A Unique Organization Supporting the Open Evolution of the Internet

Overview
January 2024
The metaverse combines the connectivity of the Web with the immersiveness of Spatial Computing through enabling multiple disruptive technologies to work together (AI, GPU, XR, Web3, 5G/6G).

Building bridges between applications to scale beyond a series of disconnected silos.

Depends on Interoperability

Evolving a platform that is open and inclusive for all – an immersive evolution of the web.

Pervasive metaverse interoperability will need a constellation of open standards ... ... involving 100s of standards organizations (SDOs).

How can we organize for cooperation on interoperability for the benefit of all?

- Where can industry go to engage efficiently with multiple SDOs?
- How do SDOs make sure they can reach industry stakeholders?
- How can SDOs engage with each other to avoid overlaps, gaps, and needless divergence?
- How do open-source projects get visibility into SDOs’ plans and industry requirements?
- How can we accelerate and fund open source and standard development projects?
A Unique Cooperative Venue for Metaverse Interoperability

Standards organizations, open-source developers, and industry stakeholders
Cooperation to align and accelerate a wavefront of business opportunities
Fostering ‘brick-by-brick’ interoperability on the road to the metaverse

Neutral venue to *ASSIST* standards organizations
*Not another standards organization*
‘Meta Standardization’

**Broad global participation**
Driving meaningful consensus on requirements
Wide visibility and adoption for initiatives and deliverables

**Pragmatic, bottom-up, industry-driven projects**
Address immediate interoperability gaps and opportunities
Multiple Forum meetings happening almost daily

Non-Profit 501(c)(6)
Consortium founded in 2022
and incorporated in 2023

Honorable Mention in
‘World Changing Idea’ Awards!
How Does the Forum Work?

- The Forum aims to accelerate the development of metaverse interoperability
  - The Forum does not create standards itself, but encourages broad standardization cooperation
- A neutral and welcoming venue for all standards organizations and companies to cooperate
  - Open to any organization, free membership tiers, no NDA, no patent licensing obligations
- Pragmatic, active and agile – strongly connected to industry activities
  - Multiple Forum meetings happening almost daily

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Use Cases
Requirements
Resources
Expertise
Project funding

Coordinated insights into use cases and requirements for current or new standards

Existing Standards Organizations

Metaverse Standards Register and Glossary

Market and Technical Reports

Interoperability prototypes, pilots, testbeds, plugfests

Open-Source Tooling

Best Practices and Guidelines

Video Library of leading practitioners

Accelerated standards development under SDO Policies

Pragmatic, actionable, projects to foster metaverse interoperability
Networking, Building Social Norms
2600 Global Members and Counting...

Wide diversity of organizations, including...

Standards Organizations
Khronos, W3C, Open Geospatial Consortium, IEEE, Web3D Consortium, OMI, ASWF, Spatial Web Foundation, VRM Consortium, XRSI, OMG, Open AR Cloud, OMA3 ...

Platforms
Meta, Microsoft, Sony, Google, Baidu, VISA, VMWare, Huawei, General Motors, RedHat, Siemens, Tencent, Paramount ...

Tools and Engines
Epic, Unity, Adobe, Autodesk, Otoy, SideFX, Maxon, Cesium, ESRI, Dolby, Blackshark.ai, Lamina1, Niantic, Ready Player Me, DGG, Manticore ...

XR
HTC, Magic Leap, Nreal, Pico, Panasonic, Tobii, zSpace ...

Hardware
NVIDIA, Intel, AMD, HP, Acer, Dell, Qualcomm, Samsung, Arm, Sony, MediaTek, Oppo, Lenovo, ZTE, LG, China Unicom ...

Wireless and Networking
Nokia, Ericsson, China Telecom, Deutsche Telekom, T-Mobile, Verizon, NTT, Orange, AT&T, BT, Telefónica, Juniper, Comcast, CableLabs, ZTE, Ookla ...

Industrial and Enterprise
Siemens, Bosch, Schneider, BMW, Daimler, Philips, Hitachi, Fujitsu, Trimble, Capgemini, IKEA, Alibaba, Target, Wayfair ...

Universities and Institutes
Stanford, John Hopkins, Yale (XRP), Cornell, Queens University Belfast, Fraunhofer, New York Institute Technology, APMG ...

Advocacy
XRSI, AREA, XR Association, VRAR Association, XR Guild, Web3 Marketing Association, International Virtual Reality Healthcare, Swiss Institute for Disruptive Innovation, IOT Consortium, Metaverse Japan, RIAA ...

Broad membership fosters collaboration across a spectrum of industries, standards organizations, and academic institutions

Global participation gathers diverse requirements and expertise

Strong industry involvement drives pragmatic projects and deliverables
Forum Organization Since Incorporation

- Participant Membership is free
  - For access to Domain Group activities
- No NDA or patent licensing obligations
  - All Forum-generated materials publicly available
- Principal Members play a significant role in Forum Governance and operations
  - Eligibility to stand and vote in elections to the Board of Directors and Advisory Panels
  - Participate and voting rights in Oversight Committee which manages Domain Groups
  - Voting rights in plenary meetings

- Principal Member Benefits
  - Influence the strategic direction and priority of Forum projects
  - Priority inclusion in the Member Directory
  - Priority participation in seminars and webinars, and Forum's Speaker Bureau

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<th>Principal Dues</th>
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<tr>
<td>$0</td>
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<td>Invited Industry Experts (individuals)</td>
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<td>Medium Enterprises (&lt; 250 emp. AND &lt;$50M revenue/assets)</td>
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<tr>
<td>$9,999</td>
<td>Large Enterprises (&gt; 250 emp. OR &gt; $50M revenue/assets)</td>
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Scaled Membership Dues to Enable Diverse Participation
Forum Domain Group Process

Poll members and rank standardization topics
Members suggest and upvote interoperability problems and opportunities affecting their organization
Over 200 topics suggested by Forum membership - and counting

Any Forum members may propose and lead Exploratory Groups
Build consensus and capture in a draft Working Group Charter pragmatic actions that can address key interoperability topics
Regular Exploratory Group Meetings open to all Forum members

Forum Working Groups execute their Charters
Any Forum members may participate to execute projects creating and delivering agreed public deliverables
Focus on pragmatic projects to create a wavefront of immediate standardization and business opportunities
Forum Domain Groups (December 2023)

3D Interoperability

- glTF/USD 3D Asset Interoperability
  Cooperation between USD and glTF to increase synergy and reduce duplication of effort, gaps, fragmentation

- Interoperable Avatars
  Cross-platform avatars and characters for film, gaming, fashion and social platforms

- Digital Fashion/Wearables
  Clothing (including layering), shoes, hats, accessories

- Volumetric Media Interoperability
  Capture, transport and display

Digital Twins and Geospatial

- Real/Virtual World Integration (Digital twins, IOT)
  Constructs to describe and integrate the physical world and created representations

- Industrial Metaverse
  Enabling collaboration between geographically dispersed teams through virtual environments, expert avatars, digital twins, data visualization, AR/VR and the emerging concept of Shared Reality

Ecosystem Navigation and Discovery

- Metaverse Standards Register
  Publicly available database mapping the landscape of metaverse-relevant standardization activities, organizations, standards & specifications, use cases, and terms

- Technology Stack

  Network Requirements and Capabilities
  Industry requirements for seamlessly transitioning traffic on multiple wireline and wireless technologies for deploying metaverse applications at scale

  3D Web Interoperability
  Enable the broadest possible interoperability of Metaverse Content using the Web

Engagement and Education

- End-User Technical Troubleshooting
  Enabling end-users to ensure reliable metaverse experiences

- Educational Research
  Using the metaverse for education

- Accessibility
  Ensuring the metaverse is accessible to all

Legal

- Asset Management (web3, protection, digital rights)
  Digital rights, protection, portability, access, availability

- Privacy, Cybersecurity & Identity
  Recommendations for responsible innovation that mitigates human and societal harm from objective and subjective privacy risks – including cybersecurity and identity risk management

- Ethical principles for the metaverse and its implementation
  Define a set of ethical principles and an implementation methodology for the development, use, procurement and commercialization of the metaverse

- Ownership and Identity
  Decentralized identity and ownership

Use Case Verticals

- Metaverse Use in the Real Estate Industry
  How Metaverses can be used in the real estate industry

Key

- Working Groups
- Exploratory Groups
- Exploratory Group Proposals
- Domain Group activities
Forum Standards Register

Navigating the metaverse standardization landscape
Organizations, Standards and Publications, Open Source Projects, Glossary, Use Cases

Collaborative Standardization Organizations

Apply

Approve

Standards Register Working Group

Glossary Terms
Use Cases
QA/Oversight

Use cases

Forum Domain Groups

Register Process

Publications and projects information

Once Approved

Searching and filtering

Currently organizations – publications coming soon

General Public

Questions?
standards_registry-chair@lists.metaverse-standards.org
Discord channel
Forum Video Presentation Library

Invited speakers at Forum Domain Groups are posted to a growing public video library

https://metaverse-standards.org/presentations-videos/
https://www.youtube.com/@metaversestandardsforum
gltF USD Asset Interoperability Working Group

- Encouraging cooperation between USD and glTF
  - >550 Members
  - Leveraging each others’ strengths and ecosystems
  - Avoiding friction points through needless divergence
  - Encouraging normative references to reduce duplicated effort

- Roadmap Alignment discussions
  - PBR Materials
  - Physics
  - Subdivision surfaces
  - Interactivity
  - Absorbing FBX functionality into glTF/USD

Proposed glTF/USD Roundtripping Project
Creating test assets and exercising tools and engines generates real-world insights and encourages standards cooperation and alignment between key asset formats
Interoperable Characters/Avatars Working Group

- Encouraging character/avatar interoperability
  - >220 Members
- Avatar Translation Framework
  - Build consensus on common data representations and guidelines for avatar and character data interoperability
  - Tools and engines may voluntarily leverage the framework if they want to increase avatar portability
  - Builds consensus around interoperability over time
  - Possibility for open-source translation tools

Avatar Translation Framework
Guidelines and tooling for handling import and export of meshes, materials, skeletons, animations, physics, and metadata enables interoperability and encourages platform alignment.
Network Requirements and Capabilities Working Group

- Collecting service and application use cases
  - Delivering Metaverse content across multiple access networks
  - >220 Members
- Identifying and describing distribution scenarios and architectures
  - Splitting computation and rendering across different entities
- Identify, and describe QoS requirements
  - Latency, jitter, throughput, reliability, time synchronization, etc.

Split Rendering Use Case
Distributing compute and rendering between and client device and edge server

A QoS API would enable the network to be configured to meet the data streaming needs of the application and devices being used. Integrating a QoS API alongside the XR runtime API could hide network configuration details from the application that may not even know it is running in the cloud.
A Constellation of Standards

3D Asset Formats
3D Streaming Formats
3D Asset Formats

Digital Virtual World Integration
Blockchain Distributed Ledgers
Privacy and security Advocacy

Networking Standards
Device Standards

Web APIs
Native APIs
A Unique Venue Promoting Metaverse Interoperability

Opportunity for accelerating and promoting meaningful standards for the next evolution of the internet

Results-driven Organization
Pragmatic projects that support standardization efforts such as pilots and plugfests that test real-world interoperability
Reports, best practices, guidelines, pilots, testbeds, plugfests, open-source tooling, frameworks and sample implementations

Inclusive and Accessible
Open to any organization to encourage a wide array of perspectives and expertise
Broad Cooperation across a spectrum of industries, standards organizations, and academic institutions

Open and Transparent
No NDA or patent licensing requirements
All Forum deliverables are freely and publicly distributed, promoting open access to information