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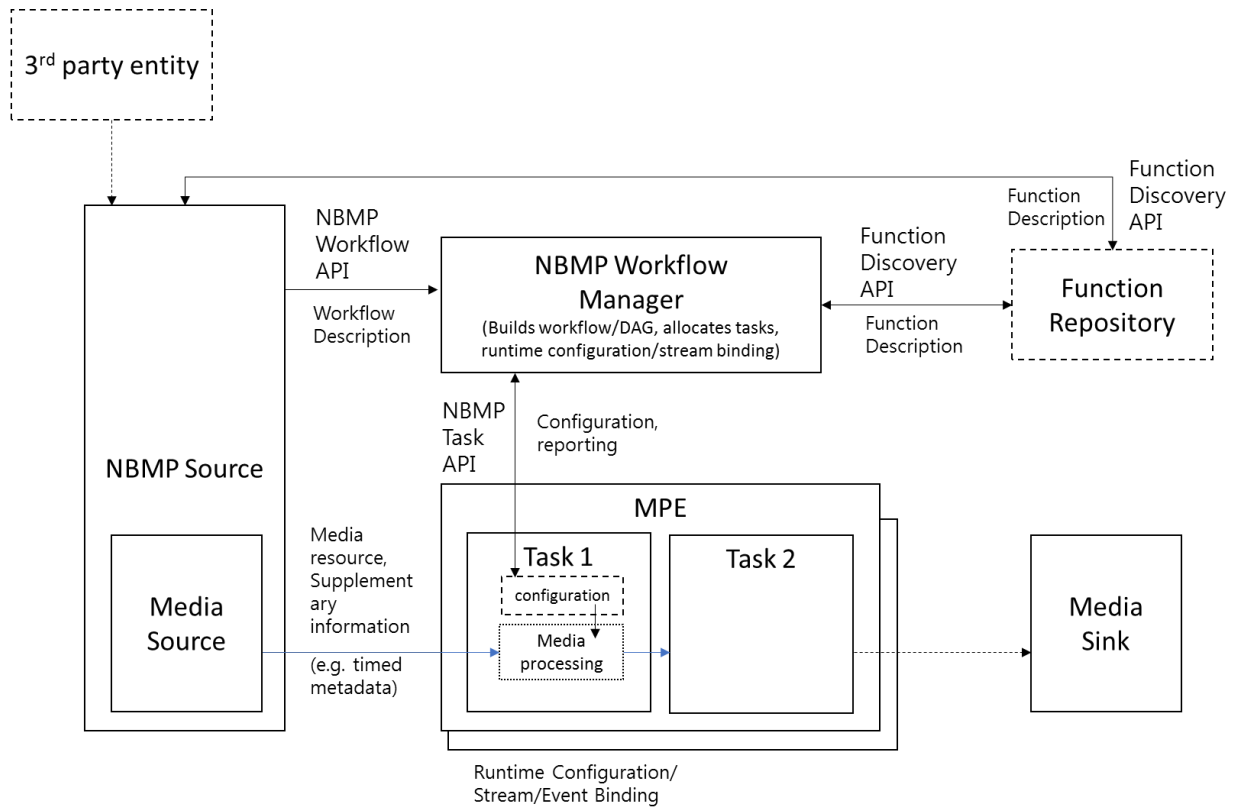
## **1 Introduction**

This contribution is a response to the mandate #3 in the NBMP ad hoc group established in the 123<sup>rd</sup> MPEG meeting:

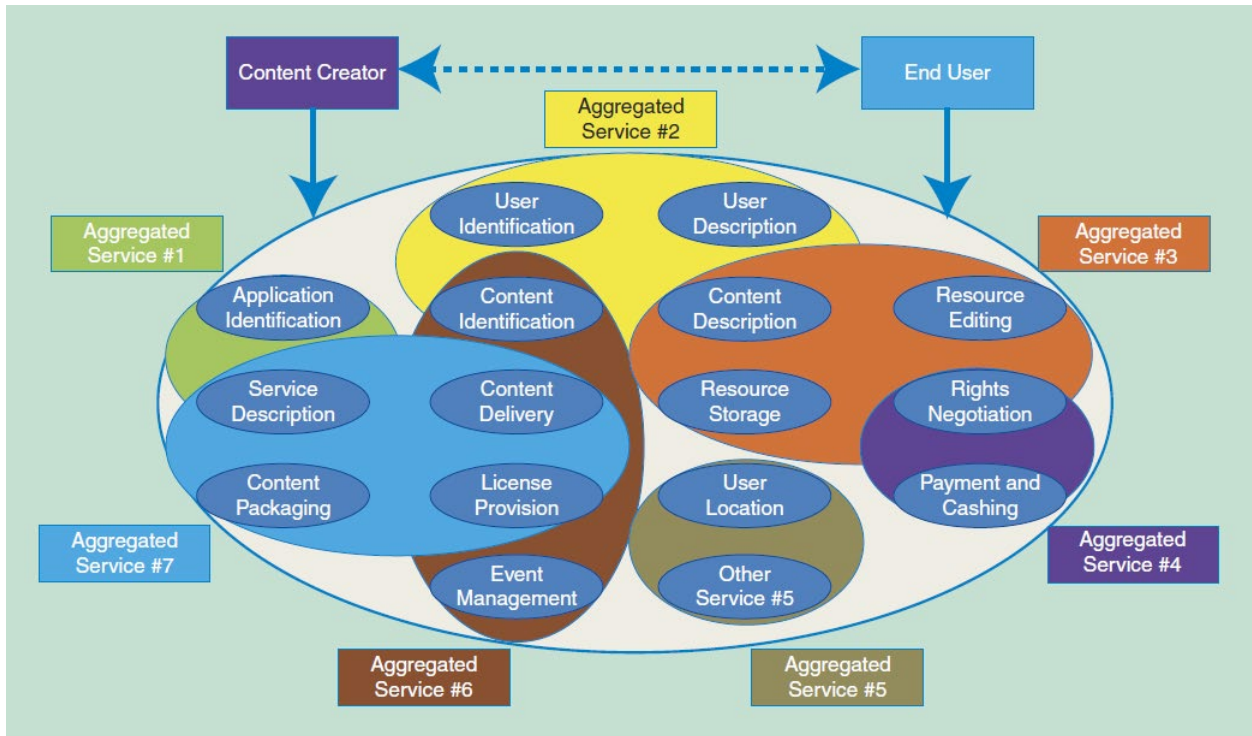
<b>Name</b>	<b>AHG on Network Based Media Processing (NBMP)</b>
<b>Mandates</b>	<ol style="list-style-type: none"><li>1. Study the Working Draft of NBMP, in particular the architecture, and solicit technical contributions for improvements on fulfilling NBMP requirements and other MPEG-I requirements relevant to NBMP.</li><li>2. Conduct Core Experiments as defined in N17874.</li><li>3. Study the relationship with existing MPEG standards (e.g., MORE on temporal synchronization) and solicit contributions</li><li>4. Collaborate with relevant SDOs, e.g., 3GPP SA4.</li></ol>

We consider the MPEG-M (MPEG Media Service Platform) technologies are very much relevant to NBMP (Network Based Media Processing), in terms of its architecture, platform, workflow, task, composite task, interface and protocol.

For instance, the following NBMP architecture is currently under consideration:



It is very much relevant to the multimedia service eco-system that MPEG-M envisioned to support:



**[TABLE 1] ESs CLASSIFIED BY OPERATIONS AND ENTITIES.**

	CONTENT	CONTRACT	DEVICE	EVENT	LICENSE	SERVICE	USER
AUTHENTICATE	X	X					
CHECK WITH		X					
CREATE	X	X			X		
DELIVER	X	X					
DESCRIBE	X		X			X	X
IDENTIFY	X	X	X				
NEGOTIATE		X			X		
PACKAGE	X						
PRESENT		X					
PROCESS	X				X		
REQUEST	X	X	X	X	X		
REVOKE		X			X		
SEARCH	X	X	X		X	X	X
STORE	X	X		X	X		
TRANSACT	X				X		
VERIFY		X	X		X		

## 2 Overview of MPEG-M

MPEG-M (ISO/IEC JTC1/SC29/WG11 Information Technology - Multimedia Service Platform Technologies (23006)) specifications consist of the following 5 parts:

1. Architecture (ISO/IEC 23006-1:2018 3<sup>rd</sup> Edition)

This TR provides an overview of MPEG-M

2. MPEG Extensible Middleware API (ISO/IEC 23006-2:2016 3<sup>rd</sup> Edition)

MXM specifies a set of Application Programming Interfaces (APIs) so that MXM Applications executing on an MXM Device can access the standard multimedia technologies contained in its Middleware as MXM Engines.

3. Reference Software and Conformance (ISO/IEC 23006-3:2016 3<sup>rd</sup> Edition)

Reference Software and Conformance for MPEG-M

4. Elementary Services (ISO/IEC 23006-4:2013 2<sup>nd</sup> Edition)

This part of MPEG-M specifies a set of Elementary Services and respective protocols enabling distributed applications to exchange information related to content items and parts thereof, including rights and protection information

5. Service aggregation (ISO/IEC 23006-5:2013 1<sup>st</sup> Edition)

This part of MPEG-M specifies the technology enabling the combination of Elementary Services to build Aggregated Services. The workflow definitions of Services are represented by the BPMN 2.0 XML format, allowing for formal descriptions of the workflows of Aggregated Services, and consequently enabling the implementation of automated tools for Service aggregation.

### 3 Relevance of MPEG-M in NBMP

This following table summarizes some notion and terminology correspondence between NBMP and MPEG-M:

NBMP	MPEG-M
NBMP System	MPEG-M System
Media Source Entity	Device/User
Media Processing Entity	Protocol Engine
Media Sink Entity	Device/User
Control Function	Orchestration
Processing Function	Service
Task	Elementary Service
NBMP workflow	Service Aggregation
NBMP Format	Service Request Message
NBMP Publish Format	Service Response Message
Media Resource	Media Resource
Supplementary Information	Metadata
Workflow Description	Aggregated Service

### 4 References

- [1] N17697, “Ad hoc groups established at MPEG 123”, July 2018, Ljubljana, SI.
- [2] N17872, “WD of ISO/IEC 23090-8 Network-based Media Processing”, July 2018, Ljubljana, SI.
- [3] N17874, “Description of Core Experiments on Network-based Media Processing”, July 2018, Ljubljana, SI.
- [4] “MPEG-M: Multimedia Service Platform Technologies”.  
<https://mpeg.chiariglione.org/standards/mpeg-m>
- [5] N13952. “White Paper on MPEG-M: A Digital Media Ecosystem for Interoperable Applications”. April 2013, Incheon, KR.
- [6] ISO/IEC 23006 MPEG-M: Multimedia Service Platform Technologies (all parts). Online. Available: [ISO/IEC 23006](https://www.iso.org/standard/54441.html)
- [7] Panos Kudumakis, Xin Wang, Sergio Matone and Mark Sandler, ‘[MPEG-M: Multimedia Service Platform Technologies](#)’, IEEE Signal Processing Magazine, pp. 159-163, Vol. 28, Issue 6, Nov. 2011.

- [8] Panos Kudumakis, Mark Sandler, Angelos-Christos G. Anadiotis, Iakovos S. Venieris, Angelo Difino, Xin Wang, Giuseppe Tropea, Michael Grafl, Víctor Rodríguez-Doncel, Silvia Llorente, Jaime Delgado, '[MPEG-M: A Digital Media Ecosystem for Interoperable Applications](#)', Ref. as ISO/IEC JTC1/SC29/WG11/N13952, Incheon, Rep. of Korea, Apr. 2013.
- [9] Panos Kudumakis, Mark Sandler, Angelos-Christos G. Anadiotis, Iakovos S. Venieris, Angelo Difino, Xin Wang, Giuseppe Tropea, Michael Grafl, Víctor Rodríguez-Doncel, Silvia Llorente, Jaime Delgado, '[MPEG-M: A Digital Media Ecosystem for Interoperable Applications](#)', Signal Processing: Image Communication, pp. 150-166, Vol. 29, Issue 1, Elsevier Press, Jan. 2014.