

# TOTAL<sup>®</sup> XML

The Productivity Solution

Cincom Systems, a 35-year veteran provider of enterprise software to the world's top organizations, delivers TOTAL XML, an advanced data management system that allows you to exploit the full potential of XML while leveraging existing applications and data.



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## Introduction

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XML's rapid adoption impacts information technology in every common IT acronym you see – EAI, EDI, B2B, IEC, ERP, and more.

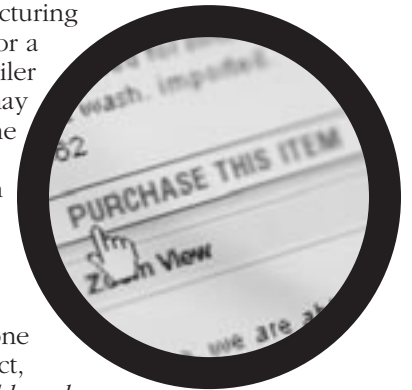
Since its first use in 1998, XML has been the driving force behind new ways to share information, transfer data, and communicate with an endless variety of systems and devices. Today, XML not only places information and data on the web, but in applications as diverse as enterprise application integration (EAI), supply chain integration, e-commerce applications, publishing, document management, web content management, intellectual asset management, and an entirely new kind of cooperative, intelligent application: web services. XML also enables a nearly unimaginable cornucopia of new things, including wireless applications that display on cell phones and PDAs.

From here forward, XML will provide the foundation for structuring information and facilitating its exchange. If you buy a book or a CD on the web, your browser may signal this fact to the e-tailer with an XML document in a given vocabulary. The e-tailer may then replenish its stock via another XML document sent to the publisher in another XML vocabulary. The publisher may order materials for another press run by requesting quotes in an XML auction vocabulary from potential suppliers, who, again, respond in XML. In short, anytime information is exchanged electronically, XML will play a central role.

Whether your organization seeks competitive advantage as one of the early adopters of XML or takes a more conservative tact, *the efficient deployment of XML-driven business processes will be a key determinant of future success.*

Today, enterprises primarily use XML as a better representation of their legacy data. As e-business embraces XML, the need to store, retrieve, and query data in XML format grows dramatically because the XML data view more closely corresponds to the e-business transaction. Keeping the data in XML format increases business efficiencies, compared with converting it to relational format.

As the use of XML-formatted documents expands, the need for a database to store the XML data becomes a business imperative. Some systems, particularly back-office systems, will likely maintain their data in relational format. Inevitably, greater business value derives from combining data from the legacy enterprise applications and the new e-business applications. This drives the need to integrate XML with relational data, without modifying the existing business systems.



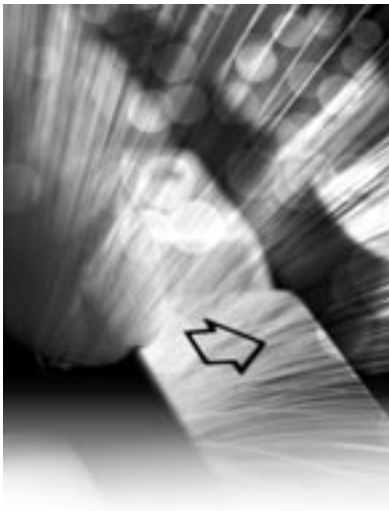
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## Selecting a Database for XML Data

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With your significant investment in relational DBMS, the impulse is to use a relational DBMS for XML. Unfortunately, a relational DBMS is a poor choice for XML data. An XML DBMS is more efficient, more flexible, and provides much greater performance and productivity when compared with a relational DBMS.

This may sound heretical, considering the successes of the relational model over the last 20 years: after all, even if relational is not the solution today, surely the vendors will upgrade their systems to support XML. The relational vendors have, in fact, all announced their plans to do this. If you can wait two or three years, maybe this will be a solution – while your competitors, who do not wait, will pass you by.



The crux of the problem is that XML supports a hierarchical data model. As such, XML data has an organizational structure that does not map efficiently onto the flat, relational world of rows and columns. Furthermore, XML elements consist of more than data: they have markup. RDBMSs break XML data and markup apart in order to store XML, adding significant limitations, complexity, and processing overhead. Other XML technology-specific problems might be explored here, but they can be traced mainly to this fundamental architectural mismatch between multi-dimensional hierarchies and flat, two-dimensional tables.

Clearly, you can build and deploy internet applications in Java™ using an RDBMS for XML data services. But just as it was once common to find relational applications hosted on first-generation DBMSs, you must then make significant trade-offs and compromises. At first, when applications are simple and the new paradigm is not well understood, you more readily accept workarounds and other compromises. But as applications increase in scale and complexity, this extracts a significant price. Just as one can imprudently drive screws with a hammer, there are issues of appropriateness and efficiency to consider.

Cincom Systems' recent technical white paper, "Programmer Productivity Using TOTAL XML," discusses programming issues in detail. It shows a programming sample taken from an implementation of the TPC Benchmark W (TPC-W). TPC-W is a transactional benchmark based on a web commerce application. The paper depicts how using an XML solution for XML data can reduce the lines of code to a mere one-sixth of that required for an RDBMS.

Although relational vendors attempt to graft key XML extensions onto their products, in general few of the attempts to retool and reposition established products have succeeded over the long term. This is because complex software infrastructure products are specifically designed and optimized to solve specific problems in specific ways. Generally, core design criteria and architectural elements prevent these systems from being extended to fully and efficiently support an emerging paradigm.

The bottom line is that RDBMSs' inability to cleanly and straightforwardly support XML unnecessarily muddies and complicates the creation, execution, and maintenance of next-generation business processes and their supporting applications. Such processes and applications are required for sustained competitive advantage, competitive parity, and/or cost reductions. Unless addressed, this insufficiency will add complexity, delay, risk, and cost to virtually every new initiative.

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## Features to Look For in an XML Database

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Given that you need an XML database, you want the one that best meets your needs. Unlike commodity relational systems with similar architectures, XML databases have very dissimilar technical architectures. Choosing an XML DBMS with the wrong architecture for your needs will inevitably leave you with at best, poor performance, poor productivity, and dissatisfaction; at worst, outright project failure.

XML DBMSs typically have one of three architectures: relational-based, text-based, and object-based.

- A relational architecture maps XML onto a relational schema. Each element becomes a relational class, and documents are constructed by SQL joins.
- A text-based architecture stores XML as text strings. To speed searches, the DBMS then indexes the text. The text-based implementations may be stand-alone, text-based database systems in their own right, or they can be implemented as character strings in a relational system.
- In object-based architectures, XML documents are stored on the database in an object-oriented format. Each element becomes an object. Each attribute in an element becomes an attribute in the object. Relationships between elements, their position in the hierarchy, their sequence, etc., are retained.

When evaluating XML DBMSs, look at the features of each XDBMS in light of your requirements. Today, because XML is so new, there is still disagreement on the list of features necessary for an XML DBMS, hence each XML DBMS has different features. In fact, some products that call themselves database management systems are not even database management systems at all.



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## A New Data Management Engine for a New Age

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To meet this challenge, Cincom Systems, a 35-year veteran provider of enterprise software to the world's top organizations, delivers TOTAL XML, an advanced data management system that allows you to exploit the full potential of XML while leveraging existing applications and data.

TOTAL XML substantially boosts programmer productivity by simplifying the manipulation and integration of data from multiple sources – including RDBMSs and other legacy data stores – thus eliminating costly, complex programming and duplication of data.

Substantially improved programmer productivity is only one of the benefits of TOTAL XML. Logic to navigate the database using complex join queries for data retrieval is unnecessary. Programming to the structure of XML is dramatically lessened. The size and complexity of even the simplest and most common program tasks can be reduced to a small fraction of its original effort.

It also makes maintenance much less costly. On average, businesses spend upward of 80 percent of their IT budgets on maintenance programming. Here, TOTAL XML's contributions to the bottom line and overall efficiency are potentially huge. With TOTAL XML, programs have little or no dependence on database design.

Finally, TOTAL XML fits seamlessly with other data management systems, because besides being an advanced, full-function XML database, TOTAL XML has strong capabilities for integration of enterprise data.



- As an XML database, TOTAL XML stores, queries, and manipulates any XML document or document fragment. Using the full potential of object technology, TOTAL XML processes the full complexity of XML documents, unlike relational systems that have restrictions based on the tabular nature of relational data. Because TOTAL XML incorporates an extended relational model, XML documents can also be processed and queried using SQL. TOTAL XML also supports the use of SQL to process and query data that is stored in other relational databases (Oracle®, SQL Server, DB2®, etc.) and even some prerelational legacy systems.
- As a data integrator, TOTAL XML supports a federated distributed data model that provides a unified and consistent view of distributed, heterogeneous data. TOTAL XML's single interface to other data managers eliminates much of the need for programs that extract, transform, and stage data to data warehouses and other isolated systems.
- Rather than forcing risky and costly application and data conversions that exploit the new XML paradigm, TOTAL XML actually eliminates these risks and dramatically reduces costs by leveraging your present investments.


The rapid emergence and spread of XML is perhaps one of the single largest challenges facing management today – and one of the greatest opportunities. With TOTAL XML, you can capture these opportunities faster, better, and cheaper – today.

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