ITUPublications

International Telecommunication Union

Standardization Sector

ITU Focus Group Technical Report

(03/2024)

ITU Focus Group on metaverse
(FG-MV)

FGMV-24

A framework for confidence in the metaverse

Working Group 1: General

PREPUBLISHED
Version

Technical Report ITU FGMV-24

A framework for confidence in the metaverse

Summary

Still in its nascent phase, even as it rides the downward swing of a highly visible hype curve; the concept of "metaverse" remains undefined. Yet, the metaverse is emerging as a new frontier of social and economic interaction with the potential to transform the way we live, work and play.

Given its potential to be highly disruptive, there is some urgency to develop a general understanding of the metaverse in this nascent phase, especially to avoid the pitfalls that continue to afflict its predecessors including Web 2.0 platforms like social media.

To address this urgent need, the International Telecommunication Union (ITU) established the first Focus Group on metaverse (FG-MV) in December 2022. A year later, in December 2023, FG-MV experts (brought together from around the world to shape the development of metaverse technology standardization for the benefit of all) proposed a baseline definition for the metaverse.

This Technical Report (also a product of FG-MV) outlines an approach to pre-standardization of confidence in the metaverse by:

1. Expanding the "User Confidence Framework" introduced in ITU's FGMV-06: Technical Report on "*Guidelines for consideration of ethical issues in standards that build confidence and security in the metaverse*" (which was approved at the third meeting of the FG-MV, held on 3–5 October 2023, in Geneva, Switzerland), to include *Security and Safety Dimensions* in user confidence.
2. Developing a new framework for metaverse participation that defines new *user centric* terms related to metaverse use and non-use as an approach to understanding user metaverse engagement.
3. Discussing the concept of personhood for metaverse contexts to contextualize user presence in the metaverse.

Keywords

avatar; metaverse; user confidence in the metaverse; user implied contract of confidence; realms of metaverse participation; off-world; in-world; metazen; netizen; networked integration; physical realm; digital realm; online; offline; personhood in the metaverse; intra-metaverse; peri-metaverse; extra-metaverse

Note

This is an informative ITU-T publication. Mandatory provisions, such as those found in ITU-T Recommendations, are outside the scope of this publication. This publication should only be referenced bibliographically in ITU-T Recommendations.

Change Log

This document contains Version 1.0 of the ITU Technical Report "*A framework for confidence in the metaverse*" approved at the 5th meeting of the ITU Focus Group on metaverse (FG-MV), held on 5-8 March in Queretaro, Mexico.

Acknowledgements

This Technical Report was researched and written by Radia Funna (Build n Blaze, LLC.) as a contribution to the ITU Focus Group on metaverse (ITU FG-MV). The development of this document was coordinated by Leonidas Anthopoulos (University of Thessaly, Greece), as FG-MV Working Group 1 Chair and by Radia Funna (Build n Blaze, LLC.) as Acting Chair of WG1 and Chair of WG1 Task Group on implications for people in the metaverse.

Additional information and materials relating to this report can be found at: https://www.itu.int/go/fgmv. If you would like to provide any additional information, please contact Cristina Bueti at tsbfgmv@itu.int.

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A framework for confidence in the metaverse

1 Scope

The scope of this Technical Report is to outline an approach to pre-standardization of confidence in the metaverse. Specifically, it:

1. Expands the "User Confidence Framework" introduced in ITU's FGMV-06 Technical Report to include *Security and Safety Dimensions* to define security and safety in the context of user confidence.
2. Develops a new framework for metaverse participation that defines new *user centric* terms related to metaverse use and non-use as an approach to understanding user metaverse engagement as follows:
    i. Defines the following existing term:
        a. Off-world
    ii. Introduces and defines the following new terms:
        a. Extra-metaverse
        b. Intra-metaverse
        c. Networked integration
        d. Peri-metaverse
        e. Realms of metaverse participation
3. Discusses the concept of personhood for metaverse contexts to contextualize user presence in the metaverse.

2 References

[1] ITU FGMV-06 Technical Report on "*Guidelines for consideration of ethical issues in standards that build confidence and security in the metaverse*"

3 Terms and definitions

3.1 Terms defined elsewhere

3.1.1 avatar [b-ISO/IEC 23005-4]: Entity that can be used as a (visual) representation of the user inside the virtual environments.

3.1.2 metaverse [b-ITU 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.

3.1.3 metazen [b-Oliver Wyman]: Citizen of the metaverse whose virtual and daily lives are fully intertwined.

3.1.4 netizen [b-Webster/netizen]: Active participant in the online community of the Internet.

3.1.5 user confidence in the metaverse [b-ITU 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/confidence].

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.

3.1.6 user implied contract of confidence [b-ITU 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.

3.2. Terms defined in this Technical Report

This Technical Report defines the following terms:

3.2.1 extra-metaverse: Area of activity located outside the metaverse, either in the digital realm, the physical realm or through a network connecting both realms.

NOTE 1: Realm is defined broadly as the area of activity [b-Collins/realm] to include the virtual world and the physical world.

NOTE 2: The "digital realm" is the virtual world or "online", which is defined as connected to, served by, or available through a system and especially a computer or telecommunications system (such as the Internet) [b-Webster/online].

NOTE 3: The "physical realm" is the physical world as we know it or "offline", which is defined as not connected to or served by a system and especially a computer or telecommunications system [b-Webster/offline].

3.2.2 intra-metaverse: Area of activity located within the metaverse.

3.2.3 networked integration: Metaverse users or non-users tied to at least one connection between the physical world and the digital world.

NOTE: This could occur if a user or non-user is connected to an object in the physical world that is also connected to the digital world (e.g., "things" connected to the Internet as with the Internet of Things (IoT)).

3.2.4 off-world: Relating to participant absence from a virtual online environment.

NOTE 1: Referring to a participant as being "off-world" assumes prior "in-world" presence in a persistent metaverse environment where users may enter and exit without interrupting the activities of other participants or the metaverse "world" itself.

NOTE 2: In-world is defined here as relating to presence in a virtual online environment [b-Collins/in-world], often using an avatar.

3.2.5 peri-metaverse: Area of activity located within and outside the metaverse while staying either in the digital realm or in a merged digital-physical realm.

3.2.6 personhood in the metaverse: Personal identity and existence in digital and digital-physical merged spaces.

NOTE 1: Based on a definition of personhood as the quality or condition of being a person; especially personal identity or selfhood [b-OED].

NOTE 2: There must be a one-to-one relationship between the user and their "personal identity and existence" as represented in the space. For example, a single user may not have multiple identities, nor can a single identity represent multiple users.

NOTE 3: User personal identity and existence can include but is not limited to avatars and other user assets.

NOTE 4: User personal identity and existence retains all human rights and responsibilities.

3.2.7 realms of metaverse participation: Areas of activity related to user engagement in the metaverse.

4 Abbreviations and acronyms

None.

5 Conventions

None.

6 Pre-standardization of confidence in the metaverse

6.1 Background

The ITU FGMV-06 Technical Report proposed the "User Confidence Framework" to address user confidence in the metaverse, specifically by considering the unprecedented level of user engagement and investment required to build the metaverse in the context of increased fluidity of roles, functions, and industries [b-Funna/4ir].

The "User Confidence Framework":

1. Defines confidence for metaverse contexts by stressing the importance of the user state of certainty and belief in immersive environments and providing a path to considering user intent,
2. Introduces the concept of an "implied contract of confidence" to quantify user intent by defining an agreement between user and platform provider implicit in user metaverse engagement and by extrapolating basic tenets as they relate to user expectations surrounding that engagement, and
3. Suggests "Confidence Dimensions" to centre human rights and ethical and social considerations [b-ITU FGMV-06].

Details of the framework are included in Annex A of this document.

6.2 Security and Safety Dimensions in the User Confidence Framework

In this section, this Technical Report defines a set of "Security and Safety Dimensions" for inclusion in the "User Confidence Framework" to help highlight the need for safety and security practices in the context of confidence in the metaverse that may more adequately address the quality, depth, and range of user engagement as physical and digital boundaries continue to blur.

Table 1 summarizes these "Security and Safety Dimensions" with some elements from Accenture's proposed framework for responsible innovation in the metaverse (see Annex B for details).

Table 1 – Security and Safety Dimensions

Dimensions	Descriptions
Security *Trust Dimensions*	• Security by design should focus on hardening infrastructure and software against novel threats, particularly cybercrime, fraud, and disinformation. • Companies should use an adaptive zero-trust security model. • Data protection should be in place to protect the confidentiality and integrity of experiences, data, and applications.
Safety *Human Dimensions*	• Safety is the top priority in virtual environments. Safety policies, practices, and technologies should consider the convergence of physical and digital dimensions. • Platforms must proactively implement policies, technologies, and practices to discourage harmful content and behaviours. • Companies should invest in predictive and real-time detection capabilities, as well as in-world features and off-world guidance to empower users to manage their own safety as it relates to the environment.

Created with some components from [b-Zheng-Daugherty]

6.3 A new framework for metaverse participation

The increasing convergence of digital and physical spaces (as integration of software and hardware components in everyday objects creates an increased bidirectional flow of information between the digital and the physical realms) is revolutionizing user online participation. This holds special relevance to the metaverse, where blurring the line between digital and physical realities is key to success.

This Technical Report develops a new framework for metaverse participation, firstly to define user participation in this context; and secondly to support the aim of the "User Confidence Framework" to consider the unprecedented level of user engagement and investment required to build the metaverse in the context of increased fluidity of roles, functions, and industries [b-Funna/4ir] by standardizing an approach to defining that engagement.

The participation framework introduces and defines a new concept of *realms of participation*, defined as:

"Areas of activity related to user engagement in the metaverse."

It also introduces and defines the following umbrella terms to specify areas that make up the realms of participation:

- Intra-metaverse
- Peri-metaverse
- Extra-metaverse

These terms, together, group participant activities inside and outside the metaverse, with an aim to provide broad enough defined areas of activity related to user engagement that can evolve to absorb future dimensions of engagement as the line between digital and physical realities continues to blur.

Targeted to an expansive understanding, which includes users and non-users of the metaverse, this framework is as much an independent tool as it is a complement to the "User Confidence Framework".

Table 2 below summarizes the framework and:

- Defines the following existing term related to user range of participation: Off-world.
- Introduces and defines the following new term that is also related to user range of participation: Networked integration.

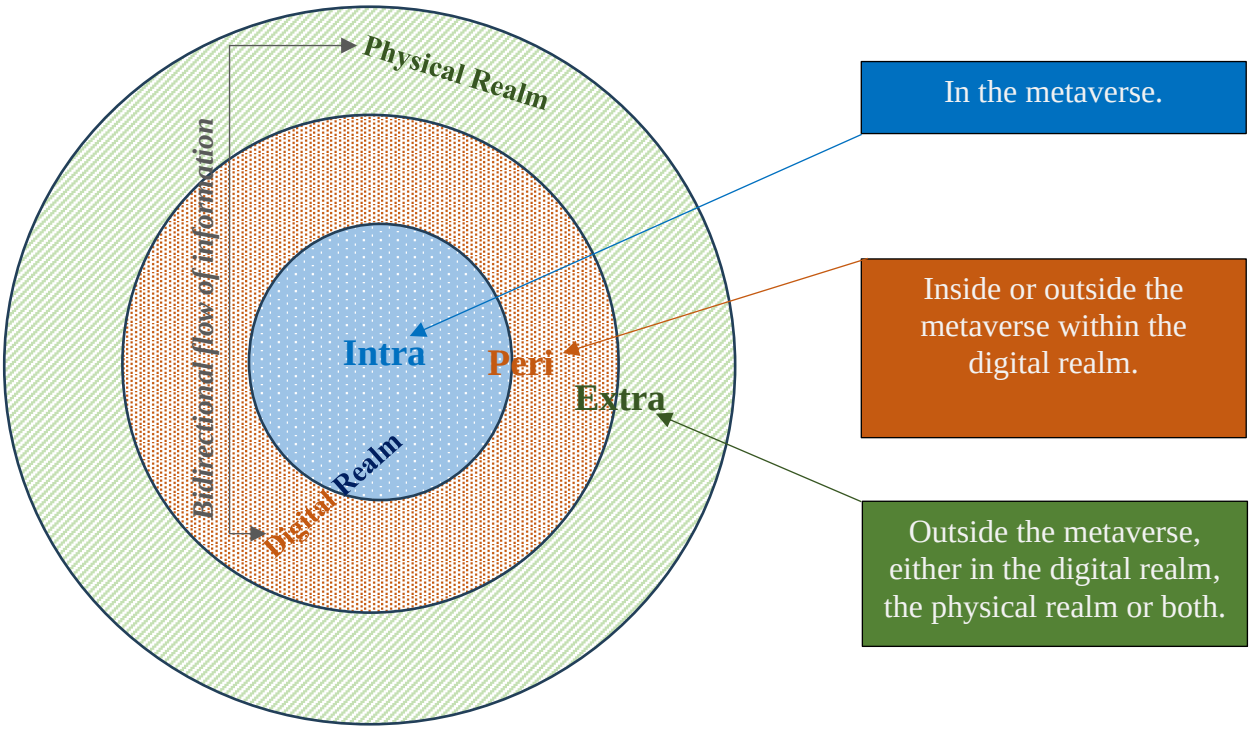
Table 2 – Framework for metaverse participation

Realm	Meaning	Range of participation
Intra	*Intra-metaverse*: Area of activity located within the metaverse.	**In-world** (*digital realm*): This type of engagement occurs when a participant is present in a virtual online environment [b-Collins/in-world], often using an avatar. It can span from engagement in purely virtual worlds to engagement in broad and blended realities. **Metazen** (*digital realm*): Citizen of the metaverse whose virtual and daily lives are fully intertwined [b-Oliver Wyman]. In the intra realm, "metazen" also refers to participants continued metaverse presence (especially through merged digital-physical realities) even when the participants (or their avatars) are "off-world".
Peri	*Peri-metaverse*: Area of activity located within and outside the metaverse while staying either in the digital	**Online** (*digital realm*): This type of engagement is available through a system and occurs when a user is connected to or served by that system (especially a computer or telecommunications system such as the Internet) [b-Webster/online]. It can occur inside or outside of the actual virtual online environment, so long as the user is connected to

Realm	Meaning	Range of participation
	realm or in a merged digital-physical realm.	the overall system. For example, users in the metaverse and users on the Internet that are not in the metaverse are online. **Netizen** (*digital realm*): An active participant in the online community of the Internet [b-Webster/netizen]. In the peri realm, "netizen" also refers to participants' *active online presence* or continued direct engagement even in the absence of a current online connection.
Extra	*Extra-metaverse*: Area of activity located outside the metaverse, either in the digital realm, the physical realm or through a network connecting both realms.	**Off-world** (*digital and physical realms*): This occurs when a participant is absent from a virtual online environment. Referring to a participant as being "off-world" assumes prior in-world presence in a persistent metaverse environment where users may enter and exit without interrupting the activities of other participants or the metaverse "world" itself. **Networked integration** (*digital and physical realms*): This refers to *metaverse users or non-users* tied to at least one connection between the physical world and the digital world. This could occur if a user or non-user is connected to an object in the physical world that is also connected to the digital world (e.g. "things" connected to the Internet as with the Internet of Things (IoT)). **Offline** (*physical realm*): This refers to the absence of connection to or service by a system (especially a computer or telecommunications system) [b-Webster/offline]. Possible engagement in the metaverse would be either by proxy or through knock-on effects; and the person in question may or may not be aware of that engagement. To *be offline* is to be in the *physical world*, the world as we know it.

Figure 1 below visualizes a bidirectional flow of information that can help enable the future definition of further dimensions of user engagement within the realms of participation.

Figure 1: Visualizing metaverse range of participation with bidirectional information flow



6.4 Personhood in metaverse contexts

The "User Confidence Framework" introduced and defined the concept of a *user implied contract of confidence* as "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" [b-Funna/confidence] [b-ITU FGMV-06].

In the above definition, the question of "personhood", as it relates to the activities of users and the ability of their avatars to represent them, has been further elevated as key to user confidence in the metaverse. It is therefore important to empower a shared understanding of the term. In the absence of an agreed-on definition, this Technical Report proposes that personhood in the metaverse can be generally understood as:

> "*Personal identity and existence in digital and digital-physical merged spaces.*"
>
> NOTE 1: Based on a definition of personhood as the quality or condition of being a person; especially personal identity or selfhood [b-OED].
>
> NOTE 2: There must be a one-to-one relationship between the user and their "personal identity and existence" as represented in the space. For example, a single user may not have multiple identities, nor can a single identity represent multiple users.
>
> NOTE 3: User personal identity and existence can include but is not limited to avatars and other user assets.
>
> NOTE 4: User personal identity and existence retains all human rights and responsibilities.

Annex A: User Confidence Framework

As introduced in Technical Report ITU FGMV-06

Confidence definition

The first component of the "User Confidence Framework" is a definition of user confidence in the metaverse as follows:

> *"A user's state of certainty and belief in the reliability of a metaverse platform or environment"* [b-Funna/confidence] [b-ITU FGMV-06].

The definition stresses the importance of the *user's state of certainty and belief* in the environment to provide a path to:

1. Considering *user intent* when developing principles that govern metaverse engagement.
2. Empowering individual users by *addressing their expectations* in immersive contexts.

An implied contract of confidence

The second component of the "User Confidence Framework" is a definition of a *user implied contract of confidence* as "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" [b-Funna/confidence] [b-ITU FGMV-06].

Basic tenets as they relate to expectations surrounding user engagement in the metaverse can be extrapolated from an implied contract of confidence to include:

- What is expected *for* the user: Primarily from policymakers while considering the roles of all relevant stakeholders for the welfare of users (including advocates and users themselves).
- What is expected *by* the user: Naturally gravitating towards user perspectives.
- What is expected *of* the user: Likely stemming from developers or system providers, allowing for the dynamic shaping and reshaping of expectations by the user community.

Confidence Dimensions

The third component of the "User Confidence Framework" is a set of "Confidence Dimensions" to help centre user experience in principles that build confidence and security in the metaverse [b-ITU FGMV-06].

Confidence Dimensions

Dimensions	Descriptions
Reliability	• The metaverse may have the potential to redefine reality, but the realization of this potential is dependent on the real or perceived reliability of its platforms. • Platforms should enable reliability of immersive environments by prioritizing "persistence" and consistency to meet user expectations of a co-created reality.
Co-Ownership	• Co-creation should lead to co-ownership: Platforms should address user co-ownership of co-created assets and value, including providing autonomy, control, and self-protection of avatars and other assets.

Dimensions	Descriptions
	• The potential extension of personhood in the form of avatars should also be considered.
Co-Responsibility	• Platforms and users are together co-creators and co-owners, each with responsibilities, which should be clearly and adequately communicated. • The resulting co-dependence should also be addressed.
Transparency	• In this nascent phase of the metaverse, it is important to be mindful of the role that users play in creating a shared reality, often by entrusting their "person" in the form of avatars to immersive environments. • Platforms should reflect the implications of this responsibility with transparent practices, inclusive design, and ethical and responsible use.

Source: [b-ITU FGMV-06]

Annex B: Responsible Innovation in the metaverse

Accenture's proposed framework for responsible innovation in the metaverse

Trust Dimensions

Dimensions	Descriptions
Privacy	• The primary purpose of collecting, processing, and sharing user data should be to deliver value to the user. • Design decisions should feature privacy defaults that are intuitive given the context of the use case or experience. • Companies should implement innovative strategies to educate users about their privacy options in the metaverse.
Security	• Security by design should focus on hardening infrastructure and software against novel threats, particularly cybercrime, fraud and disinformation. • Companies should use an adaptive zero-trust security model. • Data protection should be in place to protect the confidentiality and integrity of experiences, data and applications.
Resilience	• The metaverse should be engineered to operate in evolving and dynamic conditions and must be scalable and able to withstand and recover rapidly from disruptions and adversarial cyberattacks. • Platforms and devices should be capable of supporting high-fidelity and low-latency experiences that are immersive and persistent for large numbers of global users to interact simultaneously, in real time.
Intellectual Property	• Platforms should enforce intellectual property rights through robust detection capabilities and comprehensive user education. • Companies should invest in preventative measures and real-time identification mechanisms, such as trademark and copyright monitoring services and brand protection tools.

Source: [b-Zheng-Daugherty]

Human Dimensions

Dimensions	Descriptions
Safety	• Safety is the top priority in virtual environments. • Platforms must proactively implement policies, technologies, and practices to discourage harmful content and behaviours. • Companies should invest in predictive and real-time detection capabilities as well as in-world features to empower users to manage their own safety.
Inclusion, Diversity & Accessibility	• Companies should design systems and experiences to be inclusive and accessible.

Dimensions	Descriptions
	• As a new vehicle for fostering empathy and connection, the metaverse should ideally be grounded on universal design principles to maximize usability and accessibility. • Context matters. Users should feel empowered to reinvent themselves if they wish, but certain situations call for authenticity and real identities.
Sustainability	• Companies should explore ways to use the metaverse to become net more sustainable by using it as an alternative to energy and carbon-intensive activities. • When deciding how to build and select hardware, software, and platforms for the metaverse, companies should evaluate environmental impact such as energy usage, emissions, and e-waste. • Users, creators, and operators should be educated about what they can do to reduce the environmental footprint of the metaverse.
Well-being	• The metaverse should be leveraged to enhance and augment real-life experiences. • Devices, systems, and digital environments should be rooted in preserving and improving users' mental and physical health. • Ultimately, well-being in the metaverse is directly correlated with human-centric design choices across all the dimensions outlined in this framework.

Source: [b-Zheng-Daugherty]

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