Technology Infrastructure

Research and Advisory Services

Application Deployment
RESEARCH PAPER

Software AG Tamino XML Server

Abstract

Tamino XML Server is Software AG's product offering for storage, maintenance, publishing, and exchange of eXtensible Markup Language (XML) documents. The core of Tamino XML Server is a native XML datastore that takes an XML document as its basic unit of storage. The use of XML is growing rapidly and it will be the dominant technology in middleware over the next five years. Where data is subject to change or exhibits a complex structure, storage in a native XML datastore will give better performance and greater flexibility than a relational database, and this includes applications such as content management, enterprise portals, and the audit and archival of e-commerce transactions. Although it does not aim to replace a relational database, Tamino offers a comprehensive solution for XML storage, including XML tools and good links with other products, particularly when used in conjunction with Software AG's EntireX middleware. The product does not currently have clustering or automatic replication capabilities, which are essential for a mission-critical deployment. A developer licence to help evaluate Tamino is available as a free-of-charge download from Software AG's Web site.

STRENGTHS

- Stores XML in native format.
- Provides a robust XML engine.
- Strong range of XML tools.
- Support for XQuery.
- Good range of integration options with other data sources and applications.

WEAKNESSES

- No support for clustering or automatic replication.
- Major database vendors will also address this market.

FUTURE POTENTIAL

Version 3.1 of Tamino XML Server, released in November 2001, includes support for W3C XML schema. Version 4.1 of Tamino XML Server, due for release in 2002, will incorporate clustering and replication facilities, as well as built-in versioning. By targeting the product into specific solution areas such as content management, data staging, and e-commerce audit, Software AG can ensure that Tamino has a successful future.

Butler Group

▶ FUNCTIONALITY

Product Analysis

Tamino XML Server from Software AG has, at its core, a native XML datastore that addresses the increasing demand on organisations to store and manage content in a format that is independent of its subsequent presentation. XML is becoming deeply embedded in the IT fabric, and there are many situations where it is more efficient to store XML documents in their native format, rather than converting them to the formats used by relational databases.

Whilst it is possible to convert an XML document to a normalised, relational format, it is a complex task and retrieval of the information typically requires a large number of joins between tables, which in turn can hinder performance. So called 'object-relational' databases have tried to address this issue by allowing the storage of large object data types, but still do not have native XML querying and manipulation built into the product.

Having said this, Software AG does not see Tamino as a replacement for the relational database, and recognises that many types of data will be better stored in that environment. The company believes that it has identified some key areas where native XML storage will be more appropriate, and envisages that Tamino will run alongside a relational product in many of these scenarios.

XML is becoming established as a powerful standard for data representation and transmission between distributed systems. Butler Group believes that the next 1 to 2 years will see an explosion in the amount of information held in XML – it is already becoming a predominant format for Web site content, but will grow exponentially as business transactions are expressed in XML.

As a storage format, XML is not particularly efficient, so if the data is simple and static, it is better stored in a relational database and converted to XML as required. Where data is subject to change, or exhibits a complex structure, storage in a native XML database will give better performance and greater flexibility. Some of the applications that demonstrate these characteristics are:

- **Content Management:** Tamino has been embedded into content management solutions to offer native XML storage. This makes it easy to publish content in different formats to a wide variety of devices.

- **E-Commerce Audit:** As more and more transactions become wholly electronic, there is a need to store an accurate representation of these transactions, the vast majority of which will be XML documents.

- **Staging Server:** A staging server provides an XML representation of information held in a back-office system. It prevents the back-office system from potential overload and from untrusted access, whilst making the data accessible via the Web to customers, suppliers, and trading partners.

- **UDDI Directory:** The Universal Description, Discovery, and Integration (UDDI) directory format has the potential to be used as an internal directory of services within a larger organisation, and Tamino can act as both a directory and a repository of Web services.

- **Enterprise Portals:** Easy access to content is a vital part of a portal solution, and Tamino makes it easier to deliver content in a form that is best suited to the user's requirements.

In comparison with other XML databases, Tamino's additional services, including schema editing, provide a more complete solution. Many of these competing products are produced by relatively small start-up companies. Software AG, by comparison, has a strong reputation in the infrastructure software market, and is able to back up Tamino with a comprehensive service and support offering.

On the downside, Tamino does not currently support clustering or automatic replication. Butler Group believes that both these facilities are necessary for a mission-critical, database-centric application. Software AG intends to build these facilities into the next release of Tamino.

Butler Group believes that Tamino is a technically strong solution for storing XML documents in native format. The greatest benefit is likely to be derived in content management applications. Tamino is already embedded within other products in this market, and Butler Group considers that Tamino adds most value either as an embedded technology, or as part of an overall solution delivered by a Systems Integrator (SI).
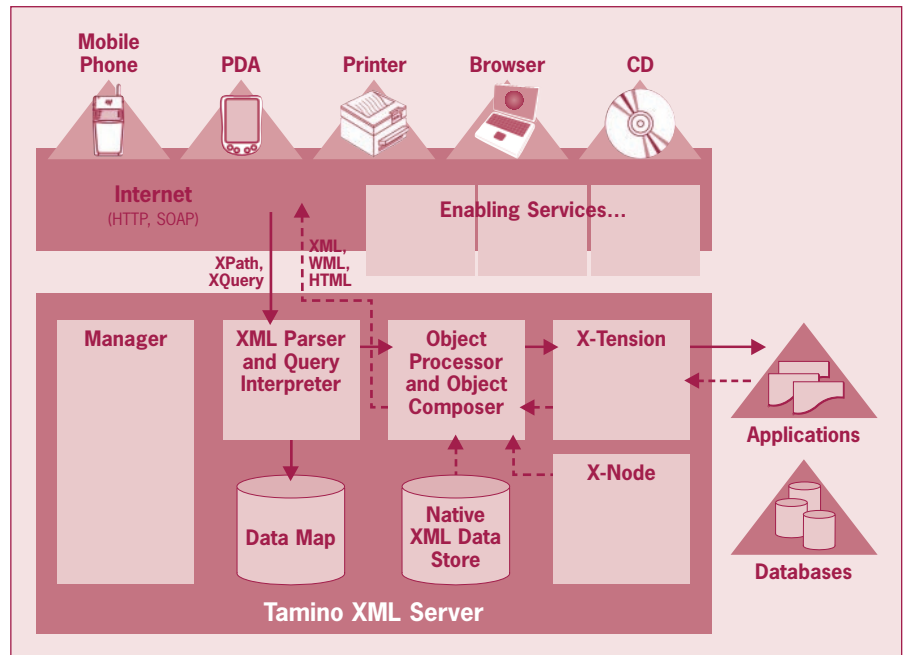
Product Operation

Tamino's core functionality is to store XML content in a native format database. Therefore, Tamino's basic unit of storage is an XML document, and a Document Type Definition (DTD) or XML schema defines the data model and its properties, rather than a relational data structure. Tamino can also store non-XML data such as graphics, audio, and video files. This functionality is provided by an XML engine that, in addition to the XML datastore, includes:

- **XML Parser:** XML objects to be stored by the XML engine are described by their schema stored in Tamino's Data Map. Tamino's built-in XML parser checks the syntactical correctness of the schema and ensures that incoming XML objects are well formed.
- **Object Processor:** The Object Processor is used when storing objects in the native-XML store. Any SQL data is stored in SQL tables and columns according to the corresponding schema. Support of external data sources is provided by the Tamino X-Node.
- **XML Query Interpreter:** Tamino's query language XQuery is based on the XPath standard. The Query Interpreter resolves incoming requests and interacts with the Object Composer to retrieve XML objects according to the schemas stored in the Data Map.
- **Object Composer:** The Object Composer is used when objects are to be retrieved. Using the storage and retrieving schemas defined in the Data Map, the Object Composer constructs the information objects and returns them as XML documents. The simplest case would be retrieving an object stored natively as XML. In more complex cases, communication with Tamino X-Node is required to compose an XML object from non-XML data sources.

Because this is a native XML database, querying the data is also done using XML standards. The query language is based on the XPath standard. Coming versions of Tamino will support the XQuery language that is currently being developed by the World Wide Web Consortium (W3C). These queries can be carried out both on native XML data and on XML representations of foreign data sources. The result of the query is returned as an XML document.

Applications communicate with the Tamino Server using standard HyperText Transfer Protocol (HTTP) requests. Software AG has also implemented the Web-based Distributed Authoring and Versioning (WebDAV) extensions to the HTTP protocol, which allows collaborative editing and management of files on a remote Web server. This can be done using standard office applications (such as Microsoft Office) which support the WebDAV interface. Tamino Server also supports a range of XML and other standards, including XSL(T), ActiveX, Java DataBase Connectivity (JDBC), and Simple Object Access Protocol (SOAP).

Simple API for XML (SAX) and the Document Object Model (DOM) provide an XML view of legacy and other data that is stored in non-XML formats. Tamino X-Node is a data integration module that maps an XML schema stored in the Tamino database to foreign data held in a distributed location. This is a vital component for integrating an organisation's data sources, and allows queries to be made to a single Tamino interface, independently of the format and location of the underlying data. Whatever the format, the result of the query is returned in XML, and Tamino can thus be used as a way to XML-enable existing data sources.

Tamino – Architecture

The capabilities of the product can be further expanded by using Tamino X-Tensions, which allow the creation of user-defined data-handling routines. These extensions can be developed in C, C++ or Java, and once plugged into the server can be used in the same way as standard Tamino functions. A Software Development Kit (SDK) is also available to allow the creation of customised interfaces to the Tamino Server.

Administration of Tamino Server can be carried out from a single Web-based interface. This tool allows the creation and maintenance of databases, the starting and stopping of the server, setting of the server parameters, instigation of backup and restore operations, and viewing of the server log. It is also the tool that would be used to plug-in and manage Tamino Server X-Tensions.

Tamino XML Server is typically deployed on top of an application server to provide load balancing and fault tolerance. Supported application servers include IBM WebSphere, BEA WebLogic, HP Bluestone Total-e-Server, and iPlanet Application Server. The product has incremental backup and restore facilities, and the datastore can be replicated manually.

Product Emphasis

The Tamino XML Platform is a standards-based approach to storing XML data in native format. It has a good set of associated tools, and the emphasis of the product is on building integration solutions where storage of XML data is an important component. In Butler Group's view, any integration solution that does not encompass XML is seriously flawed, so this indicates the enormous potential market that exists.

Tamino faces competition on two fronts. There are other XML databases on the market, although Butler Group believes that Tamino offers a comprehensive solution that has the backing of a large and reputable vendor. Tougher competition will come from the leading vendors of relational databases, such as IBM, Oracle, and Microsoft, all of which are XML-enabling their database products. At this moment in time, Tamino offers benefits for native XML storage over these competitors, but Butler Group believes that all three will attempt to push further into this territory.

► DEPLOYMENT

Deployment of the Tamino product requires expertise in XML, and in particular in architecting XML solutions. It should be appreciated that these solutions are often quite different in style to traditional client/server and three-tier distributed applications, so specific XML experience will be of significant benefit. An organisation implementing Tamino would also find Web skills and application integration skills advantageous.

The majority of Tamino deployments are carried out in conjunction with systems integration or IT consultancy partners. A pilot project can be built in a few weeks, without the need for an application server. Developing this to a full-blown production system would typically require a 3 to 6 month time-scale, including the installation and tuning of an application server to support the system.

Software AG provides a full range of training courses, including the XML Academy, which provides general grounding in XML skills. Specific Tamino training is available, either as classroom-style courses at Software AG's training facilities, or on a tailored basis at the customer's premises. 24 hour product support is provided by Software AG's support centres in the US, Europe, and Asia.

Tamino XML Server is supported on Microsoft Windows NT or Windows 2000, Sun Solaris 7 and 8, HP-UX 11.0, IBM (RS6000) AIX 4.3.3, UnixWare 7.1, SuSE Linux 7.1/2 (IA-32), SuSE Linux 7.2 (IBM S/390), and IBM OS/390. An application server will also be required for the majority of installations, and other XML tools can be used in conjunction with Tamino.

Tamino offers a wide range of integration interfaces to other data sources, through the X-Node technology for linking non-XML databases, and also via Open DataBase Connectivity (ODBC) and JDBC. Tamino also works with Software AG's Enterprise Application Integration (EAI) product EntireX, to create robust links to back-end applications. TIBCO Extensibility can be used to provide sophisticated XML editing and transformation capabilities.

Software AG believes that companies do not need to change their existing business practices to deploy a Tamino solution. Butler Group considers this a benefit of the product, but also notes that XML-based solutions do require a very different architecture to traditional integration products. XML-based integration is loosely coupled and inherently flexible, and to get the maximum benefit, a company will typically need to review and reposition its overall integration strategy.

► PRODUCT STRATEGY

Software AG believes that the Tamino product addresses horizontal markets including content management, portals, and e-commerce transaction storage. It has also focused on some vertical market opportunities, including e-government and banking. The European, Middle East and African (EMEA) market accounts for around 40 per cent of Tamino sales, the US market a further 40 per cent, and Asia-Pacific the remaining 20 per cent.

The company supports both direct sales and channel sales through integration partners, Independent Software Vendors (ISVs), and Value Added Resellers (VARs). Technology partnerships have been created with companies such as Tridion (which embeds Tamino into its content management solution), IBM, and HP. Software AG has recently announced a strategic global alliance with BEA to jointly market and integrate Tamino with BEA's WebLogic application server suite.

The licensing model for Tamino is CPU-based. Typical project values range from €50,000 to €1 million, including the licence costs and associated services. Services would normally comprise more than 50 per cent of the total project value. Product support and maintenance, including upgrades, are charged at 20 per cent of the original licence cost. A developer licence for Tamino is available as a free-of-charge download from www.xmlstarterkit.com. The download includes a number of useful tools, and Butler Group believes this is an excellent way to discover more about the product.

The current release of Tamino XML Server is Version 2.3. Software AG aims to release a new version approximately every six months. There is an active developer community working on Tamino, and this site provides additional functionality above and beyond that included in the full product releases. Version 3.1 of Tamino was released in November 2001, including full support for the W3C XML schema standard; a release to follow in 2002 will include clustering and automatic replication, full support for XQuery, and built-in versioning capabilities.

Software AG has positioned Tamino as an XML datastore and toolset that occupies a position in the middle of the traditional relational database, integration middleware, and application server markets, providing XML storage and serving capabilities. It has identified specific roles for this product in content management and electronic transaction management, as well as in more general XML-related applications. It is also looking to license its technology to other vendors of XML-based solutions.

Butler Group believes that a native XML datastore has a role to play in these and other applications. However, as a stand-alone product, Tamino will face competition from the major database vendors as they enhance the XML capabilities of their products. Software AG is also positioning itself as an XML specialist, and will gain greatest benefit through providing XML solutions to specific markets, and through the embedding of Tamino in other solutions.

► COMPANY PROFILE

Software AG describes itself as Europe's largest system software provider and is a major global player offering technology solutions for data management and electronic business. Since 1998, the company has focused its development activities on XML products for the Internet. It has 3,500 employees, representatives in over 70 countries, and its distribution and technology partners include market leaders such as IBM, Microsoft, and Hewlett-Packard, as well as solution providers like Extensibility, Softquad (part of Corel), and Sequoia (part of Citrix).

Software AG's products control the central IT processes of thousands of renowned companies worldwide, including Lufthansa, British Sky Broadcasting, ZDF, Dresdner Bank AG, Swiss Post, DaimlerChrysler, Deutsche Bahn AG (German Rail), BP, and VIAG Interkom. Software AG's corporate headquarters are in Darmstadt, Germany; its UK offices are located in Bracknell and Derby.

Software AG is active in the development of XML as a business tool, and is an active member of the World Wide Web Consortium, the Organisation for the Advancement of Structured Information Standards (OASIS), and the UDDI working group. This work reflects the company's commitment to the support of open-standards, and in particular to XML, SOAP, and Web Services Description Language (WSDL), which will play a major role in the development of Web services.

The company's shares are listed on the Frankfurt Stock Exchange. Total revenues for the year ended 31st December 2000 were €416.6 million, compared with €365.9 million for the year to 31st December 1999. The corresponding net profit figure for 2000 was €66.6 million, compared with €38.4 million the previous year.

► SUMMARY

Software AG has always identified itself as a system software specialist, and Butler Group believes that making a major pitch as an XML specialist is a good strategy for the company. Use of XML has grown dramatically in a short space of time, and it will be the dominant technology in middleware over the next five years and beyond. Although it will not supplant the relational database, a native XML store will be an important infrastructure component.

Tamino XML Server has the advantage that it has been built from scratch as a native XML store, whilst the major relational database vendors would need to rearchitect their products to fully address this area. Butler Group believes that Tamino, with the substantial backing of Software AG, has a lead in this space, but that the relational databases will inevitably try to gain market share. By targeting the product into specific solution areas, Software AG can ensure that Tamino has a successful future.

► CONTACT DETAILS

Software AG
Uhlandstr. 12
64297 Darmstadt
Germany

Tel: +49 6151 92 0
Fax: +49 6151 92 1191

Software AG UK Ltd.
Linden House, Lime Walk
Bagshot Road, Bracknell
Berkshire, RG12 9DY

Tel: +44 (0)1344 403800
Fax: +44 (0)1344 403801

Software AG Italia S.p.A.
Centro Direzionale Lombardo
Via Roma, 108
Palazzo E – Ingresso 2
20060 Cassina de Pecchi (MI)

Tel: +39 02 95 0 01 11
Fax: +39 02 95 30 04 21

Software AG France S.A.
Le Panoramique
5, avenue de Verdun
94204 Ivry sur Seine
France

Tel: +33 1 49 87 43 00
Fax: +33 1 46 72 81 99

Software AG Inc., USA
11190 Sunrise Valley Drive
Reston
Virginia 20191

Tel: +1 703 860 5050
Fax: +1 703 391 6975

Software AG España S.A.
Ronda de la Luna, 4
28760 Tres Cantos (Madrid)

Tel: +34 91 8 07 94 00
Fax: +34 91 8 07 96 31

Software AG (Asia Pacific)
7 Temasek Boulevard
Suntec Tower One #30-01
Singapore 038987

Tel: +65 333 4556
Fax: +65 336 3587/336 3538