

Xqueue Specifications

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Contents

1	About this document	1
1.1	Copying	1
1.2	Availability	2
1.3	Terms of Use	2
2	xqML language	3
2.1	xqML Symbols	3
2.2	Formal xqML (0.2) Grammar in EBNF notation	4
3	Xqueue Association	5
3.1	Xqueue Association algorithm (0.1)	5
3.2	Xqueue Association format (0.1)	6
4	Changes	6
4.1	xqML	6
4.2	Xqueue Association algorithm	7
4.3	Xqueue Association format	7
5	GNU Free Documentation License	7
5.1	Applicability and Definitions	8
5.2	Verbatim Copying	8
5.3	Copying in Quantity	8
5.4	Modifications	9
5.5	Combining Documents	9
5.6	Collections of Documents	10
5.7	Aggregation with Independent Works	10
5.8	Translation	10
5.9	Termination	10
5.10	Future Revisions of This License	10

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2 xqML language

xqML is the binary markup language that is used by Xqeeze to achieve compact document sizes as compared to XML documents. xqML is structurally very similar to XML. The greatest contributors to xqML's compact nature are the elimination of redundant information and representation of XML identifiers (NMTOKENs) whose definitions are available in the DTD/Schema with binary *xqML Symbols*.

2.1 xqML Symbols

xqML Symbols are octet sequences that represent unsigned integers written in MSB (Most Significant Byte first) order. Additionally, the least significant bit of each octet of a symbol, except the last one, should be one. For example, the integer 256 can be a valid xqML Symbol since when written in MSB order, its bit pattern is [00000001 00000000]. Thus the least significant bit of each octet in the symbol acts as a continuation flag. A 1 indicates that the next octet is a part of the symbol, a 0 indicates the end.

It is trivial that all xqML Symbols must be even numbers. Additionally, one bit of each octet is rendered unusable since it acts as a continuation flag. 16 bit xqML Symbols can represent 16384 different identifiers while 32 bit ones can represent over 268 million different identifiers. A conforming implementation is required to support atleast 16 bit long symbols.

xqML Symbols start from 0x02 (decimal 2) and symbols up to 0xFE (decimal 254) are reserved for special purposes. Higher values are available for generating associations using the Xqeeze Association algorithm. While associating a symbol with an identifier, its type is also stored. Thus, a symbol represents not only the string literal, but also the type of an identifier.

Reserved Symbols

Symbol Value		Purpose
Hex	Dec	
0x02	002	Prolog
0x04	004	xqA EL Section
0x06	006	xqA EE Section
0x08	008	xqA AT Section
0x0A	010	xqA AP Section
0x0C	012	xqA VA Section
0x0E	014	xqA EN Section
0x10	016	xqA end marker
0x12	018	Doctype declaration marker
0x14	020	CDSection delimiter
0x16	022	Attribute end marker
0x18	024	
0x1A	026	
0x1C	028	
0x1E	030	Markup flag
0x20	032	
0x22	034	Comment start
0x24	036	
0x26	038	Character reference
0x28	040	
0x2A	042	
0x2C	044	
0x2E	046	
0x30	048	
0x32	050	
0x34	052	
0x36	054	
0x38	056	
0x3A	058	
0x3C	060	
0x3E	062	End tag marker
The remaining symbols are unutilized so far		

2.2 Formal xqML (0.2) Grammar in EBNF notation

```

document ::= prolog element Misc *
prolog ::= xqMLDecl? Misc * (doctypeddecl Misc*)?
xqMLDecl ::= '{0x1E}{0x02}xqml -' Num '/' Num ('/' Num)?
Misc ::= Comment
doctypeddecl ::= '{0x1E}{0x12}' DoctypeName | xqA
DoctypeName ::= Char *
element ::= (EE_STag | STag) content ETag?
EE_STag ::= '{0x1E}' EESymbol (attribute) *
STag ::= '{0x1E}' ELSymbol (attribute) *
content ::= Char * ((element | Reference | CDSEct | Comment) Char*) *

```

attribute ::= *ATAttribute* | *APAttribute*
ATAttribute ::= '{0x1E}' *ATSymbol* *Char* * (*Reference* *Char**) * '{0x1E}'{0x16}'
APAttribute ::= '{0x1E}' *APSymbol* *VASymbol*
Reference ::= *EntityRef* | *CharRef*
EntityRef ::= '{0x1E}' *ENSymbol*
CharRef ::= '{0x1E}'{0x26}' *Num* '{0x1E}'
CDSect ::= *CDDelim* *Char* * *CDDelim*
CDDelim ::= '{0x1E}'{0x14}'
Comment ::= '{0x1E}'{0x22}' *Char* * '{0x1E}'
ETag ::= '{0x1E}'{0x3E}' *ElementsToClose*
Char ::= [^RS].
Num ::= [0 - 9] +

Note: Comments are now deprecated and may be removed from future versions.

Terminals

Figures enclosed within braces ({}) are hex codes for the value of an xqML Symbol that should occur within.

DoctypeName is a string literal identifying a document type

RS is the ASCII control character 0x1E (Record Separator). Thus, *Char* matches any character that is not 0x1E

xqA is the Xqeeze Association (without preamble)

ELSymbol is an xqML Symbol of the type “element”

EESymbol is an xqML Symbol of the type “empty element”

ATSymbol is an xqML Symbol of the type “attribute”

APSymbol is an xqML Symbol of the type “attribute with predefined value”

VASymbol is an xqML Symbol of the type “attribute value”

ENSymbol is an xqML Symbol of the type “entity reference”

ElementsToClose is an octet to be interpreted as an unsigned integer.

3 Xqeeze Association

Xqeeze uses an association between symbols and their corresponding XML identifiers and types as defined in a specification (DTD/Schema). This enables representation of known identifiers in the markup with symbols. Associating the type of an identifier along with its name also makes it easy to various structural units of the document without having to use too many special characters and character-combinations.

3.1 Xsqueeze Association algorithm (0.1)

This is the algorithm that is used to map the identifiers found in a DTD/Schema to xqML Symbols. The steps of the algorithm are:

1. collect all Element identifiers together, discarding duplicates
2. collect all Empty Element identifiers together, discarding duplicates
3. collect all Attribute identifiers together, discarding duplicates
4. collect all identifiers together for Attributes that have predefined values, discarding duplicates
5. collect all Attribute Value identifiers together, discarding duplicates
6. collect all Entity References together, discarding duplicates
7. sort the above collections alphabetically and incrementally assign them symbols in the order enumerated in steps 1 to 6

This simple algorithm assures that the assignments would remain the same even if a particular specification (DTD/Schema) has slight variations in the way it's written in the generator's and consumer's copies, as long as both define the same things.

3.2 Xsqueeze Association format (0.1)

Xsqueeze associations are represented in a format that itself is quite compact and uses xqML Symbols themselves. The specification begins with an optional prolog that begins with the sequence `< {0x02}`. The prolog continues upto the next occurrence of `<`. It is followed by *sections* that are denoted by `<`, followed by an xqML Symbol. The symbols for various sections are:

0x04 Elements

0x06 Empty Elements

0x08 Attributes

0x0A Attributes with predefined values

0x0C Attribute values

0x0E Entity References

Within each section, individual entries are listed as `<`, followed by the a symbol, followed by the string that the symbol corresponds to. Thus the type of a symbol is determined by the section it is present in. A single association specification may have multiple sections of the same type and the ordering is not restricted. However, sections can't be nested.

The end of specifications is denoted by the sequence `< {0x10}`. This structure enables inline specification of the symbols associations, if required by a document.

4 Changes

4.1 xqML

Version 0.2

- xqML Symbol ‘`{0x1E}`’ replaces ‘`<`’ for the latter’s role in xqML markup
- *Attribute* is split into *ATAttribute* and *APAttribute*, together referred as *attribute*.
- *ATAttribute* can contain *Reference*.
- *ATAttribute* is terminated by ‘`{0x1E}{0x16}`’ instead of ‘`<`’
- *CharRef* starts with ‘`{0x1E}{0x26}`’ instead of ‘`&{0x26}`’
- *CharRef* ends with ‘`{0x1E}`’. Earlier there was no end-marker
- *Comment* ends with ‘`{0x1E}`’ instead of *ETag?*
- *Comment* is deprecated
- *Char* is a terminal that matches any printable character
- *Num* does not contain ‘.’

Version 0.1

First Release

4.2 Xsqueeze Association algorithm

Version 0.1

First Release

4.3 Xsqueeze Association format

Version 0.1

First Release

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