



ADM-OSC PlugFest #1



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Problem:

Immersive Audio Interoperability

- Object-based mixing is a partial solution
- Multiple devices
 - DAWs, applications
 - Renderers (loudspeakers, binaural)
 - Controllers (consoles, plugins...)
 - Trackers
 - ...*video, lighting, VR, AR, &c...*
- Devices need to speak the same language for object position

Case 1: Irène Dréssel • Radio France • FIP 360



outputs

- multichannel audio for live show
- binaural mix for broadcast/podcast
- interactive live video projection

tools

- L-ISA
- FLUX::SPAT
- Modulo Kinetic



Solution: ADM-OSC

Open Sound Control

- widely adopted in audio/video/performance uses
- More useable/expressive than MIDI/VST API*
- open-source implementations
- not resource-intensive
 - Programmer resources
 - CPU/Network resources

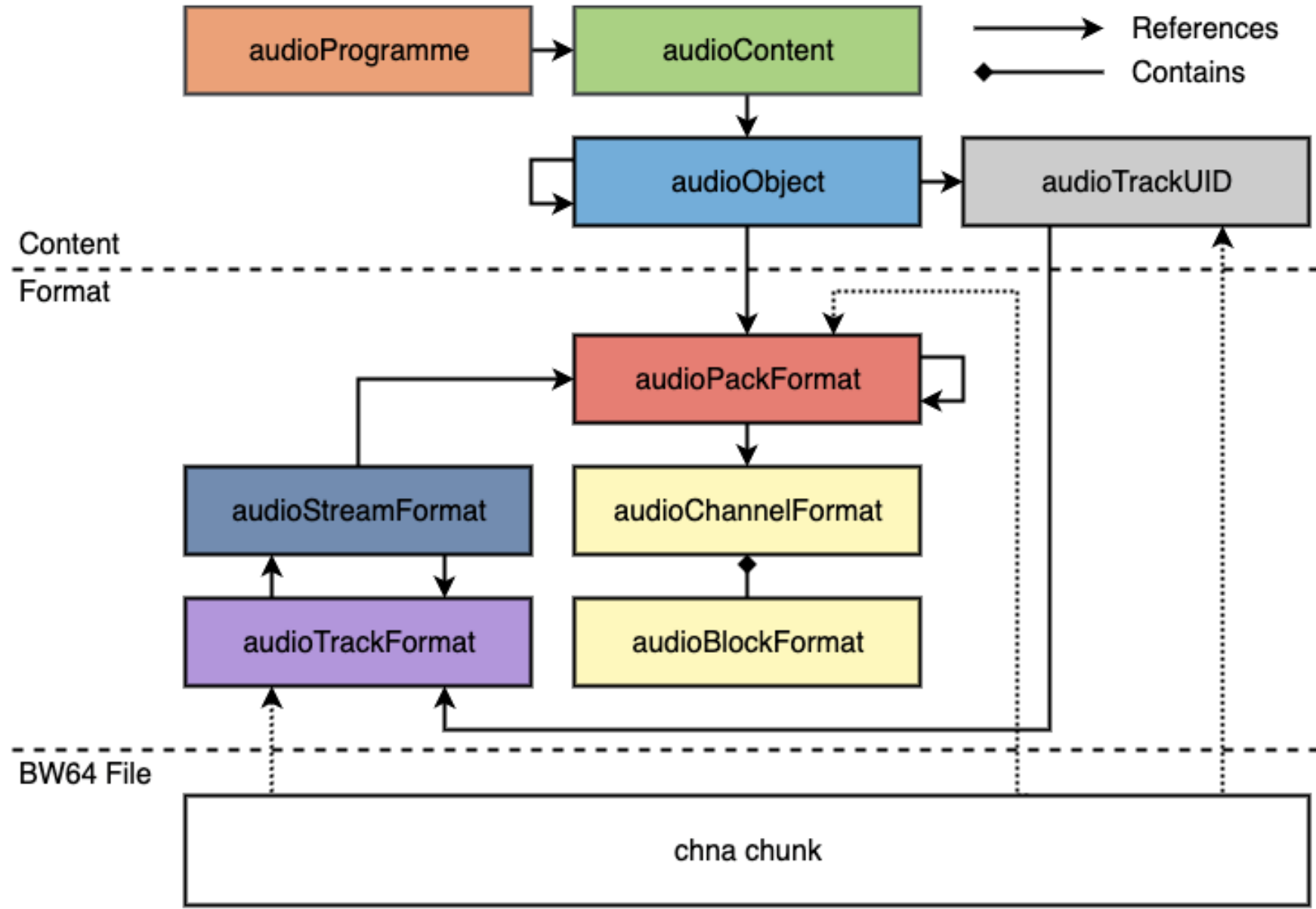
* Zbyszynski, M and Adrian Freed, Control of VST Plug-ins Using OSC, Open Sound Control Conference 200



Audio Definition Model (ADM)

Defined by the EBU in ITU-R BS.2076

- First published in 2015 as a standard representation of audio metadata
- Supports a broad range of "Next Generation Audio" use cases that includes
 - spatial & immersive audio
 - interactive personalization
 - accessibility features
- Many types of audio
 - channel-based
 - scene-based (ambisonic)
 - **object-based audio**
 - matrix-based (e.g. mid-side)
 - binaural



ADM

Complex!



ADM

Representations

There are a few ways ADM might be represented in a production/broadcast workflow:

- BW64 file (wav + XML)
 - EBU libraries for reading/writing
 - A RIFF wave file with extra data chunks (chna & axml)
 - Not good for streaming
- S-ADM
 - Serial ADM
 - For streaming
 - Frames of data
 - SMPTE formats
- ADM-OSC
 - metadata only
 - Open Sound Control
 - Position data/renderer control



ADM XML

```
<?xml version="1.0" encoding="UTF-8"?>
<ebuCoreMain xmlns="urn:ebu:metadata-schema:ebuCore_2016"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xsi:schemaLocation="urn:ebu:metadata-
schema:ebuCore_2016 ebuCore.xsd" xml:lang="en">
  <coreMetadata>
    <format>
      <audioFormatExtended >
        <audioProgramme audioProgrammeID="APR_1001" audioProgrammeName="L-ISA_Master"
start="10:00:00.00000" end="10:00:10.00000">
          <audioContentIDRef>ACO_1001</audioContentIDRef>
        </audioProgramme>
        <audioContent audioContentID="ACO_1001" audioContentName="L-ISA_Main_Content">
          <audioObjectIDRef>AO_1001</audioObjectIDRef>
```

Etc...



ADM XML

Audio block format

```
<audioBlockFormat audioBlockFormatID="AB_00031001_00000002"  
  rtime="00:00:02.00000" duration="00:00:02.00000">  
  <cartesian>1</cartesian>  
  <position coordinate="X">-0.7999999970</position>  
  <position coordinate="Y">0.5000000000</position>  
  <position coordinate="Z">0.5000000000</position>  
  <gain>0.0010000000</gain>  
  <jumpPosition interpolationLength="0.000000">1</jumpPosition>  
</audioBlockFormat>
```



Different renderers...

Polar vs Cartesian Coordinates



olby

ADM-OSC Initiative

Contributors

L-Acoustics, FLUX::SE, Radio France, d&b Audiotechnik, DiGiCo, Dolby, Lawo, Magix, Merging Technologies, Meyer Sound, Steinberg.

Implementations

SPAT Revolution (FLUX::SE), L-ISA Controller (L-Acoustics), Ovation (Merging Technologies), Nuendo (Steinberg), SpaceMap Go (Meyer Sound), QLAB 5 (Figure 53), Space Controller (Sound Particles), Modulo Kinetic (Modulo Pi), Iosono (Barco).

ADM-OSC PlugFest #1 • 28-29 September • Paris

Current spec and issue discussion on github:

<https://immersive-audio-live.github.io/ADM-OSC/>

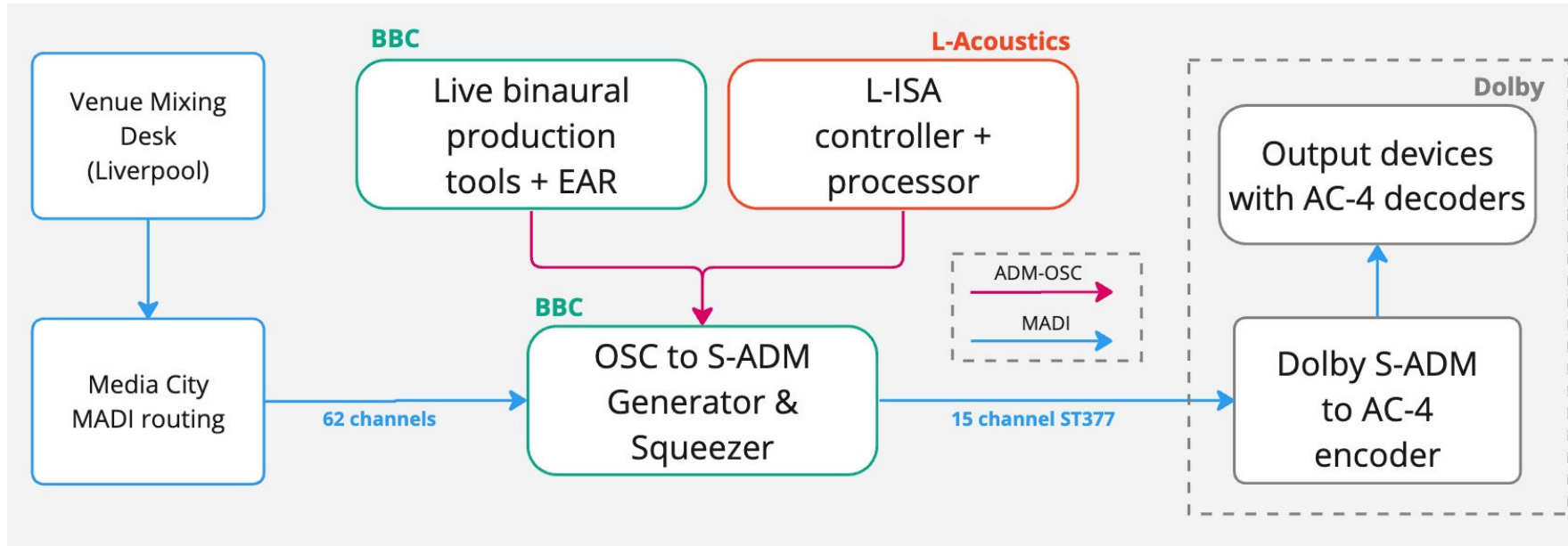
ADM-OSC v0.4

Attribute	unit	min	max	OSC
Azimuth	degrees ¹	-180.0	180.0	/adm/obj/n/azim float
Elevation	degrees ²	-90.0	90.0	/adm/obj/n/elev float
Distance	normalized	0.0	1.0	/adm/obj/n/dist float
aed		see above		/adm/obj/n/aed f f f
X	normalized	-1.0	1.0	/adm/obj/n/x float
Y	normalized	-1.0	1.0	/adm/obj/n/y float
Z	normalized	-1.0	1.0	/adm/obj/n/z float
XYZ	normalized	-1.0	1.0	/adm/obj/n/xyz f f f

¹ -90.0 degrees is on the right, 0.0 is in front.

² 90.0 degrees above the listener

Case 2: Eurovision • BBC



- multiple audio channels coming from venue
- live mix in studio with L-ISA
- translate mix to S-ADM, then multiple broadcast formats
 - AC4
 - DASH
 - ST337, ST 2098-2, etc...
- enabling “Next Generation Audio” features, like user interactivity

Next steps

*Which elements of an object-based mix are generalizable?
What details are renderer-specific?*

- Distance? *Distance is handled differently in cinematic or VR applications*
- Extent? *ADM, Dolby, L-ISA have different representations of “size”*

More touch/control features

- Nuendo & Flux
- `/adm/obj/n/touch ... /release`

Broadcast/NGA features

- Cover more of the ADM spec
- Programme setup
- Grouping/Squeezing cues

What does it mean to be ADM-OSC compliant?

Goal: preserve simplicity while increasing flexibility



Get involved!



<https://immersive-audio-live.github.io/ADM-OSC>

Thank you for your attention