

Open Source Support for TTML Subtitles

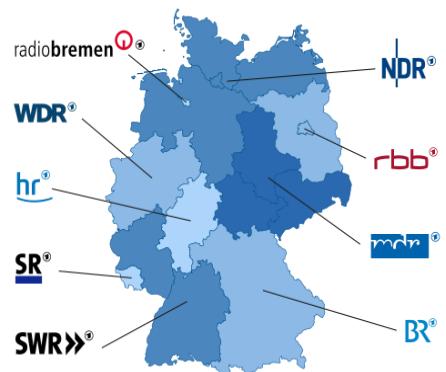
Status Quo and Outlook

FOSDEM 2017

Andreas Tai, IRT

ORF

SRG SSR



IRT participation in technical standards

- SMPTE
- DVB
- HbbTV
- EBU
- W3C
- ...

TTML (Timed Text Markup Language)

- W3C Standard for Timed Text
- Start: 2003
- Candidate Recommendation (as DFXP): 2009
- Recommendation: 2010
- 2nd edition: 2013
- „Profiles“
 - (SMPTE-TT)
 - EBU-TT/EBU-TT-D
 - IMSC 1

TTML, XML and WebVTT

- TTML = XML, Web developer prefer JSON.
- Browser „manufacturer“ developed WebVTT.
- TTML: Choice of a lot of content driven organisations (EBU, ATSC, Studios).
- WebVTT: Native support by browsers/iOS.
- TTML: Support by various video players and frameworks.

"Standard makers" support Open Source

- **EBU**
 - EBU-TT-D in DASH.js
 - EBU-TT Live Toolkit (+BBC)
- **IRT**
 - Subtitle Conversion Framework (SCF)
 - EBU-TT-D Samples
- **Netflix (Sponsor)**
 - Timed Text Toolkit (by syknav/Glenn Adams)
- **MovieLabs (Sponsor)**
 - imscJS (by Pierre Lemieux)

OSS for TTML



Production



Contribution
(Archive, Exchange)



Distribution



Presentation

OSS for TTML



Production

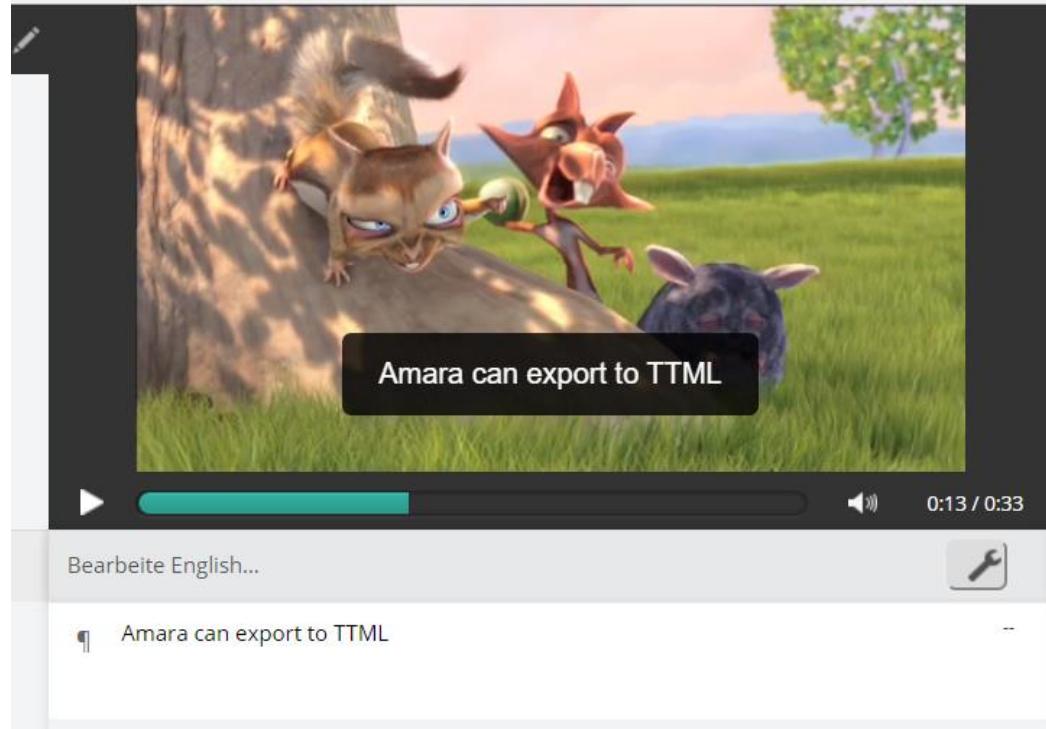
SubtitleEdit - Subtitle Editor

The screenshot shows the SubtitleEdit application window. At the top is a menu bar with Tools, Spell check, Video, Synchronization, Auto-translate, Options, Networking, and Help. Below the menu is a toolbar with icons for search, replace, synchronize, auto-translate, options, networking, and help. The main area has tabs for View, Tools, Spell check, Video, Synchronization, Auto-translate, Options, Networking, and Help. The 'Format' tab is selected, showing a dropdown menu with options: Netflix Timed Text (selected), Encoding, and Unicode (UTF-8). The main content area displays a list of subtitles with columns for Start time, End time, Duration, and Text. The 'Text' column contains various subtitle entries. A context menu is open over the first few lines of text, listing file format options: Swift Interchange File V2 (.sif), Swift text (.txt), Swift text line# (.txt), Swift text line# +dur (.txt), TEK (.tek), XML (.xml), XML 2 (.xml), Timed Text 1.0 (.xml) (selected), Timed Text draft 2006-04 (.xml), Timed Text draft 2006-04 CDATA (.xml), Timed Text draft 2006-10 (.xml), and Timed Text draft 2006-11 (.xml).

Start time	End time	Duration	Text
1,...	00:00:04,...	2,701	We're quite content to be
5,...	00:00:08,...	3,656	We don't have a fancy sto
9,...	00:00:11,...	1,798	<fo
1,...	00:00:13,...	2,566	We don't have sacred roo
4,...	00:00:16,...	2,404	We don't make the same
7,...	00:00:19,...	2,562	Or shake the same hands
0,...	00:00:22,...	2,000	And all this... is fine by us
3,...	00:00:27,...	3,628	Were are a pack of independent, spinst
7,...	00:00:29,...	2,000	who do things a little differently.
9,...	00:00:31,...	2,000	Where another company may value the bottom line...
2,...	00:00:34,...	2,300	We value... well, values.
5,...	00:00:38,...	2,368	When a competitor considers to make something proprietary.
8,...	00:00:40,...	2,000	We strive to set it free.
0,...	00:00:44,...	3,627	And while most products and technologies are developed behind closed doors.
4,...	00:00:46,...	1,720	Ours are cultivated out in the open.
6,...	00:00:48,...	1,874	For everyone to see.

- C#, GPL 3
- TTML: „Nearly“ standard conform, Problems with styles
- Profiles: TTML 1, Netflix -TT (will be deprecated in favor of IMSC)

Amara (unisubs) - Online Subtitle Editor



- Python, AGPL 3.0
- Simple TTML Export
- Minor bug on datatype

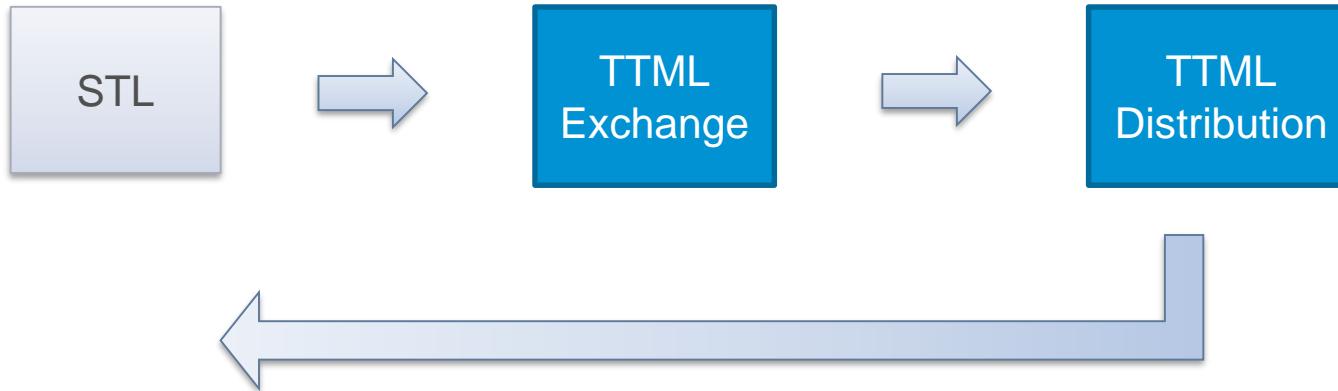
OSS for TTML



Production

Contribution
(Archive, Exchange)

Subtitle Conversion Framework (SCF)



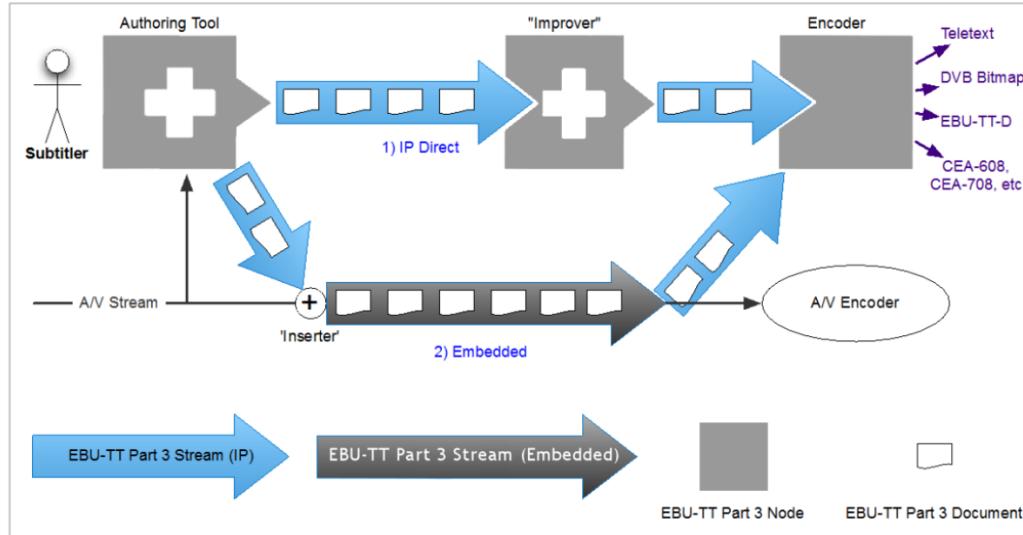
- Command Line Conversion of Subtitle Formats
- XSLT, Apache 2
- Supports: EBU STL, EBU-TT, EBU-TT-D, IMSC

Timed Text Toolkit (ttt)

```
$ java -jar ttt-ttxv-all-3.0-SNAPSHOT.jar --model ttml1 test.ttml
```

- Java, BSD
- Validates different TTML profiles, Generation of svg+png, ...
- Covers already TTML 2 features (e.g. Ruby)

ebu-tt-live-toolkit



Source: <https://tech.ebu.ch/files/live/sites/tech/files/shared/tech/tech3370.pdf>

- Python, BSD 3
- Streaming of subtitles (Contribution), EBU-TT Live Profile, WebSocket
- Scripts: Produce, Consume, Forward, Encode (EBU-TT-D)

OSS for TTML



Production



Contribution
(Archive, Exchange)



Distribution

MP4BOX

Useful command-lines for import:

```
MP4Box -add sample.ttml sample.mp4
```

- C, LGPL 2.1
- Package TTML into mp4
- Profiles: EBU-TT-D (IMSC and other TTML flavours using NHML)

OSS for TTML



Production



Contribution
(Archive, Exchange)



Distribution



Presentation

EBU-TT-D Samples

The diagram illustrates the mapping between EBU-TT-D XML code and its visual output. On the left, a large yellow area represents the video frame. Inside it, a green-bordered box represents the subtitle region. At the bottom of this region is a white rectangular box containing the text "One line Subtitle.". To the right of the video frame is a white box containing the XML code.

```
<body>
  <div>
    <p xml:id="subtitle1" region="bottom" begin="00:00:10.000" end="00:00:20.000" style="spanStyle">One line </span><span style="boldStyle">Subtitle.</span>
    </p>
    <p xml:id="subtitle2" region="bottom" begin="00:00:22.000" end="00:00:30.000" style="spanStyle">One line </span><span style="boldStyle">Subtitle.</span>
  </div>
</body>
```

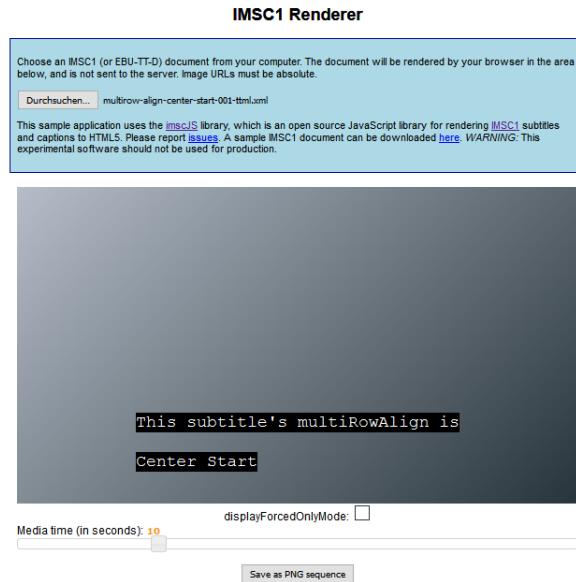
Apache 2
TTML , Video, Reference Images (Coverage EBU-TT-D)

VLC Player - Multi-*-player



- C, GPL 2.0
- Shows TTML subtitles (not all features supported)
- File extension has to be renamed to "txt"

imscJS - TTML to HTML 5



- Javascript, BSD 2
- TTML Renderer
- Coverage of IMSC 1 (text and image)

imscJS - TTML to HTML 5

```
ttmlObject = imsc.fromXML(ttmlXmlString);

times = ttmlObject.getMediaTimeEvents();

snapshot = imsc.generateSD(ttmlObject, times[1]);

domNode = document.getElementById("videoContainer");

imsc.renderHTML(snapshot, domNode);
```

Summary

- Broad support of TTML through OSS
- Some OSS needs "tweaking" to be standard compliant
- "Standard Makers" need to contribute
 - Test Material
 - Bug Reports

LINKS

SubtitleEdit

<https://github.com/SubtitleEdit/subtitleedit>

Amara (unisubs)

<https://www.amara.org/>

<https://github.com/pculture/unisubs>

Subtitle Conversion Framework

<https://github.com/IRT-Open-Source/scf>

LINKS

Timed Text Toolkit

<https://github.com/skynav/ttt>

ebu-tt-live-toolkit

<https://github.com/ebu/ebu-tt-live-toolkit/>

<http://ebu.github.io/ebu-tt-live-toolkit/>

mp4box

<https://gpac.wp.imt.fr/mp4box/>

<https://github.com/gpac/gpac>

LINKS

EBU-TT-D Application Samples

<https://github.com/IRT-Open-Source/irt-ebu-tt-d-application-samples>

VLC media Player

<http://www.videolan.org/vlc/>

<https://github.com/videolan/vlc>

imscJS

<https://github.com/sandflow/imscJS>

<http://sandflow.com/imsc1proc/index.html>

Thank you for your attention!

Experts in audio-visual media

Andreas Tai (tai@irt.de)
Production Technology (PT)



Floriansmühlstraße 60
80939 München
Tel +49 89 323 99 – 0
FAX +49 89 323 99 – 351
www.irt.de
presse@irt.de

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