

Software AG - Taking on the Establishment with XML

An IDC White Paper

Analyst: Rob Hailstone

November 2000



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What will be the role of Software AG in the evolving IT marketplace, how well adapted to the needs of the market are its products and will this be sufficient to ensure the future success of the company?

Software AG is continuing to support and enhance its solutions for its traditional market space of heavy-duty DBMS and application development/deployment, but the mainstay of its future growth will come from providing software infrastructure products in support of eBusiness.

IDC believes that Software AG has correctly identified the need to address fragmented systems through integration technology as a fundamental requirement for eBusiness, and has been quick to recognise the potential of XML to reduce the complexity of integration issues. In addition to providing a sound set of technologies for the reuse and integration of legacy applications through “traditional” EAI techniques, Software AG has become a technology leader in the provision of software for the persistent storage of XML data. This combination gives Software AG a particularly strong product line that should be evaluated by organisations that recognise that they need to address their integration issues.

Software AG has also identified the trend for organisations to look for full solution providers instead of simply acquiring best of breed products. To this end the company has created a successful partnership program, bringing providers of complementary technologies together with implementers and integration partners. This has allowed the company to create a portfolio of reference sites that have implemented successful solutions featuring Software AG products alongside those of other vendors. This has enabled the company rapidly to establish a presence in its chosen eBusiness space.

While European vendors have previously been disadvantaged in comparison with their US competitors - which have the benefit of the self-sustaining US marketplace - the eBusiness world now gives Software AG the ability to exploit its experience in selling into a multi-currency, multi-lingual, multi-national environment. With the recently announced acquisition of SAGA Software, Software AG will gain the potential for significantly higher penetration in the worldwide markets including the USA.

These factors, coupled with Software AG’s ability to recognise market needs and deliver appropriate technology solutions, should assure the company of a prominent role in the software infrastructure marketplace.

Introduction

To put into context the positioning of Software AG it is necessary to have an understanding of the business and technology issues that are driving the progress of IT.

Software AG is seeking to position itself as a major supplier of the software infrastructure for eBusiness, and this white paper will evaluate this positioning and the technology that underlies it. These next sections outline the primary movers and trends and provide the context for our analysis of Software AG.

eBusiness and IT Infrastructure

One way of looking at the impact of eBusiness is to consider that the human operator has been taken out of the feedback loop that exists between supplier and purchaser. Instead of IT systems modelling a “real world” event – such as the receipt of an order form, or a cheque, or a telephone enquiry on the status of an account – the real world has migrated to the IT system. When the human operator is removed, IT is no longer modelling real world events – it has become the real world itself.

When looked at in this way the impact of eBusiness results in some very obvious requirements that impact the types of systems that IT must deliver. The most obvious need is for continuous availability, since when the system becomes the real business world it plainly follows that when the system is unavailable business cannot be conducted.

It also follows that without the human operator acting as a buffer, eBusiness exposes our business processes directly to those with whom we conduct our business affairs – whether as a customer, provider or business partner. So we have to look at our business processes in a new light – do they really represent our organisation in the way we would wish it to be viewed?

In this respect the most important attribute of our business processes is that they should be entirely consistent. When a customer carries out a series of online transactions – such as making a payment followed by initiating a new purchase – it would be unforgivable if failure to consistently apply the payment in real time to all systems caused the purchase transaction to fail a credit check.

There are countless other examples of how to get eBusiness wrong, made more complex by the fact that the customer might use different access methods for different transactions depending on what is most convenient at the time. The detailed view of the customer should be the same to a human operator in a high street branch as it is via the Web, and still the same if contact is made through a telephone

support centre. For most mature organisations, eBusiness must coexist with all other forms of interaction with the outside world.

These simple examples indicate that attitudes towards IT must be revised if eBusiness is to be implemented successfully. In recent years business management has been primarily concerned with the functionality of applications. The software infrastructure has only become visible when it has failed.

In the new world of eBusiness, the properties of the infrastructure that ensure consistency and availability become equally visible. Our new era of computing must be accompanied by new investments in the IT infrastructure – hardware, networking and software.

Fragmentation – the Historical Impact

For historical reasons the mainstream IT industry has taken a different route to address its integration requirements. From the time that an IT shop implements its second system, integration issues have had to be managed. For much of the history of IT the integration process has been accomplished by periodic extractions of batch updates through programs that have been hand-coded and maintained at significant cost. The more recent requirement for real-time co-ordination between systems has also been addressed by hand-coded utilities. The proliferation of custom-coded point solutions to integration problems has now created an unacceptable overhead for many organisations.

A more rigorous and generalised approach to systems integration has not been sought until the last few years because of a number of false-starts and misconceptions:

1. The problem of fragmented systems has always been viewed as a temporary migration issue rather than a long-term problem.
2. Initiatives such as the corporate database, and later integrated packages such as ERP systems, were intended to remove the need for integration by delivering a fully consistent information base across all systems.
3. Failure to provide adequate integration lead to internal inefficiencies, but this was offset by reluctance to invest in an integration infrastructure that might have a long payback period.

These issues have been overtaken by a more realistic set of opinions:

1. Fragmentation of systems – and the consequent need for integration - is an inevitable result of technology evolution, evolving business models & the proliferation of mergers and acquisitions.

There is no likelihood that the need for integration technologies will go away.

2. Experience has shown that all-embracing solutions that seek to avoid integration issues by implementing a completely consistent set of applications across the organisation never actually achieve this aim. They are expensive solutions that take a long time to implement and always leave some organisation-dependent part of the solution to be custom-coded. This is not to say that they are not beneficial in the right circumstances, simply that they do not remove the need for integration.

3. Because eBusiness exposes business processes to the outside world, integration is no longer just a cost trade-off for internal efficiency. Failure to provide a consistent view of business processes to external users of the system rapidly leads to overall dissatisfaction with the quality of service and significant potential for lost business.

Enterprise Application Integration

The recognition of these facts, and the extreme complexity of hand-coding effective real-time integration solutions, has led to a significant software sub-industry that is currently enjoying substantial growth. There is a recognised requirement for software products that deliver integration with a very rapid deployment, acceptable start-up costs and low maintenance overhead.

The mainstream product sets that have evolved are generally termed EAI (Enterprise Application Integration). Many of the first-generation EAI products have their roots in the ETL (Extract, Transform, Load) sub-industry that addresses the need to refresh the contents of data warehouses from operational systems. The complexity and real-time nature of the requirements have led to second generation EAI products that deploy a “hub & spoke” architecture. These build heavily on low-level middleware technologies such as messaging, data transformation and remote procedure calls, but they add two important components:

1. A centralised rules base that determines, for each change notification, which recipients need to be informed. This will often include a persistent storage mechanism for messages so that applications that are temporarily unavailable can catch up automatically when the service is restored.
2. Sets of specific “adapters” that convert message contents between the generalised format used in the hub and the application-specific data requirements of each target system.

Of course, adapters will never be available for every application or

every target platform, so in most implementations there is a need to custom-code at least some of the adapters. The availability of a Software Development Kit (SDK) from the EAI tool provider helps to reduce the work needed.

The architecture of EAI tools brings some major benefits over hand-coded integration in addition to the obvious cost and implementation time impacts:

- The store and forward messaging that is supported by most products means that one system experiencing poor availability does not impact the overall availability of the rest of the application portfolio.
- When one of the underlying systems is subsequently replaced or a new system added, the impact is reduced to the maintenance of the rules driving the hub, plus the replacement of a single adapter. This is in contrast to having to modify and test custom code in each of the other systems.

B2B

The first phase of eBusiness focussed on the interaction between the consumer (or business purchaser) and the Web site of the supplier. On top of this requirement, second-generation eBusiness adds the need for direct system to system interaction between businesses – so that integration issues become centre stage. This scenario not only removes the human operator as a buffer between the outside person and the system, but it additionally removes the outside person as a buffer between the organisations. We are now faced with the most demanding integration requirement the industry has yet encountered.

Direct business-to-business (B2B) trading requires that systems that have been configured just to suit the needs of one organisation now have to share messages with the systems of other organisations. This is an open-ended many-to-many relationship. With very few exceptions, suppliers will need their systems to interface with a varying population of customer organisations, and customer organisations will need to interface with the systems of many suppliers. And, of course, any organisation will have a supply side and a demand side.

The complexity of this arrangement is beyond the scope of most EAI products. Instead the interface between systems needs to be raised to a higher level altogether. The way the industry is addressing this requirement is to reintroduce the concept of the document – such as a sales order form – as an electronic means of exchanging high level requirements. This in turn raises the need for an agreed way of

formatting these documents so that they can be understood by all the business partners.

This requires a brief explanation of mark-up languages.

Mark-up Languages

Recent years have seen increasing use of “MLs” or Mark-up Languages as effective mechanisms for reducing the dependence on particular technologies or hardware devices. A mark-up language embeds within the text of a message or document short “tags” that describe what the following content represents. This allows an application to understand the content of a form, for example, without ever having seen a form of that layout before.

Mark-up languages that have enjoyed considerable success include:

- SGML (Standard Generalised Mark-up Language) used mostly for electronic publishing
- HTML (Hypertext Mark-up Language) as a generic means of formatting output for Web browsers
- WML (Wireless Mark-up Language) to cater for low bandwidth wireless-connected devices.

The concept of globally agreed definitions for exchanging documents has been welcomed by user organisations around the world. These mark-up languages have achieved the ability for users and organisations to create meaningful communications with others in the value chain without needing to be aware of the specific technology used by each recipient. In other words, the mark-up languages have become the means of integration across a wide variety of technologies.

XML and its Evolving Role

XML (eXtensible Mark-up Language) extends the concept of mark-up languages to permit new types of information to be identified and incorporated in documents through users defining their own descriptive tags. This is at once both a liberating and a complicating addition.

- It is liberating because it means that new requirements for exchanging information do not have to wait for the development of any new technology or mark-up language, but can be achieved by extending the language as appropriate.
- It is complicating because of the potential for different organisations to implement the same data requirements in different ways, or to use the same tag in subtly different ways.

To overcome the potential complexity a number of industry consortia have been established to propose standard ways of defining certain commonly used document types. XML itself comes under the auspices of the World Wide Web Consortium (W3C). A worldwide trade organisation ebXML (electronic business XML) made up from United Nations and OASIS bodies is working on standards for secure international electronic trade for organisations of all sizes. There are a number of vertical industry bodies working on the common use of XML throughout their own specific industry to enable more efficient trade – of these RosettaNet is perhaps the best known, representing the IT, semiconductor and electronic components industries. Microsoft’s BizTalk initiative is aimed at agreeing standards for defining XML schemas (the definition of the types and formats of the contents of a particular type of document).

XML has followed a path similar to that of many other technologies. The initial idea was greeted with enormous enthusiasm and expectation, followed by a period where much of the activity was being carried out below the visible surface of IT. This period – which is unavoidable – lead to a degree of scepticism and the relegation of XML (by some) into the “marketing hype” category, but now the technology has become an inevitable accompaniment to any new implementation of eBusiness.

Software AG

This rather lengthy description of underlying trends in eBusiness and integration technologies provides a necessary background. Given this context, we can now describe how this applies to Software AG.

Background and Pedigree

Software AG is headquartered in Darmstadt, Germany, where it was founded in 1969. The company is probably best known for the Adabas DBMS and Natural 4th Generation Language (4GL). During the 1970s and 1980s these products provided a data management and application development foundation for heavy-duty mainframe-based applications. They still do today, with many high profile companies around the world being heavily reliant on these products to support high volume transactional systems.

During the 1990s when most of Software AG’s data management competitors succumbed to the dual onslaught of IBM’s DB2 on the mainframe and Oracle on open systems, Software AG retained its independence and continued to grow its customer base. Over this period both ADR (suppliers of the Datacom DBMS and Ideal 4GL) and Cullinet (suppliers of the IDMS DBMS and ADS 4GL) were acquired by Computer Associates and Cincom turned its focus away from data management towards packaged applications. Of the

competitive mainframe vendors only CCA (suppliers of the Model 204 DBMS) still operate in this market, though without the recent success shown by Software AG.

Because it was privately owned, and aided by a very loyal user base, Software AG was able to avoid the acquisitive nature of the world’s largest vendors, and continue to provide effective data management solutions. It’s mainframe products were ported to open systems platforms, and Adabas D – a Relational DBMS for the open systems market – was launched by Software AG in the mid 90s to considerable technical acclaim, but with insufficient marketing inertia to take a substantial slice from the highly competitive Relational DBMS market.

Thanks to continued revenue from its traditional products, and to the promising growth of a number of new technologies, Software AG succeeded in staying profitable, and in 1999 successfully launched on the Frankfurt Stock Exchange.

Software AG is one of a small number of European software companies to achieve a credible penetration in the United States, though there is considerable scope for improvement from the current 15% of license revenue that comes from the USA.

In the first nine months of 2000, the company generated revenues of EUR 299.2 million (+16% on the equivalent period in 1999), profit before tax of EUR 82.8 million (+88%) and a net profit of EUR 43.6 million (+77%).

The Current Product Set – an eBusiness Focus

In a market dominated by IBM on the mainframe and Oracle on open systems, and with cutthroat competition for the Windows platform paring profit margins away, there is little scope for growth for Software AG in its traditional market space. But this has been recognised for several years, and the focus has shifted to alternative high-growth markets.

There are three primary markets addressed by Software AG’s growth products:

1. Development of server-based Java components
2. Enterprise Application Integration
3. XML-based integration and data management.

These three markets are addressed by the products Bolero, EntireX and Tamino XML Database respectively. IDC believes that the key

to Software AG’s future growth prospects lies in Tamino, which will be described in some detail.

Bolero

While Bolero addresses the needs of server-side Java development well, its positioning as a free-standing product has not lead to major acceptance in the market. Recently, Bolero has been integrated into the development products group within Software AG’s new Tamino XML Platform. With this move the Bolero development environment can be seen as the high-end developer tool for developing professional electronic business applications based on Java. As such it complements the newly introduced XML development tool Tamino X-Studio containing tools from complementary development product vendors.

EntireX

EntireX provides very competent EAI technology. In particular its EntireX Broker component delivers a very flexible messaging bus supporting peer-to-peer or client/server, synchronous or asynchronous, and conversational or stateless application requirements. It provides persistent store & forward messaging, accommodates flexible distribution scenarios, and can itself run in a distributed server architecture to support scalability and fault-tolerance.

EntireX provides a number of adapters to different environments, so that existing implementations based on alternative messaging – such as IBM’s MQSeries – can be integrated into the environment. In addition to MQSeries, adapters of particular interest provide access to mainframe CICS applications and DCOM applications.

Software AG is Microsoft’s chosen integration partner when it is required to integrate Windows-based applications with others executing on an IBM mainframe platform. This has given a considerable boost to the adoption of EntireX.

EntireX will normally require some custom coding using the EntireX Developers Kit in order to create custom adapters to applications already deployed. For this reason (as with other EAI products) the EntireX product is usually sold together with implementation services.

Tamino XML Database

However good the underlying technology of the range of products, the product that deserves the most attention for its vision and ability to break the mould of conventional data management is Tamino XML Database. The product is the most important and central component of the recently introduced Tamino XML Platform, which provides a comprehensive set of tools around the XML

database, needed for developing, managing and integrating XML-based eBusiness applications.

Tamino XML Database is an XML database management system storing XML data in its native format. Unlike mainstream DBMS products, XML data is not mapped into flattened relational tables but stored as complex documents. The only other product of which we are aware that has taken this route is the XML DBMS from eXcelon. Beneath the surface even these products are quite different.

The positioning of Tamino XML Database is very pragmatic. Where new information is to be stored, the Tamino DBMS will store the data in native XML format within its own database. Where existing transactional data already exists it can remain in its native relational (or pre-relational) DBMS. Tamino XML Database will act as a federation hub to pull together the information required to satisfy XQL (QML Query Language) requests into an aggregated set of information that is returned in XML format. By fully indexing data within XML tags, Tamino can satisfy complex data requests efficiently, even where the XML document is composed of a mixture of native XML and “foreign” data.

There are many advantages of native XML storage as opposed to mapping XML on to a relational construct. The most important advantages are:

1. Storage of complex data by mapping into relational tables requires it to be decomposed into many simple table entries, creating a performance overhead.
2. Retrieving complex data from a relational mapping requires multiple tables to be searched and expensive join operations to be executed. Some applications simply cannot tolerate the performance degradation this causes.
3. Relational databases require a predefined schema so that all elements and attributes must be defined before data can be accepted into the database. The self-defining capability of XML permits the storage of documents constructed from elements that have not been encountered previously.

In addition to these major advantages the XML architecture lends itself to much simpler communication with XML-enabled client devices, and in particular with B2B processes built around XML as a document interchange standard.

Tamino XML Database has been carefully positioned to make it an obvious candidate for the persistent storage of XML documents

being exchanged in a B2B environment, but it is equally suitable for many complex data management tasks.

XML for Internal Integration

XML is generally described in the context of document exchanges that take place across organisational boundaries. This is the most obvious use of XML since the only alternative is the rigid and rather unfriendly (and expensive to implement) EDI (Electronic Data Interchange).

However what will work between organisations is just as appropriate within a single organisation. XML gives us the potential for raising the level of interface between systems to a much higher level, providing complete freedom of choice of the most appropriate technology for each system. Instead of integrating at the data level (as in database replication) or at the transaction level (as in EAI), XML gives us integration at the document level, where one document can represent many different transactions.

It is especially appropriate to use XML as the integration mechanism where a business transaction (as represented by the document) can consist of very many individual transactions with complex interdependencies and taking place over a significant period of time. In addition to the XML document exchange it will still be necessary to implement business rules that determine the flow of work through the different phases of the task, and to co-ordinate activities for exception handling.

Tamino XML Database along with the integration modules Tamino X-Node and Tamino X-Bridge provide a good foundation for integration at this level, and coupled with the existing EAI technology in EntireX this should put Software AG into a very good position for exploiting this market as it evolves.

Tamino architecture

While this paper is primarily an account of the strategic positioning of Software AG, the prior discussion shows the emphasis placed on XML and the native XML storage capability of the Tamino DBMS. It will therefore be helpful to understand the major components of Tamino XML Database and the functions that they support. Figure 1 shows the principal features.

XML-Engine

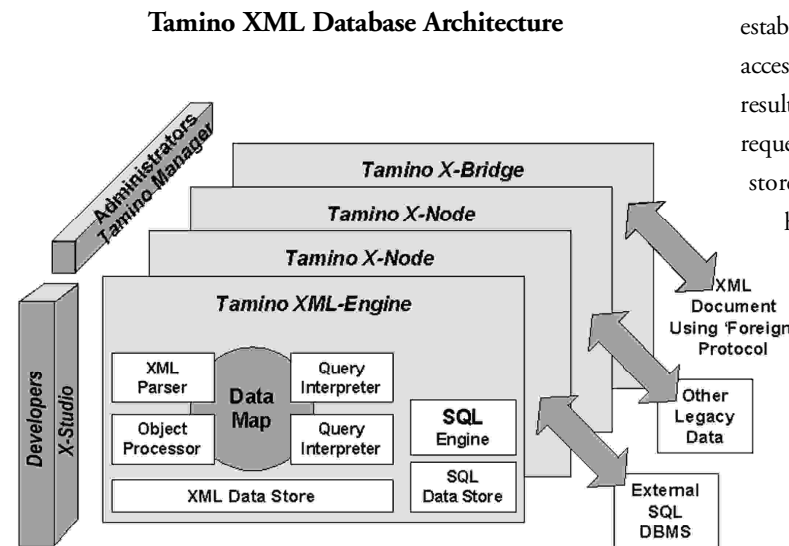
The principal run-time engine is a multi-threaded process capable of servicing multiple concurrent requests. There may be multiple of these executed to exploit the capabilities of multi-processor platforms. The XML-Engine interfaces directly with all of the popular Web server products that conform to the Apache API, Microsoft's ISAPI or Sun's (Netscape) NSAPI.

The XML-Engine carries out many of the tasks associated with other DBMS products such as buffer pool management, but differs in that all XML tags are indexed automatically. Thus XML tags replace the relational concept of keys in providing optimised access to the contents of the store. Document contents are stored in a compressed form, but in a manner that still supports full text searching.

with XML formatting rules by the XML Parser. The Parser uses schema information stored in the Data Map to validate the request. The Object Processor manages the storage of the document, hiding any complexity that might arise from underlying distribution or heterogeneous data structures (described later).

- Query Interpreter & Object Composer. Applications, tools or utilities retrieving data from Tamino use XQuery as the standard access method. The Query Interpreter accesses the Data Map to establish where the requested data is stored and how it may be accessed. The Object Composer is responsible for formatting the results into an appropriate XML document to be returned to the requestor. This might involve merging the results from multiple stored XML documents or the inclusion of data from heterogeneous systems.

Figure 1



Source: IDC, 2000

The whole environment can be managed from a single Tamino Manager from anywhere on the Internet. This can present a central view of data stored in multiple Tamino XML Databases, using a standard Web-browser style of presentation. The Tamino Manager client interface is also XML-based, providing independence of client devices.

The XML-Engine itself consists of a number of sub-components:

- Data Map. The Data Map is somewhat analogous to the catalogue in a Relational DBMS in that it stores the schema definitions used to manage the storage and retrieval of documents. However it goes beyond the capabilities of a catalogue by mapping XML objects to heterogeneous data sources. It also manages the execution of “Server Extensions” (now named X-Tension) which themselves are analogous to stored procedures in a Relational DBMS in permitting a site to extend the default functionality. In this way XML objects can contain logical attributes that are calculated at execution time through the appropriate Server Extension.
- XML Parser & Object Processor. Requests to create new XML objects or update existing ones are first validated for conformance

Tamino X-Node

Tamino X-Node provides for the integration of new native XML data with other heterogeneous data sources to be found in the organisation.

Tamino is already architected to permit data from multiple XML document types to be mapped to a single XML schema stored in the Data Map. A Tamino X-Node can be thought of as a skeletal XML-Engine that communicates with a non-XML data source. In this way applications or queries can implement a pure approach to the use of XML as a data language without needing to be aware of the heterogeneous nature of the underlying data. This is a bi-directional capability supporting both query and update access. As such it provides a very functional implementation of a virtual DBMS (also sometimes referred to as “federated database”).

This is a very simple and effective way of providing integration with existing data sources, but users must be aware that the underlying systems must all be available before such federated access is possible. In other words, in a virtual database such as this that of the weakest component dictates the overall availability and performance.

The decision whether to use Tamino X-Node plus a separate Relational DBMS would be based on the dynamics of the environment. It would rarely be justified to move an existing SQL database within Tamino. New SQL implementations with a high transaction rate would also, in most circumstances, be best stored externally with Tamino X-Node being used to make the data available to Tamino.

Tamino X-Bridge

The recently-announced Tamino X-Bridge component is designed to simplify B2B processing where the participants in the value chain do not all use the same XML schema for document exchange. Tamino X-Bridge can directly implement mapping between the XML storage schema and the document schema of the business partner. It directly supports mapping between alternative protocols such as Microsoft's BizTalk and the Open Applications Group's Business Object Documents.

Tamino X-Bridge also provides the necessary messaging infrastructure to manage fault-tolerant communication with external processes.

Tamino X-Studio

Tamino X-Studio is a suite of XML productivity tools for Java developers. It includes wizard-based application generation and the generation of Java classes for data access based on Tamino schemas or native XML DTDs (Document Type Definition). In addition to these application-based tools, Tamino X-Studio includes XML editors from partner organisations and the "Stylus" stylesheet editor from eXcelon, plus Web page authoring tools.

Partnerships and Participation

The products of Software AG have always had an appeal to technical staff. The technical bias is evident in discussions with the company where executives at any level are enthusiastic about discussing the technology. But increasingly IT investment decisions are being controlled by business managers rather than technocrats.

It is also evident that the types of product provided by Software AG still require a significant implementation effort to be made by staff with appropriate technical skills.

In order to appeal to the business manager as well as the IT professional, it is necessary for a company competing in these fields to be able to offer an end-to-end solution. This means that professional services must be offered that must include education, design, implementation, project management and other associated skills.

The rapidly increasing services revenue of Software AG reveals that this message has been understood. Growing at around 24%, services now account for around 37% of total revenue.

However, much greater market presence is being achieved through the creation of strong partnerships with systems integrators (SIs), value added resellers (VARs) and complementary independent

software vendors (ISVs). Case studies show that a user organisation can outsource the entire implementation process and benefit from the rapid implementation skills of Software AG and its partners, if that provides the best fit with business requirements.

It is vital to the success of Software AG that the high-growth sectors in which it has decided to operate should realise their full potential and achieve mainstream technology status. IDC has no doubt that the EAI and XML markets will indeed show rapid growth for several years, perhaps ultimately rivalling the size of the Relational DBMS market.

Software AG can be seen to be investing in the future of XML through its active involvement with W3C on the definition and promotion of XML standards, and has recruited staff members that can be numbered among the world's leading experts on XML.

SAGA – a Tale with a Happy Ending

While the international penetration of Software AG is creditable for a European software company, European license revenues still account for around 70% of worldwide, with the domestic German market representing nearly 25%. Sales to the USA are slightly less than 15%. This contrasts with the average mature US-based software company where the domestic US market is likely to account for between 40% and 60% of revenues, with the European market about half of the remainder.

There is much scope for Software AG to increase its international presence. The company did address this during the 1970s by establishing Software AG America (which became SAGA Systems) as a subsidiary in the USA. In 1997 the company was bought out by a consortium of its US management and Thayer Capital, and subsequently traded on the New York Stock Exchange. SAGA Systems has built up a substantial business in the USA, South America, Japan and Israel carrying out integration projects and has delivered its own EAI suite "Sagavista". SAGA has continued to be the exclusive distributors for Adabas and Natural in the USA and elsewhere, and has a non-exclusive distributor agreement for other Software AG products.

Now the wheel has gone full circle with the announced acquisition of SAGA Systems by Software AG. By bringing the distributorship back in house Software AG has the potential for greatly increasing its international sales, potentially increasing its US revenue from 15% to around 40% of worldwide.

Conclusions

Software AG has shown considerable perseverance in out-distancing all of its traditional competitors (except IBM) in the mainframe data management market. However it has not lost sight of the changing environment, and is now positioned with a portfolio of products that address some of the core problems of eBusiness – the need to integrate systems within an organisation, and the need to integrate through document exchange between organisations.

Software AG has proven itself over many years to be capable of delivering high quality, high performance products that engender a loyal user base. While it now has to address a new market in order to secure the needed growth, the company is making all the right moves in terms of building strategic partnerships and extending its international presence.

However integration technology has been recognised by the world's largest software vendors as being an area that will experience considerable growth, and it will become a very competitive (and bloody) battlefield. Already in the EAI space we are witnessing a constant stream of mergers, acquisitions and re-branding exercises in order for companies to build a critical mass and attract the required publicity. This is no longer a niche market for specialist vendors, but a marketing jungle where only the fittest will survive.

IDC believes that Software AG has all of the attributes to survive and prosper. Its greatest advantage is its technology lead in the field of XML data management. It must exploit this lead vigorously and effectively in order to capture an early share in this important market.

While there will be competitive native XML technology vendors – such as eXcelon – the most likely competition will come from the Relational DBMS vendors retro-fitting XML technology to established products. While this approach is unlikely to match the performance of a native implementation the comfort factor behind these products is a significant marketing force. Software AG will need to establish a reputation for Tamino as a product that delivers early success, continuous adaptability and very high performance for its users. IDC believes the product is capable of achieving this target.

IDC is the foremost global market intelligence and advisory firm helping clients gain insight into technology and ebusiness trends to develop sound business strategies. Using a combination of rigorous primary research, in-depth analysis, and client interaction, IDC forecasts worldwide markets and trends to deliver dependable service and client advice. More than 700 analysts in 43 countries provide global research with local content. IDC's customers comprise the world's leading IT suppliers, IT organizations, ebusiness companies and the financial community. Additional information can be found at <http://emea.idc.com>



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Software AG, Darmstadt, Germany, is Europe's largest system software provider and a major global player offering cutting edge technology for data management and electronic business. Since 1998 the company has focused its development activities on XML products for the Internet. With more than 2,700 employees and representatives in 60 countries, Software AG achieved sales revenue of Euro 366 million in 1999. Its distribution and technology partners include market leaders such as IBM, Microsoft and SCO as well as innovative IT solutions providers like Extensibility, Softquad and Intranet. Software AG's products control the central IT processes of thousands of renowned companies worldwide.

Some examples of these are Lufthansa, British Sky Broadcasting, ZDF, Dresdner Bank AG, Swiss Post, DaimlerChrysler, Deutsche Bahn AG (German Rail), BP and VIAG Interkom. Software AG is listed on the Frankfurt Stock Exchange (MDAX, Security identification number 724260 / SOWG.F).



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