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Welcome to our first anniversary edition.

With your support, In The Know has grown to become a valuable way for us to communicate with you and with its introduction we are now able to reach more of you than ever before. Our goal in 2004 is to make future content even more relevant, retaining a strong focus on technology and Hints and Tips. That's why we've launched our Reader Survey so you can help us plan future editions; we value your opinions and ideas!

2004 is set to be an exciting year, not least because SAS<sup>®</sup>9 will become available to all customers. This next generation of business intelligence solutions, tried and tested in the 'Early Adopter' programme, means IT departments have the reassurance of a high quality enterprise architecture that fully integrates with existing technologies. You can expect full coverage in later editions of In The Know.

We're proud of our long history of listening to our customers and our willingness to act on your comments: feedback is vital in keeping us 'real' and ensuring we continue to provide a high quality service based on knowledgeable people. New initiatives in 2004 will strengthen our award-winning customer services, and will see even more opportunities for you to showcase your achievements and to get the latest news from the global SAS community.

Finally, we had a great response to our Christmas Quiz and the results are in. The winners are: Tim Malvern, Barclaycard; Justin Bevan, Friends Provident; and Janice Simpson, NHS. Congratulations! The winners and runners-up have already been notified by e-mail. Thank you to everyone who took part.

## CORPORATE NEWS

### SAS Outperforms Competitors in Data Mining Category



Data mining continues to be a robust growth market, and SAS<sup>®</sup>, the leader in business intelligence, is gaining recognition in the vital area of predictive analytics.

Giga, a wholly owned subsidiary of Forrester Research Inc., recently issued a report by analyst Lou Agosta titled "Vendor Scorecard: Selecting Software for Predictive Analytics,"\* that assessed software from SAS and three other vendors. These vendors were evaluated on strategy, product functions, usability, pricing and contract options, and vendor viability and support. SAS was rated highly with its award-winning SAS<sup>®</sup> Enterprise Miner<sup>™</sup> product, the most comprehensive data mining solution in the market.

Within the area of vendor strategy, the report states that prospective buyers of software products for predictive analytics should pick SAS for its uncompromising dedication to data analysis. The report goes on to state that SAS Enterprise Miner has the most complete portfolio of algorithms for predictive modelling. In addition, it notes that SAS' interoperability through metadata with other best-of-breed SAS tools for ETL (extraction, transformation and loading), reporting and vertical applications gives SAS the edge over the competition.

"This assessment clearly shows how committed SAS is to the data mining software market," said Anne Milley, director of analytic intelligence strategy for SAS. "SAS delivers analytical software solutions that enable companies to easily identify significant relationships and trends - helping them to confidently make critical business decisions. This is why we are in a strong position to help our customers address the increasing need for high-end data analysis, which produces the largest returns."

### **Mining data for valuable intelligence**

SAS Enterprise Miner reveals significant patterns and trends, explains known outcomes and identifies factors that can secure a desired effect - all from collected demographic data and customer buying patterns. With this solution, companies can increase revenue, decrease costs and enhance their competitive position. Future enhancements to SAS Enterprise Miner will make it even easier to distil valuable data from structured, and unstructured, data.

SAS Text Miner, an add-on product to SAS Enterprise Miner, expands these data mining capabilities by providing a rich suite of tools for discovering and extracting knowledge from a wide variety of text-based documents, including e-mails, sales reports and call centre notes. Integrating text-based information with structured data enriches predictive modelling capabilities and provides new stores of insightful and valuable information for driving business and research initiatives forward.

SAS has the most complete solution on the market for supporting the entire intelligence-creation process within all areas of a business - from corporate performance to HR to finance to sales and marketing. This end-to-end enterprise intelligence infrastructure, known as the SAS Intelligence Architecture, gives businesses the agility they need to adjust to changes in the marketplace. Building on existing IT investments, the SAS Intelligence Architecture allows companies to remain responsive to the needs of the market, employees, suppliers and other stakeholders.

\* "Vendor Scorecard: Selecting Software for Predictive Analytics" (Lou Agosta, Dec. 22, 2003)

## **CORPORATE NEWS**

### **Software Vendors Come Together to Launch Java Tools™ Community**

Leading software vendors today announced the creation of the Java Tools Community (JTC), an initiative formed by members of the Java [tm] Community Process (JCP) to promote "tool friendly" Java technology standards. The JTC will promote the creation, adoption and advancement of Java™ Specification Requests (JSRs) for "toolability" and interoperability in the design-time area. Toolability is a measurement of how easy it is to build tools around a particular standard or technology. As a result, developers will be able to more easily use Java technology to build Java applications, increasing its rate of adoption.

Founding software vendors of the JTC include BEA Systems, Compuware, Embarcadero Technologies, Iopsis Software, JetBrains, Oracle Corp., Quest Software, SAP AG, SAS and Sun Microsystems. Founding customers include US Sprint & Verizon.

**"A forum where customers and vendors can work together to advance Java tools standards will help produce a much higher-quality set of development environments while further unifying the Java tools community." Mark Driver, research vice president, Gartner Group**

The JTC will work toward making standard Java technology APIs friendlier for tool development. Currently, tool vendors cannot easily take advantage of standard APIs when building functionality into their tools and often create proprietary techniques to achieve the benefits that standards were originally created to address. "The JTC is something that the Java community really needs," said Mark Driver, research vice president, Gartner Group. "A forum where customers and vendors can work together to advance Java tools standards will help produce a much higher-quality set of development environments while further unifying the Java tools community."

Supported by the JCP, the JTC will provide an online community for tool vendors, customers and developers to collaborate together in three major areas. First, the JTC will strive to maximise the toolability of current and newly proposed JSRs. Second, the JTC will be dedicated to the interoperability of Java development tools and extensions

through the advancement and proposal of design-time standards. Third, the JTC will strive for communication across the entire design-time community, allowing tool vendors, customers and developers to access information and provide input when creating or extending design-time Java standards via the JCP.

"The Java Tools Community initiative adds great value to the JCP. It encourages and synchronises greater involvement of Java tools vendors in creating Java technology standards," said Onno Kluyt, Director, Java Community Process, Program Management Office. "The initiative facilitates the combining of the expertise of the JCP members, such as the tool vendors, with the field experience of users resulting in even higher quality Java development tools and standards."

The JTC is actively seeking the participation of Java tools and extension vendors who are members of the JCP, as well as Java tool users and customer organisations outside of the JCP to ensure that the JTC aligns with the needs of users and customer organisations. "Eclipse supports any industry activities that support tool integration and interoperability", said Skip McGaughey, Eclipse Chairperson, "And I see the JTC as a strong industry initiative to achieve those objectives". There are three forms of participation in the JTC: core members who will form a steering committee; general members who will chiefly be Java software vendors; and community participants who contribute "advisory" customer input.

To learn more or to participate in forum discussions, visit <http://www.javatools.org/>

#### **About BEA Systems**

BEA Systems, Inc. (Nasdaq: BEAS) is the world's leading application infrastructure software company, providing the enterprise software foundation for more than 15,000 customers around the world, including the majority of the Fortune Global 500. BEA and its WebLogic(r) and Tuxedo(r) brands are among the most trusted names in business. Headquartered in San Jose, Calif., BEA has 77 offices in 31 countries and is on the Web at [www.bea.com](http://www.bea.com).

#### **About Compuware**

Compuware Corporation (Nasdaq: CPWR), a leading provider of software and technology services, delivers industrial-strength solutions for the enterprise-computing environment that dramatically improve productivity, quality and performance across the application life cycle. For more information about Compuware, please visit: <http://www.compuware.com/>.

### AstraZeneca Successfully Migrates Clinical Data and Meets Regulatory Requirements with SAS®

When AstraZeneca UK, a major hub of the global pharmaceutical company, needed to migrate clinical data - its most valuable asset - from one old system to a new one, any disruptions in data processes, any accidents during the transition, any delays -- even one day - could have cost the company millions of pounds. AstraZeneca UK had to ensure that the data would be transferred into the new environment quickly, accurately and in full compliance with the 21 CFR Part 11 regulations. The solution, based on SAS/Warehouse Administrator and underpinned by the SAS Intelligence Architecture, did exactly that.

**" We'd have real problems getting anything to market if we didn't have SAS integrated into our environment. ... Certainly, any submission to a regulatory authority would automatically be SAS-driven. "**  
**Paul Frost, Applications Development Leader, Clinical Information Management**

In late 2002, the immediate challenge facing the company was to migrate data from a soon-to-be-decommissioned database into its replacement, while ensuring that a complete audit trail of all transactions was in place to meet regulatory requirements. "We actually had to migrate from two clinical data entry systems, which fed into two disparate RDBMSs, into a common format: a new Oracle-based RDBMS," says Paul Frost [Applications Development Leader, Clinical Information Management] at AstraZeneca UK. "Introducing a new clinical RDBMS obviously has an impact on ongoing trials, and the time frame of trials means that decommissioning will almost always involve migrating data from one RDBMS to another."

The solution - comprising SAS/Warehouse Administrator, the SAS Intelligence Architecture to ease deployment, and related SAS technologies to support regulatory compliance - meant AstraZeneca was able to create and manage a highly controlled migration process, including the all-important audit trail which covered updates, deletions and insertions. "This gives the reassurance required by both AstraZeneca and the regulatory bodies we report to," says Frost.

SAS/Warehouse Administrator managed and documented the migration process; this involved exporting data from the legacy system to SAS datasets, which effectively formed the source data. This data is then used in conjunction with the new data collected in the replacement RDBMS. The data also had to integrate with other systems created for validation and reporting, which meant output structures had to be well defined. "Through a single point of control, SAS/Warehouse Administrator enables you to manage complex data integration processes. It manages the metadata used throughout, supporting impact analysis and providing the audit trails you need." The SAS approach combined best practice with a consistent structure in the architecture. Moreover, the additional tools developed by SAS UK, based on its position as a centre of excellence in data warehousing, covered areas such as configuration, job administration and password-protected audit. All of this contributed to faster deployment, easier scheduling of jobs, and easier maintainability.

AstraZeneca has a global three-year agreement with SAS, and knew from previous experience that all solutions involved in the migration project would come with full validation credentials and high levels of support, including ongoing support for future SAS versions. Another important consideration was SAS/Warehouse Administrator's ability to control data processes across a number of platforms, which meant inherent future-proofing.

"All pharmaceutical companies want to bring drugs to market as quickly and safely as possible," explains Paul Frost. "We'd have real problems getting anything to market if we didn't have SAS integrated into our environment. It's the de facto tool at the majority of AstraZeneca R&D sites for clinical and pre-clinical analysis. Certainly, any submission to a regulatory authority would automatically be SAS-driven." For some years, AstraZeneca has made extensive use of SAS in clinical analysis as well as in financials and product strategy.

"Based on our experience with SAS since 1977 we had the confidence it could deliver what we needed in the time frame," continues Frost. As expected, implementation was smooth. "It took three months from the first meeting with SAS to the first prototype study build. SAS Consultancy services took only 19 days, and came in on time and within budget."

#### **Standards and speed**

Batch load times were reduced by using automated job submission and parallel job flows. At the same time, an intuitive configuration management interface allowed easy migration from development-to-test-to-production environments with full version control. This approach helps when creating similar study structures, a useful feature for organizations that must address various standards for safety data. Development of all projects is underpinned by a common infrastructure which reduces installation and maintenance overheads.

"The greatest strengths of SAS are its analytics and data manipulation," adds Frost. "With SAS already used for data extraction, we're exploring how other SAS solutions can add value to the business. For example, looking at CDISC data standards. This involves examining output standards and technical solutions across AstraZeneca as well as looking at

both XML and generic data standards - we've defined our standards and are identifying how we can take them towards CDISC3 (i.e. the Submission Data Model) compliance. We've got two choices, based on our extraction tool that operates on the Oracle database and creates SAS datasets: we can either modify that to fit different data standards, or use SAS to do the transformation within SAS. We're now looking at SAS 9 - with its XML mapping tool and additional functionality, I think SAS 9 will make a big difference for AstraZeneca."

### **About AstraZeneca**

Employing 54,000 people worldwide, AstraZeneca is focused on providing prescription medicines that "make a real difference for patients" in key areas that include cancer, cardiovascular, central nervous system, gastrointestinal, infection, pain control, and respiratory and inflammation. It manufactures in 20 countries and markets products in over 100. In the UK, the company employs 10,000 people and operates eight principal sites, including an R&D centre of excellence at Alderley Park in Cheshire.

For further information on SAS/Warehouse Administrator, please visit:

<http://www.sas.com/technologies/dw/management/index.html>

or SAS Intelligence Architecture, please visit: <http://www.sas.com/technologies/architecture/index.html>

To see how SAS is helping the pharmaceutical industry, please visit: <http://www.sas.com/industry/pharma/index.html>

### Creating One Version of the Truth: Data Integration



As a manager of corporate data, typically drawn from multiple sources, you need to be able to identify duplicate records, link customers into households, uncover fraudulent activities and link customer information across many data sources.

Data Integration is therefore a crucial aspect of most data management systems, and SAS addresses this requirement by combining flexible matching algorithms with proven guidelines.

Like all good solutions there are elements of technology and human expertise: domain experts transfer their knowledge into the rules-based data management engine via a tailored interface. By eliminating manual standardisation and rationalisation processes, the SAS Data Quality solution decreases data reconciliation time from weeks to seconds. Moreover, data reconciliation rules are stored in a secure metadata repository for consistency and re-use.

#### Powerful Technology Means Low Cost

Leigh Bates, Data Quality Product Manager, SAS UK, explains why the SAS approach differs from other vendors.

“Data management vendors have traditionally invested a lot of time and effort working on-site to understand the specifics of customer data and formatting differences, and this is costly in terms of training and consulting. By contrast, our approach with the SAS Data Quality solution is to put customisation technology directly into the hands of domain experts, the people who with the best knowledge of your organisation’s data. Of course, we will be there to advise and support – but, due to the ease of use, our technology eliminates long-term consulting engagements.”

Sophisticated pattern recognition functionality, is the technology enabler that makes the difference. It allows the SAS Data Quality solution to understand the importance of elements within your business databases, and then match the identified information within or across databases. SAS does this by automating matching routines such as:

- Standardising formatting differences
- Identifying significant information within multi-value fields
- Translating abbreviations or numeric codes
- Performing fuzzy matching rules

All of this relies on hundreds of thousands of out-of-the-box and domain expert-defined comprehension and matching rules. And it delivers the highest matching accuracy in the software industry!

#### Point-and-Click Interface

Despite the power and sophistication of the solution, the point-and-click interface means you do not require specialised skills to make use of the advanced data integration capabilities. It only takes a few days to set up the solution and process data, even if some customisation is required. Once the recoding work is completed it can be handed over to for integration into the production ETL environment.

Without this point-and-click interface you could easily end up writing a lot of “if then, else” statements to cope with every possible permutation – time-consuming and potentially inaccurate.

The ability to quickly and effectively analyse and resolve data quality problems and integrate the transformations into the ETL environment means quality information and rapid return on investment.

#### Solving the Toughest Integration Challenges

SAS offers a complete data management methodology that outlines best practices. It describes in detail how to solve even the toughest data quality and integration problems. Applying the methodology is easy too. Full integration of the solution into ETL Studio enables rapid and reliable deployment of the data quality rules into an automated batch environment.

The key to success is that we do not treat integration issues in isolation but treat integration as one of the four blocks of data management: data profiling, data quality, data integration and data augmentation. We’ll look at the last of these in our concluding article of this series, in the next issue of In The Know.

The following example provides an insight into how the SAS Data Quality solution provides highly accurate matching from a single, easy-to-use interface:

## A Practical Example: Inserting Match Codes in Databases Prior to Joining

A company purchased a database of prospects for a direct marketing campaign. Prior to implementing this campaign, staff at this company wanted to remove the names of its current customers from the prospect database. They could identify current customers by merging the two databases where the COMPANY, NAME and ADDRESS fields are equal. But data in the databases often looked like this:

	Customer Table	Prospect Table
COMPANY	SAS Software Ltd	SAS Institute Inc.
NAME	Robert W. Smith	BOB SMITH
ADDRESS	SAS Campus Drive Cary, NC 27513-2414 USA.	Campus Dr, Cary, North Carolina, USA

These records clearly represent the same individual, but because of the variations, the records would not be merged. This type of problem occurs frequently in projects where data from two disparate sources is combined. Without being able to use match codes for a high rate of accurate joins, consolidating data from multiple sources can be a nightmare.

With SAS matching techniques you can make this process less stressful and make the data a lot more accurate. The first step is to generate match codes to each of the tables. Using the previous example, the match criteria would be for the COMPANY, NAME, and ADDRESS fields and the generated match information would be inserted into a MATCH\_CD field.

These records would now be identified as the same individual. Because BOB SMITH has the same match code as Robert W. Smith and Robert W. Smith is identified as an existing customer, Bob Smith will not be considered a prospect by an application that is searching the data for potential customers.

Tip: If you merge data from two databases based on the match codes, you must use the same match code definitions in both databases.

### TECHNOLOGY & SOLUTIONS

## What Does SAS<sup>®</sup> 9 Bring to Base SAS<sup>®</sup> Software

With SAS 9, Base SAS delivers a completely new framework that is easy to manage, scales to the enterprise, is highly interoperable and easy to use. From small data problems to those that are extremely large and complex, reading, formatting and analysing data with Base SAS has never been easier. This new white paper from SAS provides an overview of the major Base SAS 9 components and developments.

We are offering our readers the opportunity to download and view a free copy of this report online:  
[http://www.sas.com/offices/europe/uk/newsletter/feature/7feb\\_mar04/sas9.pdf](http://www.sas.com/offices/europe/uk/newsletter/feature/7feb_mar04/sas9.pdf)

### TECHNOLOGY & SOLUTIONS

## Introducing New Mining Capabilities

By Anne Milley

SAS has a rich and proven history of providing an integrated set of analytical tools for a wide range of applications including forecasting, optimisation, experimental design, quality improvement and predictive and descriptive modelling. In the summer of 2002, SAS Text Miner was first released to expand our customers' ability to analyse not only structured data sources, but also to gain knowledge and insight from the vast deposits of textual data collected throughout corporate and research organisations.

Responding to increased demand to distil even greater value from data - both structured and unstructured - SAS is pleased to offer new analysis capabilities in SAS 9.1 for both Enterprise Miner and SAS Text Miner.



**Anne Milley**  
director of analytical intelligence  
strategy, SAS

Enterprise Miner and Text Miner have both been redesigned for SAS 9.1 using an innovative Java client/SAS IOM server architecture to separate the mining computational server from the user interface workstations. This provides unprecedented flexibility for configuring an efficient installation that scales from a single-user system to a very large enterprise solution. Powerful servers may be dedicated to computing while end users move from office to home to remote site without losing access to mining projects or services. Mining processes can be run in parallel and scheduled in batch.

Batch processing was the No. 1 Enterprise Miner customer request for SAS 9.1. The optional Java Application Middleware enables clients to disconnect from a running diagram on the server or facilitate multiple users working with common SAS servers and a common SAS Metadata Server. Some process-intensive server tasks such as data sorting, summarization, variable-selection, and regression modelling have been rebuilt to distribute their work over multiple CPUs on the same system. All project information is stored on the SAS server for better wide-scale access and management throughout an organisation. The user interface for both products continues to be based on the popular and productive process flow environment but is now built using Java Swing libraries for delivering more advanced graphics and visualisation techniques with improved actions and controls. An easy-to-use Java Graphics wizard is also provided for developing customised graphs.

Other Enterprise Miner highlights include several new nodes and procedures, including support vector machines, Web path analysis, hierarchical associations, improved interactive decision tree training, autoneural networks, rule induction and more. Diagrams can be saved and imported as XML files for easy distribution to other data analysts. Complete compressed model results packages can also be created and registered to the metadata server for subsequent querying by data miners, business managers and data managers via the Web-based model repository. In addition to providing SAS, C and Java score code (including data preparation steps preceding modelling), model deployment through PMML will be available. An experimental Java API is also included for building customised Java applications that embed Enterprise Miner processes.

Other Text Miner highlights include additional language support, interactive graphics for linking significant concepts and hierarchical clustering output, the ability to analyse multiple text fields, Web crawling, additional parsing options and more. Since text mining, in general, is processor-intensive, improved performance also will be seen in Text Miner for SAS 9.1. Text Miner is fully integrated with Enterprise Miner, hence the distributable algorithms in Enterprise Miner also can be leveraged.

Collectively, these enhancements to SAS Enterprise Miner and Text Miner provide a more scalable and distributable set of tools for mining both structured and unstructured data sources to better address difficult business questions for even greater ROI.

For further information on SAS Enterprise Miner, text mining and data mining, please visit:  
<http://www.sas.com/technologies/analytics/datamining/>

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**Bio:** Anne Milley is director of analytical intelligence strategy at SAS. She works closely with development to articulate vision and define strategy for analytical technologies.

### We Want to Hear From You!

In the Know is now in its second year and we are interested to receive your thoughts about our newsletter. Please take a few minutes to complete this survey to help us better understand your expectations and enable us to develop the format and content. In appreciation, SAS will donate £1 to your choice of several charitable organisations. See survey for more information. Thank you for your feedback!

[http://www.sas.com/offices/europe/uk/newsletter/feature/7feb\\_mar04/survey.html](http://www.sas.com/offices/europe/uk/newsletter/feature/7feb_mar04/survey.html)

### New Features in SAS<sup>®</sup> 9

SAS 9 will be our most significant release for over a decade. Combining unparalleled ease of use, incredible depth of functionality, seamless IT integration and full intelligence architecture, it will extend SAS' position as the acknowledged leader in Business Intelligence.

This one-day course is for programmers, statisticians and data warehouse consultants who want to learn about the new features and enhancements included in SAS 9.

The course will enable you to understand SAS 9 architecture, use the new or improved functions and features of base SAS software and understand the SAS threaded kernel and when it is used.

#### Prerequisite Skills

Before attending this course, you should be able to:

- submit SAS programs on your operating system
- use a LIBNAME statement
- explain the structure of a SAS data set
- write a DATA step using statements and options
- write Base SAS procedures such as PRINT, SORT and MEANS
- use SAS functions, formats and informat

Please note that this course assumes some familiarity with SAS Version 8. If you are working with a previous release of the SAS System please contact your local office.

#### Course Topics

(This course uses SAS 9)

- Overview of the SAS 9 Architecture
- Overview of the SAS Management Console
- SAS Explorer Window Enhancements
- Introduction to SAS 9
  - defining SAS 9
  - identifying the major features and enhancements
  - recognising compatibility issues
- Enhancements to Base SAS Procedures
  - the SAS Scalable Performance Data Engine (SPDE)
  - using multi-threaded processing in the SORT, SQL and MEANS procedures
  - enhancements to existing SAS procedures such as FREQ and TABULATE
  - using the new MIGRATE procedure
- SAS Language Enhancements
  - searching character strings using new SAS functions and Perl regular expressions
  - longer format and informat names
- Enhancements to SAS/ACCESS<sup>®</sup> Software

- accessing Microsoft Access data using the SAS/ACCESS to Microsoft Access libname engine
- accessing Microsoft Excel data using the SAS/ACCESS to Microsoft Excel libname engine
- new options and support for data set options in the IMPORT and EXPORT procedures

- Moving and Accessing SAS 9 Files

- Enhancements to the SAS 9 Companion for Microsoft Windows

*(Please note: this course is still under development and content is subject to change)*

Courses are scheduled in Glasgow, Manchester and Marlow at various dates throughout 2004.

For further details and to register please visit <http://www.sas.com/uk/education/courses/sas9new.html> or call your local SAS office.

## How can I check if a directory already exists and if not, create it?

The macro works by using the %SYSFUNC macro function to check to see if a filename assigns correctly and if so puts out a message to the SAS log to say the directory exists. If the fileref does not assign correctly, due to the directory not existing, then the following code uses the %SYSEXEC macro function to create a new directory using the (dir =) parameter passed to the macro.

To demonstrate this, in this example we check for a directory that we know exists, c:\temp and then a directory that may not exist, c:\temp\sascode.

```
%macro chk_dir(dir=) ;
  options noxwait;
  %local rc fileref ;
  %let rc = %sysfunc(filename(fileref,&dir)) ;
  %if %sysfunc(fexist(&fileref)) %then
    %put NOTE: The directory "&dir" exists ;
  %else
    %do ;
      %sysexec md &dir ;
      %put %sysfunc(sysmsg()) The directory has been created. ;
    %end ;
  %let rc=%sysfunc(filename(fileref)) ;
%mend chk_dir ;

%chk_dir(dir=c:\temp) ;          /* <== your directory specification goes here ;
%chk_dir(dir=c:\temp\sascode) ;
```

Note: The above code has been tested using SAS 8.2 on the Windows operating system.

## How can I find out more information on the SAS query that has been sent to a database for processing?

The SAS options SASTRACE and SASTRACELOG are useful for diagnostic purposes when using the SAS/Access software. You can use these options to obtain more information on where each statement has been executed.

The options need to be submitted in an options statement before you execute your SAS code. These options will then display additional diagnostic information in the SAS log. This is useful if you are using code with implicit pass-through to enable you to confirm which statements, functions etc. are being passed to the database and which are being evaluated within SAS.

```
options sastrace = ',,,d' sastraceloc = saslog;
```

For the above to work on the HP/UX operating system and SAS 8.2 onwards, you will also have to set an environment variable within the operating system as follows:

```
export SAS_TB='y'    * where SAS_TB is uppercase and y is lowercase ;
```

