EBU
OPERATING EUROVISION AND EURORADIO

TECHNOLOGY
FACT SHEET

NEXT GENERATION AUDIO (NGA)

BACKGROUND

NGA delivers audio experiences that are more accessible, personalized, and interactive – independent of how they are consumed, be it on headphones, soundbars or multi-speaker setups. NGA frees producers from the need to create multiple audio mixes for different reproduction systems by allowing them to deliver a single, multi-purpose audio master instead.

NGA is so flexible and scalable because it describes all parts of the audio experience with metadata – like a script does for the elements of a play. This metadata is created at the mixing desk and transported alongside the audio elements to the end-user device, where the so-called renderer converts them to a configuration of audio signals that matches that device's specific playback environment (e.g. headphones, stereo, 5.1 etc.) and the user's preferences and control inputs.

THE OPPORTUNITY FOR PUBLIC SERVICE MEDIA

Offering NGA is not just about keeping pace with competing platforms, but also about accessibility. For example, end-users with hearing impairments can greatly benefit from being able to increase or decrease elements of the audio mix, like dialogue or audio description. NGA functionality also supports multiple language tracks without the need to produce different mixes, saving bandwidth and effort.

WHAT IS THE EBU DOING?

Developing open standards for NGA

For broadcasters, it is crucial to maintain interoperability and reproducibility. The only way to properly enable this is by establishing open standards. The EBU works alongside standardization bodies such as the ITU, AES, SMPTE and ETSI to develop the necessary open standards and facilitate the adoption of NGA by broadcasters.

Audio Definition Model

To ensure interoperability in NGA workflows, it is important to specify a common standard for the metadata that is used to describe the audio. The Audio Definition Model (ADM) defined in ITU-R BS.2076-1 is such a standard and is based on previous EBU work (EBU Tech 3364). The EBU ADM guidelines (https://adm.ebu.io/) aim at helping professional users to understand the ADM and includes relevant examples.

Live scenarios are addressed by the serial representation of ADM described in ITU-R BS.2125-0. A standard enabling serial ADM with synchronized audio signals on the AES3 serial digital audio interface will be published by SMPTE (SMPTE ST 2116).

The Audio Definition Model is intentionally kept generic in order to support a wide variety of application areas. Application-specific profiles (such as for production or distribution) are in the process of being defined and will constrain the ADM to simplify implementation and prevent interoperability problems in the production of NGA broadcast programmes.

Broadcast Wave 64

The Broadcast Wave 64 (BW64) format specified in Recommendation ITU-R BS.2088-0 adds functionality to WAVE, the standard file format for PCM audio data, to allow it to be used in NGA workflows: removal of the 4GB file size limit, and the ability to include metadata and to link it with the audio data. Like the ADM, BW64 is based on previous EBU work (EBU Tech 3306).

ADM Renderer

The EBU ADM Renderer (EAR) was developed by an alliance of R&D and broadcast organizations – the IRT, BBC, France Télévisions, b<>com and the EBU – as an open production renderer that can be used by all who wish (Tech 3388). The document was then submitted to the relevant ITU-R study group, which agreed to use the EAR as the basis for a wider common system. Together with other group members such as Dolby, Fraunhofer IIS, Xperi and NHK, the "Audio Definition Model renderer for advanced sound systems", Recommendation ITU-R BS.2127, was developed and published in June 2019. To ensure the specification is implementable, and to resolve ambiguities, this open international standard is accompanied by an open source reference implementation written in Python.

The EBU envisions a wide adoption and integration of the ADM and the ITU-R BS.2127 renderer along the end-to-end chain with transparent and compatible conversions between ADM profiles and encoder-specific interfaces.

Developing open source software for NGA

libadm

As the ADM was developed to cover all possible use cases, it can be quite difficult to parse or create an ADM file which complies completely with the standard. The IRT developed an open source C++ library to simplify the handling of ADM metadata. It is available under: https://github.com/irt-open-source/libadm

libbw64

Developed by the IRT, this C++ library supports all features of the BW64 file format – the first of its kind to do so. It is available as a lightweight, header-only library with a permissive open source license: https://github.com/irt-open-source/libbw64

libEAR

While the reference implementation is great for offline tests and as a blueprint for further implementations, it is not suitable for real-time applications. To fill this gap, the BBC and IRT have developed libear, a C++ library which provides the core functionality of the ITU ADM Renderer (IAR). It is published under the EBU umbrella and can be downloaded from: https://github.com/ebu/libear

EAR Production Suite

The BBC and IRT are working together to enable codec-independent NGA production within a DAW using the ADM format. A suite of VST plugins is provided to author metadata and monitor the result with the ITU ADM Renderer. An extension to the REAPER DAW provides import and export of the ADM file format in line with the EBU ADM Production Profile (Tech 3392). These tools are built on top of libadm, libbw64 and libear, and will be published as an open source project in the future.

FIND OUT MORE

NGA resources: https://tech.ebu.ch/nga
EBU Audio Systems Group: https://tech.ebu.ch/as