



e-business case studies

SAS Institute:

Web-enabling integrated enterprise information-delivery systems



Putting e-business to work

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SAS Institute

The Company

- Headquartered in Cary, NC
- World's largest privately held software company
- Serves 3.5 million users in 115 countries

The Web Site

www.sas.com

The Benefits

- Thin-client application deployment
- Reduced application maintenance costs
- Improved productivity

The Technology

- IBM WebSphere™ Application Server, Standard, Advanced, Enterprise Editions
- Lotus® Domino™
- IBM MQSeries® for various platforms
- IBM SecureWay® Directory
- IBM HTTP Server

The Management Software

- Tivoli® TME management software

Services

- IBM Global Services

OVERVIEW

e-business Case Studies: SAS Institute

A leading provider of integrated enterprise information-delivery solutions—including intelligent warehousing, data mining, analysis and reporting—SAS Institute is the world's largest privately held software company. Headquartered in Cary, North Carolina, the company serves some 3.5 million users at 33,000 sites in 115 countries.

In 1999, SAS posted annual revenues in excess of \$1 billion, with 60 percent of new software license revenue coming from intelligent warehouse-based solutions. Typical SAS solutions include customer relationship management; financial consolidation and reporting; enterprise information systems management and clinical data review; reporting and analysis.

Through these solutions, SAS helps companies transform large amounts of disparate organizational data into information and knowledge that analysts and researchers can leverage for better business decisions. Always striving to ensure that its solutions address customer needs and keep up with their changing business models, SAS looked to the Internet. Its objective: integrate the Web into all its decision-support solutions and enhance the value of its core offering, SAS software, Version 8, through Web-enabled intelligent warehousing, data mining, analysis, reporting and other capabilities.

To transform this vision into reality in an IT environment rife with diverse platforms and conflicting technologies, SAS, a long-time IBM Business Partner, linked its vision with that to deliver solutions based on the Application Framework for e-business.

BUSINESS DRIVERS

Combining the Reach of the Web with the Knowledge in the Data Warehouse

In 1997, SAS introduced SAS/IntrNet, its Web-enabling framework for SAS software. “SAS/IntrNet provides customers with a SAS-supported methodology for making the Web a part of their application environment,” says Aaron Hill, SAS senior manager for enabling technologies.

The Web has revolutionized the way people do business. Application development has moved from a client/server environment to a client/services model, where the client can be very thin, with only a browser installed. And users have changed, too. New Web technologies have enabled new users to access very powerful solutions with little or no application expertise required.

SAS/IntrNet provides thin-client access for a system that had historically run in a client/server environment. In other words, SAS/IntrNet expanded the number of people who could use the SAS server on the back end. Basically, anybody who could point and click with their Web browser could now access the power of SAS software on the server.

Today, SAS is extending that concept to embrace more than just the Web. SAS Integration Technologies, which enable applications to communicate with each other without IT intervention, allow individuals to subscribe to information relevant to them, and help information suppliers deliver this information efficiently and effectively. “SAS Integration Technologies allow object transport, directory services and message queuing to be used as part of the application environment,” Hill explains. “And IBM is supporting the delivery of these technologies with the Application Framework for e-business.”

The Application Framework for e-business provides:

- A vision for e-business and a set of objectives
- A methodology and technology direction for building e-business applications
- A prescribed set of standards and technologies
- An integrated set of software, a choice of servers and services.

“To provide closed-loop systems, you have to enable application-to-application and application-to-user integration. And technologies such as messaging, server-side Java, Enterprise JavaBeans and XML are key to making this happen. We believe IBM is on the leading edge of these e-business technologies.”

—Aaron Hill, Senior Manager for Enabling Technologies, SAS Institute

According to Kathy Lange, IBM alliance manager for SAS, the company's decision to embrace the Application Framework for e-business was driven largely by its customers' demands. "The way we can best serve those demands," she explains, "is through adherence to industry standards, such as the Lightweight Directory Access Protocol (LDAP), CORBA, DCOM and even IBM MQSeries, which has become a de facto messaging standard for our customers. The development of standards-based interfaces has been driving this strong trend towards application integration over the past two years, enabling systems that weren't designed to talk to each other to communicate freely."

In particular, SAS is striving to provide its customers with closed-loop solutions—systems that enable back-end data to feed front-end processes, which, in turn, update the back-end systems. "To provide closed-loop systems, you have to enable application-to-application and application-to-user integration," Hill explains. "And technologies such as messaging, server-side Java™, Enterprise JavaBeans™ and XML are key to making this happen. We believe IBM is on the leading edge of these e-business technologies."

For many SAS customers, their back-end systems rely on mainframes, such as the IBM S/390®. In fact, more than half of SAS' annual revenues come from mainframe-based platforms. "SAS/IntrNet is really changing the way people use SAS on the mainframe," Hill says. Lange adds, "Working with IBM through the Application Framework for e-business has enabled us to better support not only the S/390, but a wide variety of platforms, operating systems and software."

DEVELOPMENT STRATEGY

SAS/IntrNet Components

SAS/IntrNet extends SAS software's powerful data access and retrieval, analysis and reporting functionality to the Web. It can run in conjunction with servers like IBM WebSphere Application Server or Lotus Domino, and includes:

- Application Dispatcher, a CGI-based application distributor
- htmSQL, a query processor that enables the publishing or formatting of the query result set as HTML
- Java classes for application and report distribution
- Java Tunnel Feature, a CGI-based HTTP tunnel for drilling through firewalls.

SAS Integration Technologies Components

Through Web-enabled SAS software, organizations benefit from improved information delivery. SAS Integration Technologies include:

- Integrated Object Model, a gateway for component object request communications with the SAS server, supporting CORBA, COM and DCOM
- MQInterface message queuing capability
- LDAP interface support
- Publish/subscribe framework.



SAS Institute leads the industry in its investment in research and development. Much of this development takes place at the Institute's world headquarters in Cary, North Carolina, in the state's Research Triangle Park region.

Featured IBM Technology

WebSphere Application Server

The IBM WebSphere family of products offers customers an open, standards-based Java server runtime environment, along with Web site development tools, commerce software and management software to help companies build, manage and deploy powerful, portable e-business applications. www.ibm.com/software/webservers/appserv

Lotus Domino

The Domino Server Family is an integrated messaging and Web application software platform for growing companies that need to improve customer responsiveness and streamline business processes. Domino is based on a singular architecture, so you can choose the best Domino Server to meet your current needs and feel assured you have a server infrastructure with the flexibility and power to grow with you. www.lotus.com/domino

MQSeries

The IBM MQSeries family provides an open, scalable, industrial-strength messaging and information infrastructure, enabling enterprises and beyond to integrate business processes. www.ibm.com/software/ts/mqseries

IBM Technologies: Perfect Fit for SAS Software

As Figure 1 shows, SAS is leveraging WebSphere Application Server and Lotus Domino as its mid-tier software, with MQSeries providing the messaging capability and IBM SecureWay Directory the LDAP directory service support. “With the Application Framework for e-business, we’ve been able to develop that paradigm very quickly,” Hill says.

SAS applications run on S/390, IBM RS/6000®, IBM NUMA-Q® and IBM Netfinity® servers, as well as on the IBM AS/400® server through the Netfinity server card.

Equally important to the success of the integration was the close relationship between the two companies. SAS is a Premier member of IBM’s PartnerWorld for Developers. “We worked very closely with IBM to develop the interfaces between the IBM products and SAS solutions and deliver these Web-enabled solutions to our customers in a timely fashion,” Hill says.

SAS component	Application Framework tool or technology
Integrated Object Model (IOM)	IBM Component Broker
MQInterface	IBM MQSeries
LDAP Interface Support	IBM SecureWay Directory
Application Dispatcher	IBM WebSphere Application Server or Lotus Domino

Figure 1. SAS Components Utilizing the Application Framework for e-business

Closer Ties for Mutual Benefit

SAS is also looking to IBM to bolster its services capabilities. "Ninety-five percent of our revenue comes from software," Lange reports. "We look to business partners to provide services around SAS software and systems integration. IBM Global Services already has SAS skills, and we are working with them to expand their SAS capabilities."

Recently, IBM Global Services announced the formation of a SAS consulting practice and further development of e-business intelligence solutions that integrate the IBM DB2® database product family and SAS software. The agreement between IBM and SAS and the joint development efforts will result in:

- The creation of a consulting practice in IBM Global Services specializing in SAS solutions
- Closer integration of SAS solutions and IBM DB2 Universal Database™ to further enhance performance on all IBM server platforms
- Access by IBM Global Services to a range of SAS solutions for business intelligence, data warehousing and decision support.

Featured IBM Technology

IBM HTTP Server
 Internet Connection Server for AS/400, previously called IBM HTTP Server, utilizes HTTP (Hypertext Transfer Protocol) to provide World Wide Web browser clients with access to AS/400 multimedia objects, such as HTML (Hypertext Markup Language) documents.
www.as400.ibm.com/http

IBM SecureWay Directory
 SecureWay Directory provides a common directory for customers to address the proliferation of application-specific directories, a major driver of high costs. It is a Lightweight Directory Access Protocol (LDAP) cross-platform, highly scalable, robust directory server for security and e-business solutions.
www.ibm.com/software/secureway

Tivoli TME management software
 Tivoli management solutions centralize and automate IT processes, end-to-end. They help unite IT management processes with business objectives to deliver business-relevant services to your customers.
www.tivoli.com

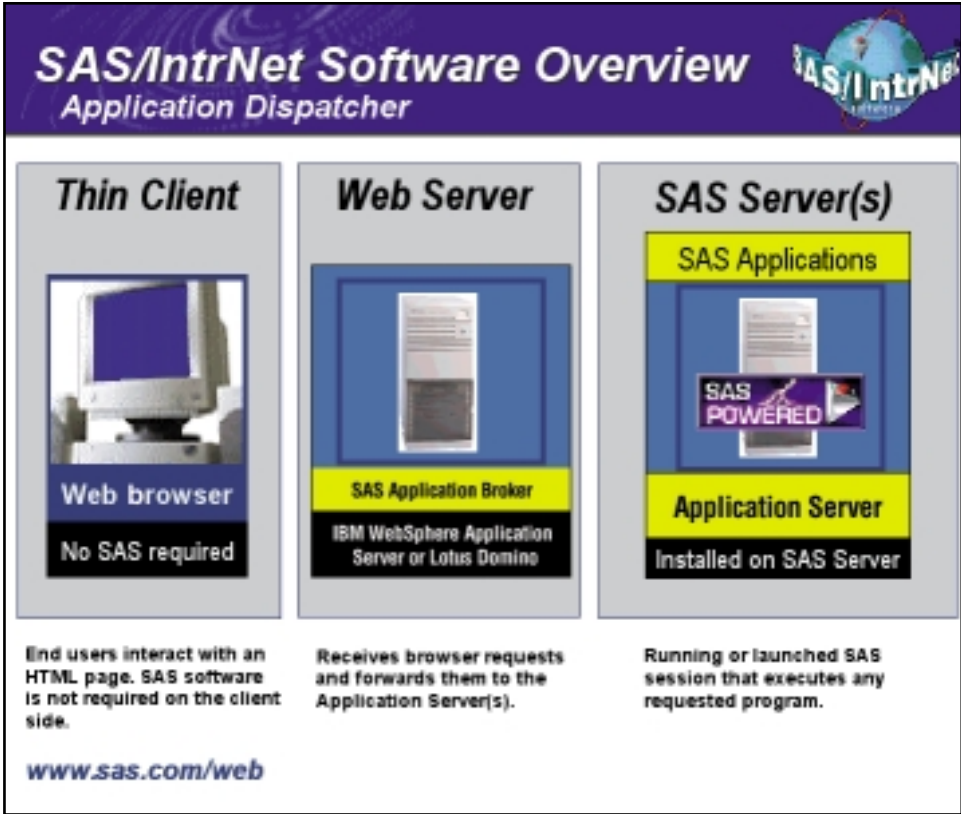


Figure 2. Overview of SAS/IntrNet's Application Dispatcher

RETURN ON INVESTMENT

Scalable System Nets Added Revenues

“As we look forward, our Web-enabled offerings in e-Intelligence, CRM, SRM and other decision-support areas will have a major impact on growth over the next few years. And SAS offerings that leverage the Application Framework for e-business—as well as our continued strong relationship with IBM—will play a key role in this growth.”

*—Kathy Lange, IBM Alliance
Manager, SAS Institute*

Both SAS and its customers benefit from the Application Framework for e-business. “IBM is very visible within SAS,” Lange asserts. “We have a customer technology center, and we have a jointly staffed International Competency Center on-site at our world headquarters in Cary, North Carolina. These facilities help our customers size and tune SAS applications on IBM hardware. It also gives them access to services that help them tune SAS for DB2. That really helps give our customers confidence when they install SAS solutions on IBM platforms.”

The company’s work with IBM through the Application Framework for e-business is helping to ensure that new solutions will be readily compatible with IBM platforms and products. The SAS e-Intelligence initiative is one example. e-Intelligence solutions will consolidate data from the Web as well as from other customer touch points to create holistic customer profiles and leverage those profiles for business intelligence.

“For e-Intelligence, the scalability of the Application Framework for e-business is a key differentiator,” explains Jeff Yaguda, the SAS global market manager for e-Intelligence. “Customers may have data residing on an S/390 or on a UNIX® or AS/400 server. There may be gigabytes of clickstream and other data generated from the Web. Products from other vendors that offer similar functionality do not scale to support this kind of environment.”

Lange notes that the e-Intelligence solutions will make use of Tivoli TME management software to collect data on network performance for performance and capacity planning. Other solutions areas that will make use of the Application Framework for e-business are customer and supplier relationship management (CRM and SRM). Hill explains, “Because we have such a strong relationship with IBM and have integrated our solutions with a lot of the offerings from the Application Framework for e-business, IBM customers can integrate SAS CRM and SRM solutions seamlessly with their existing environments.”

Ultimately, SAS will Web-enable all its software, which will have a tremendously positive impact for customers and on SAS’s bottom line. Lange notes: “SAS achieved \$1 billion in revenues for the first time in 1999. As we look forward, our Web-enabled offerings in e-Intelligence, CRM, SRM and other decision-support areas will have a major impact on growth over the next few years. And SAS offerings that leverage the Application Framework for e-business—as well as our continued strong relationship with IBM—will play a key role in this growth.”

Function	Benefit
Application development	<ul style="list-style-type: none">• Shorter time to market• Ability to provide SAS solutions for almost any client computing environment
Marketing	<ul style="list-style-type: none">• SAS and IBM consultants and sales personnel can provide integrated software and hardware solutions to meet customer data warehousing and other decision-support and e-business needs
Customer support	<ul style="list-style-type: none">• Customers can size and tune their SAS solutions in IBM environments, providing a proof of concept before actual implementation• Easier implementation of SAS solutions for IBM users

Figure 3. Customer Benefits of the Alliance Between SAS and IBM

CUSTOMER SNAPSHOT

BMG Direct Boosts Database Marketing Productivity with SAS Data Warehousing Solution

“Because of the responsiveness of the warehouse, and the SAS capabilities in general as an engine, we were able to implement a test program that generated roughly \$250,000 in profit in just a couple of days During the warehouse design and test stage, the team of SAS and IBM consultants demonstrated a gratifying commitment to the project, and they largely determined its eventual success.”

—Jeff LeSueur, Senior Director of Database Marketing, BMG Direct

The introduction of the Web as a viable marketing channel necessitated a dramatic change to existing single-channel marketing information systems. Following its success with BMG Music Service Online (<http://www.bmgmusicservice.com>), consistently one of the top 20 Web sites in the United States, BMG Direct turned to SAS for a data warehousing solution.

BMG Direct operates the world’s largest group of music clubs, including BMG Music Service, BMG Classical Music Service, BMG Jazz Club, Sound & Spirit, and Ritmo y Pasión. With 10 million club members spread across the United States and Canada, and thousands of titles from the industry’s leading companies, BMG Direct offers more than 12,000 CDs and 1,400 merchandise items in its catalog. The company’s mailing operation in Indianapolis, Indiana, processes over 13 million orders per year; and its product fulfillment center, based in Duncan, South Carolina, ships 120 million CDs and cassettes annually.

Helping customers sort through this huge collection in order to find the kind of music they want is a major challenge at BMG Direct. One way the company meets that challenge is through direct mail, with the distribution of more than 200 million pieces annually. The company also makes pioneering use of advanced database marketing technologies, aimed at improving service to individual customers in the direct-to-home shopping arena.

The raw material for the company’s database marketing activities is a 60-gigabyte production master-file containing 30 million member records and 500 million transactions. However, the archaic nature of the existing file system was seriously impeding BMG employees from doing their jobs. Says Jeff LeSueur, senior director of database marketing, “Our main data warehouse challenge is how to efficiently turn customer data into useful information, and our existing system was not meeting that challenge.” LeSueur also wanted to make it easy for users to access the data without having to go through IT to get answers to important questions. In short, BMG needed a front end that would give users direct access to the data they needed in a flexible and timely manner.

SAS leveraged the vision and methodology of the Application Framework for e-business to deliver a data warehousing solution that has resulted in a measurable improvement in productivity at BMG Direct. LeSueur explains, “The performance improvement in accessibility of data has dramatically improved the productivity of the modeling and analysis group, and the warehousing of the data has enabled us to outsource analysis with relative ease. For example, we were able to extend our telemarketing programs from quarterly to biweekly name selection, which is much more timely, and outside consultants have been able to access the data remotely almost as easily as we can.”

LeSueur continues: “With our new capabilities, we doubled the response rate to our telemarketing program from 30 percent to 60 percent, and we decreased the bad [telephone] number rate from the high 30s to the mid 20s. Not only did we increase the sales per call, but also the number of successful calls. And because of the responsiveness of the warehouse—and the SAS capabilities as an engine—we were able to implement a test program that generated roughly \$250,000 in profit in just a couple of days. In addition, several models completed in the last two months will provide an approximate \$12 million increase in our gross margin.”

The first step SAS took in approaching the data warehousing project was to show the top executives at BMG Direct that a data warehouse would work, before they made a significant investment in the technology. With the help of consultants from SAS and IBM, they tested a pilot system at the IBM RS/6000 Benchmark Center in Dallas, Texas, using real volumes of data from BMG Direct’s data tapes. The results of the pilot test let LeSueur return to the executive committee with the information they needed to give the go-ahead. “We knew, for a very nominal expenditure, whether or not we had the right platform and the right approach before we ever had to buy anything,” says LeSueur. “I was able to go to the executive committee and assure them that this configuration would really work, giving us vast improvement in the efficiency of throughput, which ultimately would give us tremendous improvement in productivity.”

BMG Direct’s data warehouse runs on an IBM RS/6000 S7A with 4 processors, and a 300-gigabyte SSA disk storage. The internal SAS team maintains a 130-gigabyte warehouse on a UNIX platform, which provides weekly sales forecasts, telemarketing name selection, modeling and ad hoc analysis. Currently, the company is implementing a webEIS-powered front end, providing warehouse access via SAS/IntrNet to a broader range of non-technical people, such as marketing staff. webEIS, a component of SAS AppDev Studio, is a robust Java application for creating tailored online analytical processing (OLAP) InformationBeans without the need to write a single line of Java code. AppDev Studio is a thin-client development suite tailored for information delivery.

Crucial to the success of BMG Direct’s data warehouse were the consultants who worked on the project. “All of the vendors gave us honest knowledge with no hype,” says LeSueur. “During the warehouse design and test stage, the team of SAS and IBM consultants demonstrated a gratifying commitment to the project, and they largely determined its eventual success—the results speak well of their efforts. I was very pleased at all the support we received.”

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