Update on ITU-T Focus Group on metaverse (FG-MV)

Jungha Hong

(jhong@etri.re.kr)

IETF 118 @ Prague
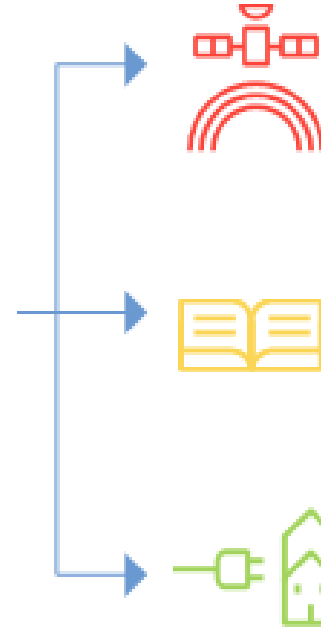07 November 2023

ITU – Who we are – Our Membership

UN agency for ICT
Information and communication technology

193
MEMBER STATES

900+
PRIVATE SECTOR

150+
ACADEMIA

**ITU Radiocommunication** **(ITU-R)**
Coordinating radio-frequency spectrum and **assigning** orbital slots for satellites

ITU Standardization **(ITU-T)**
Establishing global standards

ITU Development **(ITU-D)**
Bridging the digital divide

A unique platform for governments, private sector and academic institutions to build consensus on important and pressing ICT technical and regulatory issues facing our society today

ITU-T Study Groups 2022-2024
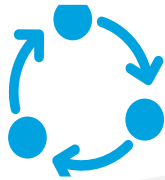
SG2: Operational aspects

SG3: Economic and policy issues

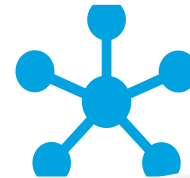SG5: Environment, EMF and circular economy

SG9: Broadband cable and TV

SG11: Protocols, testing & combating counterfeiting

SG12: Performance, QoS and QoE

SG13: Future networks

SG15: Transport, access and home

SG16: Multimedia & digital technologies

SG17: Security

SG20: IoT, smart cities & communities

Focus Group of ITU-T

- Focus Groups are an instrument to provide an additional working environment for the quick development of standards in specific areas
  - Acting as an **incubator for an future emerging issues**

- Participation in Focus Group
  - OPEN TO NON-ITU MEMBERS !
  - Any individual from a country that is a member of the ITU and who is willing to contribute actively to the work may participate in a Focus Group
  - stimulate open dialogue through open participation

Differences between SGs and FGs in ITU-T

Focus Groups (FGs)	Study Groups (SGs)
▪ Open to non-members of the ITU from an ITU Member State	▪ Open to members of the ITU only
▪ Some Flexibility/independence concerning working methods, outputs, financing, administration…	▪ Limited flexibility concerning working methods, types of outputs, financing, administration…
▪ Outputs are non-normative	▪ Main outputs are ITU-T (normative) Recommendations or standards +
▪ Outputs (aka deliverables) can stand-alone or feed into the work of Study Groups	▪ Technical Papers, Supplements and other non-normative publications
▪ Defined lifetime (9-12 months initially with extension possible)	▪ Study Groups are created for an indefinite duration, and only WTSA (and in some cases TSAG) can create or disband SGs

5

Establishment of ITU-T FG-MV

■ ITU-T SG 16 (Multimedia and related digital technologies)

  ❖ The necessity of standardization work on multimedia related metaverse issues was discussed at the SG 16 meeting in January 2022

  • Correspondence Group on Metaverse (**CG-Metaverse**) was established with ToR
    - Co-Chairman : Shin-Gak KANG (ETRI/Korea)

      Kepeng LI (Tencent/China)

  • ToR of CG-Metaverse
    - carry out the preliminary standardization analysis to help SG16 effectively make decision on appropriate standardization issues and work method in the next SG16 meeting
    - to discuss technical aspects leading to a SG16 analysis of future standardization directions, potential work items and future coordination needs

  ❖ CG-Metaverse **discussed standardization issues and the need for FG establishment** through three e-meetings

  • First (06 July 2022), Second (10 August 2022), Third (8 September 2022)

Establishment of ITU-T FG-MV

- ITU-T SG 16 (Multimedia and related digital technologies)
  - **Decided to establish a Focus Group** through discussions on metaverse standardization issues and working methods at the SG 16 meeting in October 2022
  - **Proposed to ITU-T TSAG for approval** of establishment of FG-MV
    - TSAG: Telecommunication Standardization Advisory Group

- ITU-T TSAG meeting (December 2022)
  - **Decided to establish** the Focus Group on metaverse **(FG-MV) under TSAG**
    - Scope of the FG-MV covers more than a single Study Group of ITU-T
    - Most of the ITU-T SGs expressed their interest and willingness to participate in FG-MV
  - Access link for ITU-T FG-MV
    - https://www.itu.int/en/ITU-T/focusgroups/mv/Pages/default.aspx

ToR of ITU-T FG-MV

- **Objectives**
  - To study terminology, concepts, vision and ecosystem.
  - To identify and study the enabling technologies, their evolution and key tasks for standardization purposes,
    - including multimedia, network optimization, connectivity, interoperability of services and applications, security, protection of personally identifiable information, quality (including bandwidth), digital assets (e.g., digital currencies), IoT, accessibility, digital twin and environmental sustainability
  - To study and gather information to develop a pre-standardization roadmap.
  - To build a community of experts and practitioners to unify the concepts, develop common understandings, so that it be benefiting the global community.
  - To identify stakeholders with whom ITU-T could collaborate and establish liaisons and relationships.
  - To stimulate international collaboration, to share knowledge and best practices, and to explore the opportunities and challenges related to interoperability.
  - To provide a platform to share findings and for dialogue on economic, policy and regulatory implications of metaverse related to telecommunication/ICT.

ToR of ITU-T FG-MV

- Specific tasks and deliverables
  - To develop deliverables related to working definitions and terminology, use cases, and requirements.
  - To develop deliverables with guidelines and collection of best practices, including a gap analysis and a pre-standardization roadmap.
  - To develop deliverables related to technical frameworks, and architecture, taking into consideration security requirements and approaches, PII protection and design principles to meet accessibility requirements.
  - To organize and participate in workshops to share and collect knowledge and experience from a wide range of expert community and stakeholders.
  - Upon completion of its lifetime, to provide the final report and a complete set of deliverables to TSAG.

FG-MV: Focus Group on metaverse

- A unique collaboration platform to shape an open and interoperable metaverse

Build **a community of experts and practitioners**

Facilitate **dialogues** and **sharing findings**

Identify stakeholders and liaise with **other organisations**

Stimulate **international collaboration**

Outcomes of the First FG-MV Meeting

- *8–9 March 2023, in Riyadh, Kingdom of Saudi Arabia*
- The 1st FG-MV meeting broke the record!
  - ✓ Most attended ITU Focus Group meeting ever, with over 650 participants!
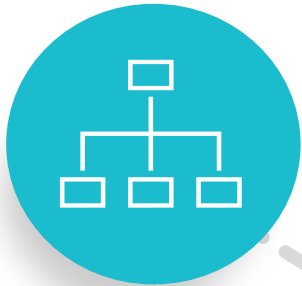
FG-MV Management Team extended

Government, industry, academia, UN agencies, Asia, Africa, Europe, the Americas

FG-MV Structure established

8 Working Groups and 10 Task Groups

Work Plan agreed

18 new work items were created and are moving fast!

ITU FG-MV Management Team ('23.03.)

Chairman

Shin-Gak Kang
(ETRI, Rep. of Korea)

Vice-Chairmen

Andrey Perez (Brazil)	**Hideo Imanaka** (NICT, Japan)	**Per Fröjdh** (Ericsson, Sweden)	**Shane He** (Nokia, Finland)	**Vincent Affleck** (United Kingdom)	**Yuntao Wang** (China)
Leonidas Anthopoulos (Greece)	**Manuel Barreiro** (Aston Group, Mexico)	**Cristina Martinez** (European Commission)	**Stella Kipsaita** (Communications Authority, Kenya)	**Natalia Bayona** (UNWTO)	

FG-MV Structure – WGs ('23.03.)

WORKING GROUP 1

General

WORKING GROUP 2

Applications & Services

WORKING GROUP 3

Architecture & Infrastructure

WORKING GROUP 4

Virtual/Real World Integration

WORKING GROUP 5

Interoperability

WORKING GROUP 6

Security, Data & PII Protection

WORKING GROUP 7

Economic, Regulatory & Competition Aspects

WORKING GROUP 8

Sustainability, Accessibility & Inclusion

FG-MV Initial Structure (March 2023)

- **Task Groups (TGs)** can be formed under either FG or WG for intensive discussions and developing deliverables on **specific sub-areas or topics**. [FG's decision]
  - ✓ **10 Task Groups (TGs)** were established at the 1st ITU-T FG-MV meeting in Riyadh as an initial step, and they will be expanded in future meetings

FG	metaverse
	TG-collaboration
WG 1	**General**
	TG-terminology & definitions
	TG-gap analysis
WG 2	**Applications & Services**
	TG-media coding
WG 3	**Architecture & Infrastructure**
WG 4	**Virtual/Real World Integration**

WG 5	Interoperability
WG 6	Security, Data & Personally Identifiable Information (PII) Protection
	TG-child online protection
	TG-cybersecurity
	TG-building confidence and security in the metaverse
	TG-issues on trustworthiness related to the metaverse
WG 7	**Economic, regulatory & competition aspects**
WG 8	**Sustainability, Accessibility & Inclusion**
	TG-sustainability
	TG-accessibility & inclusion

Outcome of the 2nd FG-MV meeting (4~6 July, 2023)

- Second ITU-T FG-MV meeting was held in Shanghai, China

- The Focus Group meeting, was attended by **more than 2,000 participants** on-site and online, which broke the record set by the first FG-MV meeting.

- A Technical Report on "**Exploring the metaverse: opportunities and challenges**" has been approved.

  - The 1st time that a deliverable has been approved at the 2nd Focus Group meeting.

- **39 new work items** have been approved.

  - Currently, total 57 on-going work items

- **1 new Working Group and 10 new Task Groups** have been approved.

  - Change of TG-collaboration to 'WG9 on collaboration' for promoting of relevant activities

- FG-MV encouraged ITU to organize a **UN Metaverse Week** in 2024.

- FG-MV encouraged ITU to establish a **Digital Coalition on CitiVerse**.

Outcome of the 2ⁿᵈ FG-MV meeting (4~6 July, 2023)

■ **1st FG-MV Technical Report**
"Exploring the metaverse: opportunities and challenges"

- Opportunities and challenges

- The role of international standards

- The potential for the metaverse in the achievement of the United Nations Sustainable Development Goals.

Download at: ***https://www.itu.int/pub/T-FG-MV-2023***

ITUPublications — International Telecommunication Union / Standardization Sector

ITU-T Focus Group Report
(07/2023)

ITU-T Focus Group on metaverse (FG-MV)

FG-MV D.WG1-01

Exploring the metaverse: opportunities and challenges

Working Group 1: General
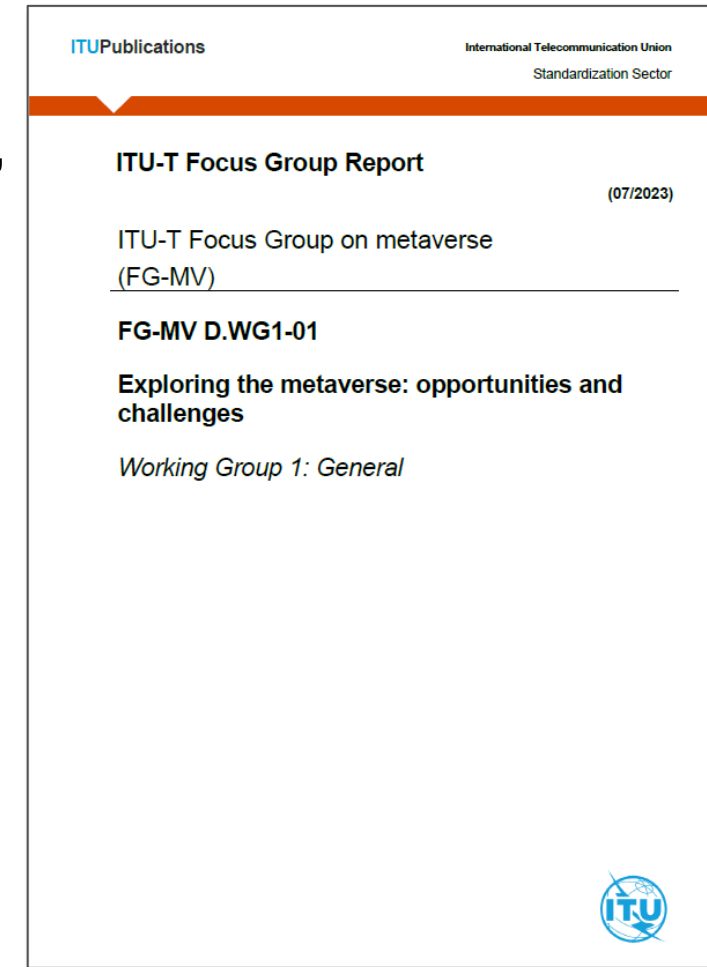
Outcome of the 2nd FG-MV meeting (4~6 July, 2023)

- 1 new Working Group and 10 new Task Groups have been approved

Working Groups	New Task Groups
WG1 - General	• TG on **implications for people** in the metaverse
	• TG on pre-standardization for the **CitiVerse**
WG2 - Applications & Services	• TG on **Generative Artificial Intelligence** in the metaverse
	• TG on **Embodied Artificial Intelligence** for metaverse
	• TG on **medical** metaverse
	• TG on metaverse **tourism**
	• TG on **power** metaverse
	• TG on **Industrial metaverse**
WG8 - Sustainability, Accessibility & Inclusion	• TG-design criteria and metrics with incentives for **sustainable metaverse**
	• TG-metaverse **social safety**
WG9 - Collaboration	• TG-gap analysis

FG-MV structure (since 06 July 2023)

WORKING GROUP 1

General

WORKING GROUP 2

Applications & Services

WORKING GROUP 3

Architecture & Infrastructure

WORKING GROUP 4

Virtual/Real World Integration

WORKING GROUP 5

Interoperability

WORKING GROUP 6

Security, Data & PII Protection

WORKING GROUP 7

Economic, Regulatory & Competition Aspects

WORKING GROUP 8

Sustainability, Accessibility & Inclusion

WORKING GROUP 9

Collaboration

Outcome of the 3rd FG-MV meeting (3~5 October, 2023)

- Third ITU-T FG-MV meeting was held in Geneva, Switzerland

- The Focus Group meeting, was attended by **more than 248 participants** on-site and online. ** China's big holiday…*

- 8 draft deliverables have been approved

- 9 new work items have been approved
  - Current work items : 57

- 18 planned draft deliverables for approval during the 4th FG-MV meeting in December 2023

Outcome of the 3rd FG-MV meeting (3~5 October, 2023)

■ Approved Deliverables

WGs	Type	Title of deliverable
WG1 - General	Technical Report	Metaverse: an analysis of definitions
WG2 - Applications & Services	Technical Report	Power metaverse: Use cases relevant to grid side and user side
WG6 - Security, Data & Personally identifiable information (PII) Protection	Technical Report	Guidelines for consideration of ethical issues in standards that build confidence and security in the metaverse
WG7 - Economic, regulatory & competition aspects	Technical Report	Policy and regulation opportunities and challenges in the metaverse
WG8 - Sustainability, Accessibility & Inclusion	Technical Report	Guidelines to assess inclusion and accessibility in metaverse standard development
	Technical Specification	Requirements of accessible products and services in the metaverse: Part I – System design perspective
	Technical Specification	Requirements of accessible products and services in the metaverse: Part II – User perspective
	Technical Specification	Design criteria and technical requirements for sustainable metaverse ecosystems

Outcome of the 3rd FG-MV meeting (3~5 October, 2023)

■ Approved New Work Items

WGs	Type	Title of deliverable
WG1 - General	Technical Report	Definitions relating to confidence in the metaverse
	Technical Report	Building a People-centred CitiVerse
	Technical Specification	Definition of metaverse
	Technical Specification	Definition of CitiVerse
WG2 - Applications & Services	Technical Report	Use Cases for the Industrial metaverse
WG3 - Architecture & Infrastructure	Technical Specification	Multimedia aspect of metaverse architecture
WG8 - Sustainability, Accessibility & Inclusion	Technical Report	Guidance on accessibility of Web3 economy layer of the metaverse for women
WG9 - Collaboration	Technical Report	Standardization roadmap for metaverse
	Technical Report	Gap analysis on metaverse standardization

Structure of FG-MV - WGs/TGs (October 2023)

Working Groups	Task Groups
WG1 - General	• TG on **Terminology & definitions** • TG on **implications for people** in the metaverse • TG on pre-standardization for the **CitiVerse**
WG2 - Applications & Services	• TG on Media coding • TG on **Generative Artificial Intelligence** in the metaverse • TG on **Embodied Artificial Intelligence** for metaverse • TG on **Medical** metaverse • TG on metaverse **Tourism** • TG on **Power** metaverse • TG on **Industrial metaverse**
WG3 - Architecture & Infrastructure	
WG4 - Virtual/Real World Integration	

Structure of FG-MV - WGs/TGs (October 2023)

Working Groups	Task Groups
WG5 - Interoperability	
WG6 - Applications & Services	• TG on **Cybersecurity**
	• TG on **Building confidence and security** in the metaverse
	• TG on **Child online protection**
	• TG on **Issues on trustworthiness** related to the metaverse
WG7 - Economic, regulatory & competition aspects	
WG8 - Sustainability, Accessibility & Inclusion	• **Sustainability**
	• **Accessibility & inclusion**
	• **Design criteria and metrics with incentives for sustainable metaverse**
	• Metaverse **social safety**
WG9 - Collaboration	• **Gap analysis**

Current Work Items (5 October, 2023)

FG	Template	Use case template
WG1	TS	Overview of metaverse
	TR [Approved, '23.07]	Exploring the metaverse: opportunities and challenges
	TS	Vocabulary for metaverse
	TR	Principles and Processes for Building Concepts and Definitions Related to metaverse
	TR [Approved, '23.10]	Metaverse: An analysis of definitions
	TS	Definitions relating to confidence in the metaverse
	TS	Definition of metaverse
	TS	Definition of CitiVerse
	TR	Pre-standardisation roadmap for an inclusive and sustainable CitiVerse
	TR	Building a People-centred CitiVerse
	TR	Near-term and Long-term Implications of People in the metaverse
WG2	TR	Overview of the application requirements of metaverse on emergency management in chemical industrial parks
	TS	Use case and requirements for virtual and real fusion coding in metaverse application
	TS	Use cases and requirements on immersive audio coding for metaverse applications and services
	TS	Framework and requirements for the construction of 3D manual driven digital human application system based on image recognition algorithm
	TS	Use cases and requirements for Generative AI in metaverse applications and services

Current Work Items (5 October, 2023)

WG2	TS	Requirements and framework for extended reality content creation system based on artificial intelligence
	TR	Medical metaverse: Use-case Relevant to Medical Training and Hospital
	TR	Guidelines and use cases on tourism in the metaverse
	TR	Use case and requirements for remote amusement service with automatic movable robot (AMR) with multimedia functions on metaverse
	TR [Approved, '23.10]	Power metaverse: Use Cases Relevant to Grid Side and User Side
	TS	Guidelines for metaverse application in energy power
	TR	Use Cases for the industrial metaverse
WG3	TR	Requirements and challenge associated with network infrastructure to enable the metaverse
	TS	Requirements and functional architecture of IoT- based metaverse service
	TS	Reference architecture of industrial metaverse
	TS	Setting the framework for an ICT architecture to enable the metaverse
	TS	Multimedia aspect of metaverse architecture
WG4	TS	Use cases and requirements for the metaverse based on digital twins enabling integration of virtual and physical worlds
	TS	Reference model for the metaverse based on a digital twin enabling integration of virtual and physical worlds

Current Work Items (5 October, 2023)

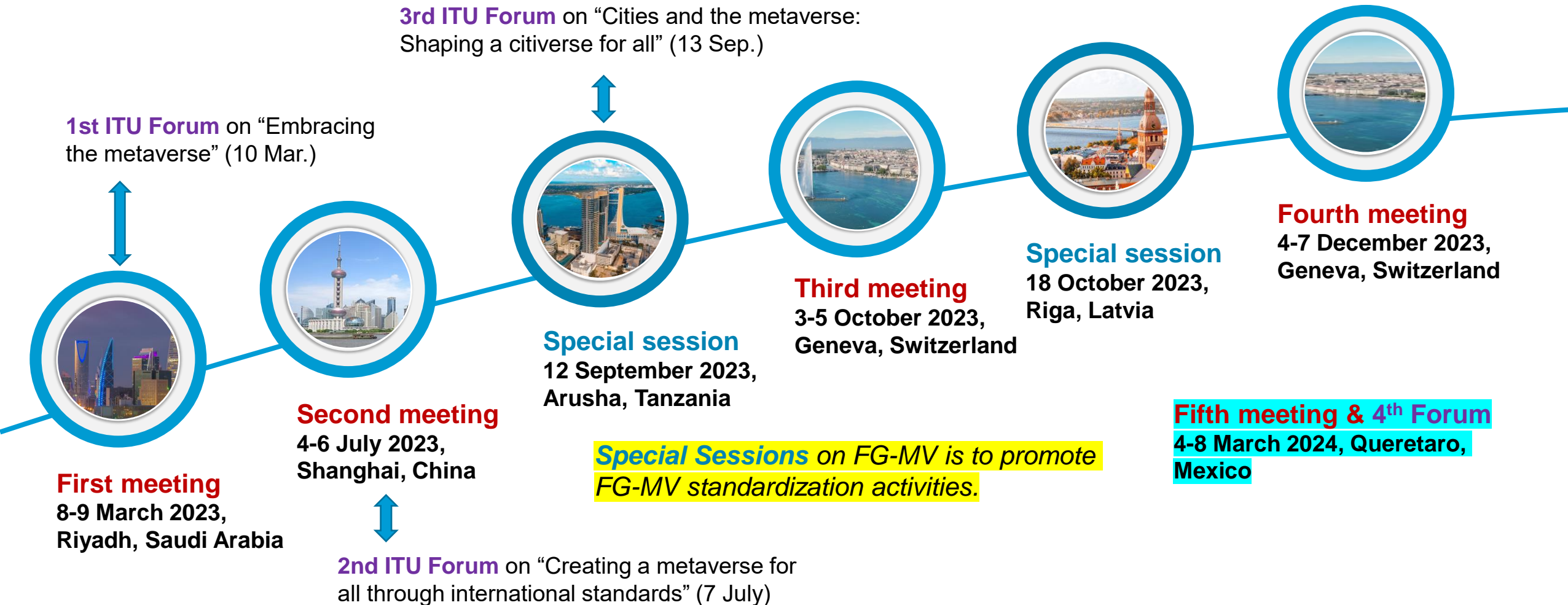| WG5	TS	Service scenarios and high-level requirements for metaverse cross-platform interoperability
	TS	High-level interoperability architecture for cross-platform metaverse
	TS	Interoperability of identity of things across metaverses
WG6	TR	Requirements and framework for digital identity system
	TS	Data management and security for things across metaverses
	TR	Risks, threats and potential harms in the metaverse
	TS	Security Framework for the Metaverse Architecture
	TS	Identity management Security guidelines in the metaverse
	TS	Guidelines for security management of using metaverse applications
	TS	Asset management Security guidelines in the Metaverse
TR [Approved, '23.10]		Guidelines for consideration of ethical issues in standards that build confidence and security in the metaverse
	TR PII	Embedding safety standards and the user control of Personally Identifiable Information (PII) in the development of the metaverse
	TR	Responsible use of AI for child protection in the metaverse
	TS	Children age verification in the metaverse
	TR	Extended reality and children: key issues and recommendations for government stakeholders, including policymakers and regulators, and technology companies
	TR	Trustworthy Metaverse
	TS	The framework of building a trustworthy digital human

Current Work Items (5 October, 2023)

WG7	TS	Economic Value Creation and Competition in metaverse
	TR	Regulatory and economic aspects in the metaverse: Data protection-related
	TR [Approved, '23.10]	Policy and regulation challenges of the metaverse
WG8	TS	Guidance on green and low carbon development of metaverse
	TS	Accessibility requirements for metaverse services supporting IoT
	TR	Interpreting in the metaverse
	TR [Approved, '23.10]	Guidelines to assess inclusion and accessibility in metaverse standards development
	TS [Approved, '23.10]	Requirements of accessible products and services in the metaverse: Part I – System design perspective
	TS [Approved, '23.10]	Requirements of accessible products and services in the metaverse: Part I – System design perspective
	TR	Accessibility for a sustainable metaverse
	TR	Guidance on how to build a metaverse for all
	TR	Guidance on accessibility of Web3 economy layer of the metaverse for women
	TS	Use of metaverse as a mitigation strategy for people with cognitive development difficulties in flood regions

Current Work Items (5 October, 2023)

WG8	TS [Approved, ;23.10]	Requirements and design criteria for sustainable metaverse systems
	TS	Incentive strategies to boost high-impact sustainable metaverse applications
	TS	Metrics and indicators to drive the design of sustainable metaverse applications
	TR	Metaverse social safety: mitigating harassment in the metaverse
WG9	TR	Standardization roadmap for metaverse
	TR	Gap analysis on metaverse standardization

Roadmap of FG-MV and Forum

3rd ITU Forum on "Cities and the metaverse: Shaping a citiverse for all" (13 Sep.)

1st ITU Forum on "Embracing the metaverse" (10 Mar.)

Fourth meeting
4-7 December 2023, Geneva, Switzerland

Special session
18 October 2023, Riga, Latvia

Third meeting
3-5 October 2023, Geneva, Switzerland

Special session
12 September 2023, Arusha, Tanzania

Second meeting
4-6 July 2023, Shanghai, China

First meeting
8-9 March 2023, Riyadh, Saudi Arabia

Fifth meeting & 4th Forum
4-8 March 2024, Queretaro, Mexico

Special Sessions on FG-MV is to promote FG-MV standardization activities.

2nd ITU Forum on "Creating a metaverse for all through international standards" (7 July)
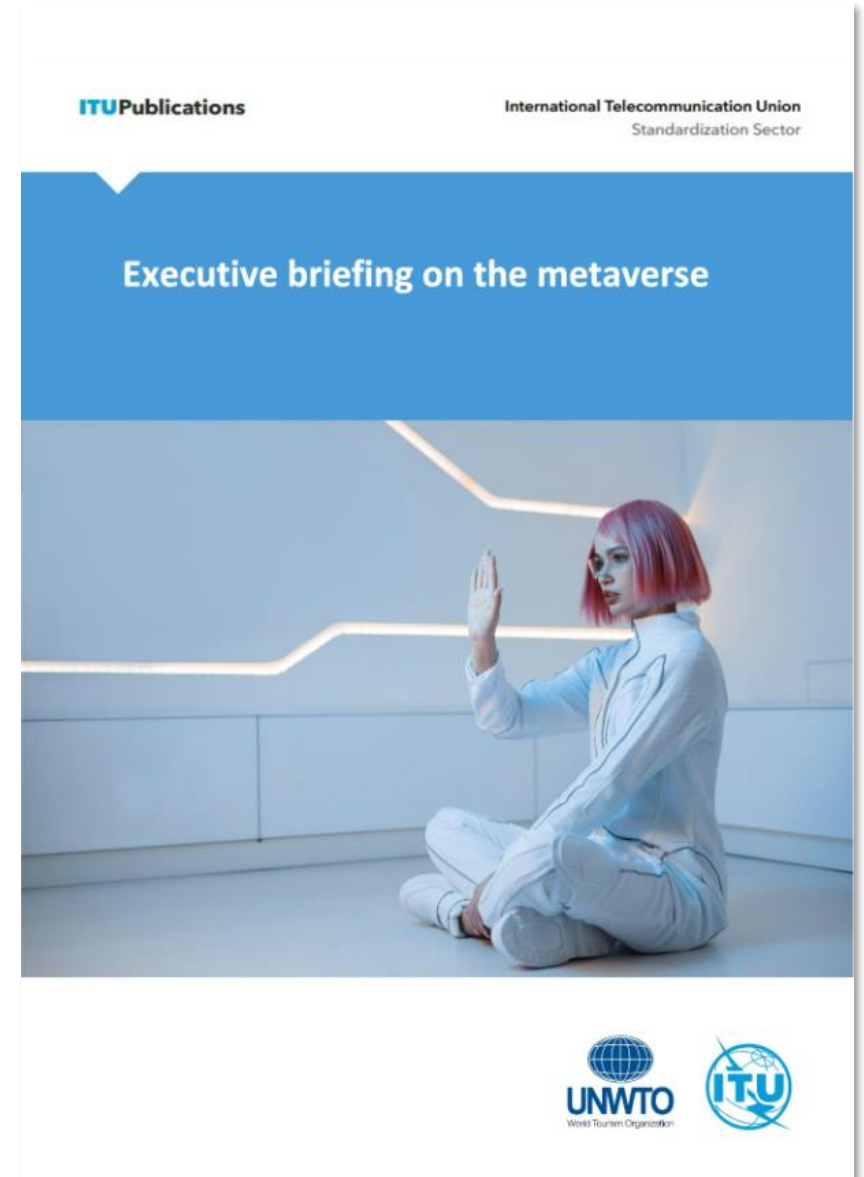
Executive briefing on metaverse

- Co-published by ITU and UNWTO

- Contributed and reviewed by more than **40 experts** of the FG-MV management team from **Africa**, **Asia**, **the Americas** and **Europe** with a background in **industry**, **government**, **academia**, and **UN agencies**

To download the executive briefing, please visit: www.itu.int/metaverse

1st ITU Forum on metaverse

Outcome document

650+

Participants in person and online

30+

speakers from governments, industries, UN agencies, SDOs

7 March 2023, Riyadh, Kingdom of Saudi Arabia

2nd ITU Forum on Creating a metaverse for all through international standards

7 July 2023, Shanghai, China

15,000+

Participants in person and online

Showcase of metaverse applications

Exhibition on ITU Focus Group on metaverse
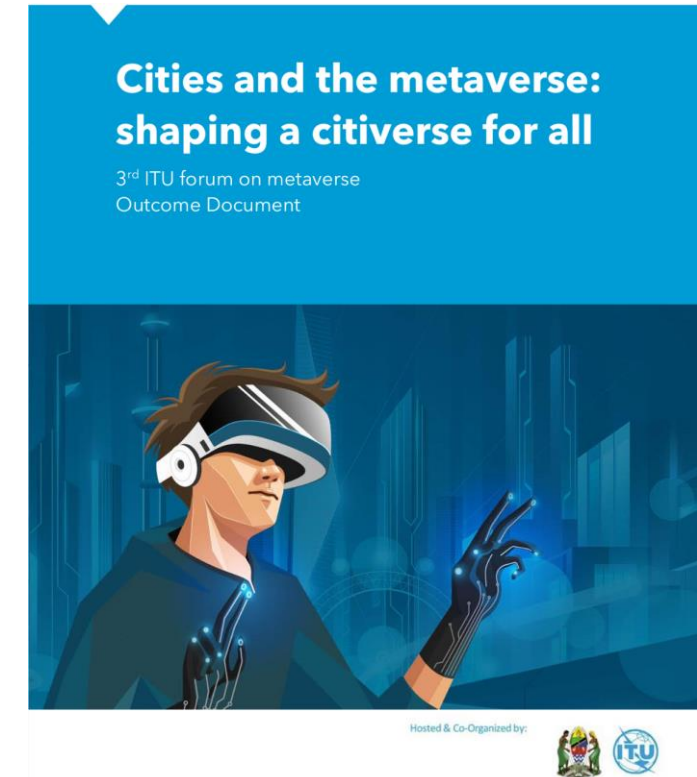

Outcome document

3rd ITU Forum on "Cities and the metaverse: Shaping a citiverse for all"

13 September 2023, Arusha, Tanzania

Outcome Document

- The Forum concluded with the adoption of the Arusha Call to Action

Thank you

Email
tsbfgmv@itu.int

Website
www.itu.int/metaverse