

# Metaverse Is the Next Biggest Thing

## Advancing Digitalization from Intelligentization to Realitization

*Don't miss the next biggest thing!  
Join us to accelerate its arrival and ensure it benefits all.*

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IEEE-USA's 50th Anniversary Cruise

## ❖ **Metaverse is facing an unprecedented opportunity for explosive and disruptive growth.**

Our observations include:

- AI will help boost the development of Metaverse on both the supply and demand sides.
- Metaverse will also help boost the development of AI.
- Metaverse is the next stage of Digitalization.
- Metaverse is the next biggest thing.
- Metaverse will also play an important and constructive role in addressing sustainability challenges.

## ❖ **Join us to accelerate the take-off of the metaverse industry for sustainability and humanity.**

Let us work together on:

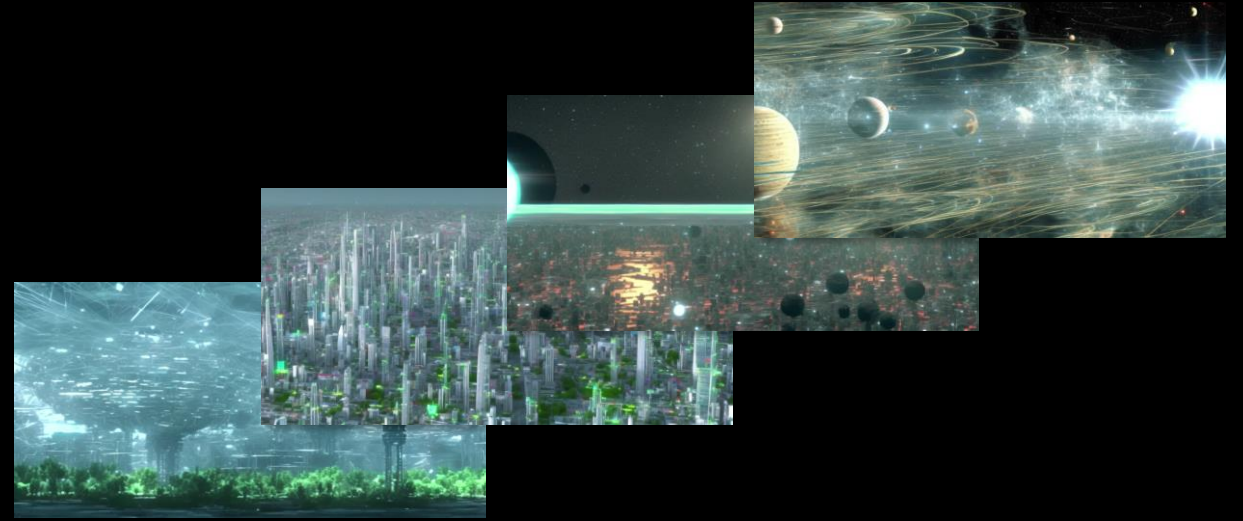
- Landscape, Outlook, and Roadmaps
- Open Standards, Conformity Assessment and Certification
- Open-Source Reference Implementations and Pilot Applications
- Digital Assets Pool and Exchange
- Innovation-Driving Competitions and Rankings
- Advocacy and Lobbying for Broad Acceptance and Adoption
- Coordination for Responsible Development: *Safety, Privacy, Ethics, Inclusion, and Sustainability*

# Background: Metaverse + AI

AI will help boost the development of Metaverse on both the supply and demand sides

## SUPPLY SIDE:

- Enriching the content
- Driving intelligent NPCs
- Understanding the worlds
- Understanding the users



Images created with DreamStudio (Stable Diffusion)

	“VR” Metaverse	“AR” Metaverse	“DT” Metaverse
Enriching the content	★ ★ ★	★ ★	★
Driving intelligent NPCs	★ ★ ★	★ ★	★
Understanding the worlds	★ ★	★ ★ ★	★ ★
Understanding the users	★ ★ ★	★ ★ ★	★

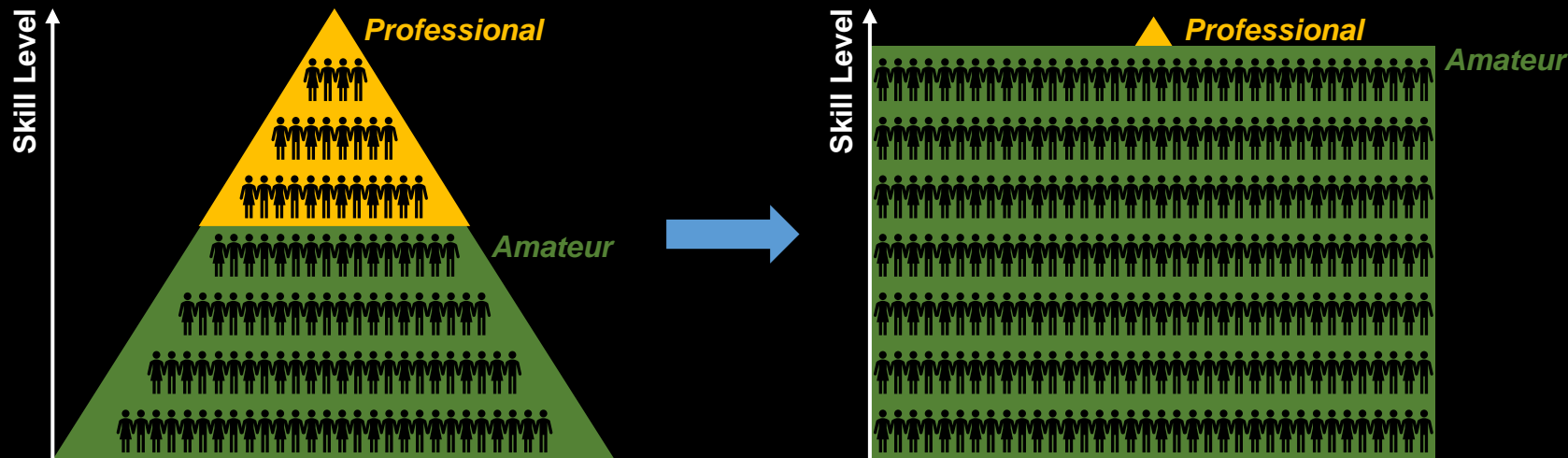
On the supply side, large-scale and fine-grained virtual worlds, including massive and diverse virtual scenes and virtual objects, will be created at a hundred or even a thousand times faster with the aid of Generative AI. Hundreds of millions of virtual characters, driven by Generative AI, will provide a variety of deeply personalized interactive experiences and services.

# Background: Metaverse + AI

AI will help boost the development of Metaverse on both the supply and demand sides

## DEMAND SIDE:

- New Job Opportunities
- Fewer Working Hours, More Leisure Time
- And more...



### Labor Market Transformation Driven by Generative AI

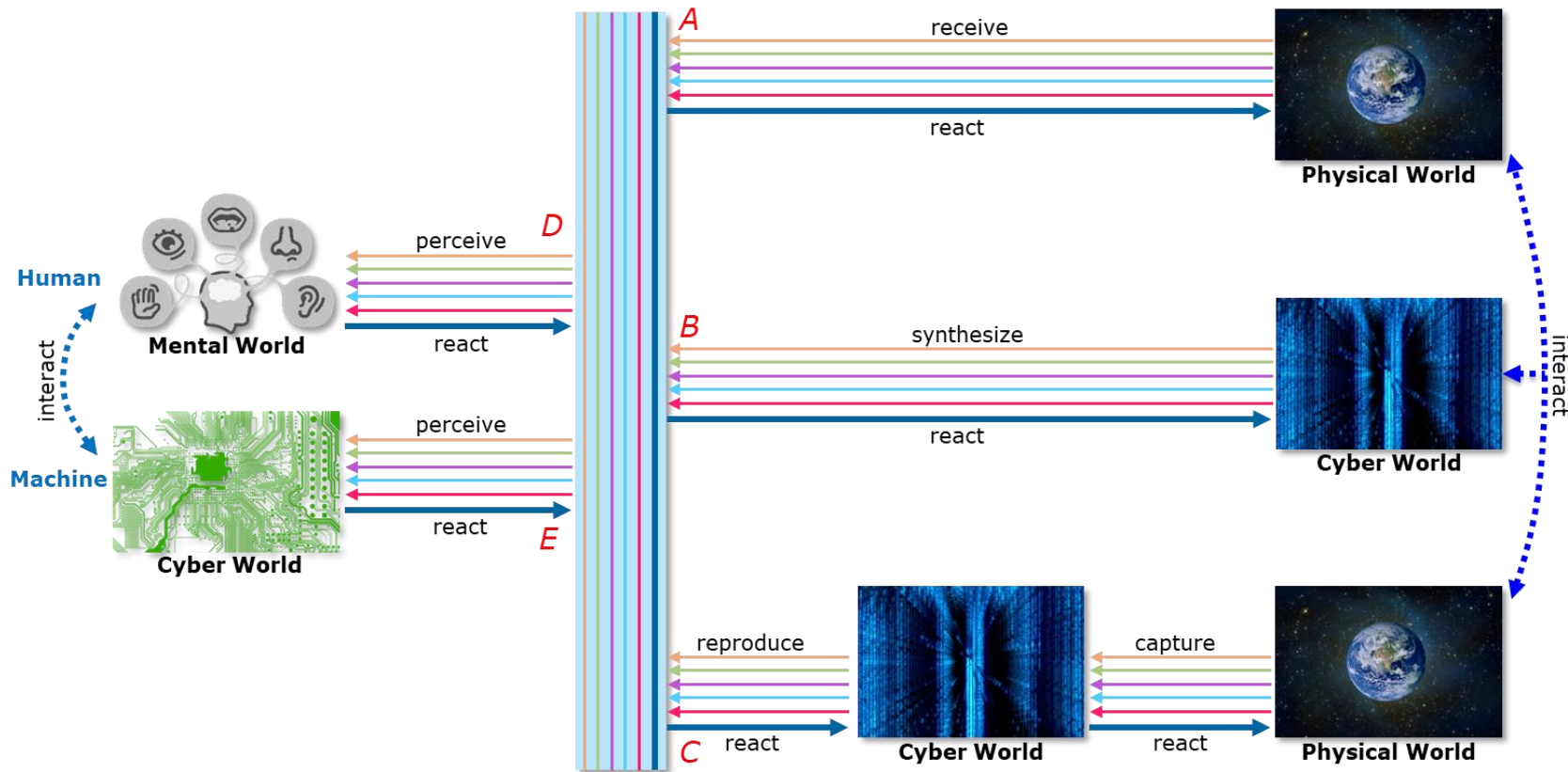
1. In many professions, generative AI will significantly improve the skills of amateurs.
2. As a result, only a very small number of people can continue to be called professionals and make a living doing it as a job.
3. Many people will have to look for new job opportunities or enjoy fewer working hours and more leisure time.
4. To accommodate these needs in metaverses is probably the most sustainable and cost-effective approach.

On the demand side, whether we like it or not, AI will replace a large amount of human labor. This is not only an inevitable trend but also something that is already happening. The labor market in the real world will polarize. Some people will greatly improve their work efficiency and excellence with the help of AI, gaining more opportunities. However, others will face competition from AI. Metaverse might be the best solution to accommodate the surplus labor force. People who are willing to work will have more job opportunities in metaverses. Those who don't wish to work can enjoy a relaxed and happy life in metaverses at a lower cost and with less energy consumption than in the real world. Another possibility is that all of humanity will reduce working hours to rest and enjoy life more. The labor market is essentially a competition among people, but it can be managed to avoid overwork and polarization, making AI work for the benefit of all humanity.

# Background: AI + Metaverse

## Metaverse will also help boost the development of AI

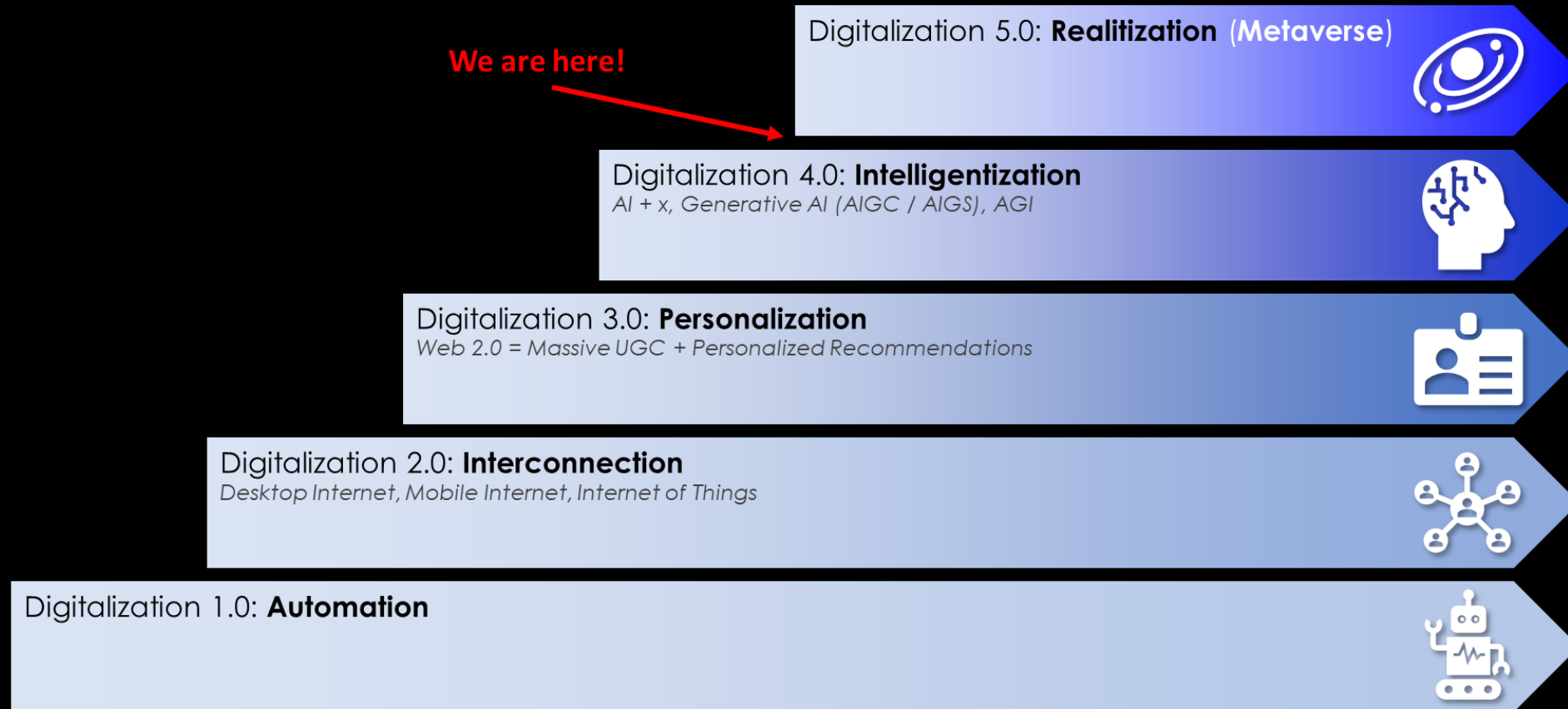
The further development of AI, including the generalization of capabilities of large models, the rise of embodied AI, and the emergence of Artificial General Intelligence (AGI), requires a "real world" training environment to obtain massive multimodal training data. Metaverse can provide such a training environment with the lowest cost and risk, and the highest efficiency and diversity, thereby helping boost the development of AI. **Training AI in metaverses will become the new paradigm for AI research and development.** For example, testing autonomous driving under various complex road conditions in a virtual world is one of the first sprouts of this new paradigm and has already become a common practice in the industry.



Digital Senses – Conceptual Diagram

# Background: Metaverse = Digitalization 5.0

## Metaverse is the next stage of Digitalization



## Digitalization 1.0 – 5.0

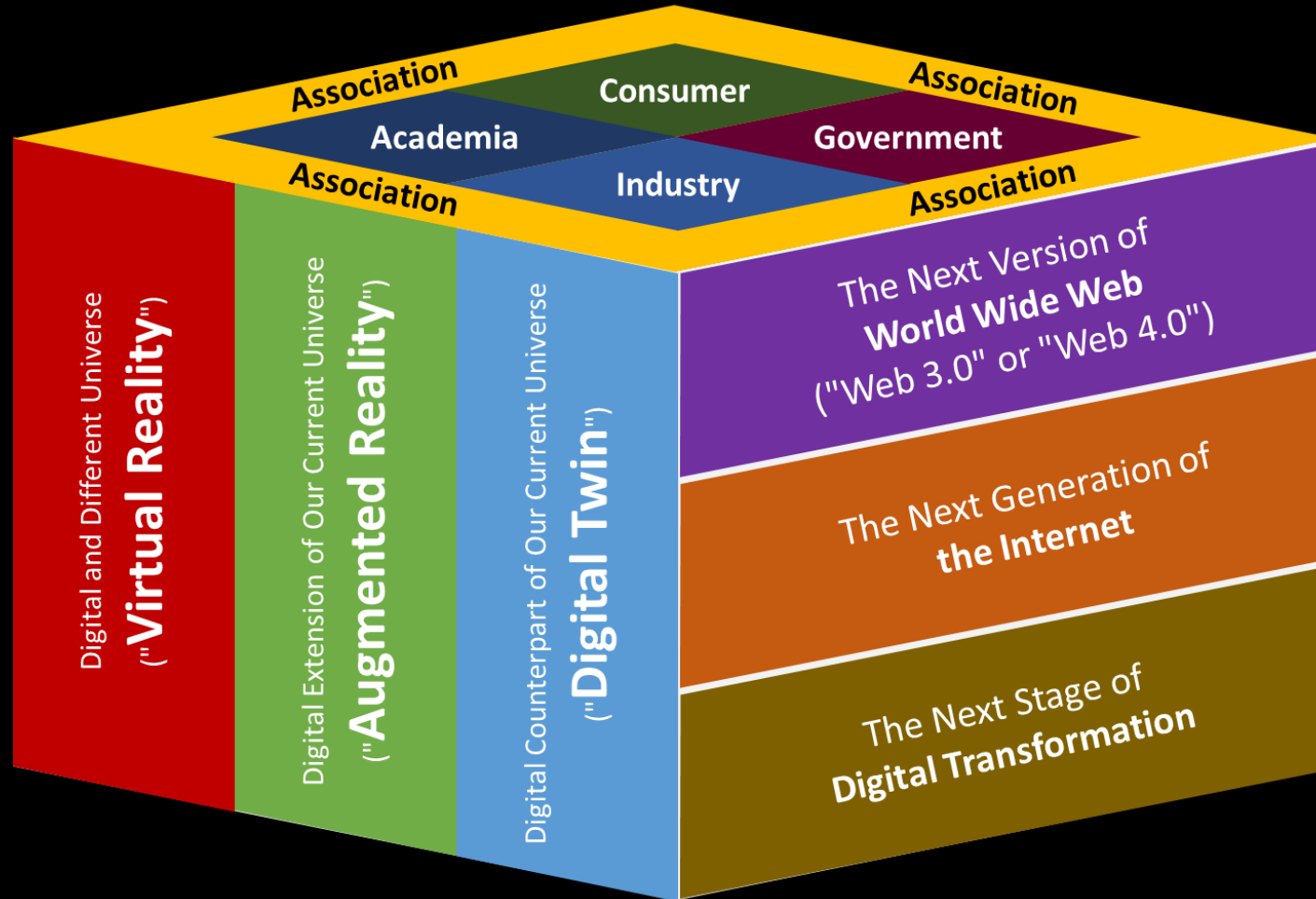
We are currently between two stages of Digitalization:  
the exploding *Intelligentization* and the upcoming *Realitization (Metaverse)*.

# Background: Metaverse × Everything

## Metaverse is the next biggest thing

### Experiential View

**Experiential View:** Metaverse refers to a kind of experience in which the outside world is perceived by the users (human or non-human) as being a universe that is built upon digital technologies as a different universe ("Virtual Reality"), a digital extension of our current universe ("Augmented Reality"), or a digital counterpart of our current universe ("Digital Twin").



### Functional View

**Functional View:** Metaverse is the next version of World Wide Web ("Web 3.0" or "Web 4.0"), the next generation of the Internet, and the next stage of Digital Transformation.

AI is transforming forces of production and relations of production, while Metaverse will redefine production and redefine life.

# Background: Metaverse & Sustainability

## Metaverse will also be a cure for sustainability challenges

- We need to develop and build metaverse infrastructure with low energy consumption and low carbon emissions as far as possible;
- Metaverse can also be used in environmental protection education, climate science research and other fields to provide more support for tackling global climate change;
- **Metaverse will transfer more and more activities from the real world to digital worlds, reducing energy consumption and carbon emissions;**
- Collectively, metaverse will provide an effective path to promote sustainable development and address climate change.



We should advance metaverse technology in a sustainable manner and for greater sustainability.



# IEEE DRIVES STANDARDIZATION EFFORTS TO PAVE THE ROAD TO THE METAVERSE

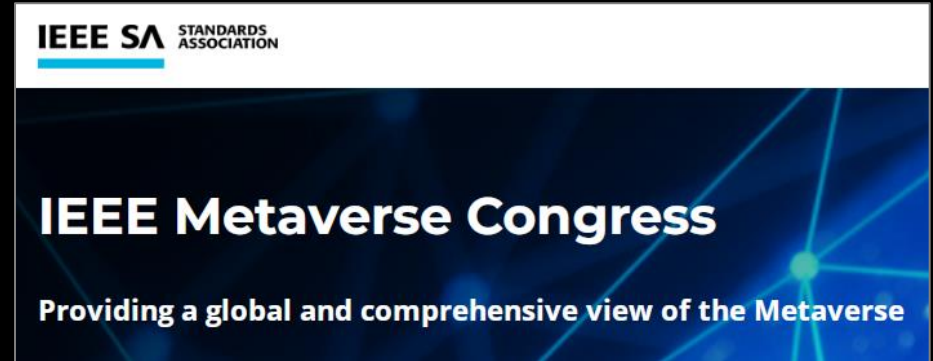
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# IEEE METAVERSE CONGRESS

[metaverse.ieee.org](https://metaverse.ieee.org)

## A series of virtual or hybrid sessions

- SESSION 0 (Pilot): **Forum about the Metaverse** | 14 Jun 2022 | Hybrid (Toronto, Canada)
- SESSION 1 (Kickoff): **Demystifying and Defining the Metaverse** | 6 Jul 2022 | Virtual
- SESSION 2: **The Metaverse and Its Rapid Growth in China** | 9 Jul 2022 | Virtual
- SESSION 3: **Developing and Deploying the Metaverse** | 27 Sep 2022 | Virtual
- SESSION 4 (Shenzhen Summit): **New Opportunities from the Metaverse and the New Wave of Digital Economy** | 30 Sep 2022 | Hybrid (Shenzhen, China)
- SESSION 5: **Behind and Beyond the Metaverse** | 8 Dec 2022 | Virtual
- SESSION 6: **Behind and Beyond the Metaverse – Year-end Wrap-up** | 27 Dec 2022 | Virtual
- SESSION 7 (Davos Special Session): **The Future of the Web, the Internet, and the Metaverse** | 17-19 Jan 2023 | Hybrid (Davos, Switzerland)
- SESSION 8 (Bangalore Summit): **Onboarding Metaverse – From Infrastructure to Applications** | 6 Feb 2023 | Hybrid (Bangalore, India)
- SESSION 9: **New Year, New Momentum** | 14 Feb 2023 | Virtual
- SESSION 10: **New Trends, New Opportunities** | 28 Feb 2023 | Virtual
- SESSION 11 (New York Summit): **Advancing Metaverse for Economic Growth and Sustainability** | 14 Apr 2023 | Hybrid (New York, NY, USA)
- SESSION 12: **Metaverse on the Brink of Accelerated Growth** | 24 Apr 2023 | Virtual
- SESSION 13 (AWE USA Special Session): **Redefining Web 3.0 and Accelerating Metaverse for Greater Sustainability** | 31 May-2 Jun 2023 | Hybrid (Santa Clara, CA, USA)
- SESSION 14 (WAIC Special Session): **The Synergistic Acceleration of Metaverse and AI Development** | 6 Jul 2023 | Hybrid (Shanghai, China)
- SESSION 15 (Kyoto Summit): **Metaverse Revolution, Web 3.0 Standardization, and NFT Construction for Virtual Economy** | 26-27 Jul 2023 | Hybrid (Kyoto, Japan)
- More to come...



With about 480000 attendees collectively, IEEE Metaverse Congress has been one of the best-known events in the global metaverse industry.

# IEEE STANDARDS AND PROJECTS FOR METAVERSE

Many metaverse-related standards and projects are NOT listed here if their titles do not explicitly include “metaverse”

- **P2048 Standard for Metaverse: Terminology, Definitions, and Taxonomy**

Status: Project approved by IEEE SASB on 10 November 2022

- **P7016 Standard for Ethically Aligned Design and Life Cycle of Metaverse Systems**

Status: Project approved by IEEE SASB on 10 November 2022

- **P7016.1 Standard for Ethically Aligned Educational Metadata in Extended Reality (XR) & Metaverse**

Status: Project approved by IEEE SASB on 30 March 2023

- **P3812.1 Standard for General Requirements for Identity Framework for Metaverse**

Status: Draft Standard approved by IEEE SASB on 21 September 2023

- **P3231 Standard for a Blockchain-based Energy Metaverse Application Model, Framework, and Requirements**

Status: Project approved by IEEE SASB on 5 June 2023

- **P3819 Standard for Metaverse Financial System - Reference Architecture and Technical Requirements**

Status: Project approved by IEEE SASB on 29 June 2023

- **P3422 Recommended Practice for Metaverse Ecosystem Reference Models**

Status: Project approved by IEEE SASB on 21 September 2023

- **IC22-012 Persistent Computing for Metaverse Initiative**

Status: Activity approved by IEEE SA CAG on 12 October 2022

- **IC22-015 Decentralized Metaverse Initiative**

Status: Activity approved by IEEE SA CAG on 12 October 2022

- **See also “Why Are Standards Important for the Metaverse?”**

<https://standards.ieee.org/beyond-standards/industry/technology-industry/why-are-standards-important-for-the-metaverse/>



# IEEE-ISTO Metaverse Acceleration and Sustainability Association

## Introduction and Call for Participation

*Don't miss the next biggest thing!  
Join us to accelerate its arrival and ensure it benefits all.*

## Vision

- Metaverse Acceleration and Sustainability Association (MASA) will be essential to the global metaverse community as a leading platform for metaverse-related collaborations and collective efforts such as open and responsible metaverse development toward a bright future where metaverse is adequately advanced, equitably accessible, and globally embraced for the benefit of humanity.

## Mission

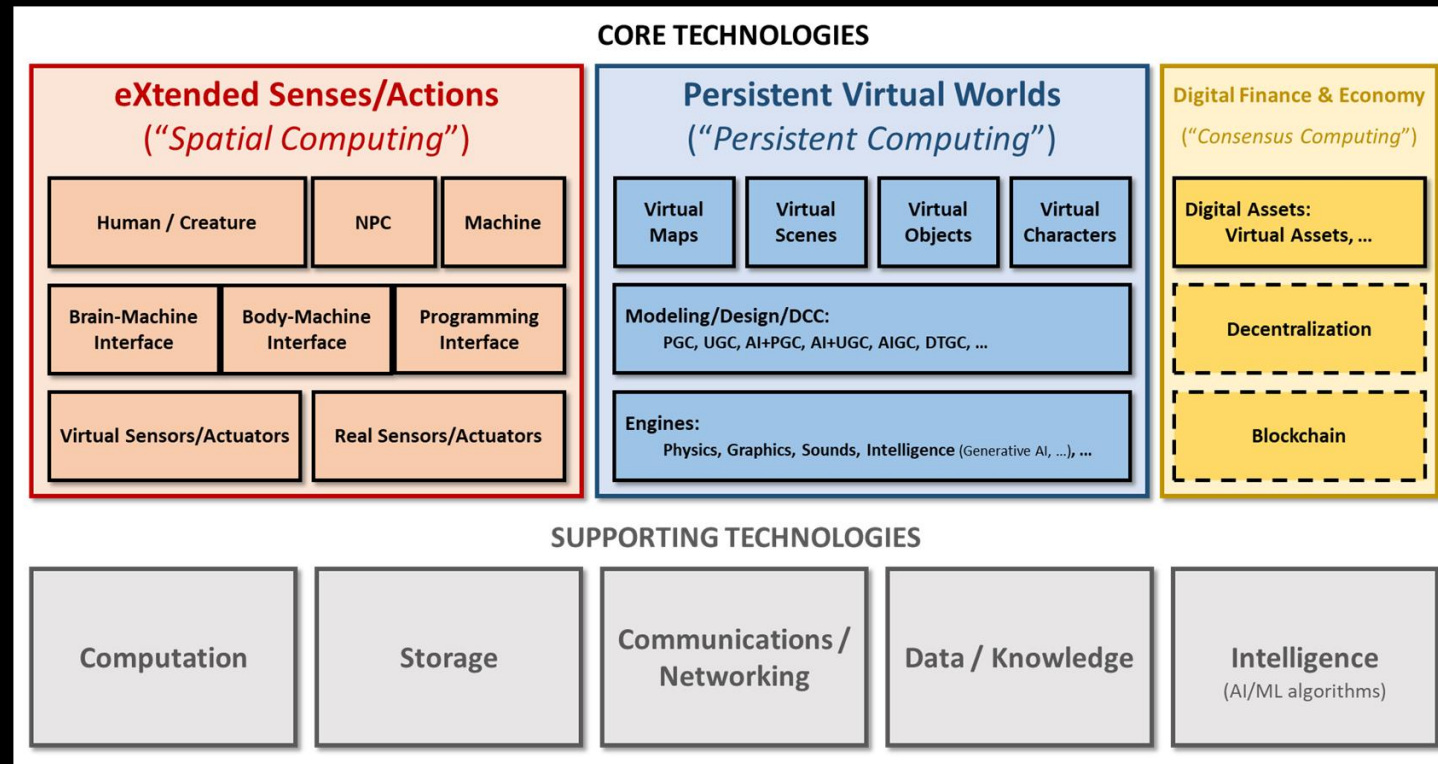
- The mission of the Metaverse Acceleration and Sustainability Association (MASA) is to undertake activities to accelerate the development of metaverse-related technologies, ecosystems and markets across the world, and to do so in a sustainable manner, supporting sustainable development goals.

Our workstreams include but are not limited to:

- Landscape, Outlook, and Roadmaps
- Open Standards, Conformity Assessment and Certification
- Open-Source Reference Implementations and Pilot Applications
- Digital Assets Pool and Exchange
- Innovation-Driving Competitions and Rankings
- Advocacy and Lobbying for Broad Acceptance and Adoption
- Coordination for Responsible Development: *Safety, Privacy, Ethics, Inclusion, and Sustainability*

# MASA Workstream #1:

## Landscape, Outlook, and Roadmaps



Metaverse Technology Landscape

## Metaverse Technology Landscape, Outlook, and Roadmaps

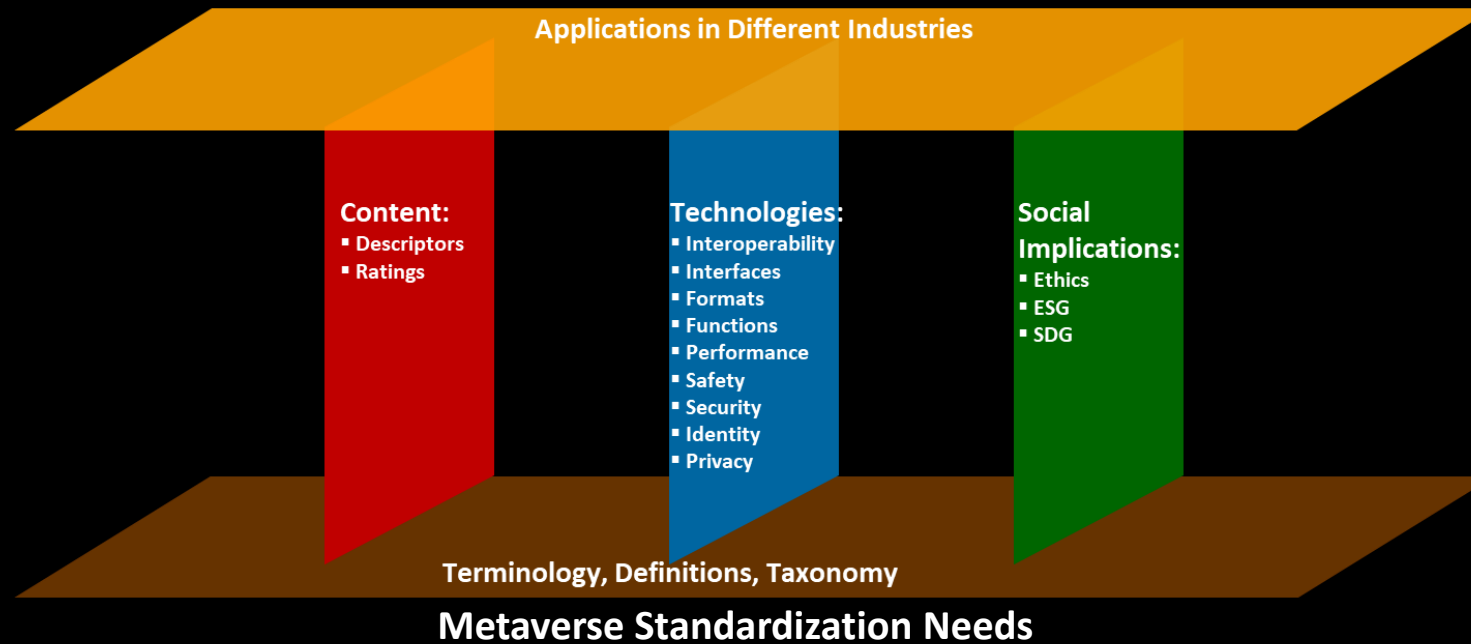
- To be developed and updated annually, semi-annually, or quarterly

## Metaverse Global Market Analysis and Business Outlook

- To be developed and updated annually, semi-annually, or quarterly

# MASA Workstream #2:

## Open Standards, Conformity Assessment and Certification



### Open Standards for Metaverse

- Cross adoption and open access for a recommended set of metaverse-related standards from different SDOs
- “Fast-lane” standards development for metaverse-related standardization gaps
- Through IEEE SA Industry Affiliate Network (IAN)
- Welcoming partnership with other organizations: MSF, OMA3, Khronos Group, AOUSD, MPAI, W3C, etc.

### Metaverse Conformity Assessment and Certification

- Through IEEE Conformity Assessment Program (ICAP)

# MASA Workstream #3:

## Open-Source Reference Implementations and Pilot Applications

### Open-Source Metaverse Reference Implementations

- Including but not limited to software, hardware, design, data
- To enable extended senses/actions
- To build persistent virtual worlds
- To support digital finance and economy
- Through IEEE SA Open

### Metaverse Pilot Applications

- In various niche markets and vertical industries
- Cooperating with Persistent Computing for Metaverse Initiative
- Cooperating with Decentralized Metaverse Initiative
- Cooperating with IEEE VR/AR Advisory Board
- Seeking partnership with investors

#### IEEE SA OPEN

Welcome to IEEE SA Open

A community-powered platform for open source projects.

##### Impact through Open Source

Open source has changed the landscape of technology development, speeding innovation and enabling radical advancements in the way we live, work and communicate. It has also impacted the standards world, providing opportunities for dynamic new collaborations that can further advance and improve technology. Aligned with IEEE's mission, values, and body of work, IEEE SA Open supports standards through building communities of technology collaboration.



##### About IEEE SA Open

IEEE SA Open is a comprehensive open source development platform designed to bring together:

- The power of robust, familiar open source development tools with IEEE's unparalleled network, technical expertise and resources that empower independent software developers, startups, projects, foundations and industry organizations around the world to create, test, manage and deploy projects in a collaborative, safe and responsible environment.
- Global standards development and open-source developer communities working to accelerate the development and adoption of technical solutions.
- People and organizations that have common goals to drive innovation for technological advancements that positively impact the way people live, work, and communicate.

##### Why IEEE SA Open?

IEEE SA Open is a comprehensive open source development platform that promotes diversity and inclusiveness. We foster community success with a strong infrastructure, tech support, and training. IEEE SA Open helps bridge the gap between global standards, corporations, non-for-profits, government, academia, and open-source communities with experienced and neutral governance.

Benefits of IEEE SA Open include:

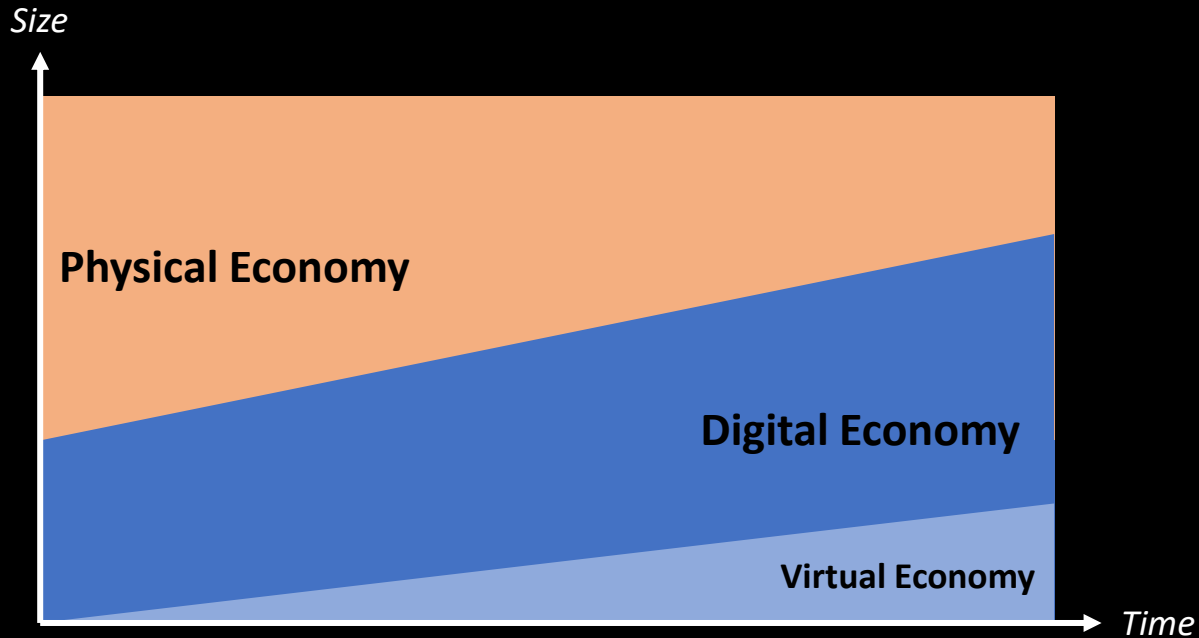
- "Open" governance model to help guide participants through development, testing, management and deployment of innovative projects
- Access to a diverse community of IEEE members from across many technical disciplines and fields
- Grounded in an organization deeply experienced in facilitating technological research, advancement, and change for decades
- Aligned with IEEE's principles of openness, transparency, consensus and inclusion





# MASA Workstream #4:

## Digital Assets Pool and Exchange



Generative AI will force the physical economy to shift towards the digital economy. Massive amounts of native digital assets will drive up the demand for ownership and transactions in the form of virtual assets.

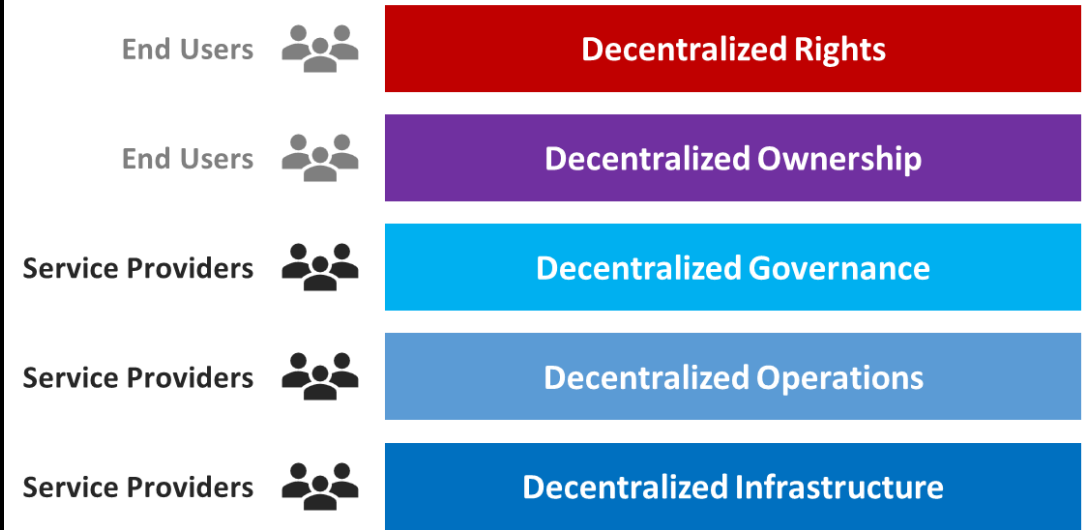
### Metaverse Digital Assets Pool

- Licensing services for models, designs, virtual assets, and more

### Metaverse Digital Assets Exchange

- Trading services for models, designs, virtual assets, and more

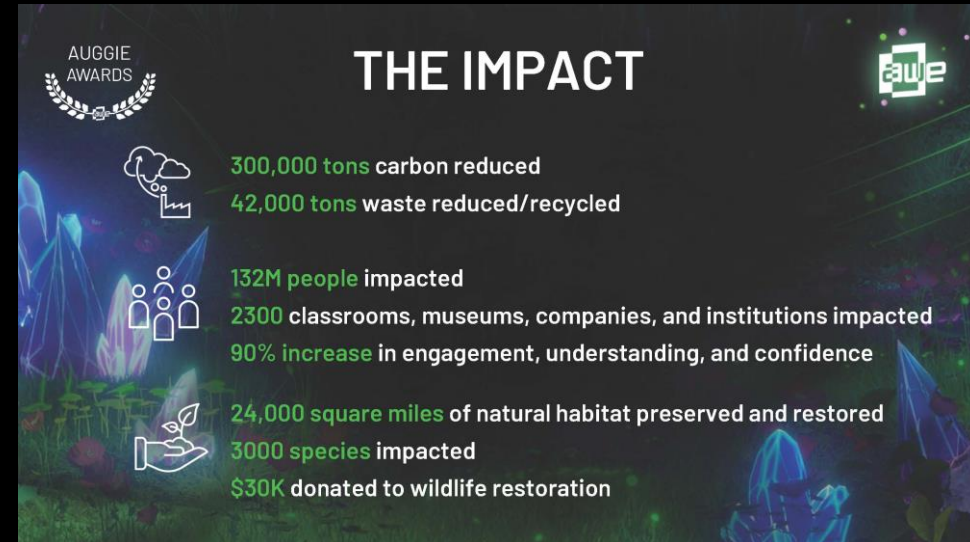
When we talk about decentralization, what exactly do we mean?



Generative AI has lowered the barriers to production. Tasks that required a group of people to form a company can now be done by a single individual. This will drive a transformation of production relations towards decentralization.

# MASA Workstream #5:

## Innovation-Driving Competitions and Rankings



Reference Case: 2023 AWE XR PRIZE

## Metaverse Development and Creation Competitions

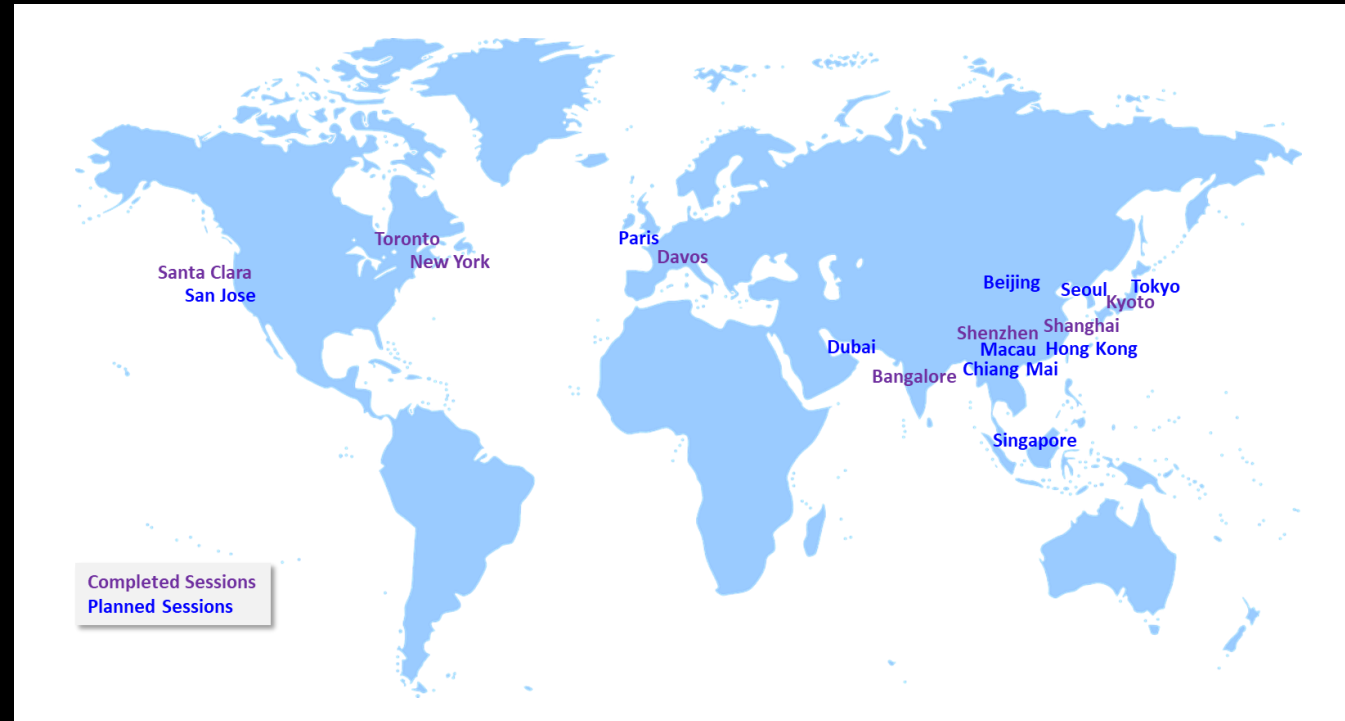
- Contests, hackathons, challenges
- Seeking partnership with other competitions and events: AWE, CES, etc.

## Metaverse Product and Service Rankings

- To constructively foster innovation

# MASA Workstream #6:

## Advocacy and Lobbying for Broad Acceptance and Adoption



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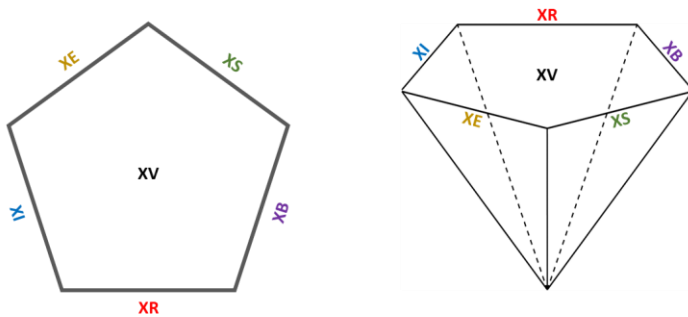
## Advocacy and Lobbying for Broad Acceptance and Adoption of Metaverse

- To industry and academia
- To governments and policymakers
- To consumers and the public

# MASA Workstream #7:

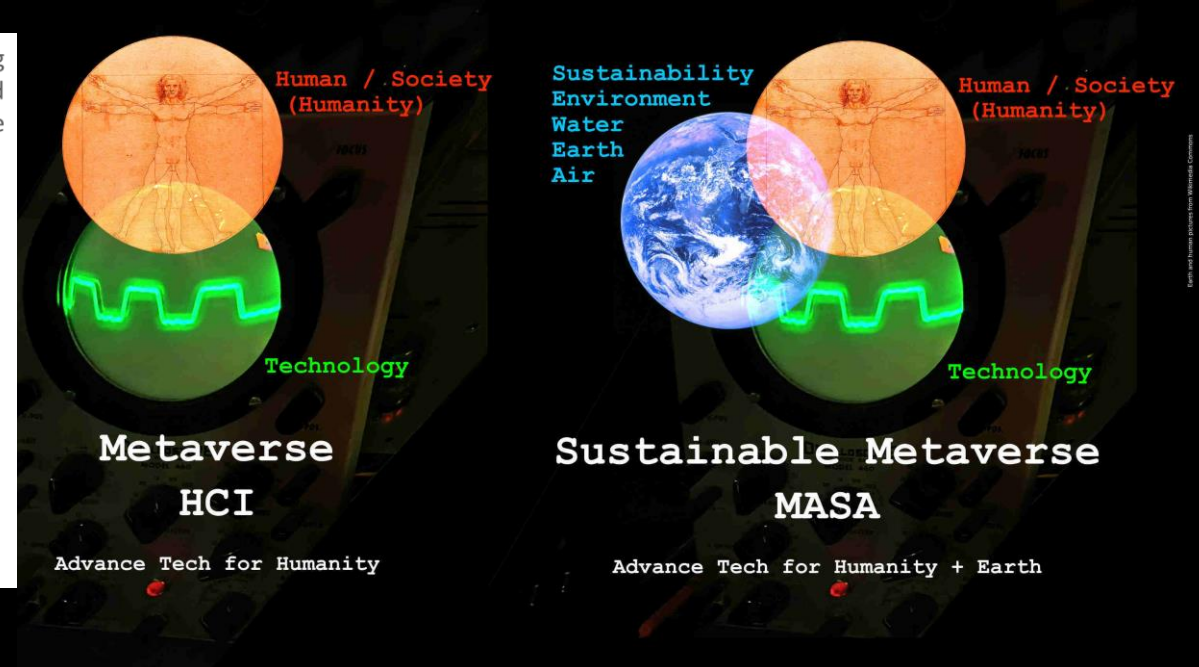
## Coordination for Responsible Development: Safety, Privacy, Ethics, Inclusion, and Sustainability

**XV** (eXtended meta/uni/Verse) combines **XR** (eXtended Reality, perceived with senses or peripherals including neural interfaces), **XI** (eXtended Intelligence), **XB** (eXtended Being, including Digital Twin), **XE** (eXtended Economy), and **XS** (eXtended Society) into a vision that covers the generally agreed scope of **metaverse** while extending the impacts and emphasizing the implications on our consciousness and humanity.



**XV** (eXtended meta/uni/Verse) = **XR** (eXtended Reality) \* **XI** (eXtended Intelligence) \* **XB** (eXtended Being) \* **XE** (eXtended Economy) \* **XS** (eXtended Society)

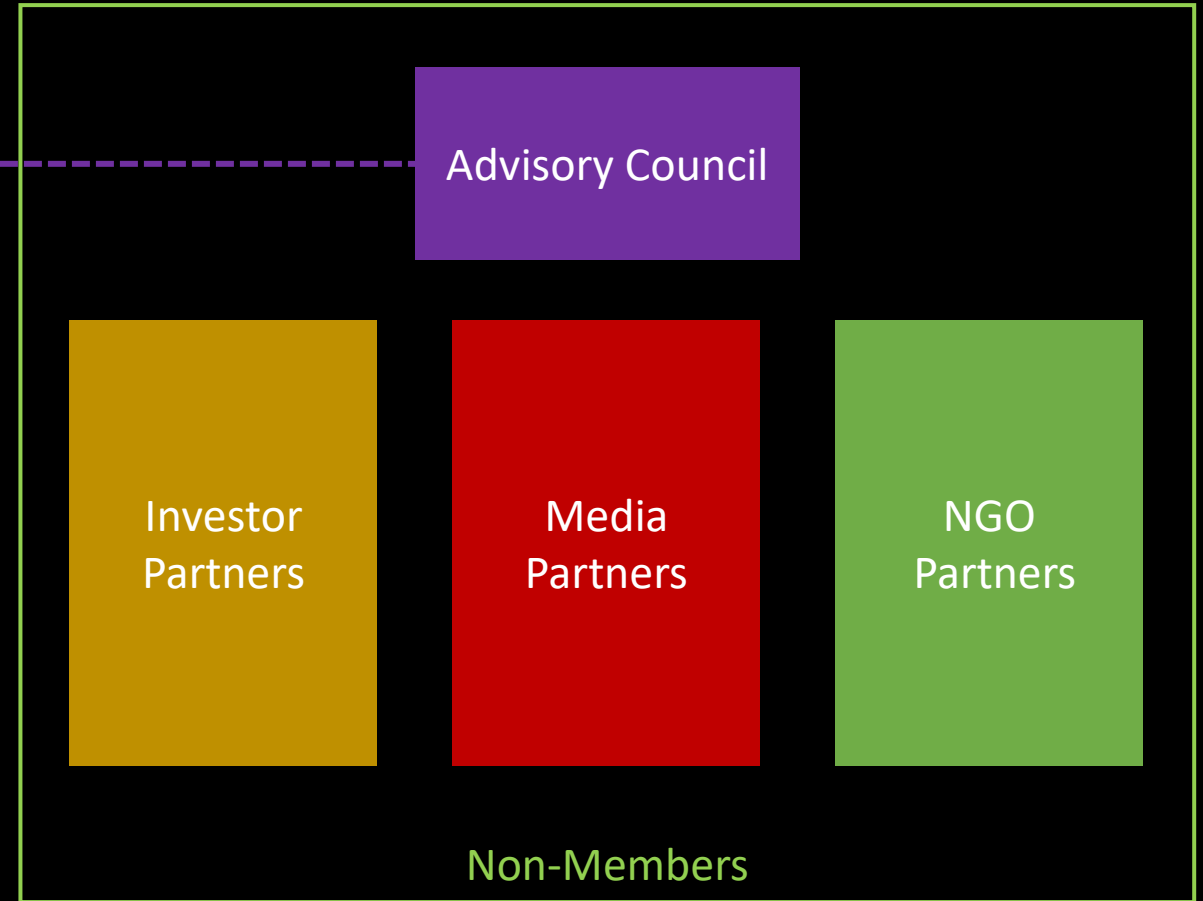
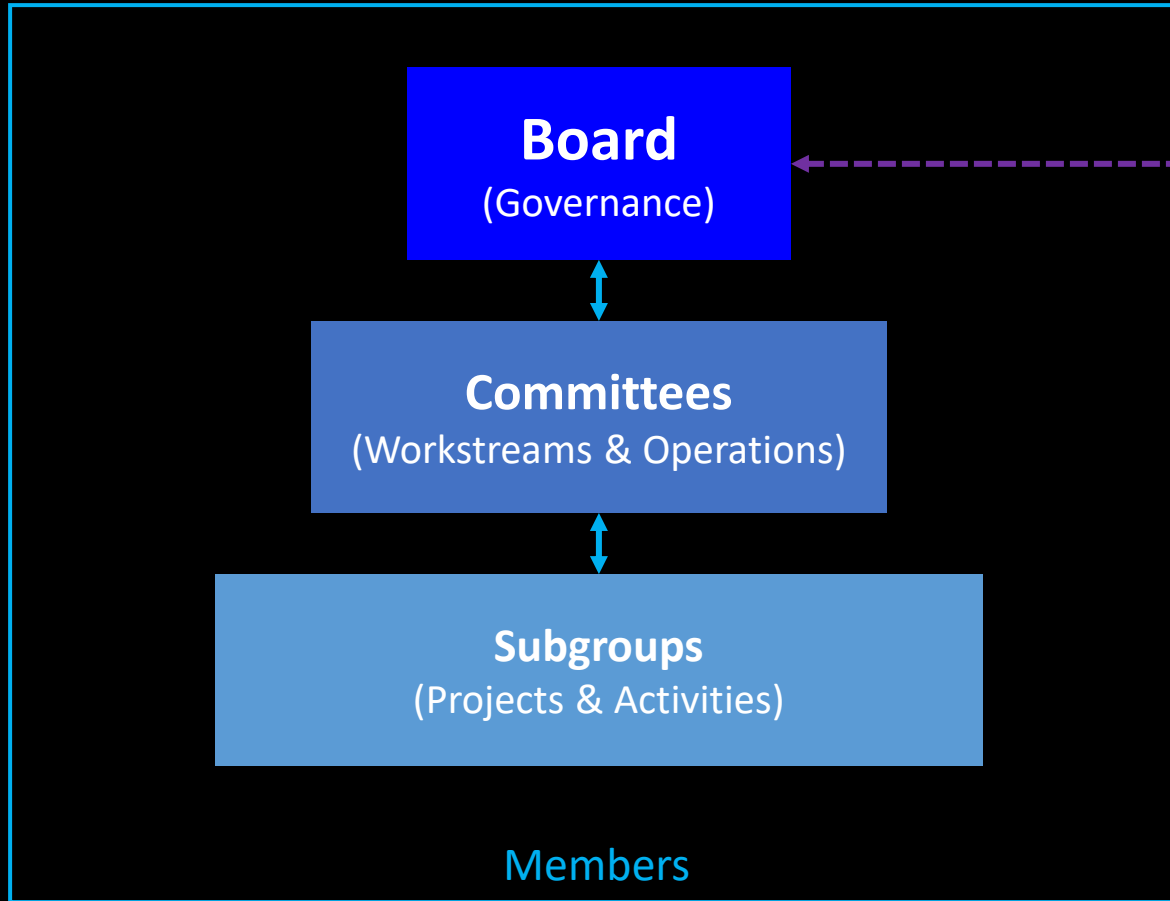
**XV** (eXtended meta/uni/Verse) proposed by Steve Mann and Yu Yuan in November 2022



## Coordination for Responsible Metaverse Development

- Principles for Responsible Metaverse Development: Safety, Privacy, Ethics, Inclusion, Sustainability
- Quantitative metrics to analyze the overall impact of metaverse on sustainability

# MASA Structure and Membership Levels



Membership Level (Entity Member)	Committee Contribution	Committee Ballot	Committee Leadership	Board Governance	Membership Dues
Board Member	Yes	Yes	Yes	Yes	\$50,000/year
Advanced Member	Yes	Yes	Yes	No	\$20,000/year
Regular Member	Yes	Yes	No	No	\$10,000/year
Associate Member	Yes	No	No	No	\$2,000/year

# MASA Advisors



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**Vint Cerf**

"Father of the Internet"



**Thomas A. Furness III**

"Grandfather of Virtual Reality"



**Steve Mann**

"Father of Wearable Computing  
and Augmented Reality"



**Michael Grieves**

"Father of Digital Twin"



**Monique Morrow**

President & Co-Founder,  
The Humanized Internet



**Tom Coughlin**

2023 IEEE President-Elect;  
2024 IEEE President & CEO



**Philip Rosedale**

Founder of Second Life



**Leonardo Chiariglione**

Founder of MPEG;  
President of MPAA



**Ori Inbar**

Founder & CEO,  
Augmented World Expo



**Eva A. Kaili**

Member of European Parliament;  
2022 VP of European Parliament



**Marc Petit**

Co-Host of  
BuildingTheOpenMetaverse.Org;  
Former VP of Unreal Engine at  
Epic Games

# MASA Team



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**Yu Yuan, PhD**

Founder



**Ramesh Ramadoss, PhD**

Acting Executive Director



**Arpana Patel**

Program Manager, IEEE-ISTO



**Janice Carroll**

Sr. Alliance Program Membership  
Manager, IEEE-ISTO

# Join MASA Today

## Call for Founding Members

### Why Join MASA?

- **“United we stand, divided we fall.”** Join MASA for cooperative endeavors that offer a steadfast path for industry advancement amidst market shifts and hype cycles.
- **“The best way to predict the future is to create it.”** Join MASA to actively participate in workstreams that not only predict the future but also work in practical ways to turn those predictions into reality.
- **“If you are not at the table, you are probably on the menu.”** Join MASA to ensure you are not absent from any crucial consensus-building that shapes the future of metaverse.

### Why Now?

- **Unprecedented Opportunities:** AI will not only comprehensively enable metaverse but also indirectly make metaverse an essential component of our lives. Further advancements in AI will also rely on metaverse. All these factors are driving metaverse toward explosive growth. Don't miss this unique chance to shape an industry on the verge of remarkable progress.
- **Pressing Challenges:** Climate change, labor market transformation, and other sustainability challenges demand urgent and innovative solutions. Metaverse may well be one of the most effective solutions. Join us now in addressing global challenges with metaverse and ensuring metaverse benefits all.



# About IEEE and IEEE-ISTO

## IEEE

- **The Institute of Electrical and Electronics Engineers (IEEE)** is the world's largest technical professional organization dedicated to advancing technology for the benefit of humanity. IEEE has:
  - Over 427,000 members in more than 190 countries
  - More than 5 million documents in the IEEE Xplore® digital library, with more than 15 million downloads each month
  - An active portfolio of more than 1,000 standards and more than 1,000 projects under development
  - More than 200 transactions, journals, and magazines
  - More than 2,000 conferences and events in 106 countries
- **The IEEE Standards Association (IEEE SA)** is one of the six major organizational units of IEEE. IEEE SA shall establish, coordinate, develop, approve, and revise IEEE standards and conduct other standards-related activities in fields of interest to IEEE. IEEE SA shall be the IEEE interface in standards-related matters with external bodies.



## IEEE-ISTO

- **The IEEE Industry Standards and Technology Organization (ISTO)** was established in January 1999 as a federation of member alliance programs with the aim of supporting accelerated technology standards development and market adoption for industry. ISTO mentors communities developing, certifying, and promoting their technology standards, best practices, guidelines, open source, and implementation activities.



# Contact Us



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Dr. Yu Yuan, President of IEEE Standards Association (IEEE SA), Treasurer of Metaverse Standards Forum (MSF), is a visionary scientist, inventor, entrepreneur, and investor in the areas of Consumer Technology, Multimedia, Virtual Reality, Internet of Things, and Digital Transformation. He has been a passionate volunteer in various leadership positions at IEEE and other professional organizations. He is also serving as a member of the IEEE Board of Directors, a member of the IEEE Consumer Technology Society (CTSoc) Board of Governors, a member of the IEEE Blockchain Technical Community (BCTC) Governing Board, a member of the IEEE Brain Technical Community Steering Committee, a member of the Metaverse Standards Forum (MSF) Board of Directors, the Honorary President of the Japan International Metaverse Association, and the Executive Vice Chair of the China Institute of Communications (CIC) Blockchain Committee. He has a Ph.D., an M.S., and a B.S. in Computer Science from Tsinghua University.