**3GPP TSG SA WG 1 Meeting #100 S1-223zzz**

**Toulouse, France, 14 - 18 November 2022** *(revision of S1-223zzz)*

**Source: Samsung**

**pCR Title: Pseudo-CR on Terminology for Mobile Metaverse Services**

**Draft Spec: 3GPP TR 22.856-020**

**Agenda item: 7.3**

**Document for: Approval**

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*Abstract: <provide a short description of the content>*

**1. Introduction**

In SA1 98e and 99e, several contributions contained terminology that resulted in prolonged discussion. In some way the target of the study remains unclear as long as the fundamental terminology has not been worked through.

**2. Reason for Change**

The following is a table of terms that have resulted in discussion that has not yet been resolved.

The terms are collected from the TR and a few contributions that have not been added to the TR.

The goal of the green categories is to group related terms to see if they can be synthesized into a single term, or at least consolidated in some way.

The proposed items that are highlighted in yellow appear to be the most important terms to define immediately, so that the study can make progress.

**The table below is for information only - it is a 'worksheet' to identify what terms to define and how to apply these to usage in the spec.**

|  |  |  |  |
| --- | --- | --- | --- |
| Term | Source | Possible meaning? / Notes | Proposal |
| local |  |
| local mobile metaverse service | title 22.856 |  | define 'local' |
| local content and services | WID/Scope 22.856 | application services (i.e. provided by Application Servers) associated with a specific location | ibid |
| local (physical and digital) information | WID/Scope 22.856 |  | ibid |
| local spatial/environmental information | WID/Scope 22.856 |  | ibid |
| local acquired spatial, environmental and user/UE information | WID/Scope 22.856 |  | ibid |
| spatially definedaccess | 22.856/5.1 |  | define 'spatially defined' **in 5.1** |
| spatially defined access points | 22.856/5.1 |  | ibid |
| in proximity or non-proximity | 22.865/5.6 | [what is 'local'] | use 'local' |
| information |  |
| user/UE(s) information | WID/Scope 22.856 |  | define **user information**  |
| spatial, environmental and user / UE information | WID/Scope 22.856 |  | define **spatial and environmental information** |
| digital representation, digital 'things' |  |
| **digital representations** of entities | WID/Scope 22.856 |  | define |
| digital twin | 22.856/5.2 | Digital Twin means a **digital representation** of the physical object or called **virtual object** in metaverse | define in 5.2 |
| virtual object | 22.856/5.2 and others |  | define |
| avatar | 22.865/5.6 and others |  | define |
| **digital representation:** representation of an avatar (in 2D or in XR), the corresponding identities.  | Orange / virtual universe | refers to the digital data associated with a metaverse user, including visual | as above |
| avatar | 22.865/5.9 | rendering ... of remote users | as above |
| digital assets | Orange / Digital Asset Container | (cryptocurrencies, tokens such as NFT, purchased items, IDs...) | define in proposed pCR |
| digital representations | 22.865/Annex A |  | as above |
| [user] digital representation | Orange / Digital Asset Container | avatar (one or more), e-money, ID, purchased items… | as above |
| identity / identification |  |
| **Identification** of users and other digital representations of entities | WID/Scope 22.856 |  | define 'user identification'  |
| Identification of these physical and virtual objects | 22.856/5.2 | Recognize them as a particular object? or to assign an ID that corresponds to the object? | define 'physical object identification''virtual object identification' |
| the metaverse *as a category of services*  [an *adjective*] |  |
| mobile metaverse | 22.856/5.2 |  | define |
| metaverse | Orange / Digital Asset Container | a wide variety of virtual realities, from workplace tools to games and community platforms. It generally refers to shared and immersive lifelike digital environments (i.e. virtual universes) that people can move between using XR devices. | use mobile metaverse |
| virtual universe, universe | Orange / Digital Asset Container |  | use mobile metaverse |
| **metaverse:**  | Orange / virtual universe | the metaverse is the union of all interconnected, interoperable, immersive and persistent virtual universes. | use mobile metaverse |
| universe | Orange / virtual universe | immersive XR media service? | use mobile metaverse |
| Metaverse | 22.865/5.10 | a typical teleoperation class of application, which involves a master and a slave device. This class of application will typically exchange haptic signals (forces, torques, position, velocity, vibration etc.,), video and audio signals. | use mobile metaverse |
| metaverse | 22.865/5.8 | a platform which supports different applications to complete a task such as game, online-working, online-education, etc. | use mobile metaverse |
| digital world | 22.865/5.6 | called mobile metaverse | use mobile metaverse |
| [the venue of the] metaverse | 22.865/5.6 |  | use mobile metaverse |
| virtual universe, metaverse | Orange / virtual universe | 'lifelike' virtual interaction on-line | use mobile metaverse |
| immersive interactive mobile services | 22.865/5.10 |  | use mobile metaverse |
| specific modes of metaverse service - useful terms perhaps? Metaverse as a *noun* - e.g. "a metaverse" ? |  |
| distributed virtual environment (DVE) | 22.856/5.3 | allows multiple users from different geographical locations (some of them are present at the same location) to interact over a network | define in 5.3 |
| immersive experience | 22.865/5.7 |  | define |
| **immersive XR media services**:  | Orange / virtual universe | virtual universe, own by a company or an entity (immersive social network, events, virtual meeting, money and commerce, etc.). | define **mobile metaverse services** and separately **immersive** |
| localized service activation | 22.856/5.1 |  | define 'service activation' in 5.1 |
| specific 'metaverse service' |  |
| situation awareness  | 22.856/5.2 |  | refer to this service in the new 'overview' section |
| traffic simulation | 22.856/5.2 |  | ibid |
| smart transport metaverse | 22.856/5.2 |  | ibid |
| traffic awareness | 22.856/5.2 |  | ibid |
| critical health care services | 22.865/5.10 | <in P.R.5.10.6-1> | ibid |
| meta-healthmetaverse health care | 22.865/5.10 |  | ibid |
| metaverse consultation | 22.865/5.10 | 'immersive' remote consultation | ibid |
| the application server providing 'metaverse services' - especially XR media |  |
| mobile metaverse server | 22.856/5.2 |  | identify one definition & use it throughout |
| metaverse application | 22.865/5.8 |  | ibid |
| application services | 22.856/5.1 | Application services are the services provided by application servers (ASs). | ibid |
| things associated with metaverse services |  |
| **service information** | 22.856/5.4 | **this information is out of scope of standardization but could contain, e.g. a URL, media data, media access information, etc. This information is used by an application to access a service.** | **define** |
| service metadata | 22.856/5.1 |  | define in 5.1 |
| service activation | 22.856/5.1 |  | define in 5.1 |
| spatially definedaccess | 22.856/5.1 |  | define in 5.1 |
| spatially defined access points | 22.856/5.1 |  | define in 5.1 |
| interactive service data | 22.865/5.6 |  | define in 5.6 |
| physical things to capture or represent based on sensing or measurement |  |
| gestures | 22.865/5.6 |  | define |
| pose | 22.856/5.5, 5.6 |  | define |
| sensing and rendering devices | 22.865/5.9 |  | define in 5.9 |
| predicted network conditions | 22.865/5.9 |  | define in 5.9 |
| predictive model associated to a remote user | 22.865/5.9 |  | define in 5.9 |
| property and status information (of physical objects) | 22.856/5.2 | interesting because both virtual and physical 'things' are modeled. How are the property and status of these objects the same & different? | define in 5.2 |
| security related  |  |
| confidentiality of the origin and the destination | Orange / virtual universe | anonymity? or confidentiality of the communication that is transported over the network? | define in pCR |
| secure avatar | 22.865/5.10 |  | define in 5.10 |
| proposed organizing principles or functions for metaverse services  |  |
| synchronized predictive <X> | 22.865/5.9 |  | define in 5.9 |
| **localization** [information] | 22.856/5.4 | **A known location in 3 dimensional space, including an orientation, e.g. defined as pitch, yaw and roll.** | defined already |
| **spatial anchor** | 22.856/5.4 | **an association between a location in space (three dimensions) and service information that can be used to identify and access services, e.g. information to access AR media content.** | defined already |
| **Spatial Map**: | 22.865/5.5 | **A collection of information that corresponds to space, including information gathered from sensors concerning characteristics of the forms in that space, especially apperance information.** | defined already |
| **Localization** | 22.865/5.5 | **A known location in 3 dimensional space, including an orientation, e.g. defined as pitch, yaw and roll.** | defined already |
| **Spatial Mapping Service** | 22.865/5.5 | **A service offered by a mobile network operator that gathers sensor data in order to create and maintain a Spatial Map that can be used to offer customers Spatial Localization Service.** | defined already |
| **Spatial Localization Service** | 22.865/5.5 | **A service offered by a mobile network operator that can provide customers with Localization.** | defined already |
| digital asset management services | Orange / Digital Asset Container | information certified by the operator, has security properties (cannot be spoofed, access control with a policy determined by the user, etc.) | define in pCR |
| low power consumption | 22.865/5.7 |  | define in 5.7 |
| virtual container | Orange / Digital Asset Container |  | define in pCR |
| local metaverse edge computing server (MECS) | 22.865/5.8 | how is this different from any edge computing server? | defined in 5.3 |
| local metaverse edge computing servers | 22.865/5.9 | as above | combine with above |
| data |  |
| [participant] context information | 22.856/5.3 | e.g. location information | define |
| semantic compatibility | Orange / virtual universe |  | define in pCR |
| user asset | Orange / virtual universe |  | define in pCR |
| Structured data | 22.856/5.2 | Structured data normally means data which has been processed and thus formatted in a certain way, can be easily stored in database and when transmitted via 5G wireless network, normally less transmission resource (e.g. lower data rate) is needed. | defined in 5.2 |
| Unstructured data | 22.856/5.2 | Unstructured data are not formatted in a certain and pre-defined way and is not easy to store in database and when transmitting over 5G network, more transmission resource would be needed. | defined in 5.2 |
| semantic compatibility | Orange / virtual universe |  | define in pCR |
| adaptation of digital representation / user asset information format | Orange / virtual universe | (see step 5 of 5.x.3) | define in pCR |
| terms I did not understand |  |
| metaverse related data | Orange / Digital Asset Container |  | clarify. define in pCR? |
| NFT characters | 22.865/5.6 |  | clarify. define in 5.6? |
| using metaverse | 22.865/5.10 | using remote interactive services? | clarify. define in 5.10? |
| Metaverse technologies | Orange / virtual universe | immersive XR media service?avatar? | clarify. define in pCR? |
| immersive [live show] experience | 22.865/5.6 | [note immersive is meant both for the users who are controlling players and the users who are spectators] | clarify. define in 5.6? |
| metaverse activity | 22.865/5.8 | such as a joint game or teleconference | clarify. define in 5.8? |

Local:

- non-digital phenomena that can be perceived through normal senses, e.g. hearing, sight, smell, etc.

- digital representations do not eliminate perception of non-digital phenomena.
 [if digital representations replace perception of non-digital phenomena, then there is no 'local' experience]

- proximate nature of users, especially that they can either preceive each other, or all perceive the same local sensory phenomena

**3. Conclusions**

1 - provide the terms identified above as initial input to SA1 100.

2 - begin to align the use of the terminology in the TR as much as possible before the meeting.

3 - for the use of 'user identifier' use *user identity* as defined in 22.101.

4 - for the definition of avatar, consider the use of external definition: [https://www.iso.org/obp/ui/#iso:std:iso-iec:27032:ed-1:v1:en](https://www.iso.org/obp/ui/%22%20%5Cl%20%22iso%3Astd%3Aiso-iec%3A27032%3Aed-1%3Av1%3Aen%22%20%5Co%20%22)

5 - it is proposed that definitions for 'digital twin' and specific identifiers described in 5.2 will be further added there, not to the terms clause

**4. Proposal**

It is proposed to agree the following changes to 3GPP TR 22.856-020.

First Change

## 3.1 Terms

For the purposes of the present document, the terms given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

**Spatial Map**: A collection of information that corresponds to space, including information gathered from sensors concerning characteristics of the forms in that space, especially apperance information.

**Localization**: A known location in 3 dimensional space, including an orientation, e.g. defined as pitch, yaw and roll.

**Spatial Mapping Service:** A service offered by a mobile network operator that gathers sensor data in order to create and maintain a Spatial Map that can be used to offer customers Spatial Localization Service.

**Spatial Localization Service:** A service offered by a mobile network operator that can provide customers with Localization.

**spatial anchor**: an association between a location in space (three dimensions) and service information that can be used to identify and access services, e.g. information to access AR media content.

**Service information**: this information is out of scope of standardization but could contain, e.g. a URL, media data, media access information, etc. This information is used by an application to access a service.

**local service experience:** user interaction and information provided by a service to a user that is relevant to the physical location in which the user accesses the service.

Editor's Note: This can be used in place of the qualifier 'local'. This is used in the scope, 5.1, 5.3 and in 5.10.

**remote service experience:** user interaction and information provided by a service to a user that has little or no relation to the physical location in which the user accesses the service. RRather the service provides interaction and information concerning either a distant or a non-existent physical location.

Editor's Note: This can be used to qualify services that are not local, e.g. for VR-based services. This term is used in in the scope, 5.3, 5.9 (for "remote users"), 5.10 (for "remote surgery," "remote robots"), Annex A ("remote controlled")

**mobile metaverse media:** media communicated or enabled using the 5G system including audio, video, XR (including haptic) media, and data from which media can be constructed (e.g. a 'point cloud' that could be used to generate XR media.)

**digital representation:** the mobile metaverse media associated with the presentation of a particular virtual or physical object. The digital representation could present the current state of the object.

Editor's Note: In 5.2.1, 5.3 ("avatar representation5.6 ("3D representation"), 5.9 use the term 'representation' extensively, Annex A. Important for the definition of Avatar.

**avatar:** a digital representation of a person [expand to include other things we interact with, like computer programs (AI) and pets, etc.] that a user may interact with. Please see Annex A for examples and overview.

Editor's Note: In scope, 5.3, 5.6, 5.9, 5.10, Annex A.

**mobile metaverse:** the user experience enabled by the 5G system of interactive and/or immersive XR media, including haptic media.

**mobile metaverse service:** the service that provides a mobile metaverse experience to a user by means of the 5G system.

**mobile metaverse:** one, or more than one, mobile metaverse service experienced by a user.

**mobile metaverse service:** a service delivered by means of the 5G system to a user that includes interactive and/or immersive XR media.

Editor's Note: In scope, 5.1, 5.2, 5.4, 5.5. It is better to define this than to use the term 'metaverse' as a noun, as in 5.6.1 "other players in the metaverse" or in Orange's pCRs mentioning 'universe'.

**immersive:** a service offering AR/MR/VR media that appears realistic and acceptable to the user, generally so rapidly responsive to user interaction that the user can behave as they would interacting with real objects.

Editor's Note: In scope, 5.2, 5.3, 5.6, 5.7, 5.9, 5.10.

**mobile metaverse server:** an application server that supports one or more mobile metaverse services to a user access by means of the 5G system.

Editor's Note: In 5.1 ("Application Servers"), 5.2 ("Mobile metaverse server"), 5.3 more specifically to AS with different qualifiers, 5.4 ("media server", "application server"), 5.6 ("cloud or edge server"), 5.7 ("Metaverse service server", "metaverse server"), 5.9 ("local metaverse computing edge server", "local edge server", "metaverse edge computing server")

Editor's Note: I add the qualifiers to the definition (local, cloud-based) so these should not require additional definitions.

**gesture:** a change in the pose that is considered significant, i.e. as a discriminated interaction with a mobile metaverse service.

Editor's Note: In 5.6.

**pose:** the relative location, orientation and direction of the parts of a whole. The pose can refer the user, specifically used in terms of identifying the position of a user's body. The pose can also also refer to an entity or object (whose parts can adopt different locations, orientations, etc.) that the user interacts with by means of mobile metaverse services.

Editor's Note: In 5.5, 5.6. Also relevant to 5.2. Also consider to refer to the SA4 term in 26.928 'XRPose' where appropriate.

**virtual object:** data that corresponds to an entity that can be represented to a user, operated upon or employed in metaverse services. This object may correspond to a model of a physical object.

Editor's Note: In 5.2. Important for definition of digital twin. Seems like a generally useful term.

Next Change

# 4 Overview

Mobile metaverse services are discussed in this technical report both in the abstract and concrete. Specific services mentioned in the TR include:

- Situational awareness for drivers, pedestrians, cyclists, to increase safety and efficiency of transport (see 5.2).

- XR enabled collaborative and concurrent engineering, to enable local and remote collaboration (see 5.3).

- Participatory in and passive observation of virtual reality events, e.g. basketball (see 5.6).

- Presentation of AR content, e.g. a feature length movie, on a virtual screen (see 5.7).

- Remote critical health care, including surgery and treatment (see 5.10).

The study also considers a number of use cases that feature new service enablers, including:

- Providing users with informations and services that are of local relevance (see 5.1).

- Enhancements to IMS to support multiple users and multi-modal XR communication (see 5.3).

- Support for spatial anchors to link service information to specific locations (see 5.4).

- Support for spatial localization and mapping services, and enablers for them in the 5GS (see 5.5).

- Support for multi-service coordination for different input and output devices and diverse services (see 5.8).

- Support for synchronization of different data streams and predicted network conditions (especially latency) to enable immersive remote collaboration despite signicant distance and therefore communication delay between participants (see 5.9).

Editor's Note: Additional services and enablers will be added to the overview as the study develops.

End of Changes