompts and filters.
 - You can use data source (information map) filters and prompts for multidimensional data sources.
 - Filters and prompts are no longer required to be case-sensitive.
 - The order of prompts can be controlled.
 - There can be multiple filter conditions for a single data item.
 - You can filter numeric category data items by unformatted data values, which exposes new operators.
 - Section filters have been improved. You can save but not apply custom filters and prompt names.
 - Data source (information map) filters that are based on physical columns can display in SAS Web Report Studio.
-

Enhanced Role-Based Settings

SAS Web Report Studio ships with three predefined roles – Report Viewing, Report Creation, and Advanced. These roles manage the availability of application features, called capabilities. Your role and the capabilities you can access are defined by your system administrator.

If you migrate from a previous release of SAS Web Report Studio and you need additional capabilities for your role, contact your system administrator.

Updated Report Features

The following enhancements were made to reports:

- A new default report style, Plateau, is available for reports and replaces the former default style, Seaside. New reports use the Plateau style; however, legacy reports use the same report style that they were saved with in SAS Web Report Studio 3.1.
 - There are color differences in the geographic hierarchy in a geographical map for the Seaside, Festival, and Meadow report styles. Formerly, there was a fixed color specification that was independent of the report style that was used. Now each report style, including Plateau, has its own three-color specification.
 - You can link directly to a SAS stored process.
 - There can be hyperlinks in stored process output for graphs.
 - You can link to a specific report section either within the same report or within a section in another report.
 - You can add and review comments in a report, depending on your settings.
 - You can e-mail a link to a report. You can also include parameter values in a URL.
 - You can call a report directly from a URL.
 - There can be data-driven hyperlinks in tables. For graphs, the links display as data.
 - The Save As feature no longer warns you about overwriting a file when it is the same as the source file.
 - You can create a group break that contains analytic results (a stored process or stored processes) and specify that when the results execute, certain stored process parameters are filled in with the appropriate group break value.
 - In View mode, you can repair invalid table and graph elements. For example, a graph typically requires both a measure and a category value. Suppose that your graph is missing a measure. While in View mode, you can drag a measure from the left-side data pane and drop it on the graph to make it valid. In the previous release, you could repair only invalid table or graph elements in design mode.
 - You can now specify time zone preferences. For example, you can specify a time zone for dynamic dates.
-

Updated Graph Features

The following enhancements were made to graphs:

- You can add vertical and horizontal reference lines with annotations to charts.
 - You can change colors used collectively in all graphs within a report.
 - Conditional highlighting is also available for geographic maps.
 - You can set a uniform scale for measures across group breaks.
 - You can manually set a scale across group breaks.
 - You can display a percentage for pie charts. You can also remove the "other" slice.
 - You can have multiple lines, multiple bars, or both on a bar-line chart.
 - Graph borders are turned off by default.
 - A new tile chart is available.
-

Enhanced Ability to Send Reports via E-mail

The following enhancements were made for distributing reports via e-mail:

- You can e-mail a URL link to a report.
 - You can e-mail parameterized URLs for reports.
-

Improved Support for Totals Based on Multidimensional Data Sources

The following improvements were made for supporting totals:

- You can select parent values or visual totals.
 - You can show the percent of visual totals or of parent values.
 - Secure parent values are now supported.
 - Totals can be positioned at the top, at the bottom, on the left side, or on the right side of a table element.
 - You can total across hierarchies.
-

Enhanced Multidimensional Data Source Capabilities

The following enhancements were made for multidimensional data source capabilities:

- You can control the display of missing multidimensional values.
 - You can filter on multidimensional member properties when they are available.
 - You can isolate a multidimensional member.
-

Improved Printing Capabilities

The following enhancements were made for printing:

- You can now specify that page X of Y appear for reports that are printed.
 - There are additional page fit options.
 - You can specify that page numbers restart after each section.
 - There is more flexibility for entering margin settings.
 - Bookmarks are available for PDF output.
-

Enhanced Geographical Map Functionality

If geographical mapping is enabled for a multidimensional data source that is used in a report section,

you can insert a map object into the layout of the report. You can now have multiple geographical maps per section, and you can link from a geographical map to another report or to an external URL. In addition, you can also select multiple parameter values to be passed to a linked report.

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