S4WS-22014

3GPP SA4
Release 18 topics

VIDEO SWG moderation

Release 18 topics identified to be moderated by the VIDEO SWG

- Extended Reality
- Video Codecs
- Artificial Intelligence Machine Learning
- Tactile communications

eXtended Reality (XR)

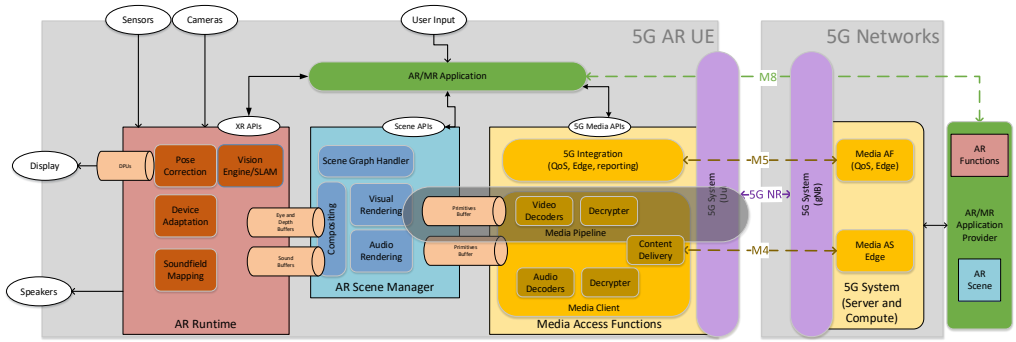
Extended reality

- Proposed topics
  - Stage 2:
    - 5G Augmented Reality Experiences Architecture (5G_AREA)
  - Stage 3:
    - Media Capabilities for Augmented Reality Glasses (MeCAR)
    - Split rendering for XR (Split_XR)
    - XR QoS, QoE Quality metrics (XR_Metrics)

5G Augmented Reality Experiences Architecture (5G_AREA)

- Objective to define a generic AR/MR media architecture for
  - Stand-alone AR devices (STAR)
  - Edge-assisted AR devices (EDGAR)

- Specify the call flows and procedures between the logical entities based on the FS_5GSTAR study.
- Support various collaboration scenarios including operator and third-party (OTT) services.
- Provide extensions to the appropriate 3GPP services (e.g. 5GMS, RTC…)



- **Draft WID**
  - https://www.3gpp.org/ftp/TSG_SA/WG4_CODEC/TSGS4_116-e/Inbox/Drafts/VIDEO/Release-18/S4-211676r1.docx
  - Timeline: March 2022 to December 2023
  - Supported by: Samsung, Ericsson

Media Capabilities for AR Glasses (MeCAR)

- AR devices have highly constrained operational requirements due to their specific design (e.g. very low power consumption, restricted System-on-Chip (SoC) area size, low latency options…)
- This class of devices requires, service independent media capabilities to be defined for
  - basic media applications on such AR glasses with simple rendering functionalities, also applicable on other device types
  - split-rendering, for which a pre-rendering of the views is carried out in the cloud/edge
  - sensor and device data streaming to the network in order to support network-based processing of device sensor information
- It is proposed to start with the EDGAR devices (while being the most constrained devices) for defining:
  - media types and formats produced and consumed by the AR device, including basic scene descriptions, audio, graphics and video as well as sensor data.
  - decoding capabilities, including support for multiple parallel decoders as well as encoding capabilities
  - encapsulation into RTP and ISOBMFF as well as CMAF

- KPIs and QoE Metrics for AR media as well as content security aspects are also in scope
- Typical traffic characteristics for AR media are to be documented into the TyTrac TR.

Draft WID

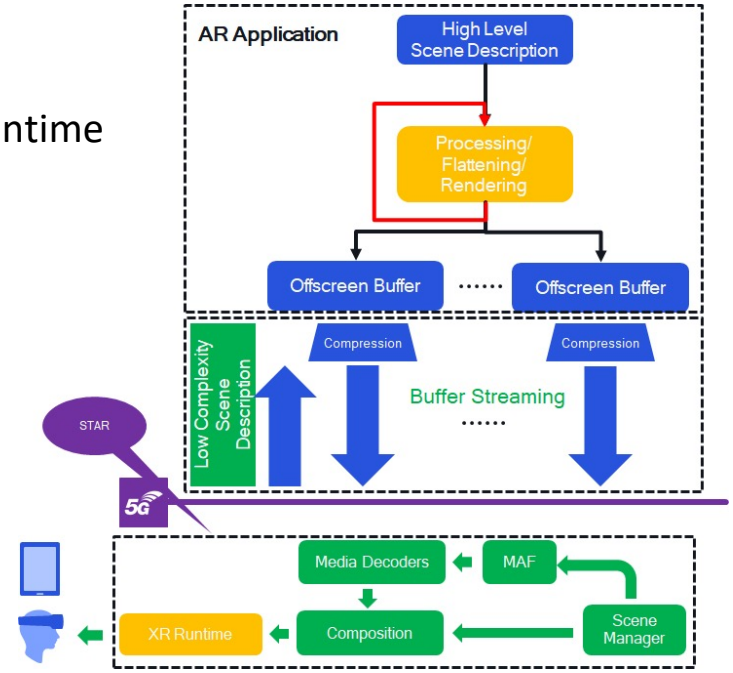
- Available in: **S4-211568** (agreed at SA4#116-e)
- Timeline: March 2022 to June 2023
- Supported by: Xiaomi, Qualcomm, Facebook, MediaTek, Tencent

Split rendering for XR (Split_XR)

- Rendering is quite complex, especially for advanced applications such as gaming and AR
  - 5G offers new capabilities such as low latency and edge processing
  - Enable UE to share rendering with the edge for superior user experience
- Objectives
  - Re-use of 5G-RTC components for
    - Media formats and codecs for split rendering
    - Control and transport protocols for split rendering
    - Define pose and metadata formats and integration with XR runtime systems
  - Re-use EDGE, STAR, and XRTraffic work
    - Integrate split rendering in the 5GMS architecture
    - Define split rendering context and context relocation
    - KPIs and QoE Metrics
    - QoS Requirements and 5G System mapping

Draft WID

- None proposed yet
- Timeline: undefined, 5G_RTC dependent?
- Supported by: no one officially



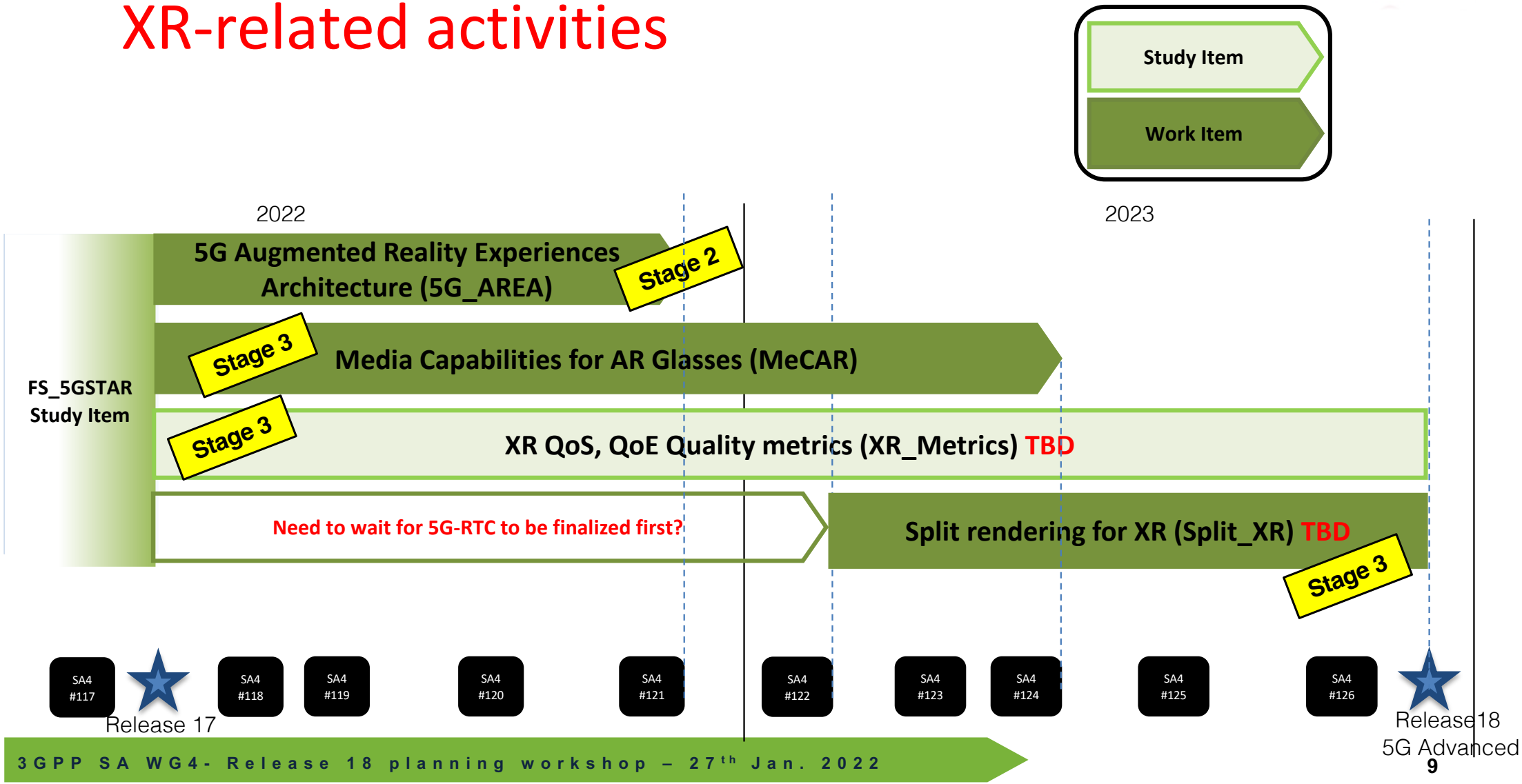
XR QoS, QoE Quality metrics (XR_Metrics)

- Topic proposed during the first workshop without any update since then.
  - Needs a clear definition on the scope
  - What problems are to be solved?
  - Would a study be more suitable to start from?
  - Isn't it already covered by MeCAR?

Draft WID

- None proposed yet
- Timeline: undefined
- Supported by: no one officially

XR-related activities



Video Codec for 5G

Video Codec for 5G

- The Release 17 study on Video codec Characteristics (FS_5GVideo) provides a framework for video codecs comparison with AVC and HEVC currently specified in 3GPP specifications.

- The TR 26.955 documents the complete characterization of new videos codecs and technical benefits are expected to be observed for new video codecs compared to existing codecs.

- Draft objectives could include
  - Provide decoding capabilities, interoperability and signaling extensions for DASH/CMAF and RTP-based Video delivery
  - Add new codec to TV Media Profiles
  - Provide recommendations and requirements for support of new video codec in different 3GPP-defined services
  - Provide complete characterization results for new video codec based on TR 26.955 for all relevant scenarios
  - Update TR 26.925 with typical traffic characteristics adding new information based on new video codec performance

- Pre-condition
  - Complete the FS_5GVideo study first that will eventually motivate the addition of new codec capabilities on 3GPP services.

- No discussion on the reflector but:
  - S4WS-22013 5G Video - Status

- **Draft WID**
  - None proposed yet
  - Timeline: start after the completion of FS_5GVideo
  - Supported by: no one officially

Artificial Intelligence
Machine learning

Media aspects of AI/ML

- AI/ML has been introduced and generalized in media related applications, ranging from legacy applications such as image classification, speech/face recognition, to more recent ones such as video quality enhancement
- 3GPP SA1 has conducted a study on traffic characteristics and performance requirements for AI/ML model transfer in 5GS, published in TR 22.874. The addressed scenarios are split into 3 major categories:
  - Split AI/ML operations between the end device and the edge/cloud
  - AI/ML model distribution and sharing
  - Distributed/federated learning
- Draft SID progressed in SA4#116-e: S4-211567 as the basis for further refinement
  - Objective to investigate Stage 3 solutions for SA1 use cases + AR spatial computing scenario from TR 26.998
  - Identify architecture impacts
  - Document associated formats and protocols
  - Investigate traffic characteristics, KPIs and performance metrics

Draft WID: S4-211567

- Latest draft: https://www.3gpp.org/ftp/tsg_sa/WG4_CODEC/TSGS4_117-e/Inbox/drafts/Video/S4-211567_Samsung_Qualcomm.doc
- Timeline: March 2022 until June 2023 (to leave space for a Rel18 WID)
- Support to be confirmed by: Tencent, Samsung, Orange, Fraunhofer HHI, Qualcomm

Tactile/Haptics communications

Tactile communications

- Topic proposed during the first workshop
  - Key open questions
    - Needs a clear definition on the scope
    - What problems are to be solved?
    - Would a study be more suitable to start from?
    - How to connect with SA1 activities?
    - Any link with MPEG activity on Haptics
  - No discussion on the reflector but
    - S4WS-22007 Brief Summary on TACMM in SA1

Draft WID

- None proposed yet
- Timeline: undefined
- Supported by:

Conclusions/Observations

Extended Reality

- 2 well progressed topics:
  - **5G_AREA**:
    - Timeline goes beyond Release18 stage2
    - Is a new specification really needed?
    - Is there any dependency with iRTC?
  - **MeCAR**:
    - Is working on Stage3 before Stage2 ok?
- 2 less certain topics:
  - **Split_XR**:
    - May be fully covered by Split rendering Media Service Enabler WID.
  - **XR_Metrics**:
    - Seems to be already in MeCAR.

Video codec for 5G

- Need to wait for FS_5GVideo to conclude on such a need.
- Need to consider what to do with already specified codecs (in other words: up to how many codecs can be specified for a given 3GPP service scenario).

AI/ML

- Progress in good direction.
- Need to agree on the exact scope
  - SA1 media-related scenarios only
  - Glass-based AR/MR services for which the spatial computing functions "are expected to mostly rely on AI/ML-assisted functions"
  - Door closed for anything else?

Tactile communications

- Seems premature to start anything in the short-term.
  - Maybe after SA2-related work completion? In Release 19?

Thank you

From the VIDEO SWG

Gilles Teniou (Tencent) – SA4 Vice Chair – Video SWG chair