Object-based audio production

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Structure

• Challenges in Radio
• ORPHEUS project
• Impact on production workflow
• Production tool demo
What is ‘object-based audio’?

‘Object-based’ ≠ immersive

‘Object-based’ = audio + metadata
Challenges in Radio
Challenges

- Personalisation
- Non-linear listening
- Metadata
Challenges - Personalisation

• People listen on a variety of devices in different environments and are interested in different things
Challenges - Non-linear listening

- BBC is set up for linear broadcast in an increasingly non-linear world
Challenges - Metadata

• Information is lost at every stage of production
• Only broadcast material is routinely archived
• Public-facing data doesn’t go beyond programme-level
• Lost opportunities to generate additional metadata
Data policy

Collect: as much data as possible
Enhance: the data with content analysis
Retain: data throughout the broadcast chain
Translate: the data into higher level concepts
Demands

- Remains relevant in ten years
- Is flexible enough to handle new workflows and audience experiences
- Reduces the cost of installation and operation
- Doesn’t give anyone extra work to do
- Doesn’t significantly change the existing workflow
- Provide a more creative and collaborative environment
ORPHEUS
Object-Based Audio Experience
ORPHEUS project

• EU-funded Horizon 2020 project
• December 2015 to June 2018 (2.5 years)
• 10 partners:
ORPHEUS vision statement

“ORPHEUS will:

• develop
• implement
• validate

...a completely new end-to-end object-based media chain for audio content”

• In collaboration with BBC Radio Technology team
Additional objectives

• Develop a concept for the **transition of existing infrastructure**, systems and software/tools to a regular operational service of object-based audio

• Demonstrate a **new, prodigious user experience** through the creation of a workflow application for the use of object-based audio as an emerging future broadcast technology

• Create a **reference architecture and guidelines** on how to implement an end-to-end broadcasting chain for object-based audio
What is IP Studio?

• Production platform that uses IP networks and commodity hardware

• Everything uniquely identified – sources, flows, devices etc. (UUIDs)

• Flows are sequences of Grains, timestamped at source from common clock

• Grains are agnostic to their payload – just time-related lumps of “stuff”

• Timestamps are perpetuated throughout the production chain, into storage

• Capture everything

• Accumulate metadata
What is IP Studio?
Impact on production workflow
Orpheus audio flow (?)
Impact on production workflow

**Collect > Enhance > Retain > Translate**

- Names of presenters, contributors, producers, characters
- Running order, script
- Music played
- Equipment used
- Locations
- Languages spoken (e.g. overdubs)
Impact on production workflow

Collect > Enhance > Retain > Translate

- Segmentation
  - Speech/music
  - Speaker diarization
  - Speaker identification
- Speech-to-text
- Music
  - Fingerprinting
  - Genre/Key/Tempo/Danceability…
Impact on production workflow

Collect > Enhance > **Retain** > Translate

- Audio channels are kept separate
- Mixing and effects are applied at user end (e.g. reverb)
- Metadata is sent to audience (except for sensitive content)
- Everything is saved for later
Impact on production workflow

Collect > Enhance > Retain > **Translate**

- Identities => Biography/discography/other programmes
- Running order => Segmentation/content swapping
- Transcript => Topic identification
- Music => Recommendations/Swap tracks
Impact on production workflow

• Immersive audio
  • Rendering
  • Quality monitoring
  • Panning techniques
  • Reverberation
• Non-linear storytelling
  • Variable length/depth
  • Branching stories
Motivation

Nobody likes change

...except when they benefit
Production tool demo
Thanks for listening!

Questions / comments / ideas welcome

www.bbc.co.uk/rd/audio