Network requirements and capabilities to support Metaverse applications

1. Proposers

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2. Exploratory Group Goals

Build consensus and draft a proposed charter for a “Network requirements and capabilities to support Metaverse applications” Domain Working Group.

3. Potential Working Group Goals and Deliverables

Deploying metaverse applications at scale will have an important impact on communication networks, increase the need for cloud-aware networking and potentially drive the evolution paths of communication network technologies.

Several SDOs are working on defining network connectivity solutions to address the needs of XR and Metaverse related applications. Supporting those SDOs activities through industry driven requirements is both timely and important.

The goal for this proposal is to focus on networks (including access and core networks: e.g. 5G, 6G, Wi-Fi, BBF, DOCSIS 10G, Non-Terrestrial Networks) and infrastructure elements, including cloud and edge computing, to address coordination amongst multiple communication types and to support secure and resilient connectivity for flawless and seamless user experiences. Special attention would be attributed to opportunities for cooperation between multiple initiatives to increase synergy and reduce duplication of effort, gaps, fragmentation and confusion, for the good of the industry.

The scope of “Network requirements and capabilities to support Metaverse applications” Working Group includes:

- Collecting service and application use cases and develop one or several end-to-end deployment architectures (including network to network interfaces) to support scalable distribution to users with different device types including phones, HMDs, glasses, etc.

- Develop QoE metrics including audio-visual quality, immersiveness, latencies and other factors.

- Develop different distribution scenarios and architectures for splitting compute and rendering across different entities, e.g. split rendering, streaming, cloud rendering, etc.

- Identify typical data flows (compressed data, content delivery protocols) and traffic characteristics for signals operating over access networks.

- Based on identified distribution scenarios, develop relevant QoS requirements including latency, jitter, throughput, reliability, time synchronization, etc.

- Analyze features in existing and ongoing Standards-related Publications and Projects (SPPs) in MSF Pre-qualified Organizations and Groups(POGs) (3GPP, IETF, BBF, W3C, ITU-T (in particular SG15), IEEE, WBA, TIP Metaverse Network Ready WG, OMA3, CAMARA project, ETSI ARF, SVTA, 5G-MAG, DASH Industry Forum, etc.) to assess if they address the requirements and identify gaps or enhancements.

- Security, privacy, ownership and sustainability considerations.

- Coordinate with POGs to ensure requirements from MSF and gaps are addressed in a timely fashion.

- Reference tools, validation prototypes and simulation considerations.

4. Non goals

- The Domain Working Group will not specify protocols, APIs nor detailed architectures (as in other SDOs).
- The Domain Working Group will not work on assets, behaviors, interactions, content-related topics, avatars, wearables, real and virtual applications, application security, X3D graphics, etc.

5. Coordination

- The Group shall coordinate with the Standards Register Working group for identifying relevant standards to support Metaverse applications
- The Group shall seek to establish appropriate liaisons with SDOs dealing with communications (e.g. in the form of 3GPP Market representation partner). Those liaisons must be established in accordance with MSF defined procedures for liaisons. Note: Liaisons work better when members submit contributions to SDOs to ensure the liaisons have the right and timely impact on specifications.

6. Risk factors

- SDOs may refuse to liaise with MSF. Incorporation of MSF as a non-trade legal entity is critical to establish formal liaisons with established SDOs and associations.
- SDOs may look for other sources of requirements themselves. An essential success factor for this group is to take into account applications and device makers requirements. Without clear effective representation of requirements, SDOs may not adhere to the requirements from MSF or look for other sources of industry requirements.

7. Target timeline to create proposed Working Group

Q2 2023

8. Acronyms

3GPP: 3rd Generation Partnership Project

IETF: Internet Engineering Task Force

BBF: Broadband Forum

W3C: World Wide Web Consortium

ITU-T: International Telecommunication Union-Telecommunication Standardization Sector

IEEE: Institute of Electrical and Electronics Engineers

WBA: Wireless Broadband Alliance

TIP: Telecom Infra Project

OMA3: Open Metaverse Alliance

ETSI ARF: European Telecommunications Standards Institute – Augmented Reality Framework

DOCSIS : Data Over Cable Service Interface Specifications

OMF: Open Metaverse Foundation

SVTA: Immersive Video Study Group

5G-MAG: 5G-Media Action Group

HMD: Head Mounted Display

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