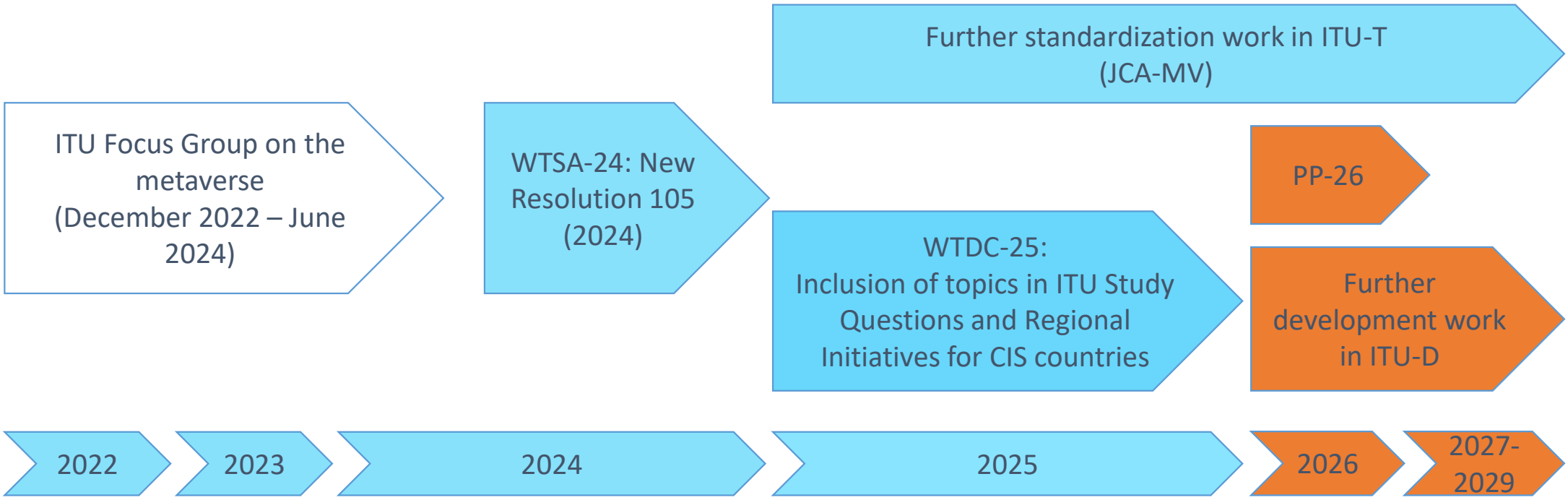
Optimal sets of metaverse services for social-value enterprises



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НАЦИОНАЛЬНЫЙ ИССЛЕДОВАТЕЛЬСКИЙ ЦЕНТР ТЕЛЕКОММУНИКАЦИЙ

ITU work on the metaverse



Outcomes of WTSA-24 relevant to the metaverse

Clear recognition of the importance of the metaverse topic in the ITU Telecommunication Standardization Sector:

- Endorsement of the results of the ITU Focus Group on the metaverse
- Adoption of new WTSA Resolution 105 on metaverse standardization
- Inclusion of metaverse aspects in several WTSA Resolutions (78, 98)
- Inclusion of metaverse standardization aspects in the terms of reference of a number of ITU-T Study Groups (12, 15, 17, 20, 21)

Outcomes of WTDC-25 relevant to the metaverse, concerning ITU-D Study Groups

Recognition of the need to address the deployment of the metaverse in the work of the ITU Telecommunication Development Sector:

- Inclusion of the study topic “The economic impact of new and emerging telecommunication/ICT services and technologies, including artificial intelligence (AI) and metaverse applications” in the scope of ITU-D Question 4/1

- Inclusion of the study topic “Case studies on the application of emerging technology tools, such as AI and the metaverse, in telecommunications/ICTs, and how they can contribute to digital transformation” in the scope of ITU-D Question 5/2

Key provisions of the Regional Initiatives for CIS countries adopted at WTDC-25, relevant to the metaverse

CIS1: Introduction of new and emerging telecommunication/information and communication technology systems and networks:

- Studies on the implementation of metaverse-related telecommunication/ICT systems and networks

CIS2: Telecommunication/information and communication technology education and skills, including for persons with disabilities and persons with specific needs:

- Use of metaverse for distance learning, including for persons with disabilities and persons with specific needs

CIS4: Enabling environment and telecommunication/information and communication technology regulation:

- Shaping of regulatory frameworks for artificial intelligence (AI) technologies and systems and for metaverse

Definitions of the metaverse

FG-MV - 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

ITU-T Recommendation Y.4238 - A collective virtual environment where physical and virtual worlds converge, that enables users to interact with shared digital spaces, objects and services

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

The metaverse has evolved from an immersive environment that extends the user's experience into a mirror environment that changes together with the user

The economics of the process has shifted from a “dopamine” economy (entertainment) to a “serotonin” economy (production)



Different sources provide such divergent metrics that any economic estimates are currently ineffective, given the difficulty of isolating the added effect of the metaverse in the IT sector

Let’s focus on the socio-economic effect

The digital divide

- Initially, the digital divide was understood as a network coverage gap, reflecting the technical availability of network infrastructure that could be used by consumers of telecommunication/ICT services

- The modern interpretation includes aspects of the usage gap for these services and related barriers, such as the affordability of services and devices, the availability of user devices, digital skills and literacy, measures to ensure trust and security in the use of telecommunications/ICT, etc.

- ITU terminology – The disparity of conditions between those populations that have widespread, easy and affordable access to digital broadcasting services and those that have difficult or no access.



Bridging the digital divide

Bridging the digital divide in the Russian Federation, given its vast territory and uneven population distribution, is one of the key priorities of the national telecommunication/ICT strategy. Measures include the use of the Universal Service Fund (USF) (telecom operators contribute 2% of their revenue to it), which is used to implement programs to reduce the digital divide.

The USF is regulated by Chapter 8 of the Federal Law “On Communications” and may be used to deploy certain telecommunication/ICT infrastructure to provide universal communication services in low-income settlements with a population of more than 100 people (with particular attention to settlements with a population of 100 to 1,000 people).

Composition of universal communication services

- telephone services provided using shared access facilities (payphones, multifunctional devices, information kiosks (infomats) and similar devices);
- data transmission and Internet access services provided using access points;
- mobile radiotelephone services provided using access points.

A new understanding of the metaverse leads to a new step in bridging the digital divide and in the structure of universal services



Social-value enterprises

- Medical institutions (hospitals, clinics, etc.); educational institutions (kindergartens, schools, universities, etc.);
- Social service institutions (nursing homes, boarding schools for people with physical disabilities, etc.);
- Sports facilities (sports complexes, swimming pools, etc.);
- Cultural institutions (museums, theaters, etc.);
- Public institutions.

Examples of use cases for metaverse

- Use case 1 “Maintenance service”. Using an augmented reality (AR) system with a detailed description of the interior systems to allow service technician to conduct the maintenance of different telecommunication and non-telecommunication systems;

- Use case 2 “Avatar telephony”. Using the interactive avatars or holographic images of speakers to establish video-calls;

- Use case 3 “Local interaction with offloaded processing”. Using extended reality (XR) system to navigate real or virtual objects remotely;

- Use case 4 “Immersive telepresence”. Using augmented/virtual (A/V) system and avatars to extend the remote participation systems allowing interactive experience

- Use case 5 “Remote participation in live event”. Using the XR system to remotely participate in live-actions

Use cases for metaverse services for social-value enterprises

- Use case 1 “Maintenance service” can be adapted for education in many sciences, such as biology, using an augmented reality (AR) system with a detailed description of the human body and its internal organs;

- Use case 2 “Avatar telephony” and use case 4 “Immersive telepresence” can also be used for distance education to increase immersion in the process, or in healthcare for conducting remote medical consultations;

- Use case 3 “Local interaction with offloaded processing” using extended reality (XR) with appropriate latency can be used for remote surgery;

- Use case 5 “Remote participation in live event” can be used for cultural facilities, such as interactive exhibitions, real-time concerts, etc.

Algorithm to identify optimal sets of metaverse services for social-value enterprises (1/2)

- Step 1 - Identify the pool of services provided using the metaverse
- Step 2 - Classify the service pool by significance: socially significant and/or commercial
- Step 3 - Determine the technical parameters for providing the service (network bandwidth, latency, other)
- Step 4 - Build a matrix of metaverse services
- Step 5 - Match existing communication technologies to the parameters defined in Step 3

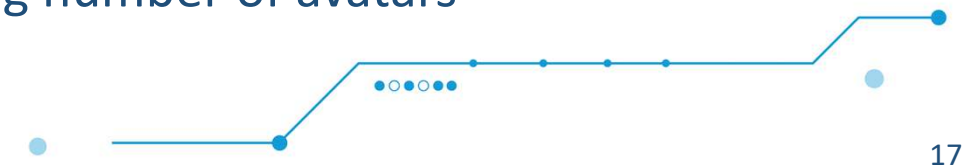
Algorithm to identify optimal sets of metaverse services for social-value enterprises (2/2)

- Step 6 - Determine the threshold number of avatars simultaneously accessing a single service or service block (see Step 2) within one network segment/server/mirror under current technologies

- Step 7 - Consider future communication technologies/projected required network parameters for seamless connection to all services/service block for a given number of avatars

- Step 8 - Determine the optimal number of avatars for various types of social institutions, both for current and projected/future technologies

- Step 9 - Identify and apply technical communication tools for automatically adjusting the segment/server/mirror to the dynamically changing number of avatars



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