The EU Project Orpheus: Object-based broadcasting – for European leadership in next generation audio experiences

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Project Summary

ORPHEUS is a European research project dedicated to improving the management of audio content.

It will develop, implement and validate a new end-to-end broadcast chain for object-based audio.

Orpheus started on 1st December 2015 and has a duration of 30 months. It receives funding from the European Commission under the Horizon 2020 programme.

Motivation: Mock-up, BR Radio Feature

Further reproduction devices are computer and AV-receiver.

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ORPHEUS Partners

Object-based Media
Object-based Audio

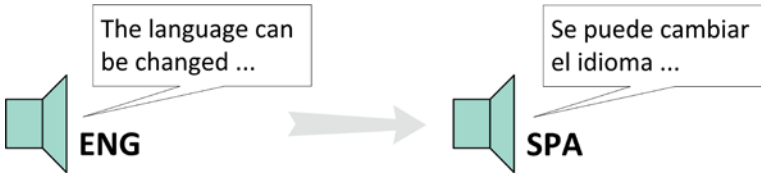
- Definition: Audio object = audio essence + metadata (e.g. position info)

- Metadata describing properties and relationships
- Media objects create new user experiences
- Object-based media is the approach for creating and deploying:
  - Interactive,
  - personalized,
  - Immersive and
  - scalable content.

Aim: Novel interactive user experiences

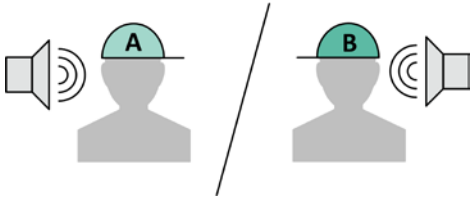
Object-based Media
Interactive, personalised

Changing the language of a program

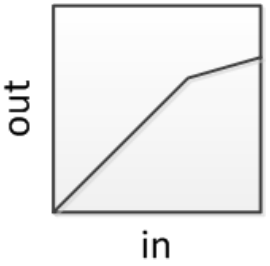


Enabling of additional tracks

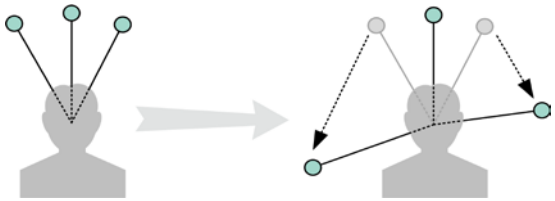
Choosing between content versions



Control loudness (range)



Changing the position of sound events



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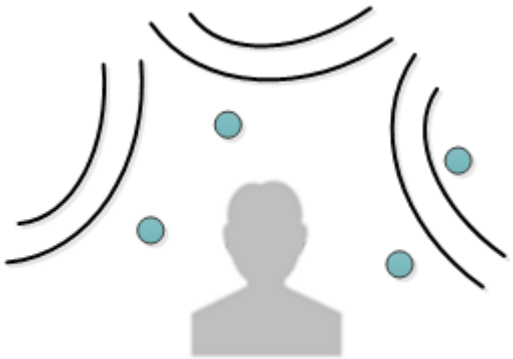
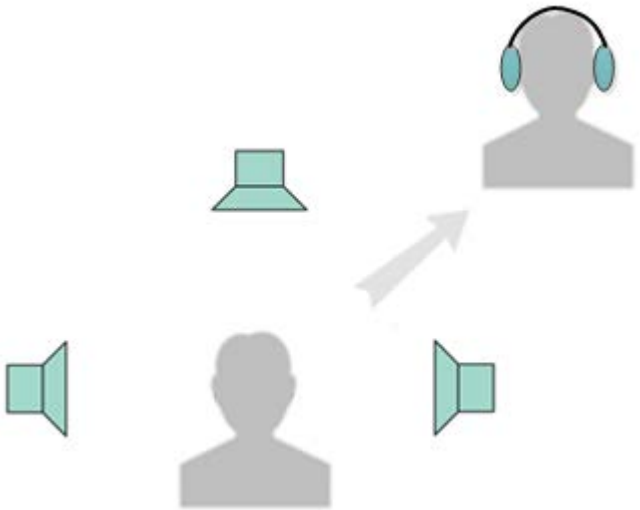
Object-based Media
Immersive, scalable

Direct and diffuse sound from everywhere



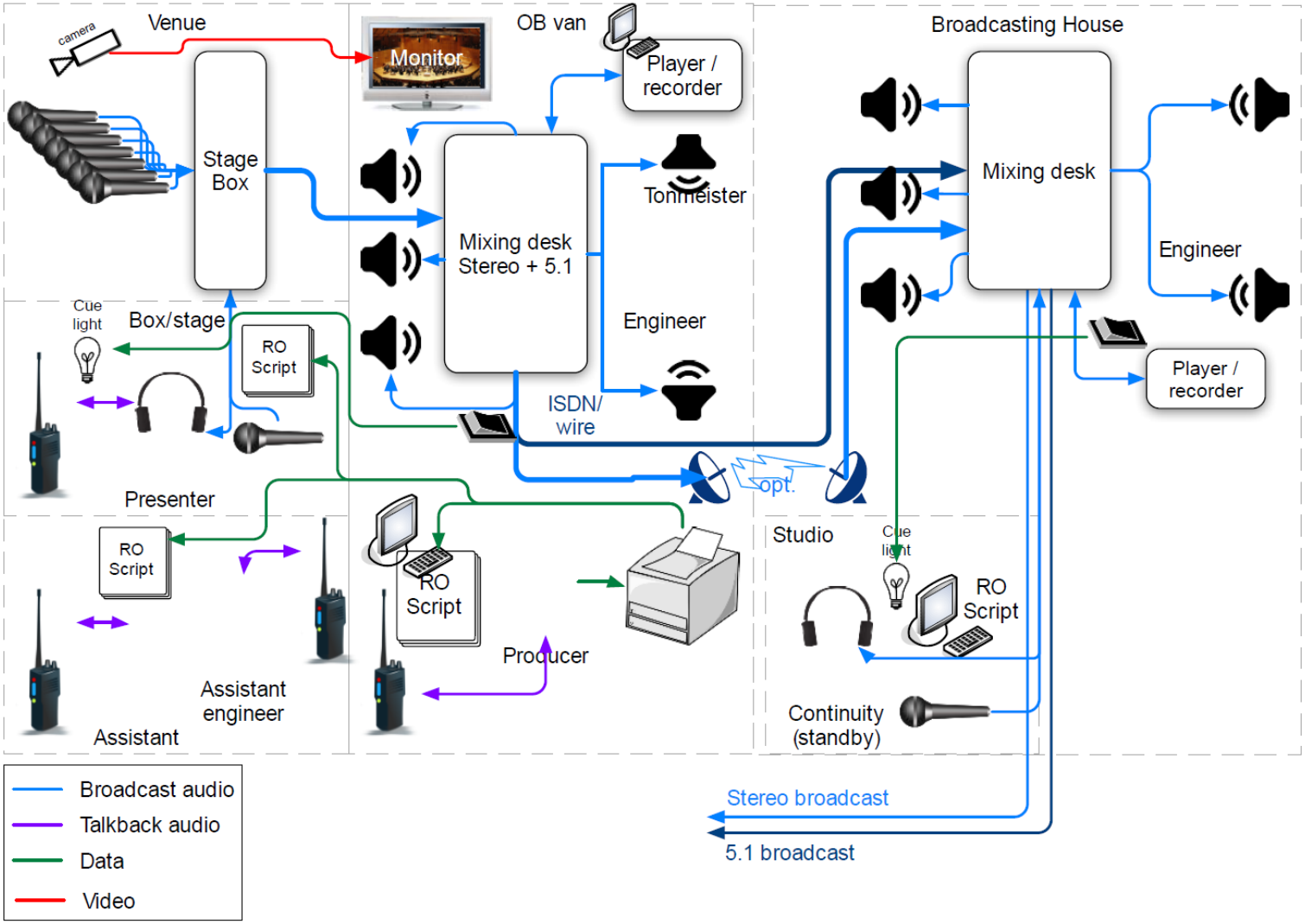
Format agnostic delivery and scalable reproduction setup



Object-based Audio
Different Types of Metadata

- Descriptive Metadata
  - Information about existence of objects
  - High-level properties of objects
- Positional Metadata
- Restrictive Metadata
  - Information of how interaction is possible or enabled by content creator
- Structural Metadata
  - Grouping and combination of objects, e.g. stereo object

Existing Schematics for a Live Music Outside Broadcast



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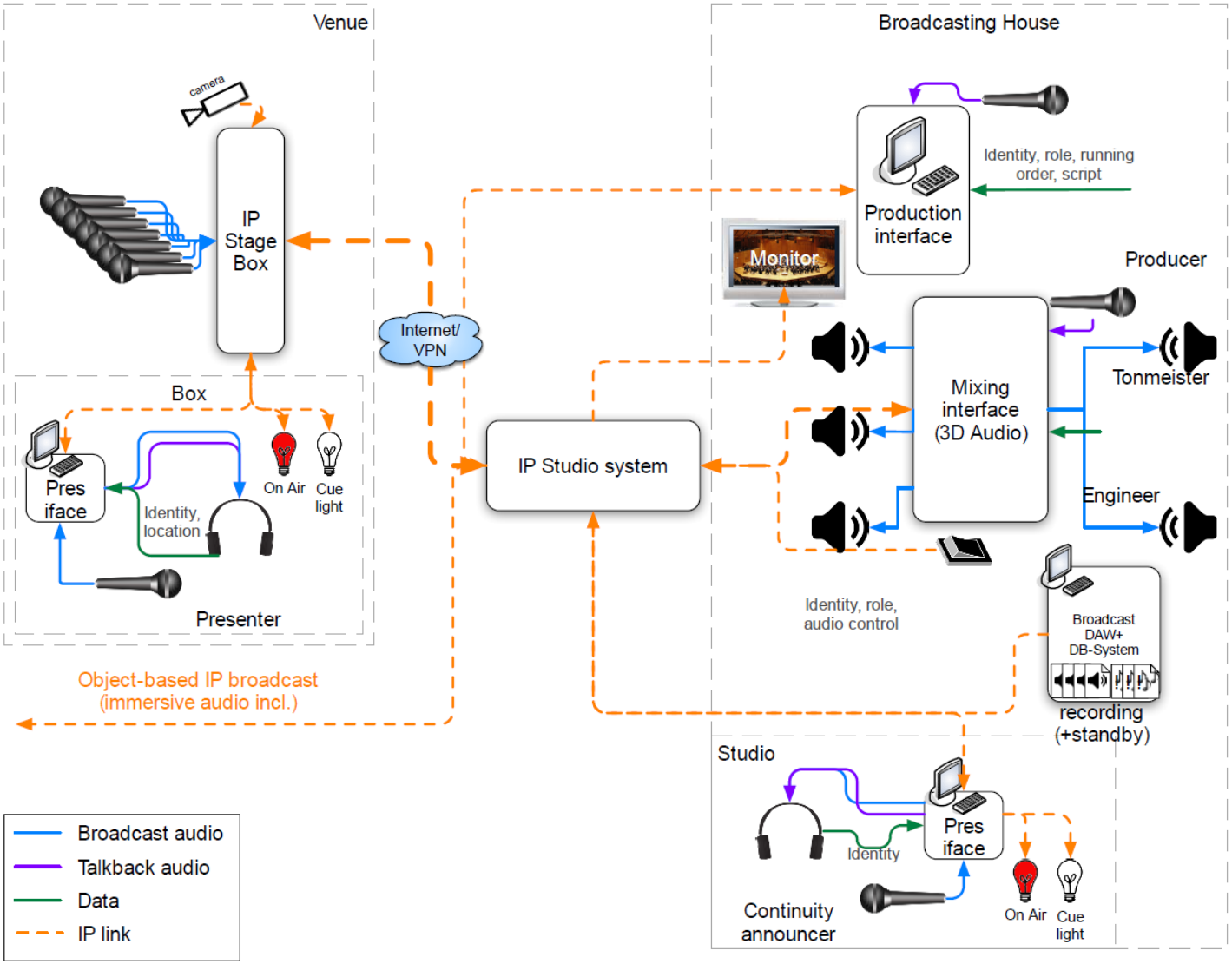
Schematics for an Object-based Live Music Outside Broadcast



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Connectors versus File/Streaming Formats

BW64 [ITU-R BS.2088-0]

ADM [ITU-R BS.2076-0]

AES67 [AES]

MPEG-H 3D Audio
[ISO/IEC 23008-3]

MPEG-DASH
[ISO/IEC 23009-1]

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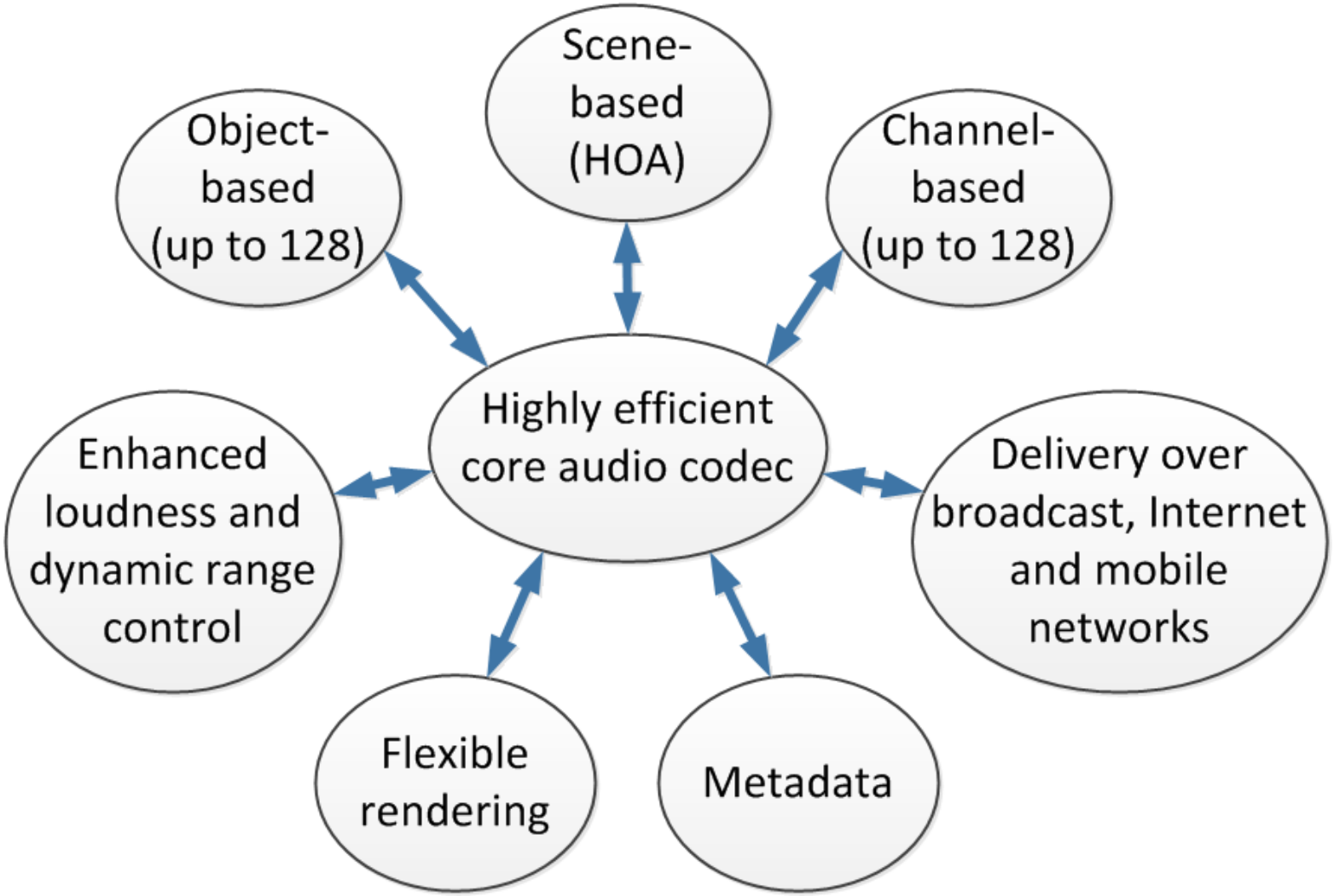
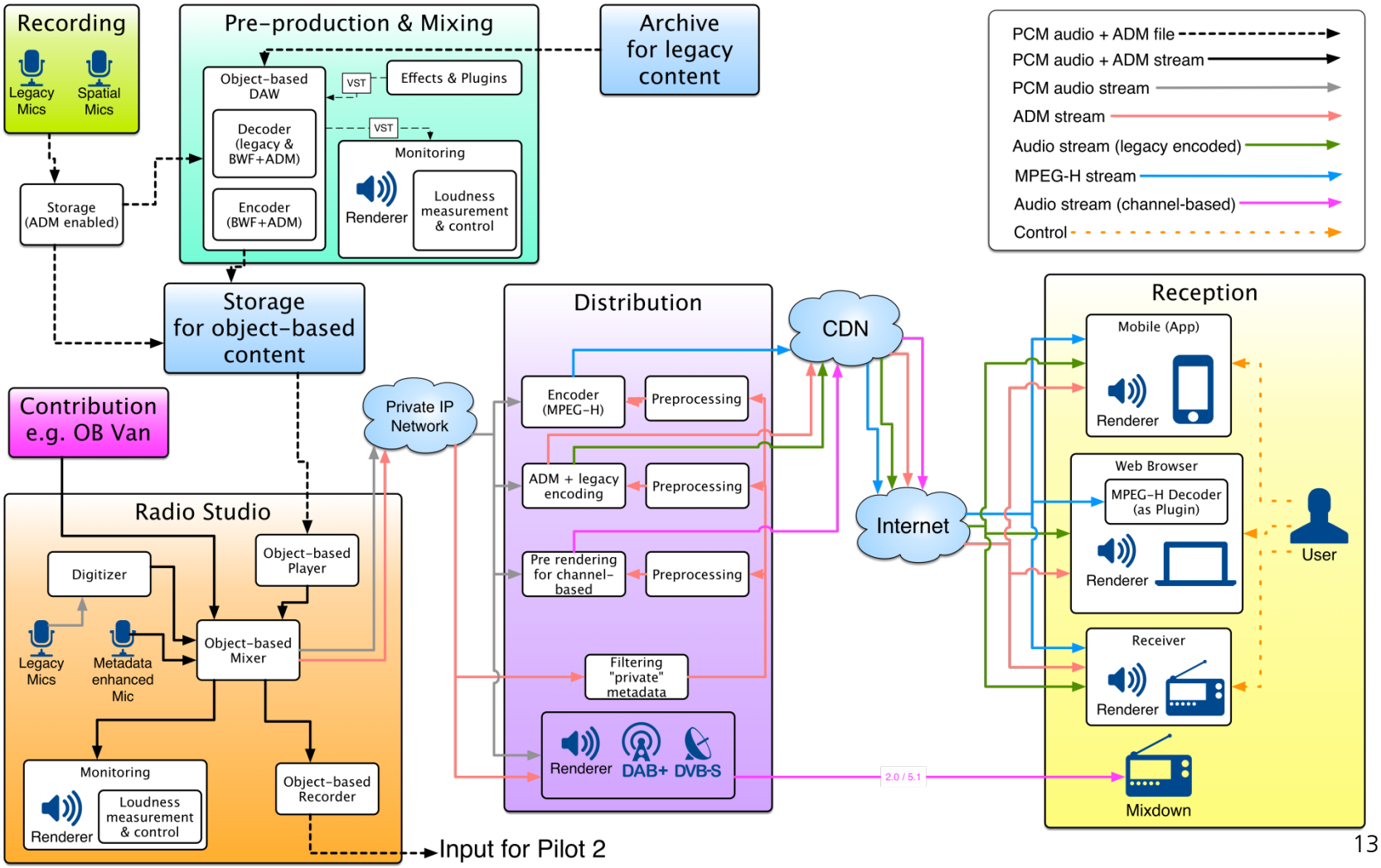
Delivery Format for Object-based Audio: MPEG-H



Pilot Implementation Architecture



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Object-based Audio Challenges in Orpheus

Significant **challenges** and fundamental **questions** were raised and exposed. These include:

- methodologies for subjective and objective quality assessment
- guaranteed Quality of Experience (QoE) and overall audio quality on any device with any content
- efficient capturing technologies and post-processing algorithms
- research on user-interface metaphors for both content producers and consumers
  - to create properly object-based content on the production side
  - to use easily object-based content on the end-user side

The Four Key Features of Object-based Audio

- Accessibility of object-based audio content, there are a lot of use-cases where object-based audio gives additional benefit
- Interactive and personalised experiences
- Spatially immersive experiences
- Compatibility to channel-based and scene-based audio

Room Acoustics

The room acoustics of a good recording room should be captured, or created during the production and then listened by the end-user.

When the end-user can not hear the intended recording room acoustics, he/she will not pay for immersive audio.

Ultimate Aims
Summary

- Bring the **'fascinating'** experience of **object-based content** to mass audiences at no added cost
- Demonstrate the new prodigious user experience through the **realisation of close-to-market workflows**
- Proofing the **economic viability** of object-based audio as an **emerging media and broadcast technology**

ORPHEUS will publish reference architecture guidelines on how to implement object-based audio chains, together with the deliverables of the project.

http://orpheus-audio.eu

Orpheus Team at Opening Meeting Dec. 2015

Thank you for your attention

http://orpheus-audio.eu

Information

- Fraunhofer IIS booth 2-06
- Workshop: VR Audio (ask at booth for schedule)
- Workshop: 3D Audio Production (ask at booth for schedule)
- Grewe: “Comparison of Main Microphone Systems for 3D Audio Recordings” (3DR-2, Thu. 1pm)
- Silzle: “The EU Project ORPHEUS” + workshop (FB-02, Fr. 4 pm)
- Adami: “Perception and Measurement of Applause Characteristics” (PE-02, Fr. 5:30 pm)
- Silzle: “The Influence of Microphone Directivity on the Level Calibration and Equalization of 3D Loudspeaker Setups” (SL-03, Sa. 10 am)
- Scuda: “Immersive Sound for VR TV Documentary” (3DD-1, Sa. 1:30 pm)