TECHNICAL SPECIFICATION

ISO/IEC TS 30135-1

First edition
2014-11-15

Information technology — Digital publishing — EPUB3 —

Part 1: EPUB3 Overview

Technologies de l'information — Publications numériques — EPUB3 —

Partie 1: Aperçu général de EPUB3

Reference number
ISO/IEC TS 30135-1:2014(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In other circumstances, particularly when there is an urgent market requirement for such documents, the joint technical committee may decide to publish an ISO/IEC Technical Specification (ISO/IEC TS), which represents an agreement between the members of the joint technical committee and is accepted for publication if it is approved by 2/3 of the members of the committee casting a vote.

An ISO/IEC TS is reviewed after three years in order to decide whether it will be confirmed for a further three years, revised to become an International Standard, or withdrawn. If the ISO/IEC TS is confirmed, it is reviewed again after a further three years, at which time it must either be transformed into an International Standard or be withdrawn.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TS 30135 series were prepared by Korean Agency for Technology and Standards (as KS X 6070 series) with International Digital Publishing Forum and were adopted, under a special "fast-track procedure", by Joint Technical Committee ISO/IEC JTC 1, Information technology, in parallel with its approval by the national bodies of ISO and IEC.

ISO/IEC TS 30135 consists of the following parts, under the general title *Information technology — Document description and processing languages — EPUB 3:*

- *Part 1: Overview*
- *Part 2: Publications*
- *Part 3: Content Documents*
- *Part 4: Open Container Format*
- *Part 5: Media Overlay*
- *Part 6: Canonical Fragment Identifier*
- *Part 7: Fixed-Layout Documents*

EPUB 3 Overview

Recommended Specification 11 October 2011

THIS VERSION

http://www.idpf.org/epub/30/spec/epub30-overview-20111011.html

LATEST VERSION

http://www.idpf.org/epub/30/spec/epub30-overview.html

PREVIOUS VERSION

http://www.idpf.org/epub/30/spec/epub30-overview-20110908.html

A diff of changes from the previous draft is available at this link.

Editors

Garth Conboy, Google Inc.

Matt Garrish, Invited Expert

Markus Gylling, DAISY Consortium

William McCoy, International Digital Publishing Forum (IDPF)

MURATA Makoto, JEPA EPUB Study Group

Daniel Weck, DAISY Consortium

TABLE OF CONTENTS

1 Introduction

1.1 Overview

The EPUB® specification is a distribution and interchange format standard for digital publications and documents. EPUB defines a means of representing, packaging and encoding structured and semantically enhanced Web content — including HTML5, CSS, SVG, images, and other resources — for distribution in a single-file format.

EPUB 3, the third major release of the standard, consists of a set of four specifications, each defining an important component of an overall EPUB Publication:

- EPUB Publications 3.0 [Publications30], which defines publication-level semantics and overarching conformance requirements for EPUB Publications.
- EPUB Content Documents 3.0 [ContentDocs30], which defines profiles of XHTML, SVG and CSS for use in the context of EPUB Publications.
- EPUB Open Container Format (OCF) 3.0 [OCF3], which defines a file format and processing model for encapsulating a set of related resources into a single-file (ZIP) EPUB Container.
- EPUB Media Overlays 3.0 [MediaOverlays30], which defines a format and a processing model for synchronization of text and audio.

EPUB has been widely adopted as the format for digital books (eBooks), and these new specifications significantly increase the format's capabilities in order to better support a wider range of publication requirements, including complex layouts, rich media and interactivity, and global typography features. The expectation is that EPUB 3 will be utilized for a broad range of content, including books, magazines and educational, professional and scientific publications.

This document provides a starting point for content authors and software developers wishing to understand these specifications. It consists of non-normative overview material, including a roadmap to the four building-block specification documents that compose EPUB 3.

Another non-normative document, EPUB 3 Changes from EPUB 2.0.1 [EPUB3Changes], describes changes in EPUB 3 from the previous version, but is intended primarily for Authors and EPUB Reading System vendors migrating from EPUB 2.0.1 to EPUB 3 and for those who anticipate supporting both

versions.

› 1.2 Roadmap

This section provides an overview of the EPUB 3 specifications by explaining in brief the components of a Publication. Links to additional information within this document and to the specifications are included.

An EPUB Publication, at its most basic level, is a bundled collection of resources that can be reliably and predictably ingested by an EPUB Reading System in order to render its contents to a User. Some of these resources facilitate the discovery and processing of the EPUB Publication, while others make up the content of the source publication. The latter, EPUB Content Documents, are described in Content Documents and are fully defined in [ContentDocs30].

A Publication's resources are typically bundled for distribution as a ZIP-based archive with the file extension `.epub`. As conformant ZIP archives, Publications can be unzipped by many software programs, simplifying both their production and consumption. The container format is introduced in Container and defined in [OCF3].

The container format not only provides a means of determining that the zipped content represents an EPUB Publication (the `mimetype` file), but also provides a universally-named directory of informative resources (`/META-INF`). Key among these is the `container.xml` file, which directs Reading Systems to the root file of the Publication, the Package Document.

The Package Document is itself a kind of information warehouse for the Publication, storing metadata about the specific work contained in the Publication, providing an exhaustive list of resources and defining a default reading order. The Package Document is introduced in Package Document and defined in [Publications30].

The preceding components of an EPUB Publication are not new to EPUB 3, and will be familiar to anyone who has worked with Publications before, although they have been changed and enhanced in this version. A new core addition to EPUB 3, however, is the Media Overlay Document, which defines a means of synchronizing text and audio playback. The Overlay Document is introduced in Multimedia and defined in [MediaOverlays30].

The following example shows the resources a minimal "Hello World" Publication might contain:

```
mimetype
META-INF/container.xml
Content/HelloWorld.opf
Content/HelloWorld.xhtml
```

While conceptually simple, an EPUB Publication is more than just a collection of HTML pages and dependent assets in a ZIP package as represented in this example. The following sections of this document delve into more detail about the primary features and functionality that Publications provide to enhance the reading experience.

› 2 Features

This section covers the major features of EPUB, including important components and topics that apply to the process of authoring EPUB Publications as a whole.

› 2.1 Package Document

Every EPUB Publication includes a single Package Document, which specifies all the Publication's constituent content documents and their required resources, defines a reading order for linear consumption, and associates Publication-level metadata and navigation information.

The Package Document represents a significant improvement on a typical Web site. A Web site, for example, embeds references to its resources within its content, which, while a simple and flexible means of identifying resources, makes it difficult to enumerate all the resources required to render it. In addition, there is no standard way for a Web site to define that a sequence of pages make up a larger publication, which is precisely what EPUB's `spine` element does (i.e., it provides an external declarative means to explicitly specify navigation through a collection of documents). Finally, the Package Document defines a standard way to represent metadata globally applicable to a collection of pages.

The Package Document and other Publication-level constructs are specified in [Publications30].

› 2.2 Navigation

› 2.2.1 Reading Order

A key concept of EPUB is that a Publication consists of multiple resources that may be completely navigated and consumed by a person or program *in some specific order*.

Many publications have an obvious reading order, or logical progression through their content. A novel is an example of a highly sequential document — it typically has a beginning, middle and end — but not all publications are so ordered: a cookbook or collection of photographic images might be considered to be more like a database. All documents do, however, have at least one logical ordering of all their top-level content items, whether by date, topic, location or some other criteria (e.g., a cookbook is typically ordered by type of recipe).

Every EPUB Publication defines at least one such logical ordering of all its top-level content (the spine [Publications30]), as well as a declarative table of contents (the EPUB Navigation Document [ContentDocs30]). Publications make these data structures available in a machine-readable way *external* to the content, simplifying their discovery and use.

EPUB Publications are not limited to the linear ordering of their contents, nor do they preclude linking in arbitrary ways — just like the Web, EPUB Publications are built on hypertext — but the basic consumption and navigation can be reliably accomplished in a way that is not true for a set of HTML pages.

› 2.2.2 Navigation Document

Every EPUB Publication contains a special XHTML Content Document called the EPUB Navigation Document, which uses the HTML5 `nav` element to define human- and machine-readable navigation information.

The Navigation Document supersedes the NCX document [OPS2], and the inclusion of NCX documents is only recommended for forward compatibility in older Reading Systems. The Navigation Document, while maintaining the baseline accessibility and navigation support and features of the NCX, introduces new functionality and rendering features to enhance navigation for all Users. Prime among these are better support for internationalization (as an XHTML5 document itself, the Navigation Document natively supports ruby annotations) and support for embedded grammars (MathML and SVG can be included within navigation links).

As XHTML Content Documents, Navigation Documents also provide a flexible means of tailoring the navigation display using CSS and the hidden attribute [ContentDocs30] while not impacting access to information for accessible Reading Systems.

The structure and semantics of Navigation Documents are defined in EPUB Navigation Documents

[ContentDocs30].

› 2.3 Linking

The new EPUB Canonical Fragment Identifier (epubcfi) Specification [EPUBCFI] defines a standardized method for linking into a Publication.

Required support for this scheme in Reading Systems means that EPUB now has an interoperable linking mechanism, one that can, for example, facilitate the sharing of bookmarks and reading locations across devices.

› 2.4 Metadata

EPUB Publications provide a rich array of options for adding Publication metadata. The Package Document includes a dedicated metadata section [Publications30] for general information about the Publication, allowing titles, authors, identifiers and other information about the Publication to be easily accessed. It also provides the means to attach complete bibliographic records to a Publication using the link element [Publications30].

The Package Document also allows a Unique Identifier to be established for a Publication using the unique-identifier attribute [Publications30]. The required last-modified date in the Package metadata section can be joined with this identifier to define a Package Identifier, which provides a means of distinguishing EPUB Publications that represent different versions of the same Manifestation (see Publication Identifiers [Publications30]). The Package Identifier addresses the issue of how to release a Publication without changing its Unique Identifier while still identifying it as a new version.

XHTML Content Documents also include the means of annotating document markup with rich metadata, making them more semantically meaningful and useful both for processing and accessibility purposes (Semantic Inflection [ContentDocs30]).

› 2.5 Content Documents

Every EPUB Publication contains one or more EPUB Content Documents, as defined in [ContentDocs30]. These are XHTML or SVG documents that describe the readable content of a Publication and reference associated media resources (e.g., images, audio and video clips).

XHTML Content Documents are defined by a profile of HTML5 that requires the use of XML serialization [HTML5] in order to ensure that content can be reliably manipulated and rendered. This profile also adds two additional EPUB-specific language constructs: the epub:type attribute [ContentDocs30] for element-level metadata and the epub:trigger element [ContentDocs30] for declaratively associating controls with multimedia elements.

These additions do not affect the ability of an HTML5 User Agent [HTML5] to render EPUB XHTML Content Documents, but Publications might not render identically in all User Agents depending on their support.

› 2.6 Rendering and CSS

A key concept of EPUB is that content presentation should adapt to the User rather than the User having to adapt to a particular presentation of content. HTML was originally designed to support dynamic rendering of structured content, but over time HTML as supported in Web browsers has become focused on the needs of Web applications, and most popular Web sites now have fixed-format layouts.

EPUB Publications, however, are designed to maximize accessibility for the visually impaired, and Reading Systems typically perform text line layout and pagination on the fly, adapting to the size of the

display area, the User's preferred font size, and other environmental factors. This behavior is not guaranteed in EPUB; images, vector graphics, video and other non-reflowable content may be included, and some Reading Systems might not paginate on the fly, or at all. Nevertheless, supporting dynamic adaptive layout and accessibility has been a primary design consideration throughout the evolution of the EPUB standard.

EPUB Content Documents may optionally reference EPUB Style Sheets, allowing Authors to define the desired rendering properties. EPUB 3 defines a profile of CSS based on CSS 2.1 [CSS2.1] for this purpose, together with capabilities defined by various CSS3 Modules and several additional properties specific to EPUB.

CSS3 properties were selected based on their current level of support in Web browsers, but support for them in Reading Systems and User Agents is not guaranteed (EPUB-defined properties may similarly be ignored).

EPUB 3 also supports CSS styles that enable both horizontal and vertical layout and both left-to-right and right-to-left writing, but Reading Systems might not support all of these capabilities. Reading Systems may also support different rendering options than the Author intended. Refer to CSS in the Global Language Support section for more information.

EPUB 3 also supports the ability to include multiple style sheets that allow users, for example, to select between day/night reading modes or to change the rendering direction of the text. Refer to Alternate Style Tags [ContentDocs30] for more information.

› 2.7 Multimedia

EPUB 3 supports audio and video embedded in [content documents] via the new [HTML5] `audio` and `video` elements, inheriting all the functionality and features these elements provide. (For information on supported audio formats, please refer to Core Media Types [Publications30]. For recommendations on embedding video, refer to Reading System Conformance [Publications30].)

Another key new multimedia feature in EPUB 3 is the inclusion of Media Overlay Documents [MediaOverlays30]. When pre-recorded narration is available for a Publication, Media Overlays provide the ability to synchronize that audio with the text of a Content Document (see also Aural Renditions and Media Overlays).

› 2.8 Fonts

EPUB 3 supports two closely-related font formats — OpenType [OpenType] and WOFF [WOFF] — to accommodate both traditional publishing workflows and emerging Web-based workflows. Word processing programs used to create Publications are likely to have access only to a collection of installed OpenType fonts, for example, whereas Web-archival EPUB generators will likely only have access to WOFF resources (which cannot be converted to OpenType without undesirable, and potentially unlicensed, stripping of WOFF metadata).

EPUB 3 also supports both obfuscated and regular font resources for both OpenType and WOFF font formats. Support for obfuscated font resources is required to accommodate font licensing restrictions for many commercially-available fonts.

› 2.9 Scripting

EPUB strives to treat content *declaratively* — as data that can be manipulated, not programs that must be executed — but does support scripting as defined in HTML5 and SVG (refer to Scripted Content Documents [ContentDocs30] for more information).

It is important to note, however, that scripting support is optional for Reading Systems and may be disabled for security reasons.

Authors should also note that scripting in an EPUB Publication can create security considerations that are different from scripting within a Web browser. For example, typical same-origin policies are not applicable to content that has been downloaded to a User's local system. Therefore, it is strongly encouraged that scripting be limited to container constrained contexts, as further described in Scripted Content Documents — Content Conformance [ContentDocs30].

Scripting consequently should be used only when essential to the User experience, since it greatly increases the likelihood that content will not be portable across all Reading Systems and creates barriers to accessibility and content reusability.

› 2.10 Text-to-speech

EPUB 3 provides the following text-to-speech (TTS) facilities for controlling aspects of speech synthesis, such as pronunciation, prosody and voice characteristics:

`Pronunciation Lexicons`

The inclusion of generic pronunciation lexicons using the W3C PLS format [PLS] enables Authors to provide pronunciation rules that apply to the entire EPUB Publication. Refer to PLS Documents [ContentDocs30] for more information.

`Inline SSML Phonemes`

The incorporation of SSML phonemes functionality [SSML] directly into a EPUB Content Document [ContentDocs30] enables fine-grained pronunciation control, taking precedence over default pronunciation rules and/or referenced pronunciation lexicons (as provided by the PLS format mentioned above). Refer to SSML Attributes [ContentDocs30] for more information.

`CSS Speech Features`

The inclusion of a select set of features from the CSS 3 Speech Module [CSS3Speech] (previously known as CSS 2.1 Aural Stylesheets [CSS2.1]) enables Authors to control further speech synthesis characteristics. Refer to CSS 3.0 Speech [ContentDocs30] for more information.

› 2.11 Container

An EPUB Publication is transported and interchanged as a single file (a "portable document") that contains the Package Document, all Content Documents and all other required resources for processing the Publication. The single-file container format for EPUB is based on the widely adopted ZIP format. An XML manifest that specifies the location in the ZIP archive of the Package Document must be found at a well-defined location within the archive.

This approach provides a clear contract between any creator of an EPUB Publication and any system which consumes such Publications, as well as a reliable representation that is independent of network transport or file system specifics.

An EPUB Publication's representation as a container file is specified in [OCF3].

› 3 Global Language Support

› 3.1 Metadata

EPUB 3 supports alternate representations of all text metadata items in the package metadata section to improve global distribution of Publications. The `alternate-script` property can be combined with the

`xml:lang` attribute to include and identify alternate script renditions of language-specific metadata.

Using this property, a Japanese Publication could, for example, include an alternate Roman-script representation of the author's name and/or one or more representations of the title in Romance languages. Refer to the alternate-script property [Publications30] for more information.

The `page-progression-direction` attribute also allows the content flow direction to be globally specified for all Content Documents to facilitate rendering (see the page-progression-direction [Publications30]).

› 3.2 Content Documents

XHTML Content Documents leverage the new HTML5 directionality features to improve support for bidirectional content rendering: the `bdi` element allows an instance of directional text to be isolated from the surrounding content, the `bdo` element allows directionality to be overridden for its child content and the `dir` attribute allows the directionality of any element to be explicitly set.

XHTML Content Documents also support ruby annotations for pronunciation support (which makes them supported in Navigation Document links, as well).

SVG Content Documents support the rendering of bidirectional text, but do not include support for ruby.

› 3.3 CSS

EPUB 3's support for new CSS3 modules enables typography for many different languages and cultures. Some specific enhancements include:

- support for vertical writing, which also provides Reading Systems the ability to allow users to toggle direction;

- better handling of emphasis, such as the inclusion of bōten;
- better control over line breaking, so that breaks can occur at the character level for languages that do not use spaces to delimit new words; and
- better control over hyphenation, to further facilitate line breaking.

› 3.4 Fonts

EPUB 3 does not require that Reading Systems come with any particular set of built-in system fonts. As occurs in Web contexts, Users in a particular locale may have installed fonts that omit characters required for other locales, and Reading Systems may utilize intrinsic fonts or font engines that do not utilize operating system installed fonts. As a result, the text content of a Publication might not natively render as intended on all Reading Systems.

To address this problem, EPUB 3 supports the embedding of fonts to facilitate the rendering of text content, and this practice is recommended in order to ensure content is rendered as intended.

Support for embedded fonts also ensures that Publication-specific characters and glyphs can be embedded for proper display.

› 3.5 Text-to-speech

EPUB 3's support for PLS documents and SSML attributes increases the pronunciation control that Authors have over the rendering of any natural language in text-to-speech-enabled Reading Systems. Refer to Text-to-speech in the Features section for more information on these capabilities.