

Kobo Fixed-Layout EPUB

Specifications

November 28th, 2011

Introduction

This document describes the specific requirements for creating Fixed-Layout EPUBs (abbreviated as FLEPUBs from here on). EPUBs must be formatted according to this specification to be compatible with the FLEPUB support introduced in the Kobo eReader product line.

FLEPUBs are different than standard EPUBs in that the text and images are not re-flowable. The position and layout of all content is fixed regardless of the size or orientation of the display. This format is best suited for titles where a fixed page layout is integral to the reading experience (ie. cookbooks, children's books, comics and graphic novels or art books).

The approach to specifying presentation details for FLEPUBs is the inverse of EPUBs. EPUB creation encourages loosely defining presentation details to allow reading applications the most discretion for displaying content. The FLEPUB format shifts control of the reading experience to the content producer and ensures that page design will be uniform across a range of reading applications.

Technical Overview

- Unless otherwise specified in this document, all required components and formatting of an EPUB must also be present in a FLEPUB.
- Each page in the book must be in its own XHTML document. For example, it will take two XHTML documents to create a two-page spread.
- All pages must have the same viewport dimensions (see the [Viewport](#) section for more details).
- The first page of each book is treated as a cover page. Cover pages are displayed on the right side of a two-page spread instead of the left. This will affect page-number pairing of subsequent two-page spreads (see [Table of Contents](#) section for more details).
- `.ncx` files are ignored.
- SVG (scalable vector graphics) content is not supported.
- FLEPUBs still use the `.epub` file extension.
- The size of the `.epub` file should be less than 100 MBs for best performance and must not be over 200 MB.

Display Options File

To declare an EPUB as a FLEPUB, a file named `com.kobobooks.display-options.xml` must be present inside the EPUB's `META-INF` folder (where the `container.xml` resides).

Contents of display options file:

```
<?xml version="1.0" encoding="UTF-8"?>
<display_options>
  <platform name="*">
    <option name="fixed-layout">true</option>
  </platform>
</display_options>
```

Currently, there are no configurable parameters in this file. Future revisions of this specification may include platform-specific and display-method parameters.

Viewport

The viewport is the container for a page. The dimensions of a viewport can be declared to be any size. The reading application will apply a visual magnification to the viewport in order to best-fit the contents for its display medium. The layout relationships of the content within the viewport will not be affected. This magnification/demagnification allows reading applications running on systems with different display sizes to use the same FLEPUB files.

Declaring a viewport:

- The `<head>` section of every XHTML file must contain a `<meta>` element that specifies the size of the page viewport. The values must be the same for every page in the FLEPUB. For example:

```
<head>
  <meta name="viewport" content="width=1200, height=1600"></meta>
  <!-- other <head> metadata -->
</head>
```

- Every page must contain styles for the `<body>` element specifying the width and height of the declared viewport size:

```
body { width: 1200px; height: 1600px;}
```

- The width and height values declared in the `<meta>` element must be the same as the style for the `<body>` element.

Table of Contents

The `<spine>` section of the `.opf` file governs the ordering of the pages. Each entry will be assigned an ascending page number starting from 1.

The first entry in the `<spine>` section (Page 1) will be used as a cover page. The cover page has the special property of being displayed on the right side in a two-page spread. This will affect the pairings of the left and right pages on a two-page spread.

For example:

The pairing of two-page spreads may be intuitively presumed as:

`[1|2], [3|4], [5,6] . . .`

However, the actual pairing is as follows:

`[|1], [2|3], [4,5] . . .`

Not recognizing this property can adversely affect the presentation of the pages especially in cases where the content is intended to be visually continuous between the left and right page.

Embedding Fonts

It is strongly recommended that all utilized fonts be embedded in the FLEPUB because default and substitute fonts can differ greatly between platforms. Failure to embed fonts can result in problems including but not limited to: abnormal font size, overlapping, clipping, image run-in, use of incorrect substitution fonts, and incorrect characters being displayed.

Using fonts in CSS:

- Do not specify multiple fonts in font-families. All subsequent fonts in the comma-separated list will be ignored by some platforms. For example:

```
font-family: "Times", "Georgia", "Serif";
```

On the Android platform, the above CSS style will only look for the font "Times", if it is not found, then the default font ("Droid Sans Serif") will be used. Instead of doing this, embed the font in the FLEPUB and reference the font directly.

- When declaring fonts with `@font-face`, font names must be enclosed in double quotes or single quotes
- Font sizes must be expressed in `px` (pixels) and not any other units.
- On the Android platform, Text that has no font style specified or font specified as "serif" will be rendered with "Times New Roman".

Page Layout

Each page of a FLEPUB must be in its own XHTML file.

Laying out a page:

- To maximize layout fidelity between platforms and devices, use absolute positioning with px units wherever possible.
- Do not have any elements positioned wholly or partially outside the bounds of the viewport.
- Do not add borders around the perimeter of the page.
- Avoid including text in the image. Text should be created in the XHTML file unless the text is hand drawn lettering (commonly found in comics and graphic novels) and does not belong to any font set

Images:

- Should be inline in the XHTML file (e.g. use `` tag instead of `background-image` style).
- Keep dimensions to a manageable size. In general, a full-bleed image should be no smaller than 600 x 1024 (614,400 pixels). If a higher resolution image is desired, use dimensions of up to 1200 x 2048 (2,457,600 pixels). Using larger images will increase download and page turning times and will not increase the quality of the image within reading applications.
- Try to compress images to a smaller size on disk.
- Images must be saved in PNG or JPEG format.
- Images should use the RGB color model. Images using CMYK or other models will be converted to use the RGB model.
- Use a lower color-depth whenever possible.

Multimedia Content

Multimedia content is partially supported.

Audio:

- Encoded using Apple iTunes AAC-LC mp4-v2 codec
- 256 kbps

Video:

- Video is not supported

Other content:

- SVG is not supported
- JavaScript is partially supported. FLEPUBS dependent on JavaScript have to be tested with extra care on all target platforms

Read-Along Content

Read-Along Content allows audio to be played to the reader in synchrony with page turns, paragraphs, and individual words. Text can also be highlighted as the audio is playing. A popular application of this feature is in children's and educational books where readers can listen to the page's content being read-aloud and have the currently read text highlighted.

A subset of the Synchronized Multimedia Integration Language 3.0 (SMIL) specification is used to facilitate this feature. To enable SMIL read-along, the following is needed:

- Audio file(s) to be played
- Anchors for text segments in page markup (if read-along text highlighted is desired)
- .smil file(s)
- Additional entries in the .opf file

Creating the audio file:

- Must follow encoding specifications outlined in the [Multimedia Content](#) section.
- Each page must use no more than one audio file.
- For best performance, minimize the number of audio files.
- If multiple audio files are used, only reference another audio file at the beginning of a two-page spread.

Creating anchors for text segments:

- For each word or group of words, assign the parent element a unique id

For example:

```
<p>
  <span id="w001">Once </span>
  <span id="w002">upon </span>
  <span id="w003">a </span>
  <span id="w004">time... </span>
</p>
```

Creating a .smil file:

- .smil files are XML files
- Add a <smil> element, then a <body> element.

- For each text segment, create a <par> element
- Inside the <par> element create two elements <text> and <audio>
- The <text> element must contain attribute `src` with value pointing to the page and the text segment's anchor id
- The <audio> element must contain attributes: `src`, `clipBegin`, and `clipEnd`
- The `src` attribute points to the audio file to be played. That must be the audio file path relative to the `.smil` file's directory.
- The `clipBegin` attribute indicates when in the audio file the corresponding text segment begins.
- The `clipEnd` attribute indicates when in the audio file the corresponding text segment ends.
- Acceptable units for `clipBegin` and `clipEnd` are seconds (s) or milliseconds (ms). If no units are specified, seconds is assumed. All other notations are not allowed.
- Example `.smil` file:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
<smil xmlns="http://www.w3.org/ns/SMIL" version="3.0"
profile="http://www.idpf.org/epub/30/profile/content/">
  <body>

    <par>
      <text src="page1.xhtml#w001"/>
      <audio src="audio/track.m4a"
        clipBegin="53.4332s" clipEnd="54.2987s"/>
    </par>

    <par>
      <text src=" page1.xhtml#w002"/>
      <audio src=" audio/track.m4a "
        clipBegin="54.2987s" clipEnd="54.9744s"/>
    </par>

    <par>
      <text src=" page1.xhtml#w003"/>
      <audio src=" audio/track.m4a "
        clipBegin="55.3332s" clipEnd="55.9002s"/>
    </par>

    <par>
      <text src=" page1.xhtml#w004"/>
      <audio src=" audio/track.m4a "
        clipBegin="56.0021s" clipEnd="57.1843s"/>
    </par>

  </body>
</smil>
```

- If text highlighting is not desired, include a .smil file with only one <par>. The <text> element's src must refer to the current page's xhtml, and it must not contain an anchor.
- Example .smil file with no text highlighting:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.1//EN"
"http://www.w3.org/TR/xhtml11/DTD/xhtml11.dtd">
<smil xmlns="http://www.w3.org/ns/SMIL" version="3.0"
profile="http://www.idpf.org/epub/30/profile/content/">
  <body>
    <par>
      <text src="page1.xhtml" />
      <audio src="audio/track.m4a"
        clipBegin="53.4332s" clipEnd="57.1843s" />
    </par>
  </body>
</smil>
```

Adding .smil entries in the .opf file:

- Just like all resources contained in an EPUB, all files included for SMIL must have an entry in the <manifest> section
- A page entry in the <manifest> section must reference the id of the SMIL content it is using in its media-overlay attribute
- A .smil entry in the <manifest> section must have the corresponding id and a media-type attribute with value: "application/smil+xml"
- Example <manifest> section in .opf:

```
<manifest>
  <item id="page1" href="page1.xhtml"
    media-type="application/xhtml+xml" media-overlay="smil001"/>

  <item id="smil001" href="smil001.smil"
    media-type="application/smil+xml"/>

  <!-- other <manifest> entries -->
</manifest>
```