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| **Authors** | Kyungmo Park |

# Introduction

Recent developments in multimedia have brought significant innovation and disruption to the way multimedia content is consumed. With the emergence of VR and AR/MR applications, users can interact and navigate the consumed content along multiple degrees of freedom. This trend has made it clear that the amount of processing required to realize these use cases goes beyond the current capabilities of consumer devices and the gap is anticipated to widen in the near future. On the other hand, standard organizations such as 3GPP are standardizing network architectures to take advantage of newer cloud technologies such as SDN, NFV, edge computing etc. to provide capabilities for compute intensive applications. Network operators look to use the services of cloud service operators to provide the underlying infrastructure to deliver required services to end users. In turn, the content/service providers can use the services of network operators and cloud service operators for hardware and platform deployments, and just focus on providing the service functionality (application layer). For example, a VR stitching service can be provided by the service provider where in the content from the content source (e.g., captured using multiple VR cameras) is sent to a VR stitching service. The stitching service will generate the stitched video and deliver it to content sink. If the viewport of the user at the content sink changes (e.g., due to head movement), the content sink can send the updated viewport to the VR stitching service, and the stitching service will generate and send the updated stitched video to the content sink as shown in Figure 1.



Figure 1: VR Stitching Service

To provide the VR stitching service described in Figure 1 above to its users, the service provider can use the network operator services for communication between different entities, and the services of cloud service operator for infrastructure to run the VR stitching service.

To provide an enabler for compute intensive processing that cannot be realized on a consumer device (e.g., advanced media processing tasks), a framework can be developed for processing in the network (e.g., cloud). To achieve this objective, MPEG is working on a framework called Network-based Media Processing that will allow end user devices to offload certain kinds of processing to the network. Network-based Media Processing (NBMP) is a framework that allows service providers and end users to describe media processing operations that are to be performed by 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). For the VR stitching service described in Figure 1 above, NBMP framework can be used to setup VR stitching media processing service in the cloud. VR stitching can be provided as a network media processing service by chaining required media processing functions such as calibration, exposure correction etc.

# Objectives

In order to develop standardized and efficient solutions for network-based media processing (NBMP), MPEG is publishing a Call for Proposals to acquire relevant technologies to develop the NBMP standard with the following functionalities.

1. Interfaces for media processing functions in networks/cloud
2. Supplementary information for media processing
3. A format for standardization of chaining and composition of network based media processing functions
4. Media processing API

# Timeline

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| --- | --- |
| 2018/04/20 | Call for Proposals issued |
| 2018/06/20 | Registration deadline |
| 2018/07/11 | Deadline for submission of description of the proposals |
| 2018/07/16-20 | Evaluation of the proposals |
| 2019/10/11 | Final draft international standard anticipated |