# INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

# ORGANISATION INTERNATIONALE DE NORMALISATION

# ISO/IEC/JTC 1/SC 29/WG 11

# CODING OF MOVING PICTURES AND AUDIO

**ISO/IEC JTC 1/SC 29/WG 11 N17909**

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**Point Cloud Compression – MPEG promotes a video-based point cloud compression technology to the Committee Draft stage**

Macau, China – The 124th MPEG meeting was held in Macau, China, from 08 – 12 October 2018

**Point Cloud Compression – MPEG promotes a video-based point cloud compression technology to the Committee Draft stage**

At its 124th meeting, MPEG promoted its Video-based Point Cloud Compression (V-PCC) standard to Committee Draft (CD) stage. V-PCC addresses lossless and lossy coding of 3D point clouds with associated attributes such as colour. By leveraging existing and video ecosystems in general (hardware acceleration, transmission services and infrastructure), and future video codecs as well, the V-PCC technology enables new applications.

Point clouds are typically represented by extremely large amounts of data, which is a significant barrier for mass market applications. However, the relative ease to capture and render spatial information compared to other volumetric video representations makes point clouds increasingly popular to present immersive volumetric data. With the current V-PCC encoder implementation providing a compression of 125:1, a dynamic point cloud of 1 million points could be encoded at 8 Mbit/s with good perceptual quality.

By providing high-level immersiveness at currently available bandwidths, the V-PCC standard is expected to enable several applications such as six Degrees of Freedom (6 DoF) immersive media, virtual reality (VR) / augmented reality (AR), immersive real-time communication, autonomous driving, cultural heritage, and a mix of individual point cloud objects with background 2D/360-degree video.

**MPEG issues Call for Proposals on Compressed Representation of Neural Networks**

Artificial neural networks have been adopted for a broad range of tasks in multimedia analysis and processing, media coding, data analytics, and many other fields. Their recent success is based on the feasibility of processing much larger and complex neural networks (deep neural networks, DNNs) than in the past, and the availability of large-scale training data sets. As a consequence, trained neural networks contain a large number of parameters (weights) and result in a quite large size (e.g., several hundred MBs). Many applications require the deployment of a particular trained network instance, potentially to a large number of devices, which may have limitations in terms of processing power and memory (e.g., mobile devices or smart cameras). Any use case in which a trained neural network (and its updates) needs to be deployed to a large number of devices could thus benefit from a standard for the compressed representation of neural networks.

At its 124th meeting, MPEG has issued a Call for Proposals (CfP) for compression technology for neural networks, focusing on the compression of parameters and weights, which account for most of the size of a trained neural network. The compression technology will be evaluated in terms of compression efficiency, runtime and memory consumption, and the impact on performance in four use cases: *(i)* visual object classification, *(ii)* audio classification, *(iii)* visual feature extraction (as used in MPEG CDVA), and *(iv)* video coding. Responses to the CfP will be analysed on the weekend prior to and during the 126th MPEG meeting in March 2019.

**MPEG issues Call for Proposals on Low Complexity Video Coding Enhancements**

Upon request from the industry, MPEG has identified an area of interest in which video technology deployed in the market (e.g., AVC, HEVC) can be enhanced in terms of video quality without the need to necessarily replace existing hardware.

At its 124th meeting, MPEG has issued a Call for Proposals (CfP) on Low Complexity Video Coding Enhancements. The objective is to develop video coding technology with a data stream structure defined by two component streams: a *base stream* decodable by a hardware decoder and an *enhancement stream* suitable for software processing implementation with sustainable power consumption. The enhancement stream will provide new features such as compression capability extension to existing codecs and lower encoding/decoding complexity.

This new video coding project targets in particular those use cases that require live and on demand video streaming, high quality video and maximum device ecosystem compatibility. The project is meant to be codec agnostic; in other words, the base encoder and base decoder can be AVC, HEVC, or any other codec in the market.

**MPEG issues Call for Proposals for a New Video Coding Standard expected to have licensing terms timely available**

At its 124th meeting, MPEG issued a Call for Proposals (CfP) for a new video coding standard to address combinations of technical and application requirements that may not be adequately met by existing standards. There is constant demand for more efficient video coding technologies, however coding efficiency is not the only factor that determines the industry choice of video coding technology for products and services.

Video coding technologies need to address all requirements of real-world use cases. The focus of this new video coding standard is on use cases such offline encoding for streaming video on demand (VoD) and live over-the-top (OTT) streaming. The aim is to provide a standardized video compression solution which combines coding efficiency similar to that of HEVC with a level of complexity suitable for real-time encoding and decoding and the timely availability of licensing terms.

**Multi-Image Application Format (MIAF) promoted to Final Draft International Standard**

At its 124th meeting, MPEG has promoted the Multi-Image Application Format (MIAF) to Final Draft International Standard (FDIS). While MPEG has already developed the standard for storage of a sequence of images with associated metadata and their relationship to each other (i.e., the High Efficiency Image File specification (HEIF; ISO/IEC 23008-12)), it has not defined specific interoperability points by which capturing devices, editing applications, storage systems, cloud and delivery networks, and playback devices and applications can interoperate with each other. For instance, a capturing device may use one of HEIF codecs with a specific HEVC profile and level in its created HEIF files, while a playback device is only capable of decoding the AVC bitstreams.

The Multi-Image Application Format (MIAF) has enabled precise interoperability points for creation, reading, parsing, and decoding of images embedded in HEIF by only defining additional constraints on the HEIF format, limiting the supported encoding types to a set of specific profiles and levels, requiring specific metadata formats, and defining a set of brands for signaling such constraints. It has also defined specific depth map and alpha plane formats.

**3DoF+ Draft Call for Proposal goes Public**

Following investigations on the coding of “three Degrees of Freedom plus” (3DoF+) content in the context of MPEG-I, the MPEG video subgroup has provided evidence demonstrating the capability to encode a 3DoF+ content efficiently while maintaining compatibility with legacy HEVC hardware. As a result, MPEG decided to issue a draft Call for Proposal (CfP) to the public containing the information necessary to prepare for the final Call for Proposal expected to occur at the 125th MPEG meeting (January 2019) with responses due at the 126th MPEG meeting (March 2019).

**How to contact MPEG, learn more, and find other MPEG facts**

To learn about [MPEG basics](http://mpeg.chiariglione.org/mpeg-basics), discover [how to participate](http://mpeg.chiariglione.org/who-we-are) in the committee, or find out more about the array of technologies developed or currently under development by MPEG, visit MPEG’s home page at <https://mpeg.chiariglione.org/>. There you will find information publicly available from MPEG experts past and present including tutorials, white papers, vision documents, short articles and requirements under consideration for new standards efforts. You can also find useful information in many public documents by using the search window including publicly available output documents of each meeting (note: some may have editing periods and in case of questions please contact Dr. Christian Timmerer).

Examples of tutorials that can be found there include tutorials for: High Efficiency Video Coding, Advanced Audio Coding, Universal Speech and Audio Coding, and DASH to name a few. A rich repository of white papers can also be found and continues to grow. You can find these papers and tutorials for many of [MPEG’s standards](http://mpeg.chiariglione.org/standards) freely available. Press releases from previous MPEG meetings are also available.

Journalists that wish to receive MPEG Press Releases by email should contact Dr. Christian Timmerer at christian.timmerer@itec.uni-klu.ac.at or christian.timmerer@bitmovin.com or subscribe via <https://lists.aau.at/mailman/listinfo/mpeg-pr>. For timely updates follow us on Twitter (<https://twitter.com/mpeggroup>).

**Further Information**

Future MPEG meetings are planned as follows:

No. 125, Marrakech, MA, 14 – 18 January 2019

No. 126, Geneva, CH, 18 – 22 March 2019

No. 127, Gothenburg, SE, 08 – 12 July 2019

No. 128, Geneva, CH, 07 – 11 October 2019

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