



Where are we with XML?

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Abstract

Although corporations manage huge software and hardware infrastructures, it is difficult to deliver or analyze large quantities of data. In recent years, Extensible Markup Language (XML) has proven its capability to move and maintain data in accurate, relevant and faster ways. According to IDC, between 2001 and 2002 XML services have grown by 168% and it is expected to grow a market worth of \$3.5 billion by 2006 (Study, 2002). This success comes from some of the distinct characteristics offered by the XML language, and are discussed in this paper. This paper also highlights some of the strengths and weaknesses of the XML language.

History

In 1996, the World Wide Web Consortium (W3C) decided to develop a new standard markup language that would use the power of Standard Generalized Markup Language (SGML) in a simplified and structured form of Hypertext Markup Language (HTML). As a result, W3C sponsored a new working group with SGML developers which was headed by Jon Bosak from Sun. This group created a marking up language called "Extensible Markup Language" (XML) from SGML by removing non-essential, unused, cryptic parts. According to one article, "The initial specification of XML (written mostly by Tim Bray and C.M. Sperberg-McQueen) was only 26 pages as opposed to the 500+ pages of the SGML specification" (Sol, 1999). The initial XML draft was presented at the SGML 96 Conference in the end of 1996. In 1997, Graphic communication association held the first XML conference in association with W3C. W3C as well as International Organization for Standardization (ISO) approved the first version of XML in 1998.

Generation of the language

XML is a 4th generation high-level meta-language. In addition, it is a second-generation web language. XML was designed to provide a higher degree of efficiency and flexibility for web programming.

Execution of the language

XML supports the separation of syntax and semantics. The structure of the XML document plays a major role in representing its data. The structure of the XML document defined either by standard specification or by document type definition (DTD). XML compliant computer applications such as Microsoft Internet Explorer can be used to interpret and view an XML document which follows the standard specification. Some special interpreters or parser can be used to view an XML document that follows DTD or an XML schema. In addition, there are few XML compilers available in the market. These

compilers translate XML scripts into other languages' executable code. For example, Sun introduced the eXtensible Stylesheet Language Transformation (XSLT) compiler that helps to translate XML scripts into Java code (Evers, 2000).

Procedural programming

XML does not support structural programming. However, XML can be used with Extensible Stylesheet Language (XSL) or XSL transformation (XSLT) to facilitate structural programming. This technology combination not only makes the programs easier to read, write, and debug, but also makes them procedural.

Object Oriented Technology

XML does not provide object oriented programming or component technology. XML supports Document Object Model (DOM) language-neutral interface which allows developers to create applications to change the structure of XML documents. However, systems such as XMLambda (an XML-specific FP language) and HaXML (XML facilities for Haskell) are under development to add object oriented programming techniques to XML (Parcia, 2001).

Scripting Technology

XML supports scripting technology. XML is generally declarative Metalanguage. It provides a higher degree of efficiency and flexibility for web programming.

Supported hardware and operating system

XML is not dependant on any hardware or platform. XML can run on different hardware architectures including PCs, Networks, mid-range, and mainframes. XML can be parsed and run on variety of operating system such as Windows, OS/2, every flavor of Unix, DOS, AS/400, VSE, VMS, VM, and MVS.

High-volume Transactions

XML was designed to handle high-volume transactions. However, it has proven its ability to move and maintain data in different application areas, including systems programming, low-level computation, business, industry and personal computing.

User Interface

XML does not provide any graphical or web interface features.

Database Access

XML supports direct database operations via Data Centric XML Documents. Database vendors provide extensions for transferring data between XML documents and their products. These XML-enabled databases include Access, Sybase, dBase, Excel, FoxPro, SQL Server, Oracle and DB2. In addition, there are handfuls of third party middleware that are available to transfer data between XML documents and databases.

Strengths

The following are some great strengths of XML:

- XML is a universal language. XML is based on Unicode. Unicode is capable of holding different language characters, which consume larger memory space. In contrast, HTML or SGML is based on ASCII that may fail on some foreign languages.
- XML can be easily structured. XML provides a tagged, hierarchical format for representing documents. This hierarchical format helps us to validate its content and syntax.
- XML is easy to use. It reduces the complexity of HTML and SGML.
- XML is highly maintainable. Since the language provides simple syntax, a huge knowledge base, and enormous resources, it is easy to maintain and support.

- XML is a best application integration tool. It facilitates cross communication between COM and CORBA or Java RMI. It Works with a wide range of applications including SOAP, BIZTalk, JAVA and Lotus Domino.
- XML is not dependant on any hardware or platform.
- XML supports major communication protocols such as HTTP, FTP, SMTP, and POP3 and wide databases including SQL Server, Oracle and DB2.
- XML helps to display data in different devices with different formats.

Limitations

The following are some limitations of XML:

- XML is still evolving. Only limited number of applications and browsers are available to support XML format.
- XML requires parsers to validate and display its content. Programming skills and time are required for developing these parsers.
- It is difficult to understand XML tags. Also, It is hard to construct complex XML files manually.
- Inexperienced programmers can use it very poorly. It is easy to code large, monolithic scripts.
- XML does not support functional programming or object oriented technologies.

Conclusion

XML is an innovative and young scripting language. It is capable of supporting small programs as well as large-scale applications. XML has some powerful features such as machine or platform independent, superior format, and better integration of network and database technologies. However, it needs more support from browsers and other processing applications. In addition, it requires some changes in syntax and programming model. If these glitches are addressed, XML is the only scripting language that has a potential of incredible growth.

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