**3GPP TSG-SA WG4 Meeting #131S4-250122\_r01**

**Geneva, Switzerland, 17 - 21 February 2025**

**Source: Samsung Electronics Co., Ltd.**

**Title: [FS\_AVATAR] pCR on reference architecture and procedures**

**Agenda item: 9.7**

**Document for: Agreement**

**1. Introduction**

A potential call flow on scene management in calls with avatars exists in clause 5.1.1 of the PD v0.6.0. This contribution provides several updates on the existing procedures for clarification, and for the updated of the same to be included into the latest version of TR 26.813.

**2. Discussion**

A reference architecture for scene management in calls with avatars exists in the PD, but not in the TR.

Updates include:

* Introducing SA2 defined avatar IDs for identification of avatars, including an avatar list
* Alignment changes on use of terms such as User #1 Device, 3D scene graph, node(s) and shared scene description
* Separating call setup and scene management/update steps for clarification

**3. Proposal**

It is proposed to agree the following changes to the latest version of 3GPP TR 26.813.

Change marks are made against the pre-existing text in the PD.

\* \* \* First Change \* \* \* \* (change marks on top of text in PD)

### x.x.x Scene Management in Calls with Avatars

The following call flow depicts the process for setting up and managing a common 3D scene for an AR call with Avatars from 2 or more participants.



**Figure x.x.x-1: Call flow for scene management in calls with avatars**

The steps are described as follows:

1. Prerequisite: In order to use Avatars in communication and shared experience sessions, the user needs to generate and upload their base avatar model:
	1. The user may use local or cloud-based avatar generation tools and services to create a personalized avatar base model
	2. The user uploads its base avatar model to a central accessible storage server that will offer download of that user’s base avatar model to authorized users.

NOTE: secure handling of based avatar models is expected, but not included in this call flow.
NOTE: the generation is not necessary, if the UE already has a pre-generated base avatar model.

Avatar call setup:

1. User #1 Device establishes or joins a communication/shared space session with User #2 Device. The scene description capability of both users may be negotiated during this step. A shared scene description is created by the Scene Manager.
2. User #1’s avatar list is requested (by User #1 Device or the Scene Manager) from the Avatar Storage and sent to User #1 via the Scene Manager.
3. User #1 selects an avatar to be used for the avatar call from the avatar list. Metadata related to User #1’s avatars (received in step 4) may also be used in the selection process.
4. User #1 offers the selected avatar to the Scene Manager as a scene update with the avatar ID corresponding to the selected avatar. This is done by offering to the Scene Manager a scene update for inserting a node into the shared scene description. The node contains a description of how user #1’s avatar can be reconstructed and animated by other participants in the session.
5. The Scene Manager adds a new node (or set of nodes) to the shared scene description that represents User #1’s selected avatar and related assets. It locally assigns the ownership of this node(s) to User #1, thus only allowing User #1 to update the status of these nodes. A camera node is also inserted and assigned to User #1. This camera is the one used by User #1 to render the 3D scene of the AR call.
6. The participants in the session receive the shared scene description that contains the users’ avatar descriptions.
7. Based on the information in the shared scene description, User #2 identifies the required base avatar model of User #1. If a previously downloaded base avatar model is available, it is reused, otherwise User #2 downloads User #1’s base avatar model in accordance with the granted level of access (i.e. which assets and at which level of detail) during that session. The access may for instance be limited to a predetermined level of detail or to a subset of the digital assets that are stored as part of the base avatar model.
8. User #2 informs User #1 on the available animation functionalities for the base avatar model.

Based on this information, User#1 generates animation streams and sends those to User #2. Note that the animation streams may be relayed by a central entity, such as an IMS MF.

1. User #2 uses the downloaded base avatar model and the animation streams from User #1 to reconstruct and animate the 3D avatar of User #1. The avatar is then rendered as part of the scene.

Scene management and update:

1. During the session User #1 or User #2 may contribute to an update of the shared scene description in the Scene Manager by offering an individual scene change to the Scene Manager, this may be in the form of a patched partial scene (e.g. JSON patch).
2. The Scene Manager receives the individual scene change and creates an updated version of the shared scene description, if acceptable.
3. The Scene Manager may periodically check the matching of the version of its latest shared scene description with that of the version(s) in the User Devices.
4. The Scene Manager delivers the latest version of the shared scene description to corresponding User Devices according to the outcome decision of step 14. Alternatively instead of the whole shared scene description, patches (individual scene change updates) may be delivered to Users to create the latest version of the shared scene description on the User Device.

[Exchanging information and scene updates to add and track the user’s avatar can be performed according to the protocol specified in TS 26.264 [33] section 6.4. This protocol may need to be updated to address all needs of a shared space experience with interactivity.]

\* \* \* End of Changes \* \* \* \*