

**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 **N17482**

April 2018 – San Diego, CA, USA

Source: Convenor of MPEG
Status: Approved by WG11
Subject: MPEG Press Release
Date: 20 April 2018



**Versatile Video Coding (VVC) project starts strongly
in the Joint Video Experts Team**

San Diego, CA, USA – The 122nd MPEG meeting was held in San Diego, CA, USA, from 16 – 20 April 2018

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The Joint Video Experts Team (JVET), a collaborative team formed by MPEG and ITU-T Study Group 16's VCEG commenced work on a new video coding standard to be known as Versatile Video Coding (VVC) at this meeting. The primary objective of VVC is to provide a significant improvement in compression performance over the existing HEVC standard, aiding in deployment of higher-quality video services and emerging applications such as 360° omnidirectional immersive multimedia and high-dynamic-range (HDR) video. The development of the VVC standard is expected to be completed in 2020. The two bodies issued a joint Call for Proposals, and the responses were evaluated at the San Diego meeting. Responses to the call were received from 32 organizations, with some demonstrating compression efficiency gains of typically 40% or more when compared to using HEVC. The gain was measured in extensive formal subjective tests conducted by independent test labs. Both 360° omnidirectional video and HDR video were tested as well as conventional dynamic range video. Particular effectiveness was shown on ultra-high definition (UHD) video test material. The results of this very successful call led to creation of a first draft, a test model for simulation experiments, and a technology benchmark set for the VVC project. The new standard is expected to enable the delivery of UHD services at bit rates that today are used to carry HDTV. Alternatively, using VVC would enable twice as much video content to be stored on a server or sent through a streaming service.

MPEG-G standards reach Draft International Standard for transport and compression technologies

The extensive usage of high-throughput deoxyribonucleic acid (DNA) sequencing technologies opens up new perspectives in the treatment of several diseases and enables “precision medicine”. As DNA sequencing technologies produce extremely large amounts of raw data, the ICT costs for the storage, transmission, and processing of DNA sequence data and related information, result to be very high due to the lack of universal standards preventing timely application of effective treatments.

The MPEG-G standard jointly developed by MPEG and ISO Technical Committee for biotechnology standards (ISO TC 276/WG 5) is the first international standard to address and solve the problem of efficient and cost-effective handling of genomic data by providing, not only new compression and transport technologies, but also a family of standard specifications associating relevant information in the form of metadata and a rich set of Application Programming Interfaces (APIs) for building a full ecosystem of interoperable applications and services capable of efficiently processing sequencing data.

At its 122nd meeting, MPEG promoted its core set of MPEG-G specifications, i.e., transport and compression technologies, to Draft International Standard (DIS) stage. Such parts of the standard provide new transport technologies (ISO/IEC 23092-1) and compression technologies (ISO/IEC 23092-2) supporting rich functionality for the access and transport including streaming of genomic data by interoperable applications. This will enable the industry to rely on a final specification in October 2018. Reference software (ISO/IEC 23092-4) and conformance (ISO/IEC 23092-5) will reach this stage in the next 12 months.

Beside standardization achievements, a workshop on the “applications of genomic information processing” has been held in conjunction with the 122nd MPEG meeting discussing requirements, open problems of genome information processing, and solutions provided by MPEG-G standards. Use cases representative of selective remote access with streaming and the execution of the Genome Analysis Toolkit (GATK) and equivalent processing pipelines using sequencing data in MPEG-G compressed forms have also been demonstrated.

MPEG issues Call for Proposals on Network-based Media Processing

Recent developments in multimedia have brought significant innovation and disruption to the way multimedia content is created and consumed. With the emergence of virtual reality (VR), augmented reality (AR), and mixed reality (MR) applications, users can interact with and navigate within the consumed content along multiple degrees of freedom. At its 122nd meeting, MPEG has issued a Call for Proposals (CfP) on Network-based Media Processing (MPEG-I part 8). This CfP addresses advanced media processing technologies (e.g., network stitching for VR service, super resolution for enhanced visual quality, transcoding, viewport extraction for 360° video) within the network environment that allows service providers and end users to describe media processing operations that are to be performed by the network. To achieve this objective, MPEG is working on a NBMP standard that will allow end user devices to offload certain kinds of processing to the network. NBMP describes the composition of network-based media processing services out of a set of network-based media processing functions and makes these network-based media processing services accessible through Application Programming Interfaces (APIs). Responses to the NBMP CfP will be evaluated on the weekend prior to and decisions made at the 123rd MPEG meeting in July 2018 (Ljubljana, SI).

MPEG finalizes 7th edition of MPEG-2 Systems Standard

At its 122nd meeting, MPEG promoted a new edition of its award-winning MPEG-2 Systems standard to Final Draft International Standard (FDIS), the final stage of development. As MPEG-2 Systems is one of the most crucial standard for various digital media services, it has been constantly revised to support additional features after its first publication. The currently published 6th edition was a result of incremental integration of 29 amendments to the first edition in 1996. The new edition will integrate three amendments to the 6th edition. Technologies

to be integrated in this edition include support of transport of JPEG 2000 video with 4K resolution and ultra-low latency, carriage of media orchestration related metadata, carriage of sample variance, and carriage of HEVC tiles.

MPEG enhances ISO Base Media File Format (ISOBMFF) with two new features

At its 122nd meeting, MPEG has promoted two new technologies enhancing the power of ISOBMFF to Final Draft International Standard (FDIS), the final stage of development.

The Partial File Format (ISO/IEC 23001-14) enables the description of an ISOBMFF file partially received over lossy communication channels. It is intended to serve as a storage and exchange format for other file formats delivered over lossy channels. The format provides tools to describe reception data, the received data and document transmission information such as received or lost byte ranges and whether the corrupted/lost bytes are present in the file and repair information such as location of the source file, possible byte offsets in that source, byte stream position at which a parser can try processing a corrupted file. Depending on the communication channel, this information may be setup by the receiver or through out-of-band means.

Another technology that has been promoted to the final stage is the 2nd edition of storage of sample variants (ISO/IEC 23001-12). Sample variants are typically used to provide forensic information in the rendered sample data that can, for example, identify the specific Digital Rights Management (DRM) client which has decrypted the content. This variant framework is intended to be fully compatible with MPEG's Common Encryption (CENC), as specified by ISO/IEC 23001-7, and agnostic to the particular forensic marking system used.

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

To learn about MPEG basics, discover how to participate 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, 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 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.

Further Information

Future MPEG meetings are planned as follows:

No. 123, Ljubljana, SI, 16 – 20 July 2018

No. 124, Macau, CN, 08 – 12 October 2018

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

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

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