

MPEG-I VIDEO DECODING INTERFACES FOR IMMERSIVE MEDIA

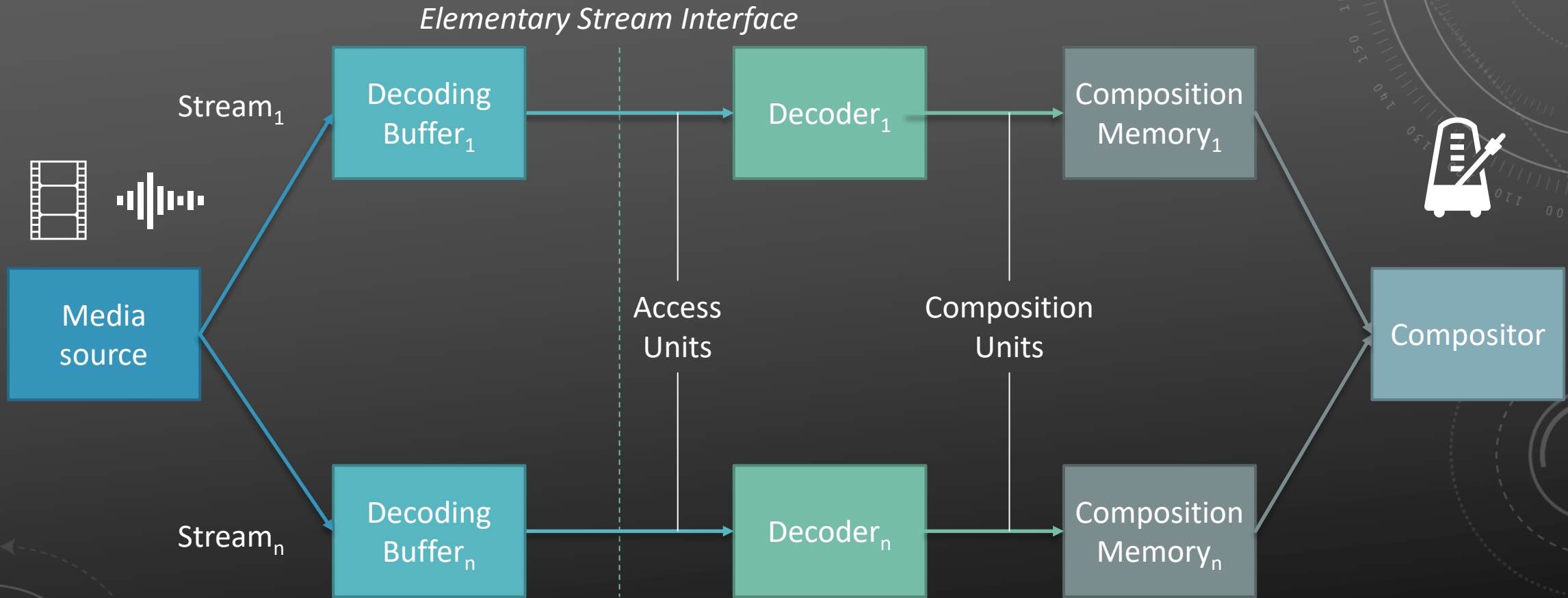
MPEG-KHRONOS WORKSHOP: STREAMED MEDIA
IN IMMERSIVE SCENE DESCRIPTIONS

29-30/09/21
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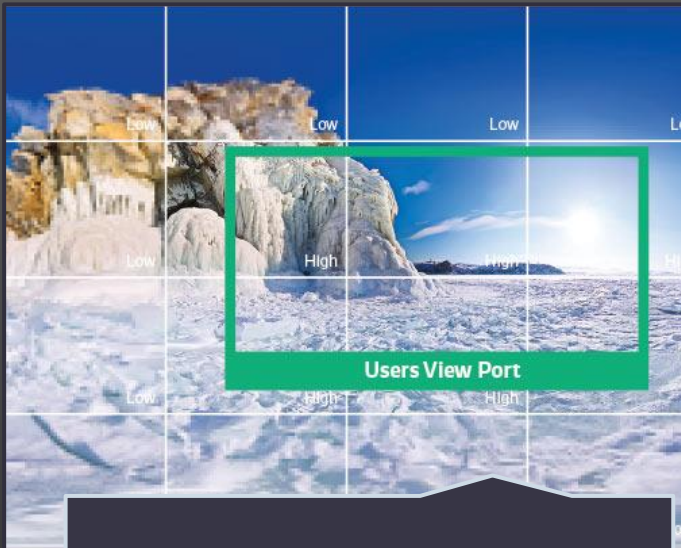
OUTLINE

1. The MPEG-4 System decoder model
2. Challenges for video decoding in XR
3. What VDI brings to XR applications
4. Finishing OpenMAX and Vulkan VDI extensions
5. Conclusion

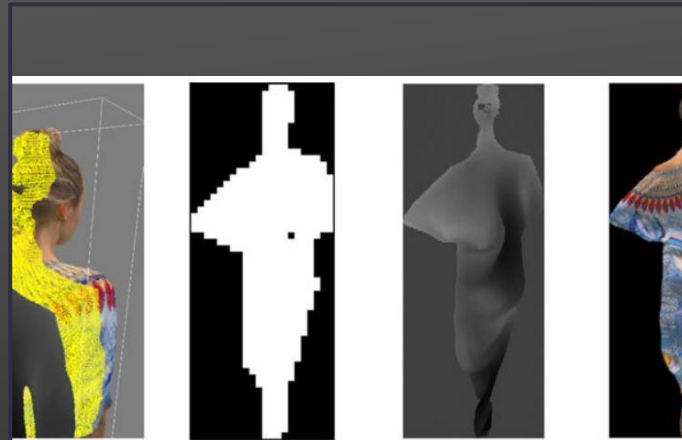
1. THE MPEG-4 SYSTEM DECODER MODEL (1ST ED. 1999)



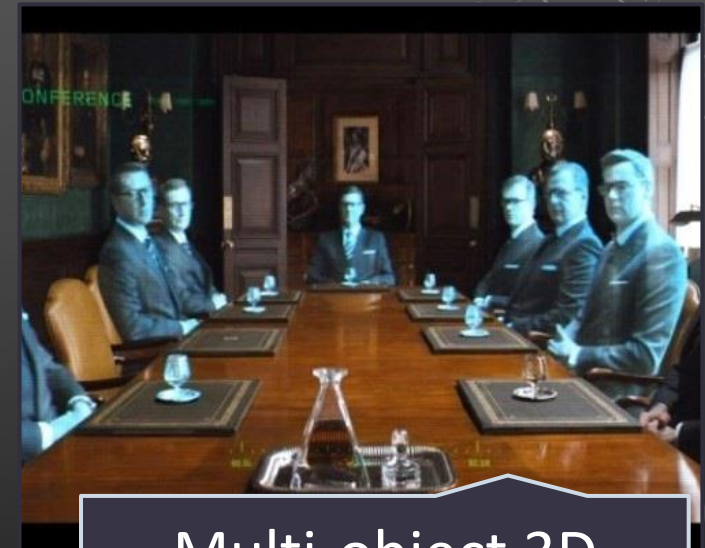
2. CHALLENGES FOR VIDEO DECODING IN XR



VR tiled streaming

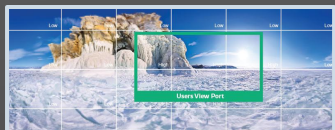


Video point cloud object



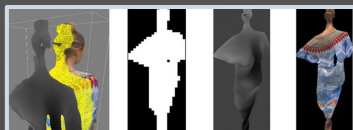
Multi-object 3D scenes

2. CHALLENGES FOR VIDEO DECODING IN XR



VR tiled streaming

- Individual tile retrieval
- 1 video decoder for all the tiles



Video point cloud object

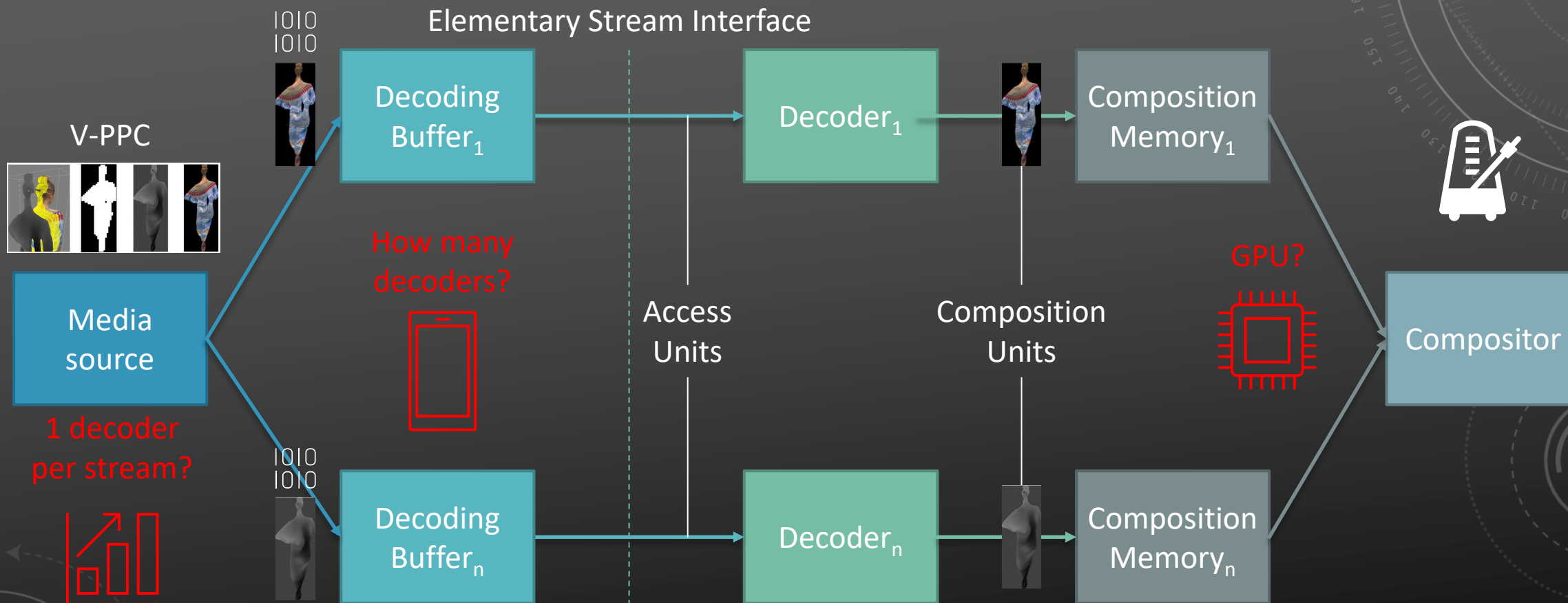
- Several video components per object
- Decoded components fused together before display



Multi-object 3D scenes

- Individual object retrieval
- Less than 1 decoder per object preferred

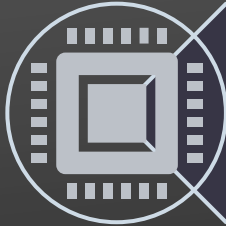
2. CHALLENGES FOR VIDEO DECODING IN XR



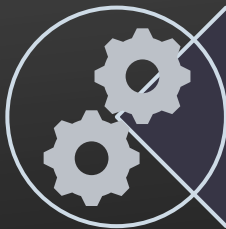
2. CHALLENGES FOR VIDEO DECODING IN XR



Lack of interoperability point for a group of video bitstreams

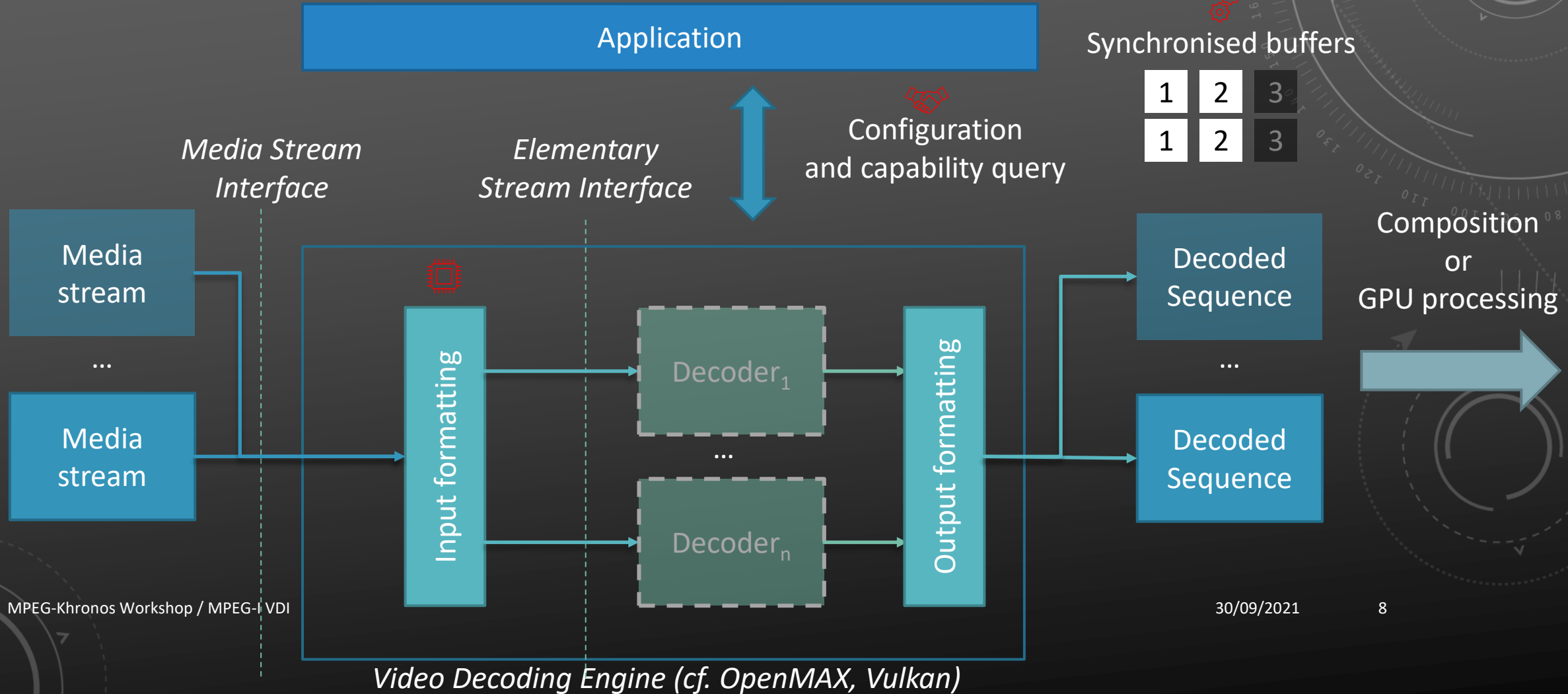


Decoupling the numbers of video bitstreams and decoder instances

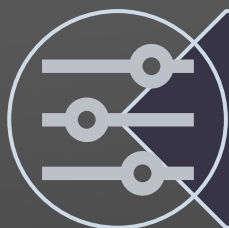


Aligning video frames for post decoding process (e.g. GPU processing)

3. WHAT VDI BRINGS TO XR APPLICATIONS



3. WHAT VDI BRINGS TO XR APPLICATIONS



Interoperability point and query capability for simultaneous decoding instances



Reduce number of decoders needed via bitstream merging functions (HEVC, VVC and EVC)



Video decoding platform can schedule multiple decoder instances in a collaborative way

4. FINISHING OPENMAX AND VULKAN VDI EXT.



- Reached some maturity
 - New functions for the C API
 - queryCurrentAggregateCapabilities()
 - getInstance()
 - setConfig()
 - getParameter() and setParameter()
 - Reference software started based on GStreamer OMX
- Early work
 - 1 Video Decoder = VK Video Session
 - Current draft adds a group ID to VK Video Session
 - Choice between extending from one point vs extending many existing objects
 - Current draft creates new standalone objects even with some overlaps with other parameters
 - No reference software started yet

CONCLUSION

Why

- Traditional MPEG decoder model challenged by XR applications.

What

- Burden on application developers to match high XR application's needs with current video decoding APIs capabilities.

How

- MPEG-I VDI to develop standardised functions for bitstream manipulation (HEVC, VVC, EVC) and extensions of video decoding platform APIs (OpenMax, Vulkan Video).

When

- MPEG-I VDI's publication due in Q4' 2022 together with reference libraries and documented extensions for Vulkan and OpenMAX.