



Global Monitor for XR and metaverse standards, specifications, guidelines and recommendations

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VIRTUAL DIMENSION CENTER



DIN

Living Lab
XR-Interakt



Standardization Strategies: global view



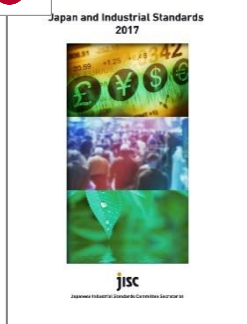
- Actively promote the consistent worldwide application of internationally recognized principles in the development of standards.
- work to prevent standards and their application from becoming technical trade barriers to U.S. products and services.
- Strengthen international outreach programs to promote understanding of how U.S. voluntary, consensus-based, market-driven standards can benefit businesses, consumers, and society as a whole.
- Respect diverse funding models for the U.S. standards system.
- Address the need for standards in support of emerging national priorities.



- supporting the EU's leading position as a forerunner in key technologies and promoting EU core values
- leveraging the European standardization system to deliver on the twin green and digital transition and support the resilience of the single market
- new High-Level Forum for Member States and European standardization organizations
- foster the development and deployment of international standards for a free, open, accessible and secure global internet
- establish an EU internet standards monitoring website
- monitor the effective implementation of existing commitments on standardization in EU trade agreements
- concerned about decision-making in ETSI



- 15-year plan to shape the future, to set the global standards for the next-generation of technologies.
- pushing domestic firms and experts to be part of the global effort to set standards
- research on China Standardization System, Method and Evaluation
- research on Supporting High-quality Development Standardization System
- research on Standardization Military-Civil Integration Development
- start with the national standards of **virtual reality technology**, integrated circuit design, intelligent health care and 5G key components, and gradually expand to the emerging areas of Internet of Things, photovoltaic, information equipment and other industries.



- Necessity of national standards
- Clarification of appropriate quality levels
- Revisions of the Industrial Standardization Law
- Observance of JIS standards and JIS markings
- Responses to Inappropriate ISO and IEC Standards
- Relationship with Standardization Organizations in Europe
- Support for Strategic Standard Proposal
- Active Contribution to Standardization Activities
- Programs for Developing Standardization Experts in Asia and the Pacific
- Standardization regarding Information Technology, environmental preservation, consumers, elderly people, and people with disabilities, manufacturing technology and industrial platform technology



- International and European trade is facilitated by standardization
- Standardization relieves the burden on government regulation and supports it
- Germany is driving forward standardization worldwide in future topics by networking stakeholders, establishing new processes and open platforms for coordination.
- Industry and society are the driving forces in standardization
- Standardization is used as a strategic and attractive tool, especially by companies.
- Standardization has a high status in the public perception



- advance national standards system
- innovate KS management system
- strengthen standard technology infrastructure
- advance measurement standards
- advance legal metrology system
- actively participate in international standardization activities
- lead the international de-jure standardization
- support international de-facto standardization
- address the technical barriers to trade (TBT)
- assist the private sector in increasing its capacity to develop standards
- foster standardization capacity of private sector
- promote standard development activity of producer group



Chris Kremidas-Courtney, senior fellow at Brussels think tank „Friends of Europe“ and Lecturer for Institute for Security Governance (ISG) in Monterey, California.

He said that China plans to “*be the world leader in metaverse development,*” a technology that dovetails with its plan for a state-controlled digital renminbi. Standard-setting is the natural first step in that roadmap.

“If you want to seize the future,
you set the standards for it”

Chris said.

POLITICO

Enter keyword



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POLITICO PRO

FROM POLITICO PRO

Beijing is coming for the metaverse

Proposals reviewed by POLITICO show China wants to assert state control over virtual environments.



Experts that reviewed the proposal at the request of POLITICO said it risks violating principles of privacy and freedom | Jade Gao/AFP via Getty Images

BY GIAN VOLPICELLI

AUGUST 20, 2023 | 4:00 PM CET | 5 MINUTES READ



Standards Strategy China

"China Standard 2035"

- 15-year plan to shape the future, to set the global standards for the next-generation of technologies.
- pushing domestic firms and experts to be part of the global effort to set standards
- research on China Standardization System, Method and Evaluation
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- start with the national standards of **virtual reality technology**, integrated circuit design, intelligent health care and 5G key components, and gradually expand to the emerging areas of Internet of Things, photovoltaic, information equipment and other industries.



Metaverse Strategy China

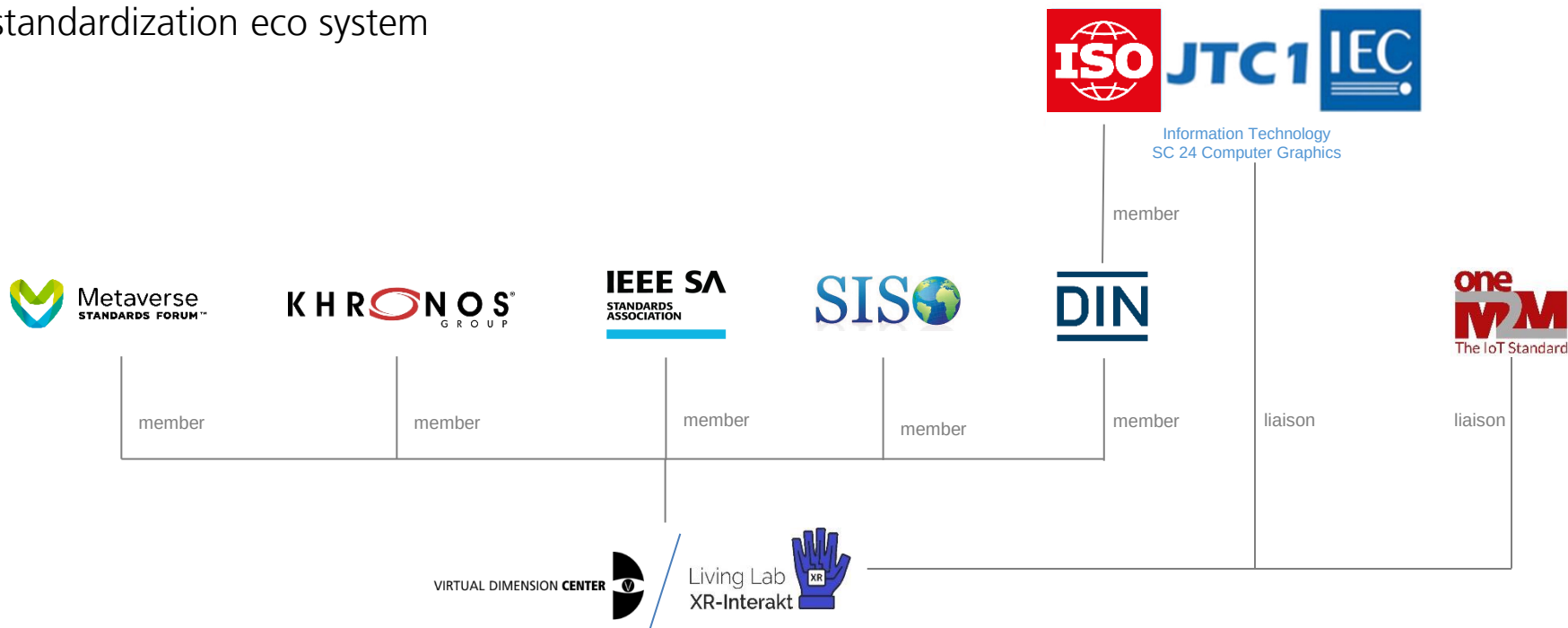
"Three-year action plan for the innovative development of the metaverse industry (2023-2025) in China"

- Extensive publicising and promotion of standards and their implementation
- Identify the standardisation needs of the metaverse value chain
- Promote the establishment of metaverse standardisation organisations
- Encourage industry to actively participate in international standardisation work
- Organise and carry out the formulation and preliminary study of national standards, industry standards and group standards.
- Encourage application industries to promote the formulation of standards in specific areas
- focal points:
 - fundamental similarities
 - networking
 - security
 - trustworthiness
 - privacy protection
 - industrial applications





We got involved in the
standardization eco system





Goals: Get our stakeholders (involved Living Lab projects , VDC members, XR / MV community)

Knowing about:

- the benefits of using standards in their daily work
- available XR /MV standards
- ongoing standardization initiatives
- existing organisations, working groups and initiatives working in standardization

Increasing:

- use of standards, connectivity, interoperability
- stakeholder engagement in ongoing standardisation



We found:

XR norms,
XR standards,
XR recommendations,
XR guidelines:

- ~800 published
- 100+ being created right now
- by 75+ active initiatives actually working on them

The screenshot shows a web browser window with a Zotero library. The address bar shows the URL: <https://www.zotero.org/groups/5002494/var-normenbibliothek/items/3HFHLE32/library>. The library is titled "VAR-Normenbibliothek". A list of documents is displayed with columns for Publisher, Title, Year, and Lit. The document "Extended Reality (XR) in 5G" by 3GPP is highlighted. Below the list, the "Info" tab is selected, showing details for the selected document.

Publisher	Title	Year	Lit
-	A pattern approach to interaction design		
3GPP	Virtual Reality (VR) streaming audio; Characterization test results	2018	
3GPP	Extended Reality (XR) in 5G	2022	
3GPP	Immersive Teleconferencing and Telepresence for Remote Terminals (ITT4RT) Operation ...	2022	
3GPP	QoE parameters and metrics relevant to the Virtual Reality (VR) user experience	2022	
3GPP	Support of 5G glass-type Augmented Reality / Mixed Reality (AR/MR) devices	2022	

Info Notes Tags Attachments Related [Show Empty Fields](#)

Item Type	Document	Abstract
Title	Extended Reality (XR) in 5G	The present document collects information on eXtended Reality (XR) in the context of 5G radio and network services. The primary scope of the present document is the documentation of the following aspects: - Introducing Extended Reality by providing definitions, core technology enablers, a summary of devices and form factors, as well as ongoing related work in 3GPP and elsewhere, - Collecting and documenting core use cases in the
Author	3rd Generation Partnership Project (3GPP)	
Publisher	3GPP	
Date	2022	
URL	https://portal.3gpp.org/desktopmodules/...	
Extra	Issue: TR 26.928	



- references to all known active XR SDO working groups. They are qualified (by tags) and with a searchable description. The group's entry further comprises the organizing/leading SDO and a link to this resource in the WWW.

The screenshot shows the Zotero web interface. The browser address bar displays the URL: [https://www.zotero.org/groups/5025618/var-standards-fokusgruppen/tags/mobile XR/items/HWCV](https://www.zotero.org/groups/5025618/var-standards-fokusgruppen/tags/mobile%20XR/items/HWCV). The page title is 'Cultural and Natural Heritage'. The left sidebar shows a tree view with 'My Library' and 'Group Libraries'. Under 'Group Libraries', 'VAR-Standards-Fokusgruppen' is selected. The main content area displays a list of items. The selected item is 'Cultural and Natural Heritage' by the 'Web3D Consortium'. The item details are shown below the list.

Publisher	Title	Year
World Wide Web Consortium (W3C)	Augmented Reality Community Group	
Simulation Interoperability Standards O...	CBMS SSG - Cloud-based Modelling & Simulation	
Web3D Consortium	Cultural and Natural Heritage	
World Wide Web Consortium (W3C)	Declarative WebVR Community Group	
Web3D Consortium	Design Printing and Scanning	
Web3D Consortium	Geospatial	
World Wide Web Consortium (W3C)	Haptic Interaction on the Web Community Group	

Info Notes Tags Attachments Related Show Empty Fields

Item Type	Document	Abstract Die Arbeitsgruppe Kultur- und Naturerbe (Heritage) erforscht die Erstellung, Handhabung und Darstellung von digitalen 3D-Daten für das Kultur- und Naturerbe.
Title	Cultural and Natural Heritage	
Editor	Web3D	
Publisher	Web3D Consortium	
URL	https://www.web3d.org/working-groups...	
Date Added	13.4.2023, 09:22:41	
Date Modified	13.4.2023, 09:22:41	
Added By	Virtual Dimension Center (VDC) w.V.	

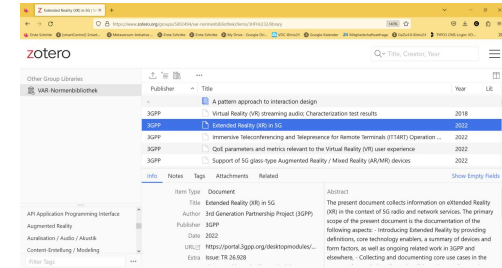


data sets – fields:

- standard type (official standard, industry standard, guideline, recommendation, spec, ...)
- created by/on
- document number
- author: name
- institution
- publishing house
- place of publication
- language
- number of pages
- date of issue
- price
- work status: published, withdrawn, wip
- location
- VDC library: available?
- comment
- file name
- abstract English
- abstract German
- online address
- tags

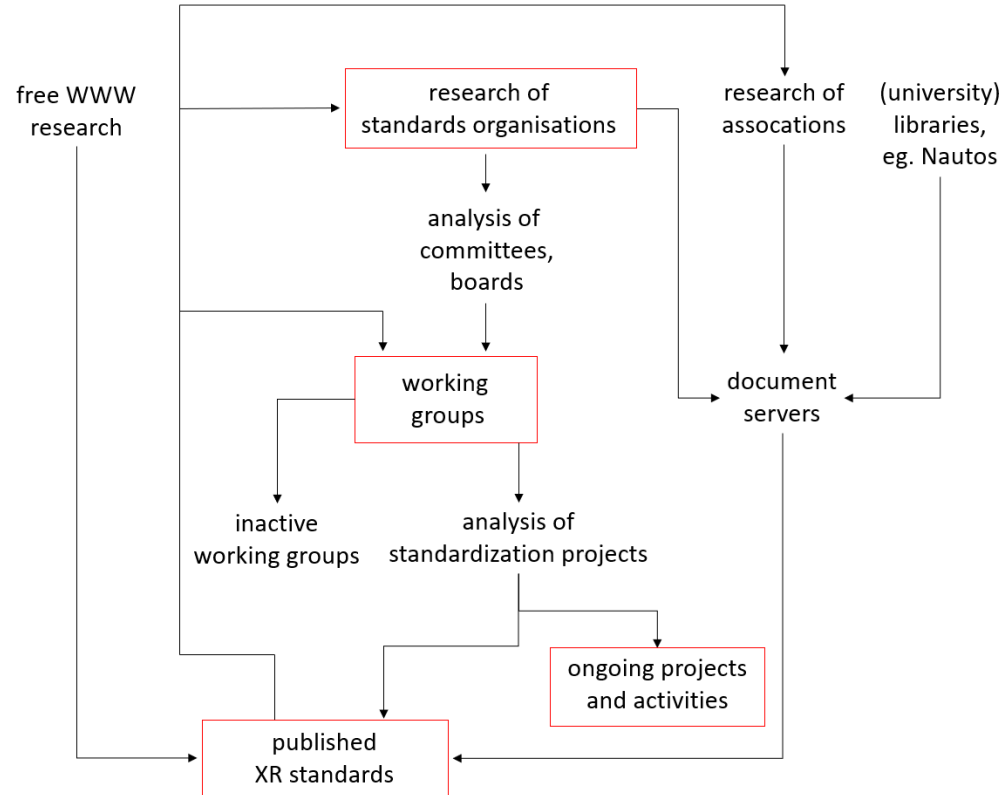
categories / tags

- basics / terms
- XR management
- regulation / ethics / governance
- evaluation / conformance
- API application programming interface
- formats / coding / compression
- communication / interoperability
- mapping
- virtual reality
- augmented reality
- user experience (UX) / user interface design (UID)
- ergonomics / usability
- interaction / patterns
- graphics software / algorithms
- graphics hardware / optics / displays
- haptics
- auralisation / audio / acoustics
- tracking / sensors / motion capturing
- mobile XR
- other XR hardware
- human models
- content creation / modelling
- application: education / training
- application: design / engineering
- application: health
- application: health: assistance
- application: collaboration
- application: marketing
- application: entertainment / culture
- application: geo & construction
- application: other





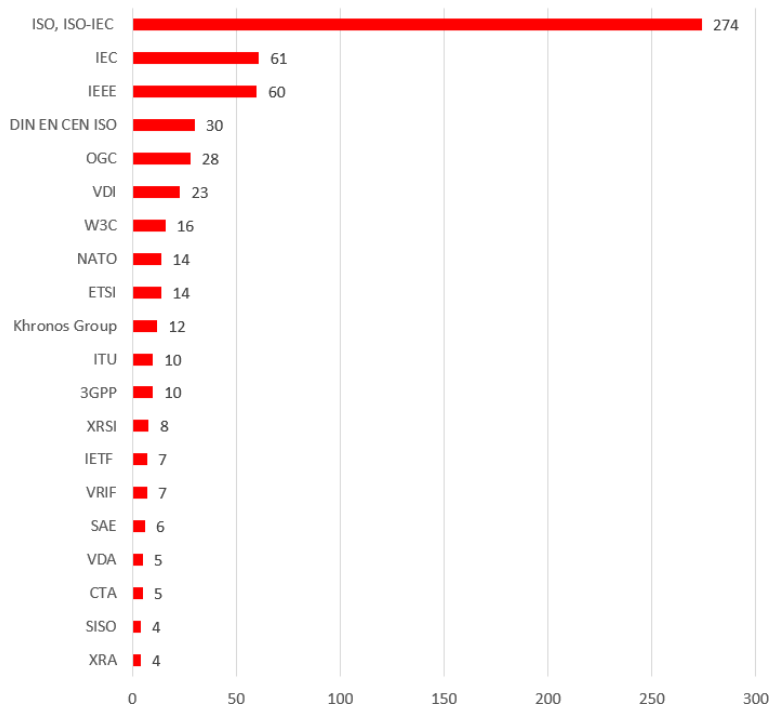
Our search strategy



XR & MV Standard Development Organizations (SDOs)



published XR norms, standards, guidelines, recommendation
[by organizations]



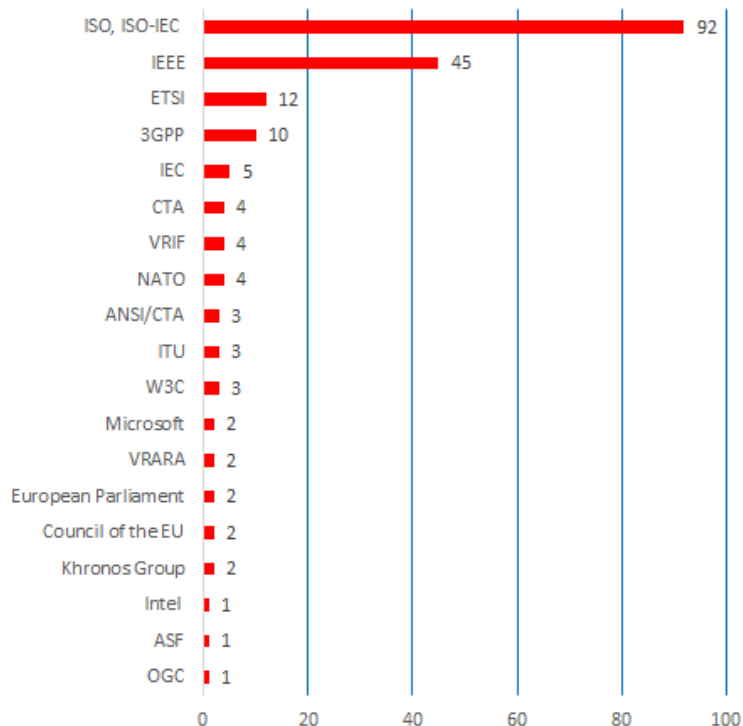
What XR SDOs work on which XR topics?



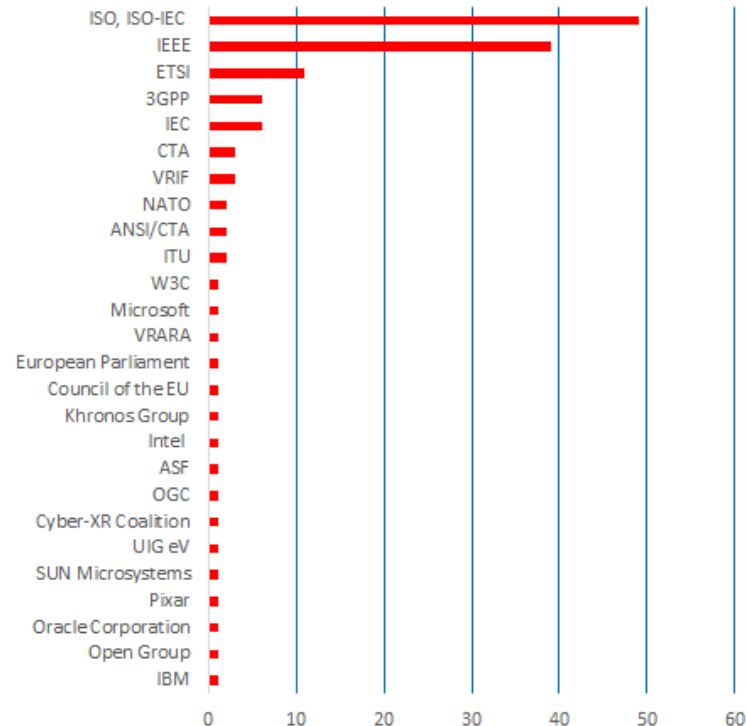
analysis on the right hand side shows XR SDOs contributing with own documents to certain XR fields.

It becomes further obvious that certain XR topics are treated by SDOs in different number at total.

fundamentals of XR



UX, ergonomics, human factors



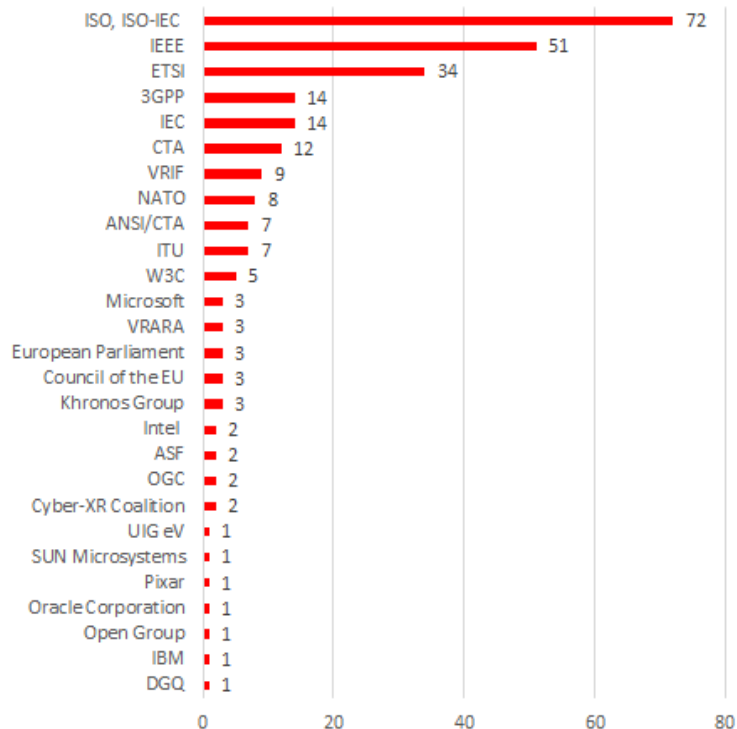
XR Standards clustering: focussing on 7 main topics



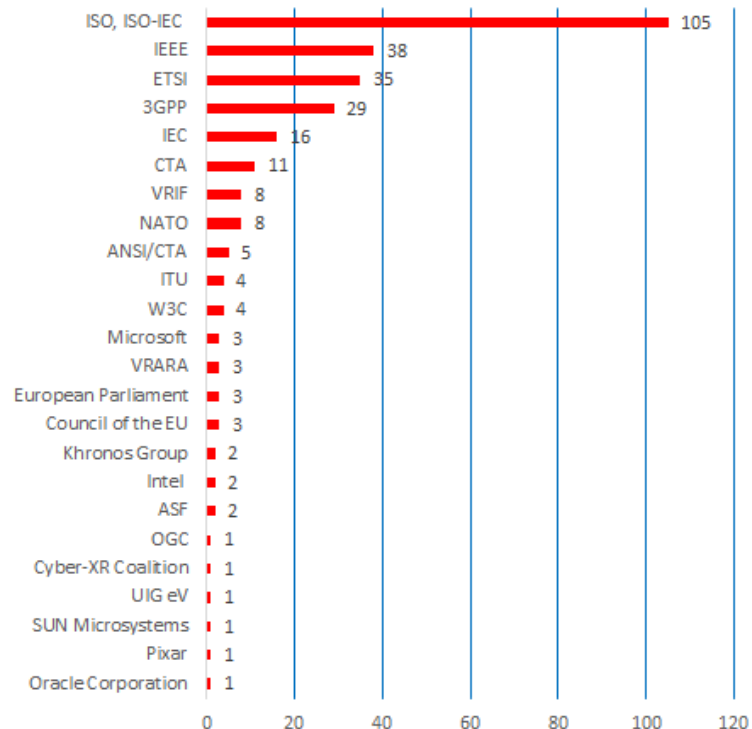
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XR management



XR applications



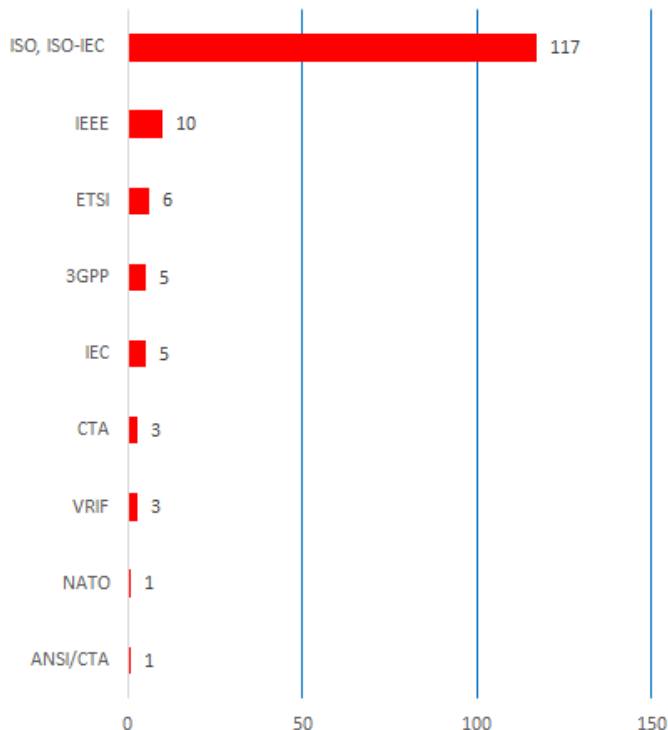
XR Standards clustering: focussing on 7 main topics



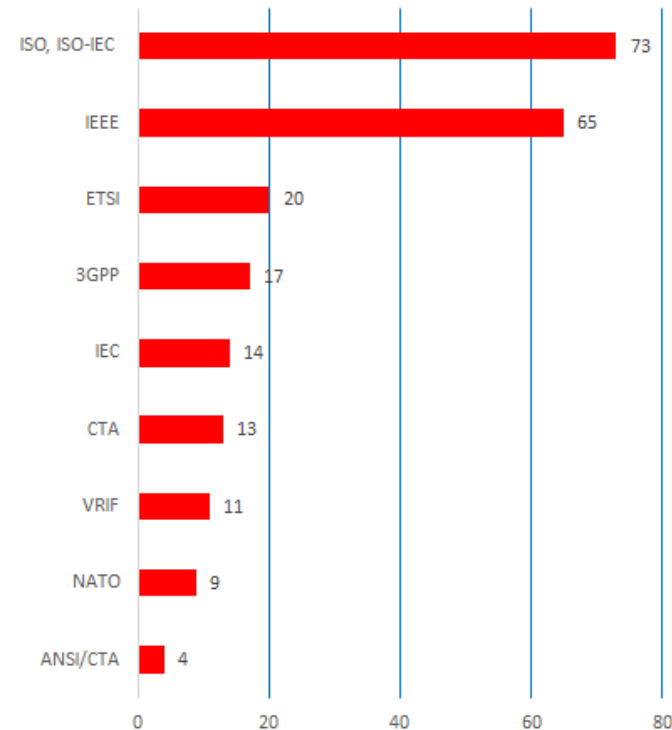
analysis on the right hand side shows XR SDOs contributing with own documents to certain XR fields.

It becomes further obvious that certain XR topics are treated by SDOs in different number at total.

graphics software, CGI



hardware: optics, haptics, acoustics, tracking, mobile

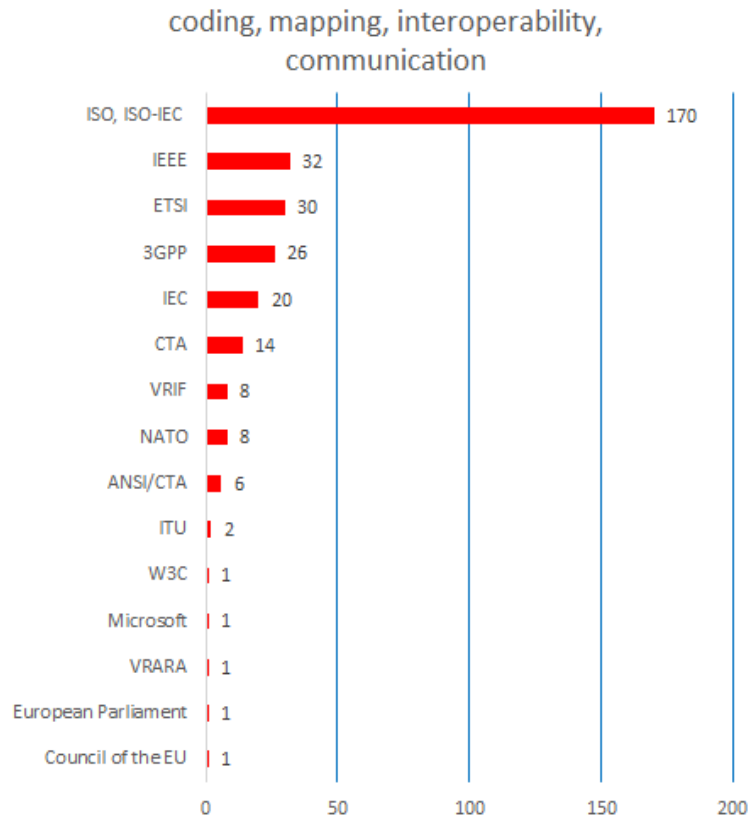


XR Standards clustering: focussing on 7 main topics



analysis on the right hand side shows XR SDOs contributing with own documents to certain XR fields.

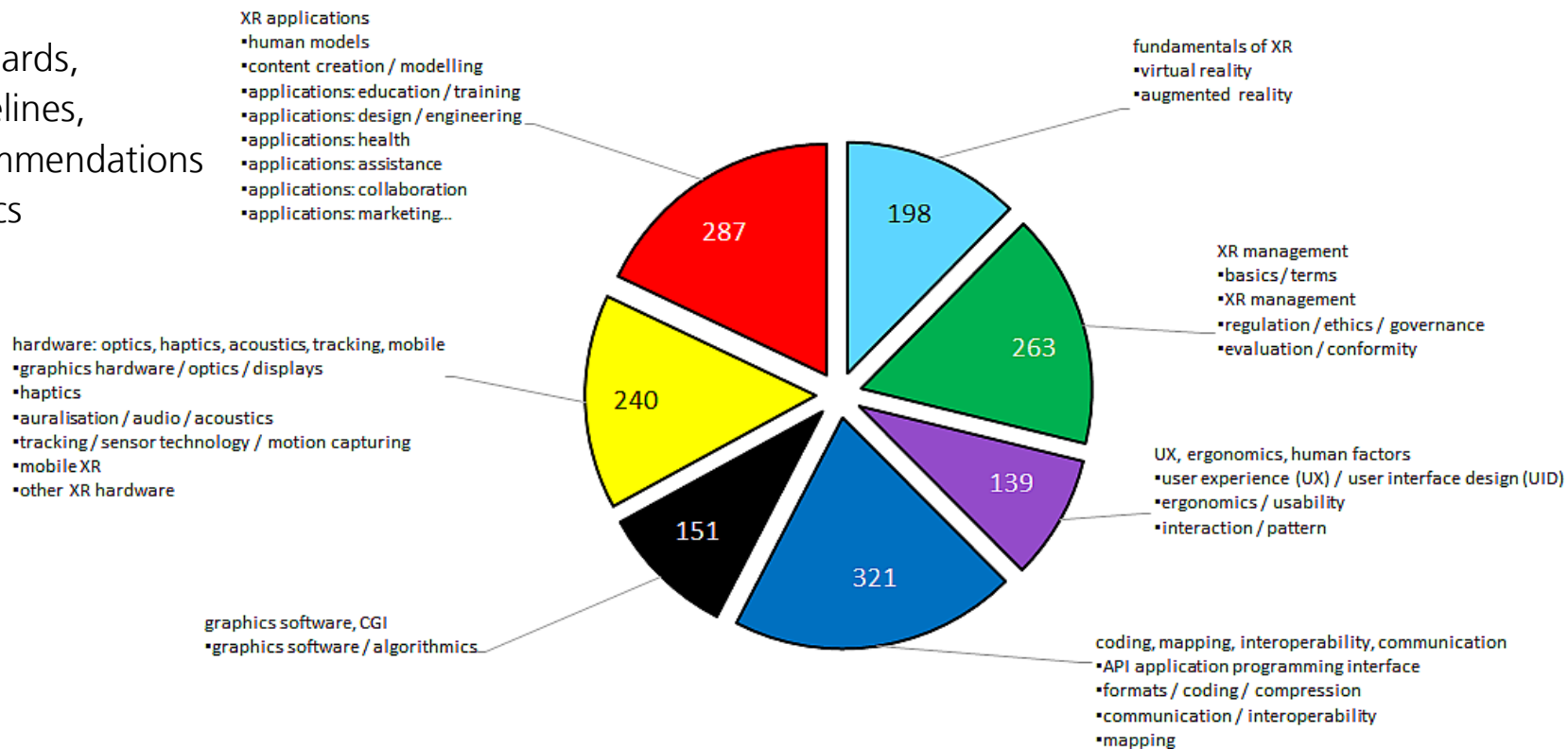
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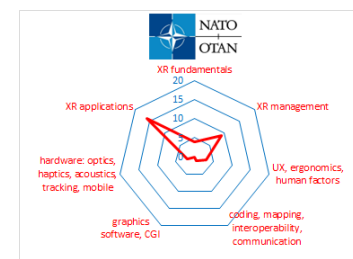
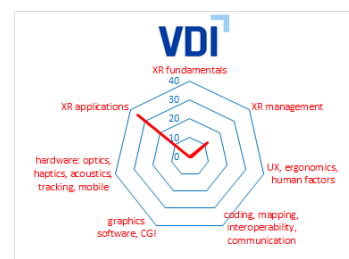
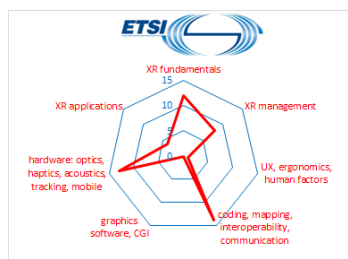
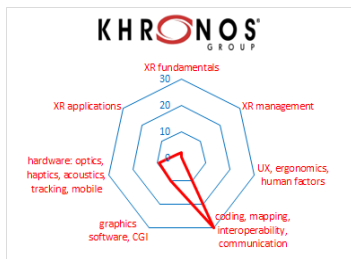
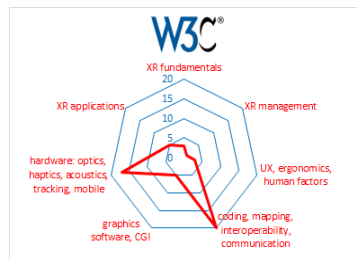
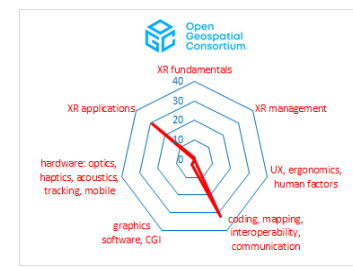
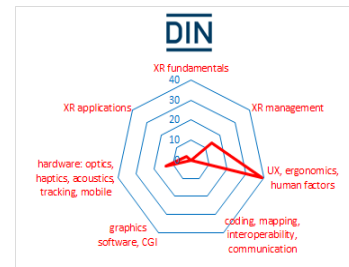
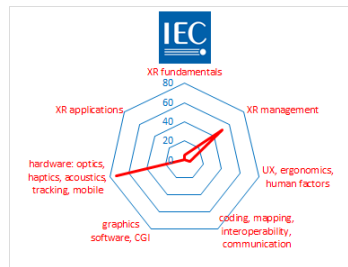
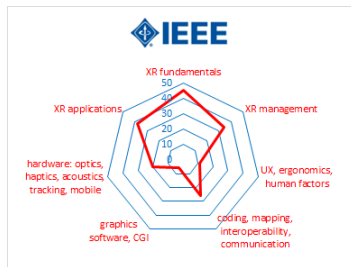
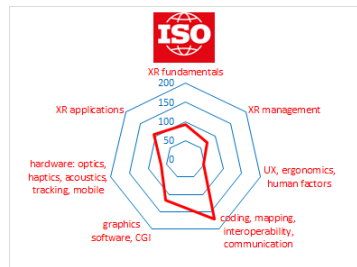
clustering

- XR standards,
 - XR guidelines,
 - XR recommendations
- into 7 topics



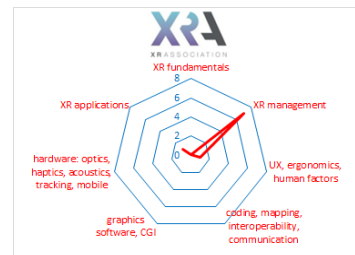
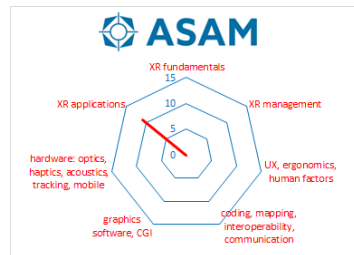
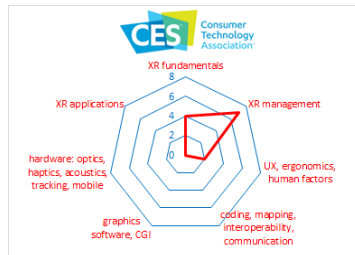
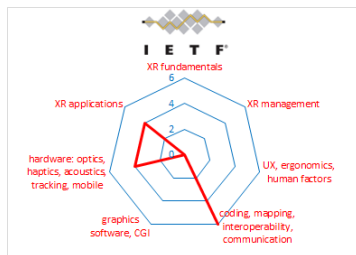
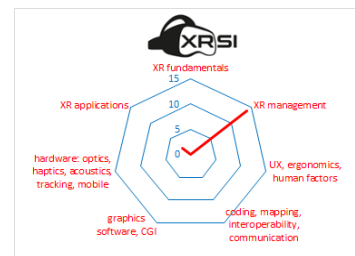
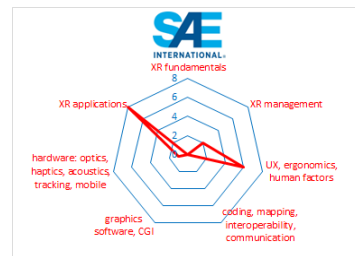
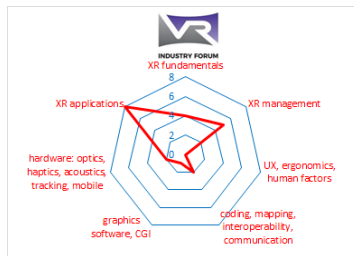
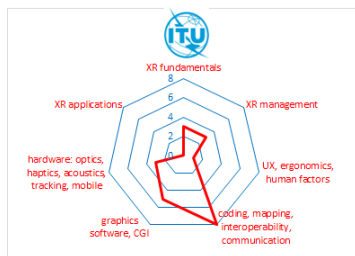
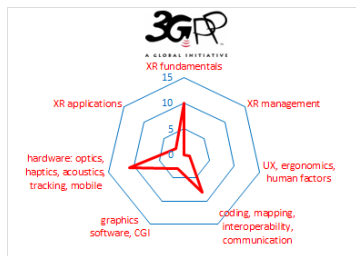


Focuses of XR standardization organizations varying



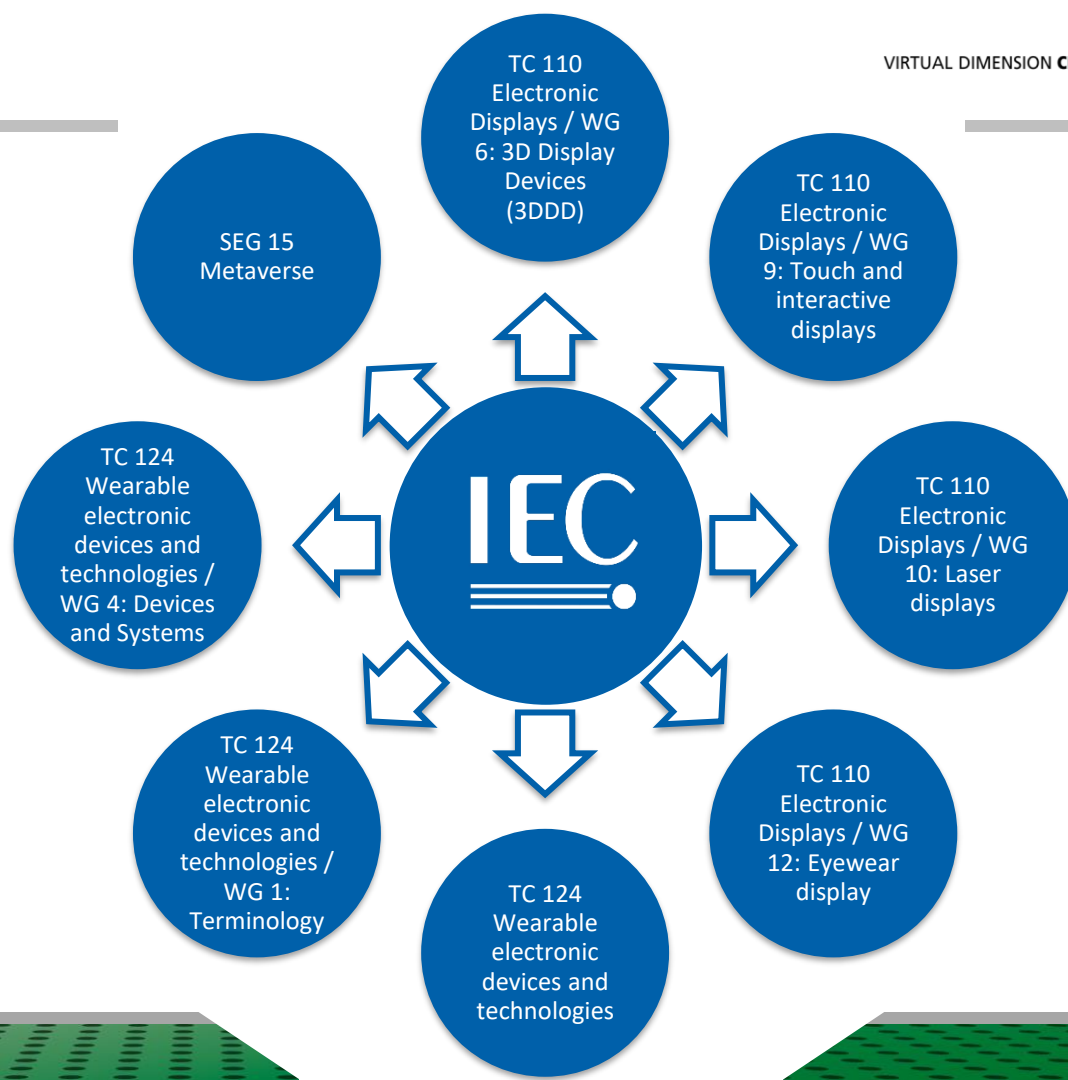


Focuses of XR standardization organizations varying





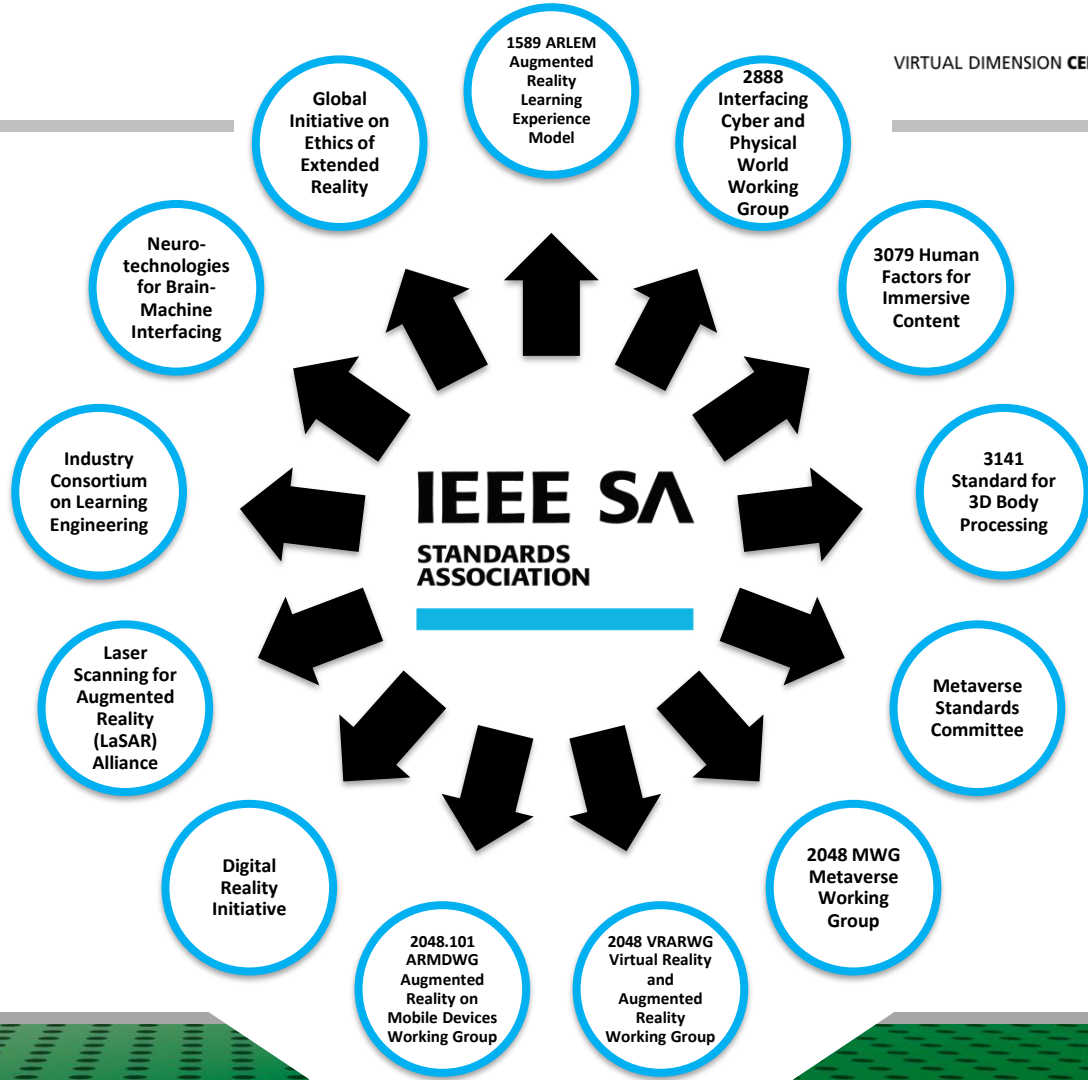
The **International Electrotechnical Commission (IEC)** is an international standardization organization for standards in the field of electrotechnology and electronics, based in Geneva. Some standards are developed jointly with ISO (International Organization for Standardization). IEC was founded in 1906 and is located in Geneva. IEC played a crucial role in standardizing units of measurement, particularly Gauss, Hertz, and Weber. It also first proposed a system of standards, the Giovanni-Giorgi-System, which ultimately became the SI, the International System of Units. The IEC charter encompasses the entire field of electrotechnology, including the transformation and distribution of energy, electronics, magnetism and electromagnetism, electroacoustics, multimedia, telecommunications, and medical technology as well as general disciplines such as terminology and symbols, electromagnetic compatibility, measurement technology and operational behavior, reliability, design and development, safety, and the environment.



XR Standards Working Groups



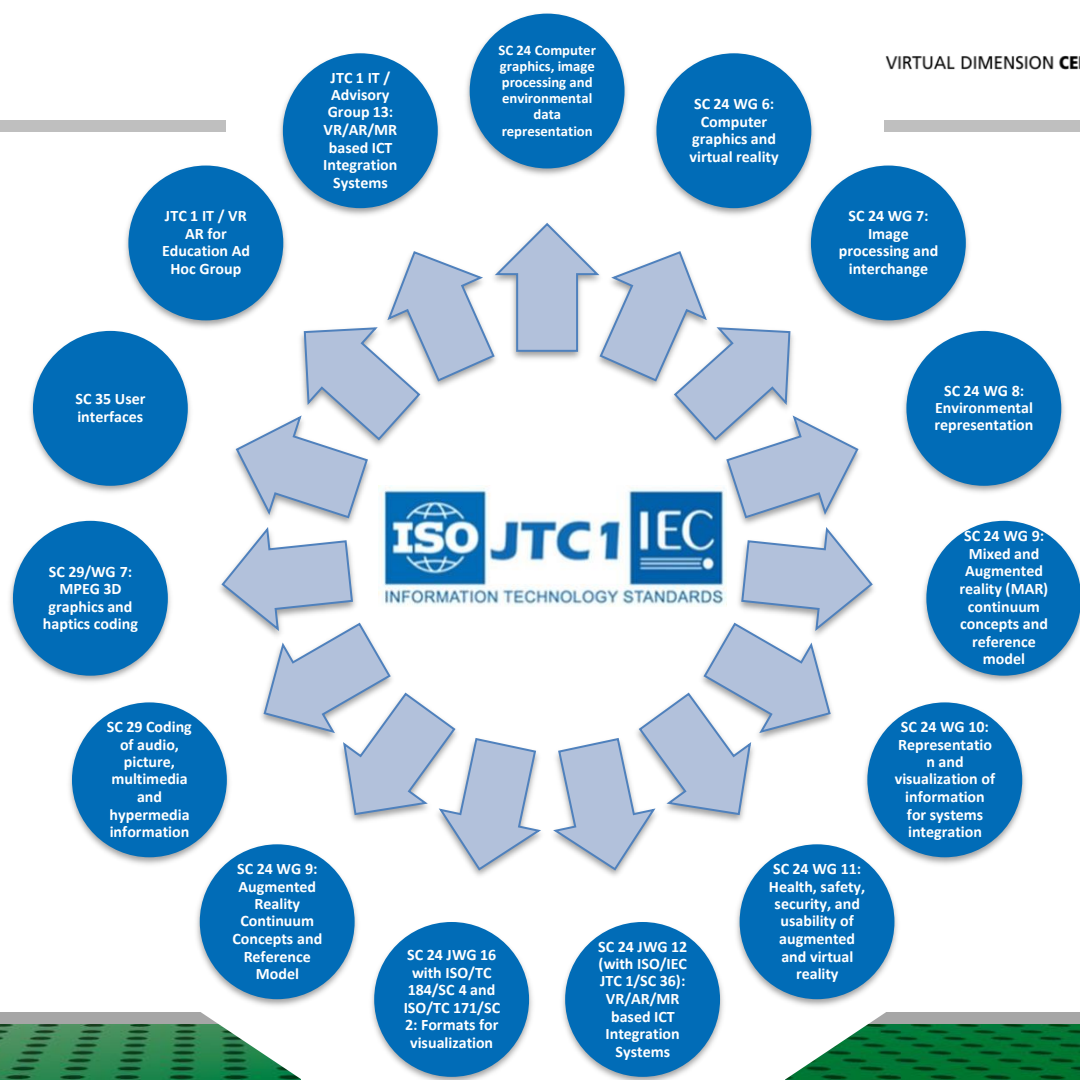
The **Institute of Electrical and Electronics Engineers (IEEE)** is a global professional association of engineers primarily from the fields of electrical engineering and information technology, legally based in New York City with operational headquarters in Piscataway, New Jersey. It organizes professional conferences, publishes various professional journals, and forms committees for the standardization of techniques, hardware, and software. Scientific contributions in journals or to IEEE conferences are generally presumed to be of particularly high professional quality. With publications like the IEEE Spectrum journal, the organization also promotes interdisciplinary information and discussion on the societal impacts of new technologies. The IEEE organizes several subgroups addressing VR or AR topics, including (1) Digital Reality, (2) Augmented Reality Learning Experience Model (AR-LEM), the (3) IEEE 2048 VR/AR Working Group (VRARWG), and a (4) Smart Glasses Interest Group. Additionally, the IEEE operates a Standards Group. Where the latter collaborates with one of the aforementioned four theme groups, V/AR-relevant norms, standards, and guidelines are created..



XR Standards Working Groups

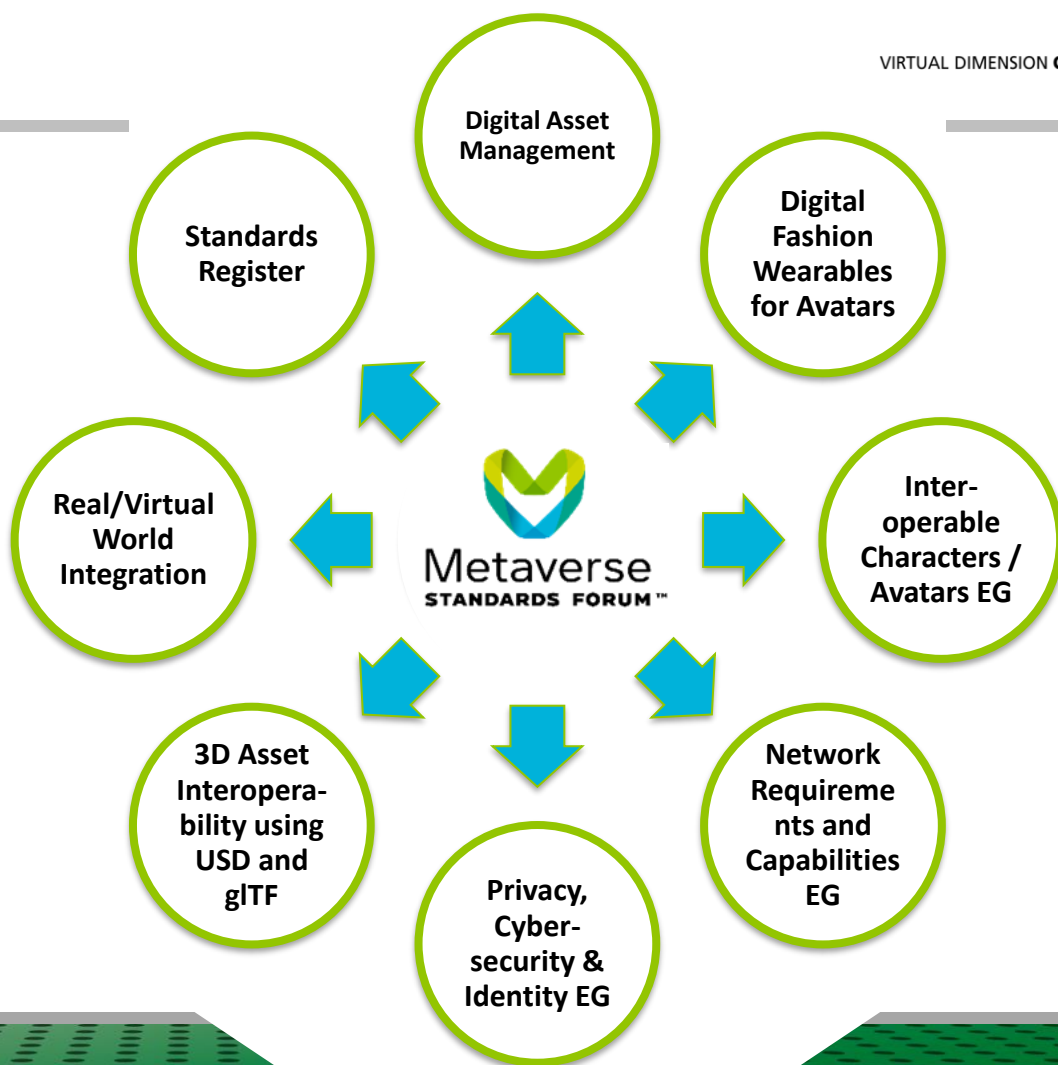


The **International Organization for Standardization (ISO)** is an independent, non-governmental organization, whose members consist of various national standardization bodies. As of 2022, there are 167 members who represent ISO in their country, with each country having only one member. The organization develops and publishes international standards in all technical and non-technical areas, except for electrical engineering and electronics, which fall under the jurisdiction of the International Electrotechnical Commission. By February 2023, ISO has developed over 24,676 standards that cover all areas from industrial products and technology to food safety, agriculture, and healthcare. **The Moving Picture Experts Group (MPEG)** is a group of experts dealing with the standardization of video compression and related areas, such as audio data compression or container formats. Colloquially, "MPEG" usually refers not to the group of experts, but to a specific MPEG standard. The MPEG meets three or four times a year for five-day meetings. About 350 experts from 200 companies and organizations from 20 countries participate in these meetings, the MPEG meetings. MPEG is part of ISO/IEC JTC 1/SC29.



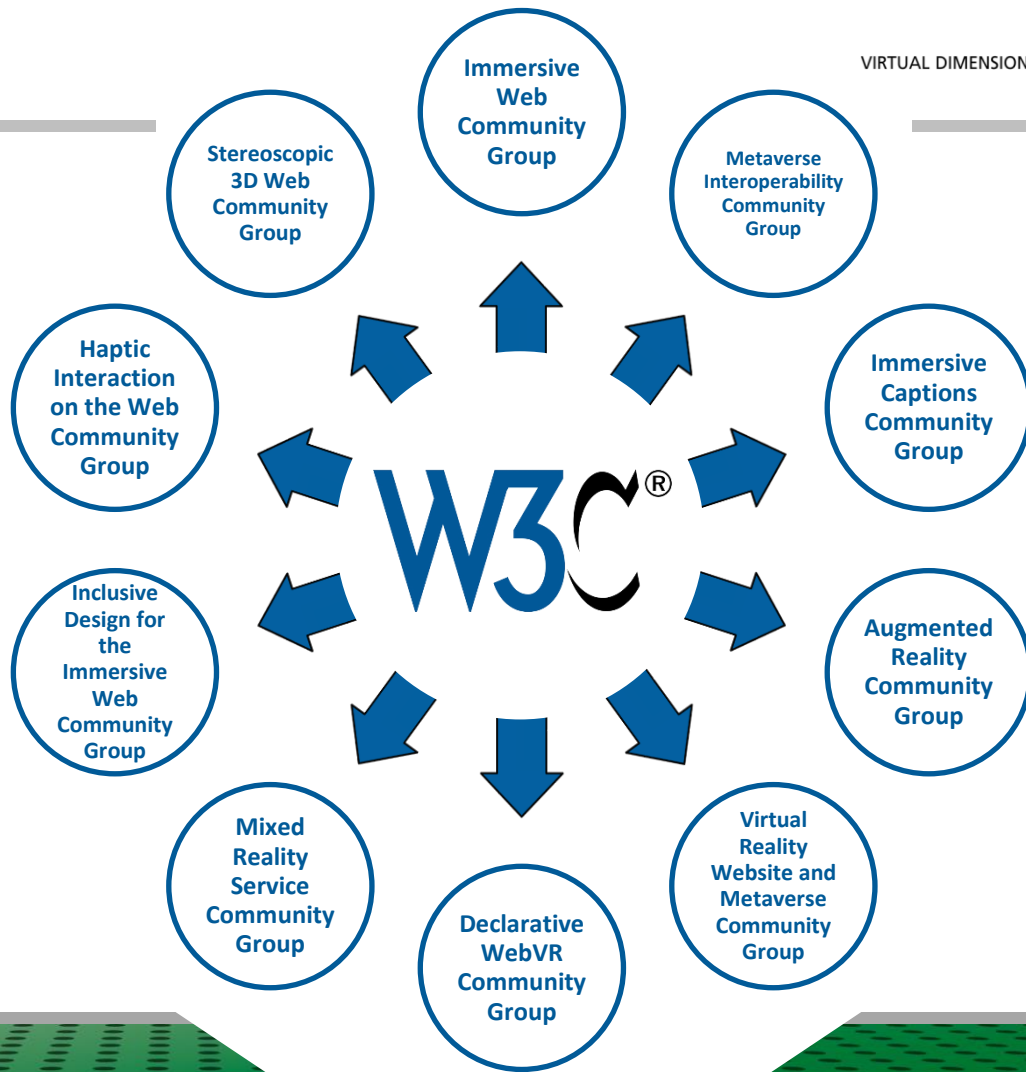


The **Metaverse Standards Forum (MSF)** was founded in June 2022 to foster the development of interoperability standards for an open and inclusive metaverse, and accelerate their development and deployment through pragmatic, action-based projects. Since the vision of the metaverse is still a work in progress, the group also has the stated purpose of bringing some order to the underlying terminology of the metaverse. The MSF is an industry-wide effort to harmonize standards and best practices for the metaverse. Its members, which to date number 1,800, include tech titans Google, Meta, Microsoft and Nvidia; standards bodies Khronos Group and Web3D Consortium; multinational software companies Adobe, Autodesk and Epic; and professional technology services firm Accenture. Members of the forum hope the process will help build trust among the builders of the metaverse. This is important as the industry explores new technologies and new business models. Early blockchain and decentralized finance efforts attempted to address trust programmatically, only to discover new vulnerabilities and types of abuse no one had previously imagined. The MSF is free for all participants, including companies, standards organizations, non-profit organizations, industry associations and universities.



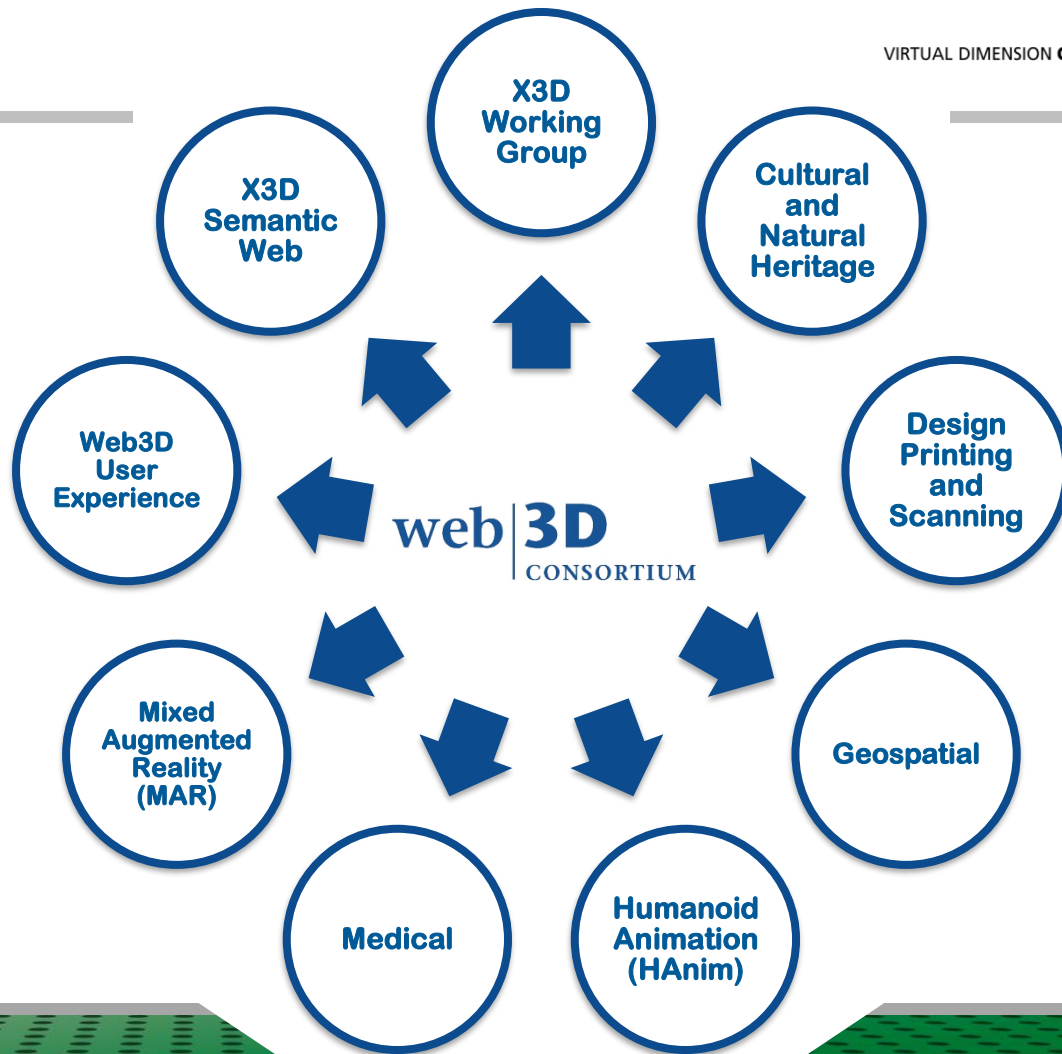


The **World Wide Web Consortium (shortly W3C)** is the body responsible for standardizing technologies on the World Wide Web. It was founded on October 1, 1994, at the MIT Laboratory for Computer Science in Cambridge, Massachusetts. The W3C is a membership organization. It develops technical specifications and guidelines through a mature, transparent process to achieve maximum consensus about the content of technical protocols, high technical and editorial quality, and approval by the W3C and its followers. Examples of technologies standardized by the W3C include HTML, XHTML, XML, RDF, OWL, CSS, SVG, and WCAG. Within its "Immersive Web Community Group," the W3C addresses VR and AR topics. Already in the early 1990s, ideas for a 3D extension of the internet emerged at the first HTML conferences, which then resulted in the Virtual Reality Language (VRML) as a counterpart to HTML.





The **Web3D Consortium** is an international, non-profit, member-funded, industry organization dedicated to the development of standards (SDO) established in 1997. The Web3D Consortium champions the deployment of ISO-ratified X3D standards for communicating interactive 3D scenes across various applications, use cases, platforms, and industries. It provides robust web-based 3D capabilities and long-term stability for enterprise solutions, as well as interoperability with other standards. Members collaboratively work on the development of the X3D standards and tools to ensure their broad dissemination across various markets, catering to academia, government, industry, and individual users. Today, the Web3D Consortium leverages its extensive industry backing to continue the evolution of the X3D specification..





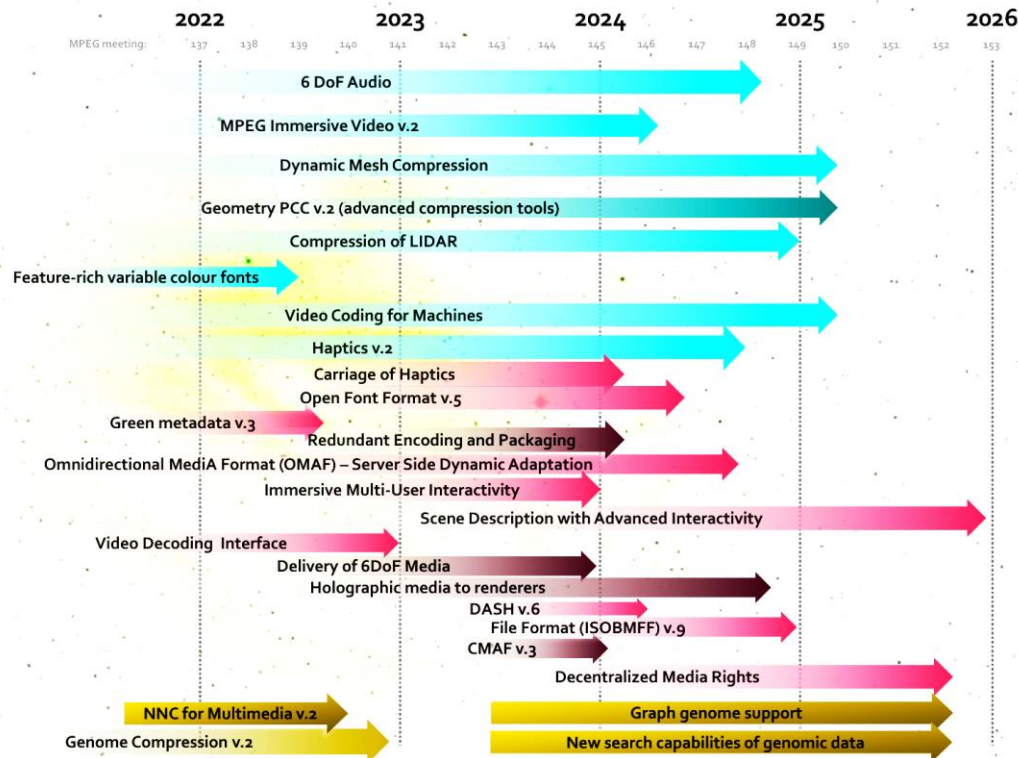
What's further interesting?

Many SDOs publish standardization roadmaps.

These roadmaps provide an excellent, combined perspective on many topics and their corresponding timelines.

This could well help to find a good starting point for an engagement.

Example on the right hand side: the MPEG roadmap



Media
Coding

Systems
and Tools

Beyond
Media



Example here: the OGC (Open Geospatial Consortium) roadmap

OGC Standards Roadmap

Progress of Official OGC Standards **OGC** & **Community Standards** **Community** 2021-05-27

	SWG Work / Work Item	OAB Review	OGC-NA Review	Public Review	TC Approval to Prepare	TC Vote	PC Vote	Public Release
Proposed Standards								
OGC Abstract Spec Topic 0 04-004		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 2 - Referencing by Coordinates 18-005		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 20 - Observations, Measurements and Samples 20-002		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 21 - DGGS v. 2.0 20-040		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 22 - Tiling 19-014		✓	✓	✓	✓	✓	✓	✓
OGC Abstract Spec Topic 6 - Schema for coverage geometry and functions	✓	✓	✓	✓	✓	✓	✓	✓
OGC CDB 1.2	✓	✓	✓	✓	✓	✓	✓	✓
OGC CDB 2.0	✓	✓	✓	✓	✓	✓	✓	✓
OGC CityGML 3.0	✓	✓	✓	✓	✓	✓	✓	✓
Community CityJSON	✓	✓	✓	✓	✓	✓	✓	✓
OGC Common Object Model Container SWG	✓	✓	✓	✓	✓	✓	✓	✓
OGC Coverage Implementation Schema - ReferenceableGridCoverage Extension 1.1 18-003b	✓	✓	✓	✓	✓	✓	✓	✓
OGC EO Extension for OpenSearch 13-029b	✓	✓	✓	✓	✓	✓	✓	✓
OGC EO Product Metadata GeoJSON/JSON-LD Encoding 17-003	✓	✓	✓	✓	✓	✓	✓	✓
OGC GeoAPI 09-003d	✓	✓	✓	✓	✓	✓	✓	✓
OGC GeoPackage 1.3 12-120b18	✓	✓	✓	✓	✓	✓	✓	✓
OGC GeoPose	✓	✓	✓	✓	✓	✓	✓	✓
OGC GeoTIFF 19-000	✓	✓	✓	✓	✓	✓	✓	✓
OGC GroundwaterML2 v2.3 19-013	✓	✓	✓	✓	✓	✓	✓	✓
OGC HDF5 Core 18-043	✓	✓	✓	✓	✓	✓	✓	✓
Community IMDF 19-009	✓	✓	✓	✓	✓	✓	✓	✓
OGC IndoorGML 1.1 19-011	✓	✓	✓	✓	✓	✓	✓	✓
OGC MetOcean Profile and Extensions to WCS 2.1 15-045, 15	✓	✓	✓	✓	✓	✓	✓	✓
OGC Moving Features Encoding Extension - JSON 19-045	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Common 18-072	✓	✓	✓	✓	✓	✓	✓	✓

	SWG Work / Work Item	OAB Review	OGC-NA Review	Public Review	TC Approval to Prepare	TC Vote	PC Vote	Public Release
OGC OGC API - Coverages	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Environmental Data Retrieval 18-006	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 1: Core 17-069	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 2: Coordinate Reference System by Reference 18-050	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 3: Filtering and the Common Query Language (CQL) 19-079	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 4: Create, Replace, Update and Delete 20-002	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Features - Part 5: OpenAPI 3.1	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Maps	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Processes	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Records	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Styles	✓	✓	✓	✓	✓	✓	✓	✓
OGC OGC API - Tiles	✓	✓	✓	✓	✓	✓	✓	✓
Community OpenFlight 16.0	✓	✓	✓	✓	✓	✓	✓	✓
OGC OpenSearch GeoJSON/JSON-LD Response Encoding 17-047	✓	✓	✓	✓	✓	✓	✓	✓
OGC PipelineML 18-073	✓	✓	✓	✓	✓	✓	✓	✓
OGC Semantic Sensor Network Ontology 18-079	✓	✓	✓	✓	✓	✓	✓	✓
OGC SensorML 2.1 12-000d1	✓	✓	✓	✓	✓	✓	✓	✓
OGC SensorThings API 1.1 - Part 1 18-008	✓	✓	✓	✓	✓	✓	✓	✓
OGC Symbology Conceptual Model: Core 18-067	✓	✓	✓	✓	✓	✓	✓	✓
OGC Time Ontology in OWL 18-071	✓	✓	✓	✓	✓	✓	✓	✓
OGC TimeseriesML 1.3 15-042b	✓	✓	✓	✓	✓	✓	✓	✓
OGC Two Dimensional Tile Matrix Set 17-003	✓	✓	✓	✓	✓	✓	✓	✓
OGC Well Known Text Representation of Coordinate Reference Systems 18-010	✓	✓	✓	✓	✓	✓	✓	✓
Community Zarr	✓	✓	✓	✓	✓	✓	✓	✓



What's further interesting?

Some SDOs and more often consultants and policy makers publish standardization requirements.

These requirement analyses could provide a valuable starting point to start own initiatives together with an SDO.

Virtual world requirements

1. Representation and exchange of three-dimensional data assets

2. Cross-platform data/asset exchange APIs

3. Extended reality (XR), including virtual reality (VR), augmented reality (AR) and mixed reality (MR) APIs and SDK

4. Real/virtual world integration, including positioning and orientation in 3D and 4D space

5. Avatars/characters interoperability

6. Identity, cybersecurity and privacy preservation

7. Networking protocols

8. Metadata and asset discoverability

Standardisation initiative

- Graphics Language Transmission Format - glTF (Khronos Group)
- GL Binary - GLB (Khronos Group)
- Universal Scene Description - USD (Pixar)
- COLLABorative Design Activity - COLLADA (Khronos Group)
- Virtual Reality Modeling Language - VRML

- MPEG-V
- Khronos 3D Commerce

- OpenXR (Khronos group)
- OpenVR (Valve corporation)
- WebXR (W3C groups)

- GeoPose (Open Geospatial Consortium - OGC)

- Avatar API (ReadyPlayerMe)
- HAnim (Humanoid Animation)
- VRM (Khronos Group)

- Decentralised Identifier - DID
- OpenID Connect - OIDC
- OAuth 2.0
- InterPlanetary File System - IPFS

- Hyperspace Modeling Language - HSML

- Cross-platform metadata - XMP (Adobe Systems)
- Dublin Core

Standards requirements from initiative paper „Next Generation Virtual Worlds“ (European Commission, July 2023)



Future Plan

Publish:

- SDO list & links on our VDC website
- standards list / global monitor including search & filtering on our website

Thank you very much for your attention.

Living Lab
XR-Interakt



VIRTUAL DIMENSION CENTER



*„Without standards,
there can be no improvement.“*

Ōno Taiichi

(* 29 February 1912 in Manchuria; † 28 May 1990) was the inventor of the Toyota production system. He developed today's basic logistics methods, the Kanban system and just-in-time production, between 1950 and 1982. The Japanese management concept Kaizen is also based on his ideas.



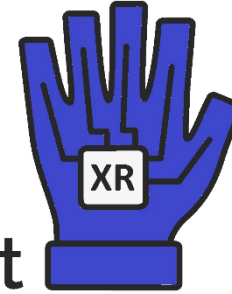
Thank you for your attention.

XR
EXPO
2024



3rd - 4th April 2024 - Stuttgart

Living Lab
XR-Interakt



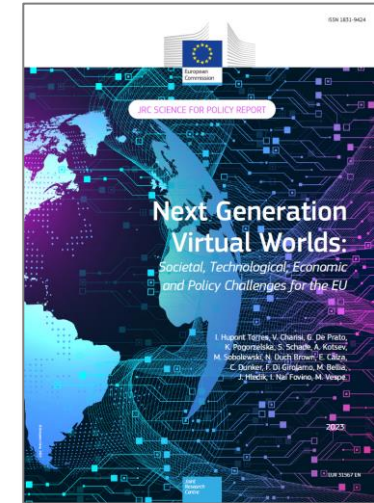
The work presented here was carried out as part of the Living Lab XR-Interakt project. This project is funded by the Federal Ministry of Education and Research under the funding code 16SV8827.



Bundesministerium
für Bildung
und Forschung



Sources:

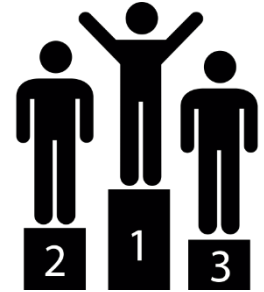


- Bundesnetzagentur: Metaverse. Status, Perspektiven für die Standardisierung und Regulierung, July 2023
- European Parliament: Metaverse opportunities, risks and policy implications, June 2022
- Council of the European Union: Metaverse - Virtual World, Real Challenges, March 2022
- European Commission: Next Generation Virtual Worlds, July 2023
- Rosenberg, Louis B. (Chief Scientist, Unanimous AI): Regulation of the Metaverse: A Roadmap, March 2022



Competition / Wettbewerb

- Requires interconnection and interoperability of many devices and platforms across digital ecosystem
- issues:
 - standardisation and interoperability
 - killer acquisitions and merger control
 - antitrust, monopolisation



Data Protection / Datenschutz

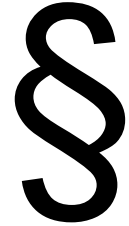
- People will participate in the metaverse through avatars, using special equipment, enabling an immersive experience. This entails the collection of massive amounts of data, including biometric and behavior data.
- issues:
 - blurred roles
 - data sharing and portability
 - issue of direct marketing
 - intrusive profiling
 - Metaverse workplace, tracking & tracing of employees





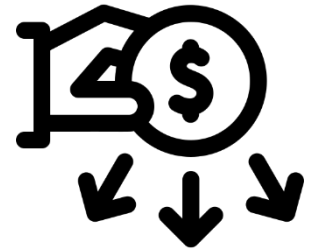
Liabilities / Haftung:

- There is considerable scope for a wide range of illegal and harmful behaviours and practices in the metaverse environment.
- issues:
 - illegal and harmful content online
 - advertising practices
 - intellectual property rights protection
 - open question for sovereign law (Hoheitsrechte) in a distributed decentral network



Financial transactions / Finanztransaktionen

- Commercial transactions in the metaverse are expected to be largely under-pinned by cryptocurrencies (e.g. bitcoin or ethereum) and non-fungible tokens (NFTs) will be used to track and validate the sale and ownership of digital goods.
- issues:
 - ownership of digital assets in the metaverse
 - misuse of NFTs
 - interoperability and portability





Cybersecurity / Cyber-Sicherheit:

- The sheer volumes of data circulating in the metaverse and the ways in which this data will be used constitute a growing risk for users. Current cybersecurity challenges such as phishing, malware and hacking will persist¹⁵ and will extend to devices enabling a metaverse experience and to avatars.
- issues:
 - security of metaverse enabling devices
 - security of protocols
 - avatar integrity, identities



Health / Gesundheit

- The metaverse has various mental and physical health implications that are especially worrying when concerning vulnerable groups such as children. At the same time, the metaverse can also help to cure people and improve patient safety.
- issues:
 - impact on mental and physical health
 - impact on children
 - occupational health and safety



Accessibility and inclusiveness / Zugänglichkeit und Inklusion:

- Although in principle, the metaverse is open to all, in practice many might have trouble accessing it for various reasons, ranging from a lack of digital skills to not having reliable broadband or the right hardware.
- issues:
 - people with a low level of digital literacy
 - disabilities
 - areas with low connectivity, no reliable broadband
 - cost of equipment



Co-Working & Distributed Work / verteilte Zusammenarbeit

- The Metavers offers new ways of distant co-working and of including (potential) customers into the design phase.
- issues:
 - copy right protection
 - co-creation and IP





Net Neutrality

- The Net Neutrality Regulation 2015 (No 2015/2120) is a Regulation in EU law where article 3(3) lays down measures concerning open internet access.
- Net neutrality is the principle that Internet service providers must treat all Internet communications equally, offering users and online content providers consistent rates.

General Data Protection Regulation:

- The GDPR 2016/679 is a European Union regulation on information privacy. It was adopted the GDPR on 14 April 2016, to become effective on 25 May 2018.
- The GDPR's goals are to enhance individuals' control and rights over their personal information and to simplify the regulations for international business.

Digital Markets Act

- Regulation 2022/1925, commonly referred to as the Digital Markets Act, is an EU regulation that aims to make the digital economy fairer and more contestable. The regulation became applicable, for the most part, on 2 May 2023.
- The DMA intends to ensure a higher degree of competition in European digital markets by preventing large companies from abusing their market power.

Digital Services Act

- The Digital Services Act (Regulation (EU) 2022/2065, DSA) is a regulation in EU law to update the Electronic Commerce Directive 2000 regarding illegal content, transparent advertising, and disinformation. It was submitted on 15 December 2020.
- The DSA is meant to "govern the content moderation practices of social media platforms" and address illegal content. It is organised in five chapters, with the most important chapters regulating the liability exemption and obligations of intermediaries.

eIDAS - electronic IDentification, Authentication and trust Services

- eIDAS is an EU regulation with the stated purpose of governing "electronic identification and trust services for electronic transactions". It passed in 2014 and its provisions came into effect between 2016 and 2018.

European Data Act

- published 22.12.2023; it aims to facilitate and promote the exchange and use of data within the European Economic Area
- European standards may be drafted by the European SDOs following standardization requests from the EC in order to support the application of the requirement that 'products shall be designed and manufactured, and related services shall be provided, in such a manner that data generated by their use are, by default, easily, securely and, where relevant and appropriate, directly accessible to the user'.

AI Act:

- The Artificial Intelligence Act (AI Act) is a European Union regulation on artificial intelligence in the European Union. Proposed by the European Commission on 21 April 2021 and not yet enforced.
- Its scope encompasses all types of AI in a broad range of sectors. As a piece of product regulation, it would not confer rights on individuals, but would regulate the providers of AI systems, and entities making use of them in a professional capacity. The proposed AI Act aims to classify and regulate AI applications based on their risk to cause harm.

EU Fitness Check on Digital Fairness

- ongoing process; call for evidence until June 2022; public consultation until Feb. 2023; final version planned for second quarter 2024
- This fitness check (evaluation) will look at the following pieces of EU consumer protection legislation to determine whether they ensure a high level of protection in the digital environment:
 - the Unfair Commercial Practices Directive 2005/29/EC
 - the Consumer Rights Directive 2011/83/EU: aligns and harmonises national consumer rules, for example on the information consumers need to be given before they purchase goods, services or digital content, and on their right to cancel online purchases, wherever they shop in the EU.
 - the Unfair Contract Terms Directive 93/13/EEC