ADOPTING NEW SUBTITLE FORMATS TO MEET AUDIENCE NEEDS

NIGEL MEGITT, IRT SUBTECH1 SYMPOSIUM
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A BIT ABOUT THE PRESENTER

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Other roles:

Co-Chair, W3C Timed Text Working Group
Co-Chair, EBU Timed Text Group
Contributor to many others…
A BRIEF HISTORY OF AUDIENCE EXPECTATIONS
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SUBTITLES: THE EARLY DAYS

Around 40 years ago, the BBC began broadcasting subtitles using the excellent new Teletext system.

Electronic text displays were basic, and this system provided readable text in a small number of colours with some positioning. Great!

Over the years broadcasters like the BBC integrated the Teletext into their workflows, standardising on storage formats (STL), and using ad hoc systems for inserting live subtitles (e.g. Nufor), and specifying how to carry the teletext in scanning video streams in ancillary data sections (SDI).
... the audience began to get used to computers that could produce nice looking text at home. The old monospaced Teletext font began to look a bit dated.

DVB created a bitmap specification that encoders could generate from the Teletext source data, to make the text look nicer. Some platforms like Sky rendered the Teletext in the client device.

The common backbone to the workflow of Teletext remained though.
Teletext was great, but in 2018 it doesn’t quite look fit for purpose.

It can’t do some things that we need for global use – on the right are just a few.

These are things that the web can do that the audience now just *expects*.

Your phone can do these!

More importantly, they are *necessary* for making video accessible.

| Display Unicode characters like €, ♫, 😐 |
| Use a wide variety of colours |
| Different fonts, including proportionally spaced |
| Precise positioning |
| Begin at the left edge |
| Handle bidirectional text שלום |
| Or vertical, or Ruby… |
| Work nicely on the web |
| Carry metadata |
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BROADCASTER INFRASTRUCTURE

BBC SUBTITLE WORKFLOWS – CURRENT (2018)

6 formats, 3 conversion points.
BROADCASTER INFRASTRUCTURE

BBC SUBTITLE WORKFLOWS - VISION

2 file formats, 1 conversion point.
The broadcast industry seems to be heading strategically towards:

- IMF for mastering and archive
- IP streams (e.g. SMPTE 2110) for playout and live

This means that we are generally heading towards a de-embedded future, where subtitles are not embedded directly into other media. But there may be a case for doing that with e.g. MXF deliverables intended for playout.

This doesn’t change the vision for subtitles, but it might have a big impact on how subtitle streams are carried and how the audio and video are managed.

Everything is just an object. Subtitles were objects first!
Quite a lot of Teletext-based solutions depend on physical hardware, for example to insert subtitles into an SDI stream.

We are moving more and more towards cloud based solutions, especially for providing web-based streams.

We just can not spin up and spin down processing instances when there's a dependency on a limited number of physical machines.

Whatever solution we choose needs to be software and IP network based so we can choose the right deployment model.
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ADOPTING NEW STANDARDS
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WHICH STANDARDS?

There are a *lot* of subtitle formats (not so many standards)!

BBC prefers:
- Open standards – freely available, developed in an open process
- As *few* standards as possible, or minimal transcoding requirements
- Technology that fits business processes

The standard needs to support:
- Everything Teletext can do, and the things it can’t do
- Prepared subtitles
- Live subtitles
- Hard of hearing and translation
- Broadcast and web distribution and playback
- Support for the whole broadcast workflow, i.e. the right timing and supporting metadata.

Our preferred choice is the TTML family. We helped make it, initiating the work in W3C back in 2003, and have worked with W3C and EBU since to create profiles that meet our needs, and the needs of our audience.

TTML profiles include EBU-TT, EBU-TT Live, SMPTE-TT, IMSC, ARIB-TT etc.

Industry seems to be converging on TTML globally:
- IMSC in MPEG CMAF and IMF (even on iOS!)
- EBU-TT-D and IMSC in DVB TTML
- EBU-TT-D in HbbTV 2.0, Freeview Play
- IMSC in ATSC 3.0
ADOPTING NEW STANDARDS

DO WE NEED MORE STANDARDS SUPPORT?

Mostly no, the standards are in a pretty good state, and have maintenance routes.

One missing area is for subtitles in IP infrastructure:

- EBU-TT Live in SMPTE 2110?

That's good for de-embedded workflows, but another where questions are often asked is where subtitles are embedded into AV assets:

- TTML in MXF? Some work may be needed, not sure.
- EBU-TT Live in SDI? Might be a short term gain, possibly not worth it if we're going straight to SMPTE-2110.
## ADOPTING NEW STANDARDS

### STEPS ALONG THE WAY

<table>
<thead>
<tr>
<th>Workflow step</th>
<th>What we want</th>
<th>Can we use?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Authoring</td>
<td>EBU-TT + EBU-TT Live</td>
<td>OK</td>
</tr>
<tr>
<td>Archive and Exchange</td>
<td>EBU-TT</td>
<td>OK</td>
</tr>
<tr>
<td>Playout</td>
<td>EBU-TT + EBU-TT Live</td>
<td>No support</td>
</tr>
<tr>
<td>Encoding for broadcast</td>
<td>EBU-TT Live -&gt; multiple</td>
<td>No commercial options</td>
</tr>
<tr>
<td>Broadcast Distribution</td>
<td>EBU-TT-D/IMSC</td>
<td>Poor support?</td>
</tr>
<tr>
<td>Broadcast Player</td>
<td>EBU-TT-D/IMSC</td>
<td>OK + more coming</td>
</tr>
<tr>
<td>Online Distribution</td>
<td>EBU-TT-D/IMSC</td>
<td>OK</td>
</tr>
<tr>
<td>Online Player</td>
<td>EBU-TT-D/IMSC</td>
<td>OK</td>
</tr>
</tbody>
</table>
Broadcast infrastructure seems to cost a lot and be refreshed as rarely as the business thinks it can get away with.

There may in the future be disruptors that offer new cheaper ways to implement broadcast workflows.

Assuming there are not, we will need to work with our major suppliers to make sure any new functionality is either built into existing equipment or included in any technical refresh projects.

Often there is a “chicken-and-egg” problem!

Result: likely to take years rather than months.
CONCLUSIONS
We know the engineering problems we want to solve.

We know how we want to solve them.

The technical standards are mostly in place.

There is momentum towards convergence in the industry.

We have more work to do specifically in automated playout and in encoders and packagers.

**Calls to action:**

- if you’re buying new kit, consider moving to new standards.
- If you’re selling kit, put this on your development roadmap.
- If you’re representing the audience, let your broadcasters (and maybe even regulator) know what you would like to see and what editorial proposition you would like.
THANK YOU!
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ONWARD...

MORE INFORMATION


BBC Academy Guide “How to create subtitles”: http://www.bbc.co.uk/guides/zmgnng8

BBC R&D publications on accessibility: https://www.bbc.co.uk(rd/topics/accessibility)