**ECMA-376-1:2016**

**Office Open XML File Formats — Fundamentals and Markup Language Reference**

October 2016

**Table of Contents**

[Foreword viii](#_Toc10341477)

[Introduction ix](#_Toc10341478)

[1. Scope 1](#_Toc10341479)

[2. Conformance 2](#_Toc10341480)

[2.1 Document Conformance 2](#_Toc10341481)

[2.2 Application Conformance 2](#_Toc10341482)

[2.3 Application Descriptions 3](#_Toc10341483)

[2.4 Interoperability Guidelines 5](#_Toc10341484)

[3. Normative References 6](#_Toc10341485)

[4. Terms and Definitions 10](#_Toc10341486)

[5. Notational Conventions 13](#_Toc10341487)

[6. Acronyms and Abbreviations 14](#_Toc10341488)

[7. General Description 15](#_Toc10341489)

[8. Overview 16](#_Toc10341490)

[8.1 Content Overview 16](#_Toc10341491)

[8.2 Packages and Parts 16](#_Toc10341492)

[8.3 Consumers and Producers 16](#_Toc10341493)

[8.4 WordprocessingML 16](#_Toc10341494)

[8.5 SpreadsheetML 18](#_Toc10341495)

[8.6 PresentationML 18](#_Toc10341496)

[8.7 Supporting MLs 19](#_Toc10341497)

[9. Packages 21](#_Toc10341498)

[9.1 Office Open XML's Use of OPC 21](#_Toc10341499)

[9.2 Relationships in Office Open XML 22](#_Toc10341500)

[10. Markup Compatibility and Extensibility 27](#_Toc10341501)

[11. WordprocessingML 28](#_Toc10341502)

[11.1 Glossary of WordprocessingML-Specific Terms 28](#_Toc10341503)

[11.2 Package Structure 28](#_Toc10341504)

[11.3 Part Summary 31](#_Toc10341505)

[11.4 Document Template 57](#_Toc10341506)

[11.5 Framesets 58](#_Toc10341507)

[11.6 Master Documents and Subdocuments 59](#_Toc10341508)

[11.7 Mail Merge Data Source 60](#_Toc10341509)

[11.8 Mail Merge Header Data Source 61](#_Toc10341510)

[11.9 XSL Transformation 62](#_Toc10341511)

[12. SpreadsheetML 64](#_Toc10341512)

[12.1 Glossary of SpreadsheetML-Specific Terms 64](#_Toc10341513)

[12.2 Package Structure 65](#_Toc10341514)

[12.3 Part Summary 67](#_Toc10341515)

[12.4 External Workbooks 102](#_Toc10341516)

[13. PresentationML 103](#_Toc10341517)

[13.1 Glossary of PresentationML-Specific Terms 103](#_Toc10341518)

[13.2 Package Structure 103](#_Toc10341519)

[13.3 Part Summary 106](#_Toc10341520)

[13.4 HTML Publish Location 124](#_Toc10341521)

[13.5 Slide Synchronization Server Location 125](#_Toc10341522)

[14. DrawingML 126](#_Toc10341523)

[14.1 Glossary of DrawingML-Specific Terms 126](#_Toc10341524)

[14.2 Part Summary 126](#_Toc10341525)

[15. Shared 139](#_Toc10341526)

[15.1 Glossary of Shared Terms 139](#_Toc10341527)

[15.2 Part Summary 140](#_Toc10341528)

[15.3 Hyperlinks 161](#_Toc10341529)

[16. Part Overview 163](#_Toc10341530)

[16.1 WordprocessingML Summary 163](#_Toc10341531)

[16.2 SpreadsheetML Summary 163](#_Toc10341532)

[16.3 PresentationML Summary 164](#_Toc10341533)

[16.4 DrawingML Summary 165](#_Toc10341534)

[16.5 Shared Summary 165](#_Toc10341535)

[17. WordprocessingML Reference Material 167](#_Toc10341536)

[17.1 Table of Contents 167](#_Toc10341537)

[17.2 Main Document Story 187](#_Toc10341538)

[17.3 Paragraphs and Rich Formatting 193](#_Toc10341539)

[17.4 Tables 371](#_Toc10341540)

[17.5 Custom Markup 484](#_Toc10341541)

[17.6 Sections 546](#_Toc10341542)

[17.7 Styles 613](#_Toc10341543)

[17.8 Fonts 669](#_Toc10341544)

[17.9 Numbering 691](#_Toc10341545)

[17.10 Headers and Footers 733](#_Toc10341546)

[17.11 Footnotes and Endnotes 746](#_Toc10341547)

[17.12 Glossary Document 779](#_Toc10341548)

[17.13 Annotations 797](#_Toc10341549)

[17.14 Mail Merge 928](#_Toc10341550)

[17.15 Settings 969](#_Toc10341551)

[17.16 Fields and Hyperlinks 1157](#_Toc10341552)

[17.17 Miscellaneous Topics 1292](#_Toc10341553)

[17.18 Simple Types 1301](#_Toc10341554)

[18. SpreadsheetML Reference Material 1523](#_Toc10341555)

[18.1 Table of Contents 1523](#_Toc10341556)

[18.2 Workbook 1542](#_Toc10341557)

[18.3 Worksheets 1589](#_Toc10341558)

[18.4 Shared String Table 1717](#_Toc10341559)

[18.5 Tables 1726](#_Toc10341560)

[18.6 Calculation Chain 1742](#_Toc10341561)

[18.7 Comments 1745](#_Toc10341562)

[18.8 Styles 1752](#_Toc10341563)

[18.9 Metadata 1801](#_Toc10341564)

[18.10 Pivot Tables 1815](#_Toc10341565)

[18.11 Shared Workbook Data 1959](#_Toc10341566)

[18.12 QueryTable Data 1988](#_Toc10341567)

[18.13 External Data Connections 1995](#_Toc10341568)

[18.14 Supplementary Workbook Data 2016](#_Toc10341569)

[18.15 Volatile Dependencies 2026](#_Toc10341570)

[18.16 Custom XML Mappings 2031](#_Toc10341571)

[18.17 Formulas 2039](#_Toc10341572)

[18.18 Simple Types 2435](#_Toc10341573)

[19. PresentationML Reference Material 2517](#_Toc10341574)

[19.1 Table of Contents 2517](#_Toc10341575)

[19.2 Presentation 2523](#_Toc10341576)

[19.3 Slides 2560](#_Toc10341577)

[19.4 Comments 2598](#_Toc10341578)

[19.5 Animation 2602](#_Toc10341579)

[19.6 Slide Synchronization Data 2691](#_Toc10341580)

[19.7 Simple Types 2692](#_Toc10341581)

[20. DrawingML - Framework Reference Material 2720](#_Toc10341582)

[20.1 DrawingML - Main 2720](#_Toc10341583)

[20.2 DrawingML - Picture 3090](#_Toc10341584)

[20.3 DrawingML - Locked Canvas 3097](#_Toc10341585)

[20.4 DrawingML - WordprocessingML Drawing 3098](#_Toc10341586)

[20.5 DrawingML - SpreadsheetML Drawing 3155](#_Toc10341587)

[21. DrawingML - Components Reference Material 3184](#_Toc10341588)

[21.1 DrawingML - Main 3184](#_Toc10341589)

[21.2 DrawingML - Charts 3365](#_Toc10341590)

[21.3 DrawingML - Chart Drawings 3473](#_Toc10341591)

[21.4 DrawingML - Diagrams 3494](#_Toc10341592)

[22. Shared MLs Reference Material 3603](#_Toc10341593)

[22.1 Math 3603](#_Toc10341594)

[22.2 Extended Properties 3724](#_Toc10341595)

[22.3 Custom Properties 3731](#_Toc10341596)

[22.4 Variant Types 3733](#_Toc10341597)

[22.5 Custom XML Data Properties 3744](#_Toc10341598)

[22.6 Bibliography 3747](#_Toc10341599)

[22.7 Additional Characteristics 3784](#_Toc10341600)

[22.8 Office Document Relationships 3788](#_Toc10341601)

[22.9 Shared Simple Types 3789](#_Toc10341602)

[23. Custom XML Schema References 3804](#_Toc10341603)

[23.1 Table of Contents 3804](#_Toc10341604)

[23.2 Elements 3804](#_Toc10341605)

[Annex A. (normative) Schemas – W3C XML Schema 3809](#_Toc10341606)

[A.1 WordprocessingML 3809](#_Toc10341607)

[A.2 SpreadsheetML 3875](#_Toc10341608)

[A.3 PresentationML 3959](#_Toc10341609)

[A.4 DrawingML - Framework 3990](#_Toc10341610)

[A.5 DrawingML - Components 4058](#_Toc10341611)

[A.6 Shared MLs 4109](#_Toc10341612)

[A.7 Custom XML Schema References 4133](#_Toc10341613)

[Annex B. (informative) Schemas – RELAX NG 4135](#_Toc10341614)

[B.1 WordprocessingML 4136](#_Toc10341615)

[B.2 SpreadsheetML 4182](#_Toc10341616)

[B.3 PresentationML 4277](#_Toc10341617)

[B.4 DrawingML - Framework 4302](#_Toc10341618)

[B.5 DrawingML - Components 4354](#_Toc10341619)

[B.6 Shared MLs 4390](#_Toc10341620)

[B.7 Custom XML Schema References 4406](#_Toc10341621)

[B.8 Additional Resources 4407](#_Toc10341622)

[Annex C. (informative) Additional Syntax Constraints 4409](#_Toc10341623)

[Annex D. (informative) Namespace Prefix Mapping in Examples 4410](#_Toc10341624)

[Annex E. (informative) WordprocessingML Custom XML Data Extraction 4412](#_Toc10341625)

[Annex F. (normative) WordprocessingML Page Borders 4415](#_Toc10341626)

[Annex G. (normative) Predefined SpreadsheetML Style Definitions 4416](#_Toc10341627)

[G.1 Built-in Table Styles 4416](#_Toc10341628)

[G.2 Built-in Cell Styles 4472](#_Toc10341629)

[G.3 Built-in PivotTable AutoFormats 4476](#_Toc10341630)

[Annex H. (informative) Example Predefined DrawingML Shape and Text Geometries 4492](#_Toc10341631)

[Annex I. (informative) Bidirectional Support 4493](#_Toc10341632)

[I.1 Introduction 4493](#_Toc10341633)

[I.2 Shared (WordprocessingML and DrawingML) 4493](#_Toc10341634)

[I.3 WordprocessingML 4495](#_Toc10341635)

[I.4 SpreadsheetML 4498](#_Toc10341636)

[I.5 PresentationML 4499](#_Toc10341637)

[I.6 DrawingML 4499](#_Toc10341638)

[I.7 The Unicode Bidirectional Algorithm and Office Open XML 4499](#_Toc10341639)

[Annex J. (informative) Accessibility Best Practices 4503](#_Toc10341640)

[J.1 The Value of Creating an Accessible Office Open XML Implementation 4503](#_Toc10341641)

[J.2 Needs by Type of Disability 4504](#_Toc10341642)

[J.3 Best Practices for Developers 4507](#_Toc10341643)

[J.4 Best Practices for Document and Template Authors 4510](#_Toc10341644)

[J.5 Best Practices for Customers of Office Open XML Implementations 4523](#_Toc10341645)

[Annex K. (informative) Root Element Locations 4536](#_Toc10341646)

[K.1 Grouped by Part Name 4536](#_Toc10341647)

[K.2 Grouped by Schema Name 4538](#_Toc10341648)

[Annex L. (informative) Primer 4542](#_Toc10341649)

[L.1 Introduction to WordprocessingML 4542](#_Toc10341650)

[L.2 Introduction to SpreadsheetML 4634](#_Toc10341651)

[L.3 Introduction to PresentationML 4773](#_Toc10341652)

[L.4 Introduction to DrawingML 4805](#_Toc10341653)

[L.5 Introduction to VML 4964](#_Toc10341654)

[L.6 Introduction to Shared MLs 4978](#_Toc10341655)

[L.7 Miscellaneous Topics 5009](#_Toc10341656)

[Annex M. (informative) Differences Between ECMA-376:2016 and ECMA-376:2006 5020](#_Toc10341657)

[M.1 WordprocessingML 5020](#_Toc10341658)

[M.2 SpreadsheetML 5023](#_Toc10341659)

[M.3 PresentationML 5024](#_Toc10341660)

[M.4 DrawingML 5025](#_Toc10341661)

[M.5 VML 5026](#_Toc10341662)

[M.6 Shared 5026](#_Toc10341663)

[M.7 Custom XML Schema References 5027](#_Toc10341664)

[Bibliography 5029](#_Toc10341665)

# Foreword

Changes from the 4th edition were made to align this 5th edition Standard with ISO/IEC 29500:2016. Both this 5th edition and ISO/IEC 29500:2016 refer to the 1st edition. As such, this 5th edition does not cancel or replace the 1st edition. This 5th edition does, however, cancel and replace the 4th edition.”

Some important differences between ECMA-376:2016 and ECMA-376:2006 are given in Annex M.

ECMA-376 consists of the following parts:

* *Part 1: Fundamentals and Markup Language Reference*
* *Part 2: Open Packaging Conventions*
* *Part 3: Markup Compatibility and Extensibility*
* *Part 4: Transitional Migration Features*

Annexes A, F and G form a normative part of this Part of ECMA-376. Annexes B–E and H–M are for information only.

This Part of ECMA-376 includes five annexes (Annex A, Annex B, Annex F, Annex G, and Annex H) that refer to data files provided in electronic form.

The document representation formats defined by this Part are different from the formats defined in the corresponding Part of ECMA-376:2006. Some of the differences are reflected in schema changes, as shown in Annex M of this Part.

Introduction

# Introduction

ECMA-376 specifies a family of XML schemas, collectively called *Office Open XML*, which define the XML vocabularies for word-processing, spreadsheet, and presentation documents, as well as the packaging of documents that conform to these schemas.

The goal is to enable the implementation of the Office Open XML formats by the widest set of tools and platforms, fostering interoperability across office productivity applications and line-of-business systems, as well as to support and strengthen document archival and preservation, all in a way that is fully compatible with the existing corpus of Microsoft Office documents.

# 1. Scope

**1. Scope**

ECMA-376 defines a set of XML vocabularies for representing word-processing documents, spreadsheets and presentations. On the one hand, the goal of ECMA-376 is to be capable of faithfully representing the pre-existing corpus of word-processing documents, spreadsheets and presentations that had been produced by the Microsoft Office applications (from Microsoft Office 97 to Microsoft Office 2008, inclusive) at the date of the creation of ECMA-376. It also specifies requirements for Office Open XML consumers and producers. On the other hand, the goal is to facilitate extensibility and interoperability by enabling implementations by multiple vendors and on multiple platforms.

This Part of ECMA-376 specifies concepts for documents and applications of both strict and transitional conformance.

# 2. Conformance

## 2.1 Document Conformance

A document of conformance class Office Open XML Strict shall be a package of conformance class OPC, as specified in ECMA-376-2, for which all the following shall hold:

* + The document obeys all constraints specified in this Part of ECMA-376
  + The document is of category Wordprocessing, Spreadsheet, or Presentation, as defined in §4
  + For each OPC Part of the document of the types listed in §11.3, §12.3, §13.3, §14.2 or §15.2, all the following shall hold:

i. The Part may contain markup in the Markup Compatibility namespace as specified in ECMA-

376-3 ii. After the removal of any extensions by an MCE processor as specified in ECMA-376-3, the part is valid against the strict W3C XML Schema (Appendix A)

This Part of ECMA-376 uses the following further terms to refer to documents of conformance class Office Open XML Strict:

* + *WML Strict*, if the document is of category Wordprocessing
  + *SML Strict*, if the document is of category Spreadsheet
  + *PML Strict*, if the document is of category Presentation

## 2.2 Application Conformance

Application conformance incorporates both syntax and semantics:

* A conforming consumer shall not reject any conforming documents of at least one document conformance class.
* A conforming producer shall be able to produce conforming documents of at least one document conformance class.
* A conforming application shall treat the information in Office Open XML documents in a manner consistent with the semantic definitions given in ECMA-376. An application's intended behavior need not require that application to process all of the information in an Office Open XML document.

However, the information that it does process shall be processed in a manner that is consistent with the semantic definitions given in ECMA-376.

[*Note*: This note illustrates the third bullet above. Conforming applications might serve various functions. Examples include a viewer, an editor, and a back-end processor. Here is an illustration of how the third bullet applies to each of those examples:

* If a conforming viewer supports a given feature, then when it displays information using that feature, it respects the semantics of that feature as described in the Standard.

2. Conformance

* If a conforming editor supports a given feature, then when it provides its user with an interface for manipulating information using that feature, it respects the semantics of that feature as described in the Standard.
* If a conforming back-end processor supports a given feature, then when that processor transforms or assembles information involving that feature, that processor respects the semantics of that feature as described in the Standard.

*end note*]

This Part of ECMA-376 defines the following application conformance classes:

* *WML Strict*, if the application is a conforming application that is a consumer or producer of documents having conformance class WML Strict.
* *SML Strict*, if the application is a conforming application that is a consumer or producer of documents having conformance class SML Strict.
* *PML Strict*, if the application is a conforming application that is a consumer or producer of documents having conformance class PML Strict.

Conformance can also involve the use of application descriptions; see §2.3 for details.

## 2.3 Application Descriptions

An application can be defined as conforming to zero or more *application descriptions* in a particular conformance class.

The application descriptions defined within ECMA-376 are:

* Base
* Full

[*Note*: These application descriptions should not be taken as limiting the ability of an application provider to create innovative applications. They are intended as a mechanism for labelling applications rather than for restricting their capabilities. The intention is to promote interoperability between different applications that share the same conformance class. Application descriptions are orthogonal to the conformance of the documents produced by those applications. For example, a tool used for automated translation of documents might have an application description of “Base” but will still produce fully conformant documents. *end note*]

The application descriptions are determined in terms of an application’s semantic understanding of particular features. *Semantic understanding* is to be interpreted in that an application shall treat the information in Office Open XML documents in a manner consistent with the semantic definitions given in ECMA-376.

Each application description is identified by a URI.

The application descriptions are defined in the following subclauses.

#### 2.3.1 Base Application Description

Description URI: <http://purl.oclc.org/ooxml/descriptions/base>

An application conforming to this description has a semantic understanding of at least one feature within its conformance class.

[*Note*: In addition, applications that include a user interface are strongly recommended to support all accessibility features appropriate to that user interface. *end note*]

#### 2.3.2 Full Application Description

Description URI: http://purl.oclc.org/ooxml/descriptions/full

An application conforming to this description has a semantic understanding of every feature within its conformance class.

#### 2.3.3 Additional Application Descriptions

It is expected that additional application descriptions will be defined within the maintenance process for ECMA376. It is also expected that third parties might define their own application descriptions; for example to inform their procurement decisions, or to deal with domains such as accessibility.

[*Note*: A possible application description would be a “standard” application description for a wordprocessing application. This could be created by taking the intersection of the features available in common wordprocessing applications such as Word 2000, OpenOffice 2, WordPerfect, and iWork Pages. In addition, it could define formats such as specific image and video formats required to be supported to conform to the description. Similar descriptions could be created for spreadsheet applications and presentation applications. Such a description would promote interoperability between applications implementing OOXML. It would also promote interoperability between applications implementing OOXML and applications implementing other document formats such as ISO/IEC 26300. *end note*]

Application descriptions are not required to be strict subsets of each other. An application can simultaneously conform to multiple application descriptions.

Any such newly created description shall enumerate the features that are required for conformance to it. Such a description should provide a machine-processable schema, preferably using a standard such as ISO/IEC 19757.

[*Note*: If the application conforming to a description is a document consumer, it should be able to consume any document that respects such a schema associated with the description. If the application is a document producer, any document produced by that application should respect the schema of the description. *end note*]

Any such description should be identified using a URI, in a similar manner to the names used for application descriptions within ECMA-376.

2. Conformance

[*Note*: For the convenience of users of the description, it is recommended that creators of a description should make a human- or machine-readable form of that description available at a URL corresponding to the description URI. *end note*]

#### 2.3.4 Representation of Application Descriptions within Documents

An application description is related to applications, rather than to document conformance. Therefore, there is no normative mechanism for representing an application description within a document.

[*Note*: It is recommended that implementers wishing to represent an application description within a document use the standard metadata mechanism for Office Open XML. *end note*]

## 2.4 Interoperability Guidelines

[*Guidance*: The following interoperability guidelines incorporate semantics.

For the guidelines to be meaningful, a software application should be accompanied by documentation that describes what subset of ECMA-376 it supports. The documentation should highlight any behaviors that would, without that documentation, appear to violate the semantics of document XML elements. Together, the application and documentation should satisfy the following conditions.

1. The application need not implement operations on all XML elements defined in ECMA-376. However, if it does implement an operation on a given XML element, then that operation should use semantics for that XML element that are consistent with ECMA-376.
2. If the application moves, adds, modifies, or removes XML element instances with the effect of altering document semantics, it should declare the behavior in its documentation.

The following scenarios illustrate these guidelines.

* A presentation editor that interprets the preset shape geometry “rect” as an ellipse does not observe the first guideline because it implements “rect” but with incorrect semantics.
* A batch spreadsheet processor that saves only computed values even if the originally consumed cells contain formulas, might satisfy the first condition, but does not observe the second because the editability of the formulas is part of the cells’ semantics. To observe the second guideline, its documentation should describe the behavior.
* A batch tool that reads a word-processing document and reverses the order of text characters in every paragraph with “Title” style before saving it can be conforming even though ECMA-376 does not recommend this behavior. This tool’s behavior would be to transform the title “Office Open XML” into “LMX nepO eciffO”. Its documentation should declare its effect on such paragraphs.

The normative requirements in §2.1 imply that a conforming producer shall not write unescaped non-XML characters. As an implementation guideline, a conforming producer additionally should not write escaped nonXML characters. Doing so damages interoperability with existing XML-based standards such as SOAP and RDF. For example, implementers could either refuse to create documents including such characters, or warn users that including such characters compromises the re-usability of their documents. *end guidance*]

# 3. Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI X3.4-1986, *American Standard Code for Information Interchange (ASCII)*

Bureau of Standards, Metrology and Inspection of the Ministry of Economic Affairs, *CNS 7648: Data Elements and Interchange Formats — Information Interchange — Representation of Dates and Times*

Calendar Reform Committee, Indian Ephemeris and Nautical Almanac. 1957

Stokes, M., M. Anderson, S. Chandrasekar, and R. Motta. *A Standard Default color Space for the Internet. Vers.*

*1.10*. November 5, 1996. http://www.w3.org/Graphics/Color/sRGB

Har'El, Zvi, *Gauss Formula for the Julian Date of Passover*. Deptartment of Mathematics, Technion, Israel Institue of Technology, Haifa 32000, Isreal, 2005, 6

Duerst, M, and M Suignard. *Internationalized Resource Identifiers (IRIs).* IETF. January 2005. http://tools.ietf.org/html/rfc3987

IANA, *Character Sets from IANA*, as specified at http://www.iana.org/assignments/character-sets

IANA. *MIME Media Types*. Internet Assigned Numbers Authority. [http://www.iana.org/assignments/mediatypes/](http://www.iana.org/assignments/media-types/)

IEC 60559:1989, *Binary Floating-Point Arithmetic for Microprocessor Systems*

ISO/IEC 2382-1:1993, *Information technology — Vocabulary — Part 1: Fundamental terms*

ISO 8601:2004, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8859-1:1998, *Information technology — 8-bit single-byte coded graphic character sets — Part 1: Latin alphabet No. 1* (referred to in ECMA-376 as the ANSI character set)

ISO/IEC 9075-1, *Information technology — Database languages — SQL — Part 1: Framework (SQL/Framework)*

ISO/IEC 9075-3, *Information technology — Database languages — SQL — Part 3: Call-Level Interface (SQL/CLI)*

ISO/IEC 9945-2, *Information technology* — *Portable Operating System Interface (POSIX) — Part 2: System*

*Interfaces*

3 Normative References

ISO/IEC 10118-3:2004, *Information technology — Security techniques — Hash-functions — Part 3: Dedicated hash-functions*.

ISO/IEC 10646, *Information technology — Universal Coded Character Set (UCS)*.

ISO/IEC 14496-22:2009, *Information technology — Coding of audio-visual objects — Part 22: Open Font Format*

*ECMA-376-2:2012, Information technology — Document description and processing languages — Office Open XML File Formats – Part 2: Open Packaging Conventions*

*ECMA-376-3:2015, Information technology — Document description and processing languages — Office Open*

*XML File Formats – Part 3: Markup Compatibility and Extensibility*

Japanese Industrial Standard, JIS X 0301: *Data elements and interchange formats —Information interchange — Representation of dates and times*. Japan, 2002.

Kingdom of Saudi Arabia, Ministry of Islamic Affairs, Endowments, Da‘wah and Guidance.

Korean Law Enactment No. 4, 1961.

Faure, D. (n.d.). *Creating and Using Components (KParts)*[. http://techbase.kde.org/Projects/Documentation.](http://techbase.kde.org/Projects/Documentation)

Maimon, Rabbi Moshe ben, *Complete Restatement of the Oral Law (Mishneh Torah)*.

Ausbrooks, Ron, et al. *Mathematical Markup Language (MathML) Version 2.0 (Second Edition)*. October 21, 2003. http://www.w3.org/TR/MathML/.

Kaliski, B. *The MD2 Message-Digest Algorithm*. April 1992. http://www.ietf.org/rfc/rfc1319.txt

Rivest, R. *The MD4 Message-Digest Algorithm*. April 1992. http://www.ietf.org/rfc/rfc1320.txt

*The MD5 Message-Digest Algorithm*. April 1992. [http://www.ietf.org/rfc/rfc1321.txt.](http://www.ietf.org/rfc/rfc1321.txt)

*National Measurement Regulations 1999*, Commonwealth of Australia <http://www.comlaw.gov.au/Details/F2011C00445>

*NIST Guide to SI Units*, http://physics.nist.gov/Pubs/SP811/appenB9.html

*QuickTime File Format Specification* (2007-09-04 version) <http://developer.apple.com/standards/classicquicktime.html>

*Resource Description Framework (RDF)*, http://www.w3.org/RDF/

RFC 822, *Standard for ARPA Internet Text Messages* (http://www.ietf.org/rfc/rfc0822.txt)

RFC 2045, Borenstein, N., and N. Freed. *Multipurpose Internet Mail Extensions (MIME) Part One: Format of*

*Internet Message Bodies*. The Internet Society. 1996. http://www.ietf.org/rfc/rfc2045.txt

RFC 2119, Bradner, Scott, 1997: *Key words for use in RFCs to Indicate Requirement Levels*. http://www.ietf.org/rfc/rfc2119.txt

RFC 2616, Berners-Lee, T., R. Fielding, H. Frystyk, J. Gettys, P. Leach, L. Masinter, and J. Mogul. *Hypertext*

*Transfer Protocol—HTTP/1.1*. The Internet Society. 1999. http://www.ietf.org/rfc/rfc2616.txt

RFC 3066, Alvestrand, H. *Tags for the Identification of Languages*. The Internet Society. 2001. http://www.ietf.org/rfc/rfc3066.txt

RFC 3339, Klyne, G. and C. Newman. *Date and Time on the Internet: Timestamps*. The Internet Society. 2002. http://www.ietf.org/rfc/rfc3339.txt

RFC 3629, Yergeau, F. *UTF-8, a transformation format of ISO 10646*. The Internet Society. 2003. http://www.ietf.org/rfc/rfc3629.txt

RFC 3986, Berners-Lee, T., R. Fielding, and L. Masinter. *Uniform Resource Identifier (URI): Generic Syntax*. The

Internet Society. 2005. http://www.ietf.org/rfc/rfc3986.txt

*Simple Object Access Protocol (SOAP)*, [http://www.w3.org/TR/soap12](http://www.w3.org/TR/soap12/)

SMIL, Bulterman, D., Grassel, G., Jansen, J., Koivisto, A., Layaïda, N., Michel, T., et al. (2005, December 13). *Synchronized Multimedia Integration Language (SMIL 2.1)*. Retrieved from W3C: <http://www.w3.org/TR/SMIL/>

SVG, Andersson, O., Armstrong, P., Axelsson, H., Berjon, R., Bézaire, B., Bowler, J., et al. (2003, January 14). *Scalable Vector Graphics (SVG) 1.1 Specification*. Retrieved from W3C - World Wide Web Consortium: <http://www.w3.org/TR/SVG/>

The GNOME Project. (2003, December 12). *Component Model - Bonobo Document Model*. Retrieved from The

GNOME Development Site: <http://developer.gnome.org/bonobo-activation/stable/>

The Unicode Consortium. *The Unicode Standard*, [http://www.unicode.org/standard/standard.html.](http://www.unicode.org/standard/standard.html)

Unicode Technical Note #28, *Nearly Plain-Text Encoding of Mathematics*. August 29, 2006, <http://www.unicode.org/notes/tn28>

United States Postal Service. *Domestic Mail Manual*. United States Postal Service. November 8, 2007.

http://pe.usps.com/cpim/ftp/manuals/dmm300/Full/MailingStandards.pdf

*The Units of Measurement Regulations 1995*, United Kingdom http://www.opsi.gov.uk/si/si1995/Uksi\_19951804\_en\_2.htm

Universal Postal Union. *POST\*CODE: Postal addressing systems*. Berne: UPU Publications, 2006, ISBN 92-9502537-7, ISSN 1020-6019

*Web Accessibility Initiative (WAI)*, http://www.w3.org/WAI/

3 Normative References

XSLT, Clark, James, *XSL Transformations (XSLT) Version 1.0*, World Wide Web Consortium Recommendation.

1999. <http://www.w3.org/TR/xslt>

XML, Tim Bray, Jean Paoli, Eve Maler, C. M. Sperberg-McQueen, and François Yergeau (editors). *Extensible Markup Language (XML) 1.0, Fourth Edition*. World Wide Web Consortium. 2006. <http://www.w3.org/TR/2006/REC-xml-20060816/> [Implementers should be aware that a further correction of the normative reference to XML to refer to the 5th Edition will be necessary when the related Reference

Specifications to which this International Standard also makes normative reference and which also depend upon

XML, such as XSLT, XML Namespaces and XML Base, are all aligned with the 5th Edition.]

XML Base, Marsh, Jonathan. *XML Base*. World Wide Web Consortium. 2001. http://www.w3.org/TR/2001/RECxmlbase-20010627/

XML Namespaces, Tim Bray, Dave Hollander, Andrew Layman, and Richard Tobin (editors). *Namespaces in XML 1.0 (Third Edition)*, 8 December 2009. World Wide Web Consortium. [http://www.w3.org/TR/2009/REC-xmlnames-20091208/](http://www.w3.org/TR/2009/REC-xml-names-20091208/)

XPATH, Clark, James; DeRose, Steve *XML Path Language (XPath) Version 1.0*, World Wide Web Consortium Recommendation. 1999. [http://www.w3.org/TR/xpath.](http://www.w3.org/TR/xpath)

*XML Schema Part 0: Primer (Second Edition)*, W3C Recommendation 28 October 2004, http://www.w3.org/TR/xmlschema-0/

*XML Schema Part 1: Structures (Second Edition)*, W3C Recommendation 28 October 2004, http://www.w3.org/TR/xmlschema-1/

*XML Schema Part 2: Datatypes (Second Edition)*, W3C Recommendation 28 October 2004, http://www.w3.org/TR/xmlschema-2/

*.ZIP File Format Specification* from PKWARE, Inc., version 6.2.0 (2004), as specified in

http://www.pkware.com/documents/APPNOTE/APPNOTE\_6.2.0.txt

# 4. Terms and Definitions

For the purposes of this document, the following terms and definitions apply. Other terms are defined where they appear in *italic* typeface, on the left side of a syntax rule, or within subclauses of language-specific grammars (§17.16 and §18.17). Terms explicitly defined in this Part of ECMA-376 are not to be presumed to refer implicitly to similar terms defined elsewhere. [*Note*: This Part uses OPC-related terms, which are defined in ECMA-376-2. *end note*]

**application** — A consumer or producer. **behavior** — External appearance or action.

**behavior, implementation-defined** — Unspecified behavior where each implementation is expected to document that behavior, which would thereby promote predictability and reproducibility within any given implementation. (This term is sometimes called “application-defined behavior”.) **behavior, locale-specific** — Behavior that depends on local conventions of nationality, culture, and language.

**behavior, unspecified** —Behavior where ECMA-376 makes no recommendations. (This term is sometimes called “application-dependent behavior”.) [*Note*: To add an extension, an implementer must use the extensibility mechanisms described by ECMA-376 rather than trying to do so by giving meaning to otherwise unspecified behavior. *end note*] **byte** — A sequence of 8 bits treated as a unit.

**comment** — A note attached to content in a document. Although a consumer might choose to display comments, they are not considered part of the body of the document. A comment might include the text of the note, the comment author's name and initials, and date of creation, among other things.

**consumer** — A piece of software or a device that reads packages through a package implementer. A consumer is often designed to consume packages only for a specific physical package format.

**content type** — Describes the content stored in a part. Content types define a media type, a subtype, and an optional set of parameters, as defined in RFC 2616.

**document category** — One of the three categories of Office Open XML documents: Wordprocessing, Spreadsheet, and Presentation, defined as follows:

* A document whose package-relationship item contains a relationship to a Main Document part (§11.3.10) is a document of category Wordprocessing.

4 Terms and Definitions

* A document whose package-relationship item contains a relationship to a Workbook part (§12.3.23) is a document of category Spreadsheet.
* A document whose package-relationship item contains a relationship to a Presentation part (§13.3.6) is a document of category Presentation.

An Office Open XML document can contain one or more embedded Office Open XML packages (§15.2.11) with each embedded package having any of the three document categories. However, the presence of these embedded packages does not change the category of the document.

**DrawingML** — A set of conventions for specifying the location and appearance of drawing elements in an Office Open XML document.

**extension** — Any XML element, XML attribute, relationship, or part not explicitly included in ECMA-376, but that uses the extensibility mechanisms described by ECMA-376.

**id** — In some XML-related technologies, the term *id* implies use of the xsd:ID data type. In this international standard, this term is used to refer to a variety of different identification schemes. See *unique identifier*.

**ODBC** – An implementation of ISO/IEC 9075-3:2008 “Information technology -- Database languages -- SQL – Part 3: Call-Level Interface (SQL/CLI)” or SQL/CLI-based database connectivity API. An example of a broadly used SQL/CLI-based database connectivity API is the Open Database Connectivity (ODBC) API.

**Office Open XML document** — A rendition of a data stream formatted using the wordprocessing, spreadsheet, or presentation ML and its related MLs as described in ECMA-376-1 and ECMA-376-4. Such a document is represented as a package as described in ECMA-376-2.

**OLE** – OLE in this context does not refer to any specific technology; instead, it refers to the generalized abstraction of embedding and linking objects within a document. **package**— A ZIP archive that conforms to the Open Packaging Conventions specification defined in ECMA-376-2.

**package,** **embedded**— A package that has been stored as the target of an Embedded Package relationship (§15.2.11) in an Office Open XML document

**PresentationML** — A set of conventions for representing an Office Open XML document of category Presentation.

**producer** — A piece of software or a device that writes packages through a package implementer. A producer is often designed to produce packages according to a particular physical package format specification.

**relationship** —The kind of connection between a source part and a target part in a package. Relationships make the connections between parts directly discoverable without looking at the content in the parts, and without altering the parts themselves. (See also Package Relationships.) **relationships part** — A part containing an XML representation of relationships.

**relationship, explicit** — A relationship in which a resource is referenced from a source part’s XML using the Id attribute of a Relationship tag.

**relationship, implicit** — A relationship that is not explicit.

**SpreadsheetML** — A set of conventions for representing an Office Open XML document of category Spreadsheet.

**unique identifier** — In some XML-related technologies, the term *unique identifier* implies use of the xsd:ID data type. In this international standard, this term is used to refer to a variety of different identification schemes. See *id*.

**WordprocessingML** — A set of conventions for representing an Office Open XML document of category Wordprocessing.

# 5. Notational Conventions

**5. Notational Conventions**

The following typographical conventions are used in ECMA-376:

* The first occurrence of a new term is written in italics. [*Example*: The text in ECMA-376 is divided into *normative* and *informative* categories. *end example*]
* In each definition of a term in §4 (Terms and Definitions), the term is written in bold. [*Example*: **behavior** — External appearance or action. *end example*]
* The tag name of an XML element is written using a distinct style and typeface. [*Example*: The bookmarkStart and bookmarkEnd elements specify … *end example*]
* The name of an XML attribute is written using a distinct style and typeface. [*Example*: The dropCap attribute specifies … *end example*]
* The value of an XML attribute is written using a constant-width style. [*Example*: The attribute value of auto specifies … *end example*]
* The qualified or unqualified name of a simple type, complex type, or base datatype is written using a distinct style and typeface. [*Example*: The possible values for this attribute are defined by the ST\_HexColor simple type. *end example*]

When assigned namespaces are used in examples, they are included at the beginning of the example, but with the specific namespace replaced with ellipsis ("…") for brevity.

# 6. Acronyms and Abbreviations

**This clause is informative**

The following acronyms and abbreviations are used throughout ECMA-376:

IEC — the International Electrotechnical Commission

ISO — the International Organization for Standardization

W3C — World Wide Web Consortium

**End of informative text**

# 7. General Description

**7. General Description**

This Part of ECMA-376 is divided into the following subdivisions:

1. Front matter (clauses 1–7);
2. Overview (clause 8);
3. Package Part Structure (clauses 9–16);
4. Reference Material (clauses 17–23);
5. Annexes

Examples are provided to illustrate possible forms of the constructions described. References are used to refer to related clauses. Notes are provided to give advice or guidance to implementers or programmers. Rationale provides explanatory material as to why something is or is not in ECMA-376. Annexes provide additional information or summarize the information contained in ECMA-376.

Clauses 1–5, 7, 9–15, 17–23, Annex A, Annex F, and Annex G form the normative part of this Part of ECMA-376; the Introduction, clauses 6, 8, and 16, Annex B–Annex E, Annex H–Annex M, as well as notes, examples, rationale, guidance, and the index, are informative.

Except for whole clauses or annexes that are identified as being informative, informative text that is contained within normative text is indicated in the following ways:

1. [*Example:* code fragment, possibly with some narrative … *end example*]
2. [*Note:* narrative … *end note*]
3. [*Rationale:* narrative … *end rationale*]
4. [*Guidance*: narrative … *end guidance*]

In addition to the declarations in the “General Description”, each annex that is informative, also contains the following text at the beginning of the annex: "**This annex is informative.**"