

## Comparison of fast, multiplatform XML libraries

1. The eXpat XML Parser (<http://expat.sourceforge.net/>)
2. The XML C Library for Gnome (<http://www.xmlsoft.org/>)
3. Apache Xerces for C++ parser (<http://xml.apache.org/xerces-c/index.html>)
4. Language Technology Group RXP XML parser (<http://www.ltg.ed.ac.uk/software/xml/index.html>)
5. Trolltech QT XML Module (<http://doc.trolltech.com/3.1/xml.html>)
6. Oracle 9i XML Developers Kit for C/C++/Java (<http://otn.oracle.com/tech/xml/xdk/>)
7. Intel XML Software Suite (<http://software.intel.com/en-us/articles/intel-xml-software-suite/>)
8. Java XML pack (<http://java.sun.com/xml/downloads/javaxmlpack.html>)

	<i>Expat</i>	<i>libXML</i>	<i>Xerces C</i>	<i>RXP</i>	<i>QT</i>	<i>XSS</i>	<i>XDK 10</i>	<i>Xerces J</i>
Author	SourceForge	Gnome	Apache	LT Group	Trolltech	Intel	Oracle	Apache
License	MIT	MIT	Apache	GPL	LGPL	Comercial	OTN	Apache
Sources	open	open	open	open	open	close	close	open
Supported OS	Win Linux QNX LynxOS ? BSD Solaris MacOS X HP-UX IRIX AIX OS/2 OpenUnix OpenVMS	Win Linux QNX BSD Solaris MacOS X OpenVMS MVS	Win NT Linux BSD Solaris MacOS X HP-UX IRIX AIX OS/2 UnixWare PTX AS/400 OS/390	Win Linux MacOS X	Win Linux QNX LynxOS BSD Solaris MacOS X HP-UX IRIX AIX OS/2 UnixWare Tru64 XFree86	Win XP+ Linux HP-UX	Win NT Linux Solaris HP-UX AIX	Java
Bits	32/64	32/64	32/64	32/64	32/64	32/64	32	32/64
Language	C/C++	C/C++	C++ Java	C/C++	C++	C++ Java	C/C++	Java
Bindings	Python PHP Perl Tcl/Tk Ruby Delphi	Python PHP Perl Tel/Tk Ruby Delphi Kylux						

	<i>Expat</i>	<i>libXML</i>	<i>Xerces C</i>	<i>RXP</i>	<i>QT</i>	<i>XSS</i>	<i>XDK 10</i>	<i>Xerces J</i>
Used By	Mozilla	Gnome	Apache, IBM, Intel					Apache, IBM, Intel
Library	Shared	Shared	Shared	Static	Shared	Shared	Static	
Library Size	128KB	984KB	3440KB	354KB	7033KB	14590KB	7992KB	
Thread Safe	Yes	Yes	Yes	?	Yes	Yes	Yes	
Multicore						?		
Latest Version	v. 2.0.1	v. 2.7.3	v. 3.0.0	v. 1.4.8	v. 4.5.1	v.1.2	10.2.0.2.0	v. 2.9.1
Release Date	05.06.2007	18.01.2009	29.09.2008	29.06.2006	23.04.2009	19.01.2009	07.04.2006	15/09/07
XML	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Parser	SAX Like	DOM Like	SAX, DOM	DOM Like	SAX, DOM	SAX, DOM	SAX, DOM	SAX, DOM
Namespace	+	+	+	+	+	+	+	+
Validating		+	+	+	-	+	+	+
DTD	CallBack	+	+	+		+	+	+
XML Schema		1.0 Mainly	1.0, 1.1 Planed	-	-	1.0	1.0	+
Relax NG		+						
Validation without reparsing		Yes	No			?	Yes	No
SAX 1		minimal	+		+		+	+
SAX 2	Arabica <sup>5</sup> , CenterPoint	Arabica <sup>5</sup>	+, Arabica <sup>5</sup>		+	+	Declared in some docs	+
StAX						+		
DOM L.1	Sablotron <sup>4</sup> , Arabica <sup>5</sup> , CenterPoint <sup>8</sup>	Gdome <sup>2</sup> , Arabica <sup>5</sup>	+, Arabica <sup>5</sup>		+	+	+	+
DOM L.2	Sablotron <sup>4</sup> , Arabica <sup>5</sup> , CenterPoint <sup>8</sup>	Gdome <sup>2</sup> , Arabica <sup>5</sup>	+, Arabica <sup>5</sup>		+	+	+	+
DOM L.3	CenterPoint <sup>8</sup>		Partial			Partial	Java Only	planed
DOM Tree Serialization	Sablotron <sup>4</sup> , CenterPoint <sup>8</sup>	+	DOM Level 3		+	DOM Level 3	+	+

	<i>Expat</i>	<i>libXML</i>	<i>Xerces C</i>	<i>RXP</i>	<i>QT</i>	<i>XSS</i>	<i>XDK 10</i>	<i>Xerces J</i>
XSLT	Sablotron <sup>4</sup>	Libxslt <sup>1</sup>	Xalan <sup>6</sup>			+	+	+
EXSLT		Libxslt <sup>1</sup>	Xalan <sup>6</sup>			?		+
XSL-FO		Xmlroff				?		
Xpath 1	Sablotron <sup>4</sup>	+	Partial, Xalan <sup>6</sup> , XQilla <sup>7</sup>			+	+	+
Xpath 2			XQilla <sup>7</sup>				Java Only	
XQuery			XQilla <sup>7</sup>					
XBase		+						+ ?
XPointer		+						+ ?
XLink		Planned						+ ?
XInclude		+						+ ?
Canonical XML	1.0	1.0						Apache XML Security
Signature		XML Security Library <sup>3</sup>	Apache XML Security <sup>13</sup>					Apache XML Security
Signature Xpath Filter		XML Security Library <sup>3</sup>						Apache XML Security
Decryption Transform for XML Signature		Planned in XML Security Library <sup>3</sup>						
XML Encryption		XML Security Library <sup>3</sup>						Apache XML Security
XForms								
Additional Supported Standards		XML Catalog						
Network Clients		FTP, HTTP	FTP, HTTP					FTP, HTTP
SOAP 1.1		cSOAP	Axis				+ ?	Axis
SOAP 1.2			Axis					Axis
SOAP Attachment			Axis					Axis
WSDL			Axis					Axis
UDDI								+
ebXML								+
XML GUI					+			

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XSD -> Class Generator							+	

1. The XSLT C Library for Gnome (<http://xmlsoft.org/XSLT/>) is distributed under MIT license and claims to support all systems, supported by XML C Library for Gnome.
2. Gnome DOM Engine (<http://gdome2.cs.unibo.it/>) is distributed under LGPL license and claims to support all systems, supported by XML C Library for Gnome.
3. XML Security Library (<http://www.aleksey.com/xmlsec/>) is distributed under MIT license and requires OpenSSL 0.9.6c or 0.9.7 (preferred).
4. Sablotron ([http://www.gingerall.com/charlie/ga/xml/p\\_sab.xml](http://www.gingerall.com/charlie/ga/xml/p_sab.xml)) is distributed under GPL and Mozilla Open License 1.1 licenses. Sablotron is written in C++ and depends on expat XML parser.
5. Arabica (<http://www.jezuk.co.uk/cgi-bin/view/arabica>) is distributed under BSD license, written in C++ and claims to support Linux, Windows and different Unixes equipped with GNU compiler 3.
6. Xalan for C++ (<http://xml.apache.org/xalan-c/index.html>) is distributed under Apache license and known to work on Windows, Linux, Solaris, HP-UX and AIX platforms.
7. Pathan (<http://software.decisionsoft.com/pathanIntro.html>) is distributed under BSD style license, written in C++ and known to support Windows, Linux and Solaris platforms.
8. Center Point XML (<http://www.cpointc.com/XML/>) is distributed under Netscape Public License and claims to support many platforms, including Windows, Linux, BSD, Solaris, HP-UX, MacOS X. Written in C++.
9. EasySOAP++ (<http://easysoap.sourceforge.net/>) is distributed under LGPL license, supports Linux and Windows platforms. And claims to be compatible with different SOAP implementations including, but not limited, Microsoft SOAP toolkit, Microsoft .NET platform, Apache, White Mesa, Phalanx.
10. iconv (<http://www.gnu.org/software/libiconv/>) is part of GNU c library and distributed under GPL license.
11. IBM International Components for Unicode (<http://oss.software.ibm.com/icu/>) is written in pure C unicode 3.2 library, provided under X Open Source license. ICU claims to support Linux, Windows and variety of Unix platforms.
12. Apache XML Security for C++ (<http://xml.apache.org/security/index.html>) is distributed under Apache license and known to work on Windows, Linux, Solaris, HP-UX and AIX platforms.

	<i>libxslt</i>	<i>GDome</i>	<i>xmlsec</i>	<i>sablotron</i>	<i>cslxml</i>	<i>arabica</i>	<i>xalan</i>	<i>XML Security</i>	<i>pathan</i>
Author	Gnome	Gnome	Alexey Sanin	Ginger Alliance	Connective Software Engineering	Jez UK	Apache	Apache	Decision Soft
License	MIT	LGPL	MIT	GPL Mozilla	Netscape	BSD	Apache	Apache	BSD
Requirements	LibXML2	LibXML2	LibXML2 OpenSSL	Expat	Expat	Expat LibXML Xerces	Xerces	Xerces Xalan	Xerces
Language	C/C++	C/C++	C/C++	C++	C++	C++	C++ Java	C++ Java	C++ Java

	<i>libxslt</i>	<i>GDome</i>	<i>xmlsec</i>	<i>sablotron</i>	<i>cslxml</i>	<i>arabica</i>	<i>xalan</i>	<i>XML Security</i>	<i>pathan</i>
Bindings	Perl Ruby Python  Tel/Tk Pascal	Perl Ruby    Caml		Perl Ruby Python Php Tel/Tk Pascal Ada Erlang					Perl
Used By	Gnome	Gnome	Gnome	mozilla			Apache	Apache	
Library	Shared	Shared	Shared	Shared	Static	Static	Shared	Shared	shared
Library Size	255 KB	225 KB	317 KB	805 KB	962 KB	76 KB	3.3 MB	345 KB	991 KB
Thread Safe	Yes	?	?	Partly <sup>1</sup>	Yes	?	Yes	Yes	Yes
Latest Version	1.1.24	0.8.1	1.2.11	1.0.3	2.1.7	Oct08	1.10	1.4.0	1.2r2 2.0beta
Release Date	08.04.08	10.05.03	07.11.07	26.06.06	15.05.03	18.10.08	08.02.07	31.10.07	04.09.03

## 1. Expect DOM Modification part

# Benchmark Setup

## 1. Hardware

1. Intel Core Duo E6300 (1.86GHz, 2MB L2 cache)
2. Fujitsu-Siemens D3217-A, Intel Q965 chipset (ICH8R, 1066 Mhz bus)
3. 4 GB DDR2-800 Memory
4. 2 x Seagate Baracuda 7200.10 ST3500630AS (500GB) organized in Raid-1

## 2. Software

1. Gentoo Linux 64bit, Single User Mode
2. Kernel 2.6.25
3. GNU C Library 2.6.1
4. GNU C Compiler 4.2.4
5. Java SE Runtime Environment 1.6.0\_07 (64 bit)

## 3. Libraries

1. Expat 2.0.1
2. Sablotron 1.0.3
3. Arabica Oct2008
4. Gnome XML Library 2.7.3
5. Gnome XML DOM Library 0.8.1
6. Gnome XSLT Library 1.1.24
7. XML Security Library 1.2.11

8. Apache Xerces for C++ 3.0
9. Apache Xalan for C++ 1.10
10. Apache XML Security 1.4.0
11. Apache Xerces for Java 2.9.1
12. Apache Xalan for Java 2.7.1
13. Apache XML Security for Java 1.4.2
14. Trolltech QT 4.4.3
15. Intel XML Software Suite for C++ 1.2
16. Intel XML Software Suite for Java 1.2
17. Oracle XML Developers Kit for C 10.2.0.2.0
18. Oracle XML Developers Kit for Java 10.2.0.2.0

#### 4. XML Files

1. **RDF** - A big RDF document from DMoz.org project describing various web resources. It includes nodes from few namespaces and has constant depth of 3 levels.
2. **XMLGen** - Scalable data generator producing very simple XML content: 4 levels of depth, no namespaces, very limited amount of different XML nodes.
3. **XMark** - Another scalable data generator provided by XMark Project . It produces XML documents modeling an auction website. The XML have slightly more complicated structure: up to 8 levels of depth, higher variety of XML elements. The namespaces are still not used.
4. **OPCGen** - A data generator emulating behavior of OPC XML-DA server . The SOAP messages used in data exchange are generated. Size of some of these messages is scaled by scaling parameter, others are staying constant. The nodes and attributes are belonging to 3 different namespaces. The depth of generated XML is depending on the message type and varies from 1 to 5.

## Parsing Benchmarks

	OPCGEN 50	XMLGEN 256	XMARK 16k	RDF
Expat (SAX)	7015	5.7	1891.6	217.27
Arabica (DOM)	99113	103.58	924323	2100
Arabica (SAX)	28520	23.08	8172	616.69
Sablotron (DOM)	40081	50.02	16353	1040.11
LibXML (DOM)	11219	10.98	5093.63	588.22
GDOME (DOM)	13248	12.36	5482	611.29
LibXML (SAX)	4915.4	4.2	1535.16	223.52
LibXML (DOM/Push)	11461	13.1	5028	591.02
Xerces/C (DOM)	22411	14.86	6454	534.47
Xerces/C (SAX)	13024	7.67	3123	342.02
RXP Parser (SAX)				
QT XML Module (DOM)	54230	50.97	22417	1198.9
QT XML Module (SAX)	36329	26.62	12806	906.4
Oracle XDK/C (DOM)	91690	19.29	9836	1091.81
Oracle XDK/C (SAX)	89891.96	17.95	9916	1132.21
Oracle XDK/C++ (DOM)	78333	19.47	9850	1081
Oracle XDK/C++ (SAX)	76609	18.38	9985	1121.6
Oracle XDK/Java (DOM)	19061	14.99	164478	512.32
Oracle XDK/Java (SAX)	14762	9.72	3710	345.76
Intel XML Suite/C (DOM)	7206	10.47	2492.19	134.9
Intel XML Suite/C (SAX)	3089	2.7	1087.38	68.11
Intel XML Suite/J (DOM)	12933	8.85	182917	233
Intel XML Suite/J (Deferred DOM)	10759	6.15	3269	172.76
Intel XML Suite/J (SAX)	10211	5	2058	151.56
Xerces/Java (DOM)	20557	12.38	182917	332
Xerces/Java (Deferred DOM)	19143	9.79	14084	292.36
Xerces/Java (SAX)	13324	6.59	2373	203.68

## Validation Benchmark

	OPCGEN 50	XMLGEN 4	OPCGEN 50k	XMLGEN 256
LibXML	146.8	0.06	9697.41	4.23
Xerces/C	430	0.17	34889	15.18
Oracle XDK/C	1167	0.32	89928	20.69
Intel XML Suite/C	143.7	0.13	9579	5.96
Intel XML Suite/J	271	0.18	13235	8.41
Xerces/Java	1038	0.26	Failed	12.04

## XSLT Transformation Benchmark

	XMLGEN 4	ODT (PhD)	RDF (Mini)	XMLGEN 65536
Sablotron	4.21	5181	226444	53003
LibXSLT	1.15	7049	59402	13189
Xalan/C	1.45	3661	57113	14785.37
Oracle XDK/C	3.31	11555	Failed	14457
Intel XML Suite/C	0.27	276	7008	2505.91
Intel XML Suite/J	0.46	310.8	6803	6176
Xalan/Java	1.68	2551	28410	Failed

## DOM Benchmark

	0KB XML	000KB XML	9MB XML	90MB XML
Sablotron	1.22	128.29	4471	2046.9
LibXML	0.22	29.88	728.08	740.804
GDOM	0.71	102.80	2118.70	191.00
Xerces/C	0.73	71.22	1440.03	14791
QT XML Module	1.00	106.86	3209	32960
Oracle XDK/C	0.00	10.79	307.07	2790.78
Oracle XDK/C++	0.00	10.43	302.00	2708.23
Oracle XDK/Java	0.28	26.64	094.3	100.40
Intel XML Suite/C	0.27	32.04	749.4	7486.21
Intel XML Suite/J	0.39	24.9	019.10	Failed
Xerces/Java	0.17	18.01	482.9	4729

## XML Security Benchmark

	OPCGEN 00	XMLGEN 206	OPCGEN 0k	RDF
Gnome XMLSec (Signature)	7178.00	60.83	09710	1231.46
Gnome XMLSec (Encryption)	12009.11	91.98	128729	4000.6
Apache XML Security/C (Signature)	23838	337	326716	0638
Apache XML Security/C (Encryption)	212.6	183	286838	7281
Apache XML Security/Java (Signature)	20741	38.2	213983	901.67
Apache XML Security/Java (Encryption)	38032	184.27	6002621	376694

## Compiler Benchmark

	DOM(Xmark 200M)	SAX(Xmark 200M)	XSD (OPC 5K)	XSD (OPC 5M)	XSLT (XML 4K)	XSLT (ODT/HTML)
Gcc 4.2.4 / Glibc 2.6.1, 64 bit, O2	7425	3807	546.9	2589	1.41	2752.85
Gcc 4.2.4 / Glibc 2.6.1, 64 bit, O3	7259	3296	510	2413	1.4	2607
Gcc 4.2.4 / Glibc 2.9.0, 64 bit, O2	7218	3904	540	2533	1.37	2666
Gcc 4.2.4 / Glibc 2.9.0, 64 bit, O3	7073	3378	516	2417	1.41	2627
Gcc 4.3.3 / Glibc 2.9.0, 64 bit, O2	7251	3375	485	2102	1.22	2662
Gcc 4.3.3 / Glibc 2.9.0, 64 bit, O3	6977	3301	493	2287	1.35	2629
Gcc 4.3.3 / Glibc 2.9.0, 64 bit, TC3	5427	3363	428.04	2040.9	1.21	2627.43
Gcc 4.2.4 / Glibc 2.5.0, 32 bit, O2	8497	4406	609	2712	1.91	3641
Gcc 3.3.1 / Glibc 2.6.1, 64 bit, O2	8013	3825	553	2498	1.5	2969
Intel C Compiler 10.0, 64 bit, -xT	7930	3507	515.6	2324.77	1.46	3054