Metaverse
STANDARDS FORUM™

Forum Update
and Bringing the Metaverse to the Web

SIGGRAPH 2023
LOS ANGELES+ 6-10 AUG

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Metaverse will be Built on Interoperability Standards

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+)

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

A unique venue for cooperation between standards organizations and with the wider industry

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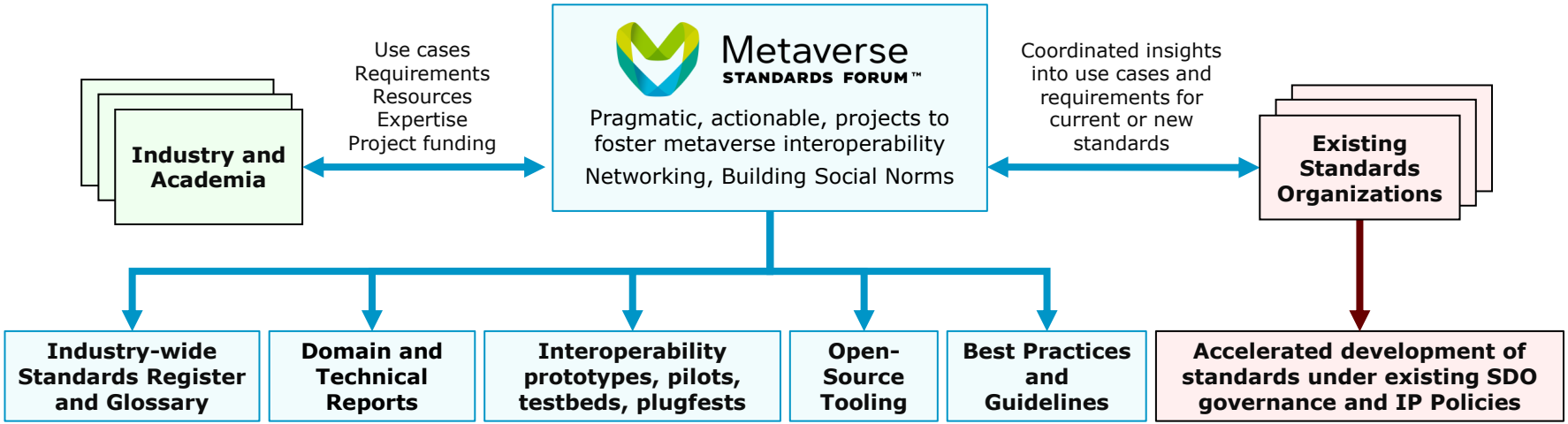
Effective Standards for the Metaverse – Sooner!

- The Forum aims to assist and ***accelerate*** **development of metaverse standards *by its Members***
  - The Forum does not create standards itself!
- 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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2500 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, Huawei, General Motors, RedHat, Siemens, Tencent, Mozilla, Paramount …

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

XR
HTC, Magic Leap, Nreal, Panasonic, Tobii, zSpace …

Hardware
NVIDIA, Intel, AMD, HP, Acer, Dell, Qualcomm, Samsung, Sony, MediaTek, Oppo, Lenovo, ZTE, LG …

Wireless and Networking
China Telecom, Deutsche Telekom, T-Mobile, Verizon, NTT, AT&T, Telefónica, Juniper, Comcast …

3D Commerce
Alibaba, Alvanon, Avataar, CLO, Browzwear, IKEA, VNTANA, Metaverse Fashion Council, Target, Wayfair …

Universities and Institutes
Stanford, John Hopkins, Yale (XRP), Queens University Belfast, University Salford, 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 …

Global participation gathers diverse requirements and expertise
Strong industry involvement drives pragmatic projects and deliverables

Any company or organization is welcome to join the Forum!
https://metaverse-standards.org/

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Organizing for Effective Forum Action

1. Gather standardization topics of interest from all members

Actionable interoperability problems and opportunities

Over 200 topics suggested and counting, for example..

Database of metaverse standards
Taking 3D assets between worlds
Asset LODs
glTF / USD interoperability
Avatar customization / animation
3D Apparel and Fashion
Cloth Simulation
Metaverse traversal
Geospatial ontologies
Geospatial streaming
Decentralized User ID
Ethical framework
User privacy
Child safety
Payment frameworks
Etc. etc..

2. Organize Topics into Domains

Member voting on where the Forum can best add industry value

Member-prioritized Domain List

Privacy, Safety, Security, Inclusion
Interoperable 3D Assets
Real/Virtual World Integration
Identity (was User Identity)
Avatars and Apparel
Teaching, Education, Certification
Metaverse Standards Register
XR and UI
Metaverse Definition
Networking
Geospatial
Payments and Economy
Runtimes and Object Model
Governance and Advocacy
Video Broadcasting and Meetings
Forum Outreach
Tooling and Creators
Gaming
Health and Medical
Performance and Scalability
Business Analytics

3. Create Domain Groups

Execute projects to create public work products

Focus on pragmatic focused projects to create a wavefront of immediate business opportunities

Video presentation libraries
Domain and technical reports
Use case & requirements matrices
Best practices and guidelines
Pilots, testbeds and plugfests
Test assets, interoperability testing data and insights
Open-source tooling
Etc.

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Forum Domain Group Pipeline

Continuously Evolving Pipeline

Metaverse Standards Register
Publicly available database mapping the landscape of metaverse-relevant standardization activities

glTF/USD 3D Asset Interoperability (visuals, behaviors)
Cooperation between USD and glTF to increase synergy
and reduce duplication of effort, gaps, fragmentation and industry confusion

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

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

Network Requirements and Capabilities to Support Metaverse Applications
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

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

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

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

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

Ownership and Identity
Accessibility
Best Practices for Living and Working in the Metaverse
Academia & Research and the Metaverse
Ethical principles for the metaverse and their implementation
The Industrial Metaverse

Any Forum member can propose and participate in Domain Groups

There are often multiple Domain Group meetings each day

Key
Working Groups
Exploratory Groups
Exploratory Group Proposals

Forum Domain Group activities
https://metaverse-standards.org/domain-groups/

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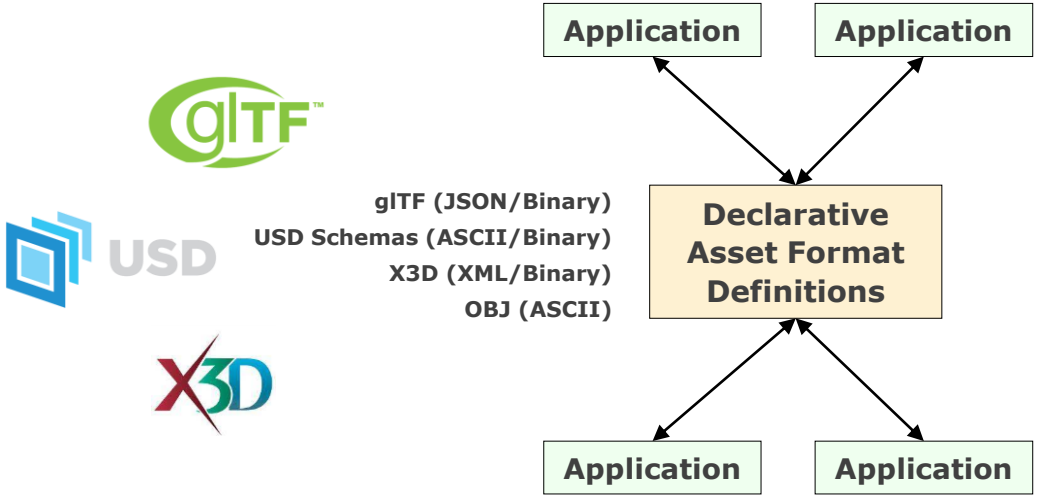
3D Asset Interoperability



Asset Interoperability goes far beyond just the standardization on how to represent meshes, materials and animations

Aspects to consider when an asset in passed between worlds on the metaverse:

Ownership

Transfer fees

IP Rights

Age appropriateness

Gameplay integrity

Aesthetic Styling

....

The metaverse will need virtual customs posts

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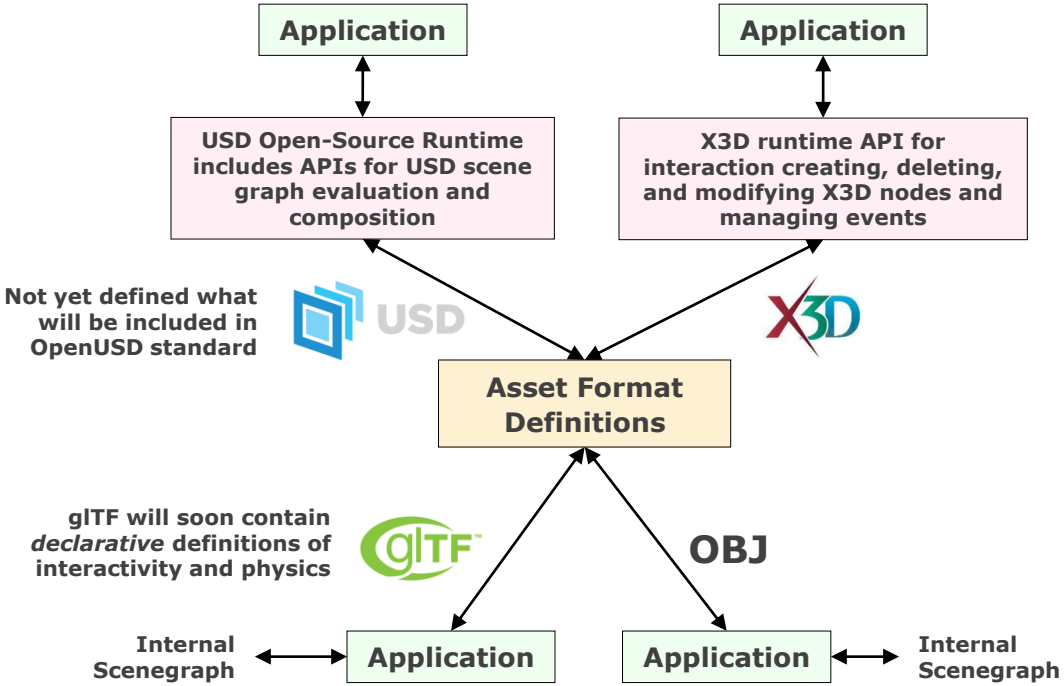
Which Formats Also Standardize Runtime Behavior?



Standardized run-time APIs and scenegraph
Increase consistency
Reduced flexibility

No Standardized run-time APIs or scenegraph
Decreased consistency
Increased flexibility

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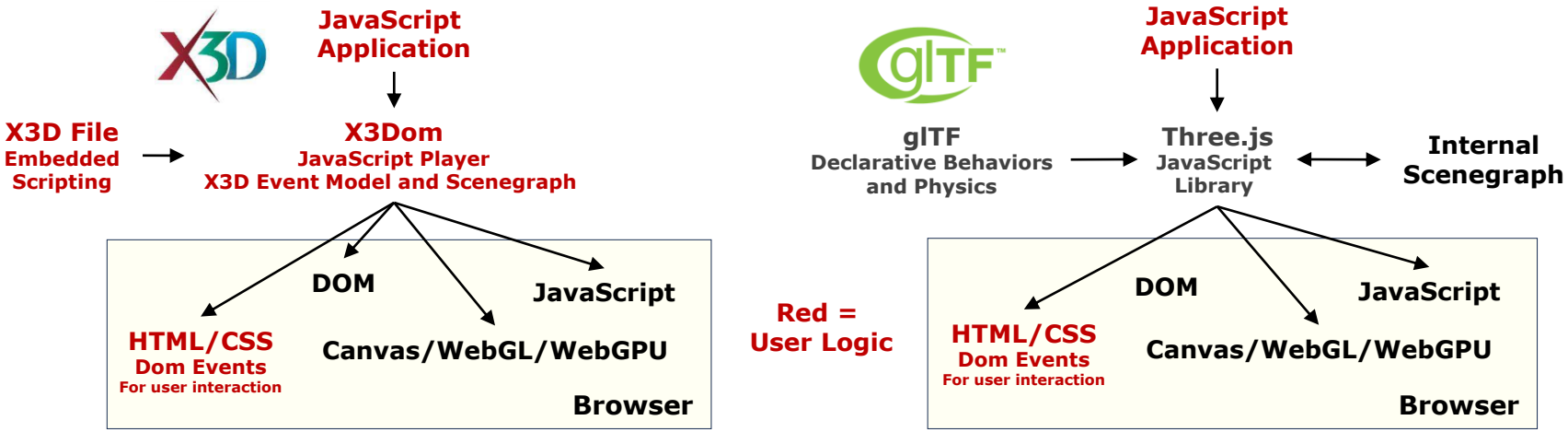
Bringing 3D to the Web… the Story So Far



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Metaverse on the Web – Brainstorm Questions!

Do we want to want to integrate the metaverse with the current Browsers or create a whole new type of internet/web client?

Will we use, expand or replace the existing HTML/DOM standards?

Should we standardize 3D runtime APIs and scene graphs or just declarative asset formats?

Will WebGL/WebGPU have enough functionality to support metaverse applications?

Is JavaScript sufficient for advanced metaverse applications?

What other layers in the Internet Protocol Suite will need upgrading? E.g., is QUIC enough?

web 3D CONSORTIUM

AOUSD Alliance for OpenUSD

KHRONOS GROUP CONNECTING SOFTWARE TO SILICON

W3C

IETF

Cooperative exploration and development between multiple standards organizations will be essential

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