

# Product Description for SaxonCS-EET (Enterprise Edition, Transformation Package)



Version 12 released Jan 2023

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This document lists the features provided by SaxonCS 12 Enterprise Edition, Transformation Package (Saxon-EET) - a license that enables all the facilities of Saxon Professional Edition, plus XSD schema validation, plus enterprise features (including Schema Awareness) for XSLT (but not XQuery), for .NET 6.

This document does not form part of any contract unless expressly incorporated.

## Language Support

### 1. XSLT (Transformation Processing)

- |  |   |
|--|---|
| <b>1.1 XSLT 3.0<br/>Basic<br/>Processor</b>    | Provides all mandatory features from the XSLT 3.0 specification (including try/catch, iterate, accumulators, maps, named modes, content value templates, and extended patterns, as well as features retained from XSLT 2.0).  |
| <b>1.2 XSLT 3.0<br/>Schema<br/>Awareness</b>   | Provides a schema-aware XSLT 3.0 processor: specifically, the ability to import an XSD schema when compiling a stylesheet, to use this for type-checking, and to process and create schema-validated instance documents.  |
| <b>1.3 XSLT 3.0<br/>Serialization</b>          | Provides the serialization feature: specifically, the ability to convert the result trees produced as output of an XSLT transformation to lexical XML, or other formats including HTML, JSON, and plain text, under the control of serialization parameters defined in the stylesheet or via an external API. |
| <b>1.4 XSLT 3.0<br/>Compatibility</b>          | Provides XSLT 1.0 compatibility mode as defined in the XSLT 3.0 specification. If a stylesheet specifies <code>version="1.0"</code> , this causes certain constructs to behave in a way that retains the XSLT 1.0 behavior.   |
| <b>1.5 XSLT 3.0<br/>Streaming</b>              | Includes additional features of the XSLT 3.0 specification that enable streaming (processing of documents that are too large to fit in memory).   |
| <b>1.6 XSLT 3.0<br/>Dynamic<br/>Evaluation</b> | Provides use of the XSLT 3.0 instruction <code>xsl:evaluate</code> , which allows dynamic evaluation of XPath expressions.  |
| <b>1.7 XSLT 3.0<br/>XPath 3.1<br/>Feature</b>  | Provides full use of XPath 3.1 features, including XPath 3.1 functions, and maps and arrays.<br><br>Note: Saxon supports XPath 3.1 unconditionally in XSLT 3.0 stylesheets, it does not offer a processing mode in which XPath is restricted to version 3.0.  |

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## 1.8 XSLT 3.0 Higher-Order Functions

Provides higher-order functions: specifically, the ability to use functions as values, including dynamic function calls, inline functions, partial function application, and the standard higher-order functions defined in the XPath 3.1 function library.

For more details see: [XSLT 3.0 conformance](#).

Relevant W3C Specification: [XSLT 3.0 Recommendation \(08 June 2017\)](#).

## 2. XPath

### 2.1 XPath 3.1 Basic

Provides all XPath 3.1 features which do not require schema-awareness or higher-order functions. This includes an implementation of maps and arrays, and support for JSON, as well as language constructs retained from earlier XPath versions.

### 2.2 XPath 3.1 Schema Aware

Provides schema-awareness: specifically, any use of source documents with type annotations, and any use of XPath expressions that contain the names of schema components such as element declarations and types, other than the built-in types.

### 2.3 XPath 3.1 Higher-Order Functions

Provides higher-order functions: specifically, the ability to use functions as values, including dynamic function calls, inline functions, partial function application, and a library of built-in higher-order functions.

For more details see: [XPath 3.1 conformance](#).

Relevant W3C Specification: [XPath 3.1 Recommendation \(21 March 2017\)](#).

## 3. XQuery

### 3.1 XQuery 3.1 Minimal Conformance

Provides Minimal Conformance (including try/catch and "group-by", as well as language features retained from earlier XQuery versions) as defined in section 5 of the XQuery 3.1 specification.

### 3.2 XQuery 3.1 Modules

Provides the Module feature, which allows a query to be made up of multiple modules.

### 3.3 XQuery 3.1 Serialization

Provides the Serialization feature. This allows the output of a query to be serialized as lexical XML, or in other formats including HTML, JSON, and

plain text, under the control of serialization parameters contained either in the query itself, or supplied externally.

### 3.4 XQuery 3.1 Higher-Order Functions

Provides the Higher-Order Function feature. This provides the ability to use functions as values, including dynamic function calls, inline functions, partial function application, and a library of built-in higher-order functions.

Optional features not provided: XQuery 3.1 Schema Aware, XQuery 3.1 Typed Data, XQuery 3.1 Static Typing, XQuery Update 1.0.

For more details see: [XQuery 3.1 conformance](#).

Relevant W3C Specification: [XQuery 3.1 Recommendation \(21 March 2017\)](#).

## 4. XSD (XML Schema Validation)

### 4.1 XML Schema 1.0 Validation

Saxon includes a complete implementation of XML Schema 1.0. This provides the ability to process XSD 1.0 schema documents and use them to validate instance documents. Note that Saxon does not expose the full PSVI, as required by the conformance rules in the XSD 1.0 Recommendation. Also includes Saxon extension functions to provide access to a compiled schema.

From Saxon 10, the Saxon schema processor accepts XSD 1.1 syntax unconditionally. XSD 1.0 schemas are processed according to the rules of the XSD 1.1 specification. This offers a very high level of backwards compatibility, except in a few areas where the XSD 1.0 rules were unclear and have been clarified in the XSD 1.1 recommendation.

For more details see: [XML Schema 1.0 conformance](#).

Relevant W3C Specification: [XML Schema 1.0 Recommendation \(28 October 2004\)](#).

### 4.2 XML Schema 1.1 Validation

Saxon includes a complete implementation of XML Schema 1.1. This provides the ability to process schema documents that use the new features of XSD 1.1, and use them to validate instance documents. More specifically, in the language of section 2.4 of the specification, it is a General-Purpose Web-Aware Validator. Also includes Saxon extension functions to provide access to a compiled schema.

For more details see: [XML Schema 1.1 conformance](#).

Relevant W3C Specification: [XML Schema 1.1 Recommendation \(05 April 2012\)](#).

## Performance Features

### 5. Export stylesheet packages

XSLT 3.0 packaging allows stylesheet modules to be independently compiled and distributed, and provides much more "software engineering" control over public and private interfaces, and the like. The ability to save packages in compiled form ("stylesheet export file", SEF) gives much faster loading of frequently used stylesheets, and also enables in-browser execution using SaxonJS.

For more details see: [Compiling a stylesheet](#).

### 6. Import stylesheet packages

Allows the importing of stylesheet packages in compiled form. Possible with all editions provided the package only uses features available in that edition.

For more details see: [Compiling a stylesheet](#).

### 7. Multi-threading (XPath)

Takes advantage of multi-core CPUs by providing automatic parallel execution of the `collection()` function.

### 8. Multi-threading (XSLT)

Takes advantage of multi-core CPUs by providing automatic parallel execution of the `xsl:result-document` instruction; plus an extension attribute `saxon:threads` to allow multi-threaded execution of `xsl:for-each` instructions under the control of the stylesheet author.

### 9. Optimizer (Advanced)

The Advanced optimizer provides the wide range of static and dynamic optimizations featured in the Basic optimizer - including full pipelining of list operations, lazy evaluation of variables, elimination of redundant sorting operations, etc. - and additionally provides join optimization, inlining of variables and functions, just-in-time compilation of template rules, and optimized searching of large sets of template rules, where feasible.

### 10. Reading W3C schemas and DTDs

The W3C web server routinely rejects requests for commonly-referenced files such as the DTD for XHTML, causing parsing failures. In response to this, Saxon now includes copies of these documents within the issued JAR/DLL file, and recognizes requests for these documents, satisfying the request using the local copy.

## 11. Streaming (XPath and XQuery)

Provides `saxon:stream()`, an extension function to allow large documents to be processed without holding the whole document in memory.

For more details see: [Streaming XML documents](#).

## 12. Streaming (XSLT)

Allows large documents to be processed without holding the whole document in memory. Provides the streaming features of the XSLT 3.0 specification.

For more details see: [Streaming XML documents](#).

## Extensibility

### 13. EXSLT extension functions

A selection of EXSLT extension functions are provided (in the modules Common, Dates and Times, Math, Random, and Sets), as listed in the documentation.

Only the `exslt:node-set` function is available in SaxonCS.

For more details see: [EXSLT extensions](#).

### 14. EXPath extension functions

A selection of EXPath extension functions are provided (in the modules Archive, Binary, and File), as listed in the documentation.

For more details see: [EXPath extensions](#).

### 15. Extensibility using custom classes

Ability to write extension functions (for use in XSLT, XQuery, or XPath) by implementing a Saxon-defined interface and registering the implementation with the Saxon Configuration.

For more details see: [Extensibility](#).

## 16. Saxon extension functions (Advanced)

Extension functions, as listed in the documentation, in the Saxon namespace. The Advanced level includes those that depend on streaming or schema-awareness: `saxon:schema()`, `saxon:stream()`, and `saxon:validate()`.

For more details see: [Saxon extension functions](#).

## Localization

### 17. Formatting dates using ICU

Full support for formatting dates as words in different languages is provided using the ICU4N library.

For more details see: [Numbers and dates from ICU](#).

### 18. Sorting and collations using ICU

Support for sorting and comparison of strings using the Unicode Collation Algorithm uses the collation facilities available from the ICU4N library.

For more details see: [Unicode Collation Algorithm](#).

## Interfaces and APIs

### 19. .NET API

SaxonCS's interface for processing XSLT, XQuery, XPath, and (with Saxon-EE) XML Schema, on .NET.

For more details see: [Saxon API for .NET](#).

### 20. Support for DOM

Ability to use a DOM (Document Object Model) for the input and output of transformations and queries. On the .NET platform this includes the System.Xml DOM classes.

For more details see: [Object models](#).