

TOSHIBA REVIEW

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Special Reports I

XML Technology Supporting Next-Generation Net Business

*XML : The Evolution of the Internet

MIYABE Yasuo

*Technological Trends in XML

HARASHIMA Shuji SUEDA Naomichi
Extensible Markup Language (XML) is an internationally standardized format to describe data. Users can define tags to represent semantics of data. Computers can recognize data by using the tags, so many applications can be designed in XML. In particular, XML is a highly effective format for shared or exchanged data. Many tools are available for handling XML in programming languages.

In this paper, we describe some typical applications of XML including knowledge management, contents management, and data exchange among systems and/or companies. Many efforts are being made to use XML in these fields, and some remarkable results can be seen. After reviewing these results, we outline the basic merits of XML and discuss future trends in these fields.

*Application of XML in FlyingServ FormExpert™ Net Business Platform

MATSUI Koji MIYAZAKI Masashi KANEKO Hiroshi
Extensible Markup Language (XML) is becoming a standard for the exchange of data in net business. FlyingServ FormExpert™ is a middleware for form-based systems that has been developed to handle XML, and is able to import XML data from any application system. Furthermore, its use of XML for internal data enables the preparation of complex report forms. Since XML for defining forms is user extensible, it can be used for integrated data definition in form application systems.

*XML Processing Engine Knowledge Factory

HATTORI Masakazu SUEDA Naomichi
Toshiba has developed an Extensible Markup Language (XML) processing engine that manages and accumulates XML-based information in an organization. This engine can search and process XML data online. Many techniques for storing XML data in a relational database (RDB) have been proposed. In our engine, XML data are stored using the native database approach adapted to the XML data model. Despite the increase in search cost due to the semi-structured nature of XML, Toshiba has developed an optimization technique for speeding up searches and achieved high performance.

*eXcart™ Technology for Rearranging Web Information across Web Sites

HAMADA Shinichiro SEKI Toshitomi
Personalization technology, which provides the information required by individual users in a well-ordered manner, has become increasingly important due to the enormous volume of contents of the World Wide Web.

Toshiba has developed eXcart™ as a client-side Web personalization system that enables users to collect sub-resources of different Web pages defined as Web parts from different Web sites with a drag-and-drop operation, and then merge them into an original page. Users can therefore collect their favorite articles across Web sites, or compare goods offered on different sites, in a unified page view with eXcart™.

*XML for Electronic Catalog Model Based on ISO/PLIB

OODAKE Yasutaka MIZOGUCHI Yumiko
One of the e-procurement services that Toshiba provides is an electronic catalog system based on the Parts Library standard of the International Organization for Standardization (ISO/PLIB). Although ISO/PLIB is a complete e-catalog model, it is too complex to readily use and implement. In addition, it is also desirable for catalog models to be exchanged in Extensible Markup Language (XML) format so as to be integrated with e-commerce standards.

To meet these requirements, Toshiba and LISI/ENSMA (France) have proposed the Simplified Parts Library (SimPLIB), an XML-based catalog model.

*Web Services

YAMAMOTO Junichi MORIYASU Takashi
Web services integrate systems over the Internet using XML documents as messages exchanged between systems, and are expected to become a standard means of realizing BtoB systems integration. Toshiba is therefore setting up businesses in the Web services field as a systems integrator and service provider. We are also conducting technical research to enhance the functionality of Web services (e.g., a matchmaking mechanism for service providers and consumers).

As the trend toward Web services has significant potential for flexible and dynamic BtoB systems integration and new service businesses, Toshiba will continue to strongly support it.

*Knowledge Solutions Based on XML for Distribution and Financial Fields

DOHI Michihiro KANJI Yoshihiko HATANNO Shinichi SEIKE Mariko
Voice of customer (VOC) is significant information that affects the course of an enterprise. This important information, which can be referred to as the knowledge of customers, is a corporate management resource. This concept has recently taken root in the distribution and financial industries. In spite of its importance, however, it has been difficult for computers to handle unstructured data such as sentences.

In order to solve this problem, Toshiba has developed a knowledge management system utilizing Extensible Markup Language (XML), which can express unstructured data flexibly, and text-mining technologies. By structuring and formalizing data with XML and text-mining technologies, this system can easily classify and analyze unstructured data.

*XML-Based Information Management Systems

NONOMURA Katsuhiko OHMORI Yoshihiro YAMAMOTO Koji
Extensible Markup Language (XML) has two major features ; namely, reference expression to external information and tag-based expression for processing of information. This paper describes two XML-based information management systems that promote these features : a multimedia album system and a technical document analysis system. The multimedia album system can automatically manage multimedia contents by using automatic indexing techniques, and an XML multimedia framework within the system allows high extensibility. The technical document analysis system can process multidimensional analysis using an XML processing engine (Knowledge Factory).

Special Reports II

Software Engineering

*Software Engineering in the 21st Century

TORII Koji

*Trends in Software Engineering and Toshiba's Approach

KOJIMA Shoichi HIRAYAMA Masayuki NOGUCHI Kunio
About a quarter of a century has passed since software engineering was born. During this period, the areas of application of software have been expanding in line with the evolution of computer technologies. Especially in recent years, software has become a familiar technology in people's lives. This paper introduces trends in software engineering as a core strategy for coping with the drastic technological changes taking place. Toshiba considers software engineering to be an important resource for the efficient development of high-quality software. Toshiba's approach to software engineering is also described here.

*Architecture-oriented Software Design

FUKAYA Tetsuji YOSHIDA Kazuki HOSOYA Ryuichi MIYATA Takashi TAMAKI Yuji
The infrastructure and requirements of software systems are rapidly changing nowadays. Flexibility and timeliness are key factors for grasping as many business opportunities as possible. Under such circumstances, software system development requires flexible and agile adaptability to various changes. These papers describe an architecture-oriented software development technology which is implemented in the following steps: (1) construction of the software architecture reflecting the characteristics of each product domain; (2) preparation of a framework as an archetype of the target software based on the architecture; and (3) development of the target software using the derived framework. Using this technology, we have improved the quality, cost, and delivery (QCD) of a certain product by 30 % compared with the conventional development method.

*Software Quality Improvement Techniques

HIRAYAMA Masayuki UEKI Katsuhiko MIYAMOTO Ryuichi OKAYASU Jiro KISHIMOTO Takuya FUJIMAKI Noboru MASUOKA Norio
Software systems have recently proliferated greatly and become a pervasive presence both in the life of individuals and in society at large. Accompanying the expansion of software use, it is essential to ensure the high quality of software. Sufficient software testing, verification, and fault elimination are the most important techniques for improving software quality.

This report focuses on techniques related to software testing, verification, and fault management with examples of their application.

*Assessment and Improvement for Software Development Processes

OGASAWARA Hideto NAKANO Kazuo TANAKA Fumiaki
An appropriate development process and continuous improvement of the process are necessary for the development of high-quality software with high efficiency. To establish an ideal development process, assessment of the existing development departments and the application of methods and techniques for process improvement are important.

Software process improvement technology is actively utilized for quality and productivity improvement in Toshiba's software development departments.

Feature Articles

*PCX3000SH Cable Modem Supporting VoIP Feature

FURUTA Tetsuro

Cable modems are spreading as one of the high-speed data services for home use. In the United States, trials are progressing to provide telephony service using Voice over Internet Protocol (VoIP) technologies over this high-speed data service. CableLabs® in the United States has defined a standard called PacketCable™ and started certification tests this year in order to maintain interoperability of telephony services among vendors. Cable operators in the United States are searching for a solution for telephony services before the standards are finalized.

Toshiba has been participating in several trials since January 2000, and has developed the PCX3000SH VoIP cable modem to obtain know-how of VoIP technologies from these trials. The PCX3000SH was demonstrated at the Western Show in November 2000.

*Strata™CTX670 Business Telephone System

OTSUKA Eiji IIDA Toru NISHIDA Toshio
Toshiba has developed the Strata™CTX670 business telephone system as the successor to the current Strata™DK series, with enhanced features (VoIP) together with telephony integration, networking, and Voice over Internet Protocol (VoIP) as a conventional system compatibility and extensibility. The CTX670 also offers improved maintainability, with the ability to upgrade the capacity and features software online.

Object-oriented technology was adopted for the software development, in response to the diversification of users' requirements accompanying the progress of information technology (IT). This improved the efficiency of development for modification and addition of features.

*Infrared Barcode

URANO I. Taeko IKEDA Naru SANO Kenji
Toshiba has developed woven barcode labels for supply chain management (SCM) of rental textile goods ranging from apparel to linen and uniforms. Barcodes with black stripes cannot be used for these goods as visual design is essential. The concept of hidden barcodes has been realized with barcodes whose bars are of almost the same color as the spaces. Infrared light is used to read the barcodes for the identification tags of these goods. A system to prevent forgery is also proposed.

Techno Notes

*Machine Translation Technology Supporting Global Communication

Toshiba Technologies for the New Century

*8. ISO 13584 Parts Library, an ISO Standard for e-Engineering