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Abstract: This document was discussed and updated at the first session of the WG1 meeting at the fifth FG-MV meeting in Queretaro, 5-8 March 2024. The meeting agreed to the contents of this deliverable and, after review of any new terms, to submit the document for approval at the June FG-MV meeting.

A liaison has been drafted to relevant SDOs and other organizations with a request to provide inputs and comments on this Draft Technical Specification by 8 April 2024.

Draft Technical Specification ITU FGMV- Vocabulary

Vocabulary for metaverse

Summary

This Technical Specification provides a set of core terms and associated definitions to reflect the basic concepts used in metaverse. The document aims to encourage a mutual and consistent understanding of, and a coherent and consistent approach to, the activities relating to metaverse, and the use of harmonized terminology. It includes terms and definitions for metaverse which have been widely used in the FG-MV deliverables, including terms already defined in relevant standards development organizations (SDOs). This document is intended to be relevant for: a) people engaged in metaverse activities; b) people involved in metaverse activities of ISO, IEC, ITU-T and other international standards bodies; c) developers of national or sector-specific standards, guides, procedures and codes of practice relating to metaverse.

Keywords

Metaverse, vocabulary, term, definition.

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Draft Technical Specification ITU-T FGMV- Vocabulary

Vocabulary for metaverse

1 Scope

This Technical Specification provides a set of core terms and associated definitions to reflect the basic concepts used in metaverse. The document aims to encourage a mutual and consistent understanding of, and a coherent approach to, the activities relating to metaverse, and the use of harmonized terminology. It includes terms and definitions for metaverse which have been widely used in the FG-MV deliverables, including terms already defined in relevant standards development organizations (SDOs). This document is intended to be relevant for: a) people engaged in metaverse activities, b) people involved in metaverse activities of ISO, IEC, ITU-T and other international standards bodies, c) developers of national or sector-specific standards, guides, procedures and codes of practice relating to metaverse.

2 References

None.

3 Definitions

This Technical Specification uses the following terms defined elsewhere:

3.1 Terms defined elsewhere

3.1.1 Accessibility [b-ITU-T F.791]: Degree to which a product, device, service or environment (virtual or real) is available to as many people as possible.

3.1.2 Accessibility feature [b-ITU-T F.791]: Any additional content component that is intended to assist people hindered in their ability to perceive an aspect of the main content.

Note: It is suggested that “an” is replaced with “any” in the above definition.

3.1.3 Application [b-ITU-T Y.101]: A structured set of capabilities, which provide value-added functionality supported by one or more services.

3.2.1 Artificial intelligence (AI): Computerized system that uses cognition to understand information and solve problems.

NOTE 1 – ISO/IEC 22989:2022 defines AI as research and development of mechanisms and applications of AI systems (Note 1 to entry: Research and development can take place across any number of fields such as computer science, data science, humanities, mathematics and natural sciences).

NOTE 2 – In computer science AI research is defined as the study of "intelligent agents": any device that perceives its environment and takes actions to achieve its goals.

NOTE 3 – This includes pattern recognition, the application of machine learning and related techniques.

NOTE 4 – Artificial-intelligence is the whole idea and concept of machines being able to carry out tasks in a way that mimics human intelligence and would be considered "smart".

3.1.4 Assistive technology [b-ITU-T F.791]: Piece of equipment, product system, hardware, software or service that is used to enable, maintain or improve functional capabilities of individuals with disabilities.

3.1.5 Augmented reality (AR) [b-ITU-T J.301]: A type of mixed reality where graphical elements are integrated into the real world in order to enhance user experience and enrich information.

3.1.6 Blockchain [b-ITU-T F.751.0]: A type of distributed ledger which is composed of digitally recorded data arranged as a successively growing chain of blocks with each block cryptographically linked and hardened against tampering and revision.

3.1.7 Cloud computing [b-ITU-T Y.3500]: Paradigm for enabling network access to a scalable and elastic pool of shareable physical or virtual resources with self-service provisioning and administration on-demand.

NOTE – Examples of resources include servers, operating systems, networks, software, applications, and storage equipment.

3.1.8 Database [b-ITU-T Q.1290] Entity that stores user and/or network information.

3.1.9 Data interoperability [b-ITU-T Y.4563]: Ability of two or more systems or components to exchange data and to use the data that has been exchanged.

3.1.10 Decentralized system [b-ITU-T X.1400]: Distributed system wherein control is distributed among the persons or organizations participating in the operation of system.

3.1.11 Digital human [b-ITU-T F.748.15]: Computer application that integrates the technologies of computer graphics, computer vision, intelligent speech and natural language processing. It can be used for digital content generation and human-computer interaction to help improve content production efficiency and user experience.

3.1.12 Digital Signage (DS) [b-ITU-T H.780]**:** A system that sends information, advertising and other messages to electronic devices (e.g., displays, speakers) in accordance with the time of day and the location of the display, or the actions of audience. Contents and their relevant information, such as display schedules, are delivered over networks.

3.1.13 Digital transformation [b-ITU-T Y.4906]: A process during which, by advanced applications of ICTs in sectors' business activities such as R&D, production, services, etc., the sectors' business activities are optimized, reconstructed and integrated, and sectors' development modes are disruptively reformed and innovated. The digital transformation is vitally useful for sectors to optimize resource configuration, improve operational efficiency and innovation capability, and hence realize sectors' sustainable development.

3.1.14 Digital twin [b-ITU-T Y.4600]: Digital representation of an object of interest.

NOTE – A digital twin may require different capabilities (e.g., synchronization, real-time support) according to the specific domain of application.

3.1.15 Digital twin network [b-ITU-T Y.3090]: Virtual representation of a physical network. It is useful for analysing, diagnosing, emulating and controlling the physical network based on data, model and interface, to achieve the real-time interactive mapping between the physical network and virtual twin network.

3.1.16 Distributed ledger [b-ITU-T X.1400]: A type of ledger that is shared, replicated, and synchronized in a distributed and decentralized manner.

3.1.17 Distributed ledger technology (DLT) [b-ITU-T X.1400]: Technology that enables the operation and use of distributed ledgers.

3.1.18 Diverse users [b-ISO/IEC 71]: Individuals with differing abilities and characteristics or accessibility needs.

3.1.19 Easy-to-understand language [b-ISO/IEC 23859]: Any language variety which enhances comprehensibility. Note 1 to entry: Easy-to-understand language includes plain language, easy

language and any intermediate variety. These varieties share many recommendations, but the extent of comprehensibility is different as they address different user needs.

3.1.20 Extended reality (XR) [b-ITU-T P.1320]: An environment containing real or virtual components or a combination thereof, where the variable X serves as a placeholder for any form of new environment (e.g., augmented, assisted, mixed, virtual or diminished reality).

3.2.21 Home avatar [b-ITU-T FGMV-19]: The avatar which exists within original metaverse platform, remaining customizable for its corresponding entity. This primary version of an avatar 'in the metaverse resides exclusively within a specific metaverse platform or avatar service.

NOTE – The entity includes users, IoT devices, robots, digital humans, AI, system components, etc.

3.1.22 Inclusion [b-ITU-T G.9959]: Process of adding a new node to a domain in a way so that the node can communicate with other nodes in the domain and filter out traffic from other domains.

3.1.23 Inclusive development [b-UN SDGs]: Leaving no one behind.

3.1.24 Internet of things (IoT) [b-ITU-T Y.4000]: A global infrastructure for the information society, enabling advanced services by interconnecting (physical and virtual) things based on existing and evolving interoperable information and communication technologies.

NOTE 1 – Through the exploitation of identification, data capture, processing and communication capabilities, the IoT makes full use of things to offer services to all kinds of applications, whilst ensuring that security and privacy requirements are fulfilled.

NOTE 2 – In a broad perspective, the IoT can be perceived as a vision with technological and societal implications.

3.1.25 Interoperability [ITU-T Y.101]: Ability of two or more systems or applications to exchange information and to mutually use the information that has been exchanged.

3.1.26 Ledger [b-ITU-T X.1400]: Information store that keeps final and definitive (immutable) records of transactions.

3.1.27 Metaverse [b-ITU-T FGMV-20]: An integrative ecosystem of virtual worlds offering immersive experiences to users, that modify pre-existing and create new value from economic, environmental, social and cultural perspectives.

NOTE – A metaverse can be virtual, augmented, representative of, or associated with the physical world.

3.1.28 Metaverse thing [b-ITU-T FGMV-X]: Alias as avatar of thing, a functional entity inside a metaverse which represents and interacts with an IoT thing outside of the metaverse.

3.1.29 Minimal interoperability [b-ITU-T Y.4602]: The minimal sufficient degree needed to meet a certain requirement for data sharing, use and reuse.

NOTE – This is an approach to build a set of modular mechanisms, including information models, across multiple domains, locations and events. The definition aligns with the definition of "interoperability" in [b-ITU-T Y.101]. （ITU-T FG-DPM D0.1）.

3.1.30 Mixed reality (MR) [b-ISO/IEC 18038]: Merging of real and virtual worlds to generate new environments where physical and synthetic objects co-exist and interact.

3.1.31 Nonfungible token (NFT) [b- ITU-T X.1400]: An entirely unique digital representation of an asset.

3.1.32 Person with age related disabilities [b-ITU-T F.791]: A person with cognitive or physical disabilities caused by the aging process. Examples are impaired eyesight, deafness in varying degrees, reduced mobility or cognitive abilities.

3.1.33 Person with specific needs [b-ITU-T F.791]: Includes persons with disabilities (PWD), persons who are not literate, those with learning disabilities, children, indigenous people, older persons with age related disabilities, and anyone who has a temporary disability [FGMV-15]

3.1.34 Product [b-ISO/IEC 9241-11]: Item that is made or created by a person or machine.

3.1.35 Sensor [b-ITU-T Y.4105] [b-ITU-T Y.4113]: An electronic device that senses a physical condition or chemical compound and delivers an electronic signal proportional to the observed characteristic.

3.1.36 Service [b-ITU-T Y.2091]: A set of functions and facilities offered to a user by a provider. NOTE: [b-ISO/IEC 9241-11]: Means of delivering value for the customer by facilitating results the customer wants to achieve.

3.1.37 System [b-ISO/IEC 9241-11]: Combination of interacting elements organized to achieve one or more stated purposes.

3.1.38 Thing [b-ITU-T Y.4000]: In the Internet of things, an object of the physical world (physical things) or of the information world (virtual things), which is capable of being identified and integrated into the communication networks.

3.1.39 Trust [b-ITU-T X.1252] [b- ITU-T FG-DPM0.1]: The reliability and truth of information or the ability and disposition of an entity to act appropriately, within a specified context.

3.1.40 Trustworthiness [b- ISO/IEC 22989:2022, 3.5.16]: ability to meet stakeholder expectations in a verifiable way.

NOTE 1– Depending on the context or sector, and also on the specific product or service, data and technology used, different characteristics apply and need verification to ensure stakeholders' expectations are met.

NOTE 2– Characteristics of trustworthiness include, for instance, reliability, availability, resilience, security, privacy, safety, accountability, transparency, integrity, authenticity, quality and usability.

NOTE 3– Trustworthiness is an attribute that can be applied to services, products, technology, data and information as well as, in the context of governance, to organizations.

3.1.41 User confidence in the metaverse [b-ITU-T FGMV-06]: A user's state of certainty and belief in the reliability of a metaverse platform or environment.
NOTE 1 – Confidence is generally defined as the quality or state of being certain [b-Webster].
NOTE 2 – Stressing the importance of the user's state of certainty and belief in the environment, this definition of user confidence seeks to provide a path to:
a. Considering user intent when developing principles that govern metaverse engagement.
b. Empowering individual users by addressing their expectations in immersive contexts.

3.1.42 User implied contract of confidence [b-ITU-T FGMV-06]: An agreement between the user and the platform provider implicit in the user's willingness to co-create with and entrust resulting assets to the platform. This is especially noteworthy when assets, including user 'avatars', can represent the individuals' personhood.

3.1.43 User interface [b-ISO/IEC 9241-11]: All components of an interactive system (software or hardware) that provide information and/or controls for the user to accomplish specific tasks with the interactive system.

3.1.44 Virtual human body [b-ISO 18825-1]: Virtual human model for digital fitting in the apparel industry, including information such as size, shape, cross section, body texture and skeletal structure

Note 1 to entry: Also called "fashion avatar". In computing, an avatar is the graphical representation of the user or the user's alter ego or character.

Note 2 to entry: The virtual human body is classified into two key types — virtual clone (virtual shape) and virtual twin (virtual size); see Table B.1.

3.1.45 Virtual reality (VR) [b-ITU-T P.1320]: An environment that is fully generated by digital means. To qualify as virtual reality, the virtual environment should differ from the local environment.

3.1.46 Virtual world [b-ISO/IEC 18039:2019]: Virtual environment, spatial organization of multiple virtual objects, potentially including global behaviour.

3.2 Terms defined in this Technical Specification

This Technical Specification defines the following terms:

3.2.2 Avatar: Digital entity that can be used as a (visual) representation of the user inside the virtual environments.

3.2.3 Ecosystem: A system consisting of a set of interdependent components sharing the same environment and interacting with each other, which functions as a unit.

NOTE 1 – Ecosystem can be distributed, stable functioning, complex, structure, adaptive, open, socio-technical, and interrelated system, with properties of self-organization, scalability and sustainability.
NOTE 2 – A set of interdependent components include, but are not limited to, technical factors and non-technical factors, mechanisms, activities, communities, and a set of stakeholders.

3.2.4 Power metaverse: Subcategory of metaverse in the power industry.
NOTE 1 – Power metaverse includes but is not limited to power production, transmission, distribution, and consumption in metaverse.
NOTE 2 – Power metaverse creates a link between stakeholders, tangible assets (e.g., power meters, environmental sensors), and intangible assets (e.g., policies, regulations, and electricity trading modes) in the metaverse ecosystem of power industry, promoting sustainable and efficient utilization of energy resources.

3.2.5 Spatial computing: Interaction between humans and machines, wherein machines retain and manipulate referents to real objects and spaces.
NOTE 1 – With spatial computing, we control the interaction process between humans and machines by utilizing gestures, eye movement, and voice commands detected by sensors, rather than using keyboards and buttons.
NOTE 2 – Unlike traditional computing methods, spatial computing takes into account the spatial relationships and interactions between objects, environments, and users in a three-dimensional (3D) space.
NOTE 3 – Spatial computing involves the integration of various technologies, such as augmented reality (AR), virtual reality (VR), mixed reality (MR), computer vision, IoT, AIGC, and other sensor-based technologies, to perceive and interact with the environment in real time.
NOTE 4 – In terms of applications and services, spatial computing has been applied in various sectors, including media, culture and tourism, industry, business, collaborative offices, etc.

4 Abbreviations and acronyms

This Technical Specification uses the following abbreviations and acronyms:

3D	Three-Dimensional
AI	Artificial Intelligence
AIGC	AI Generated Content
AR	Augmented Reality
DLT	Distributed Ledger Technology

DS	Digital Signage
IoT	Internet of Things
MR	Mixed Reality
MV	Metaverse
NFT	Non-Fungible Token
XR	Extended Reality
VR	Virtual Reality

5 Conventions

None.

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