



www.web3d.org

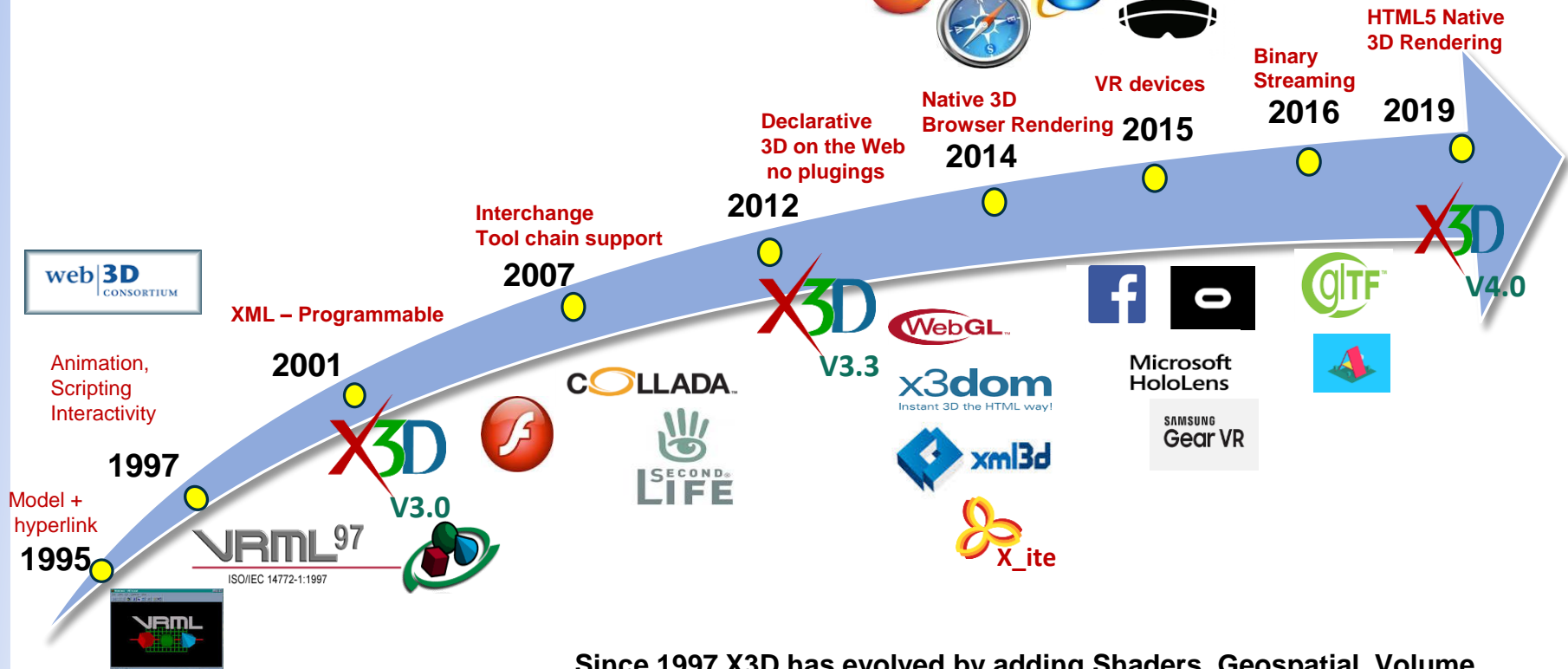
Open Standards for Collaborative 3D Visualization

Web3D Collaborative Naval Visualization Workshop
VTARC, Arlington, VA
December 6, 2019

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History of 3D on the Web



Since 1997 X3D has evolved by adding Shaders, Geospatial, Volume Rendering, Scanning, 3D Printing and now HTML5 support

Current State of 3D on the Web



Factors Influencing 3D technology today

- Growth of enterprise 3D content
- Less hardware and network limitations
- Rendering high quality graphics in real-time
- 3D is an essential technology for MAR, VR, AR Technologies
- Native Browser support
- **Web is our platform**





Why Are Open Standards Important for 3D?

Creating quality 3D content is expensive

Both in time and software costs

Something just as expensive is recreating 3D content

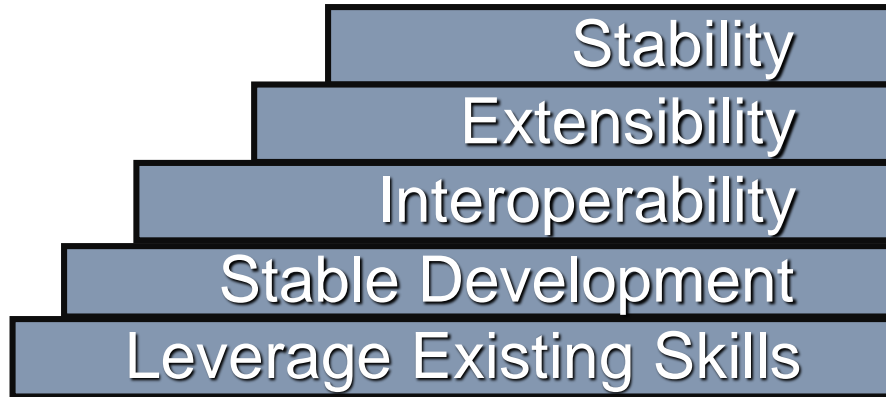
when the underlying technology no longer works

Well-kept secret of proprietary 3D technologies

Rarely interoperable

Single vendor solutions are almost always limited

Strategic Building blocks for stable 3D solutions (ROI)



Is your 3D solution providing these building blocks?

The Web3D Vision

An immersive 3D world in which everyone can **securely** access and **share** 3D data **when and where** they need it.

The Web3D Mission

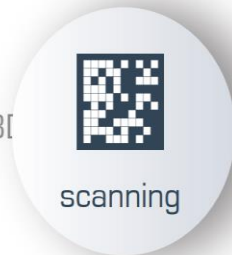
To provide standards that empower **efficient** and **secure** 3D Graphics that is **interoperable** and **archiveable**.

www.web3d.org/join

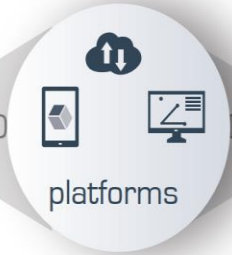
The backbone for the **new dimensions** of 3D!



medical



scanning



platforms



3D printing

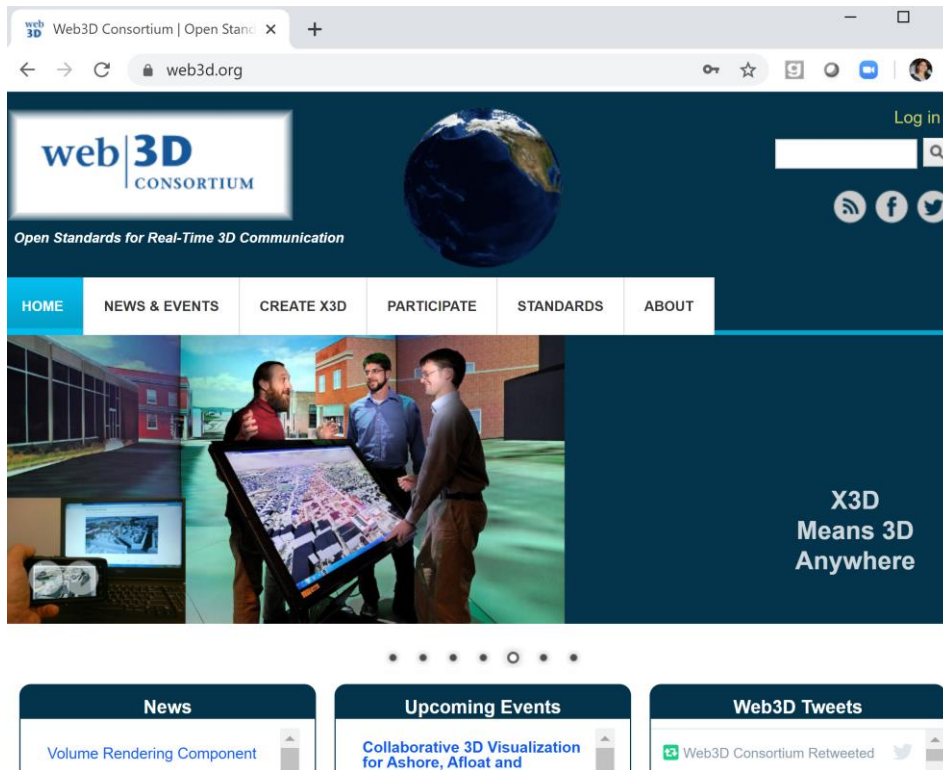


geospatial



The backbone for new dimensions in 3D

www.web3d.org



Founded in 1997

Web3D Consortium is
an international
non-profit
member-driven
industry consortium
developing open
royalty-free 3D ISO
standards

www.web3d.org

www.web3d.org



Web3D Resources

Membership: www.Web3D.org/join

Web3D Standards: www.Web3D.org/standards

Work Groups: www.Web3d.org/working-groups

Workshop: www.Web3d.org/Web3d-quickstart

Examples: www.web3d.org/x3d/content/examples/Basic/

Events: www.Web3D.org/events

Active ISO Web3D Standards



X3D Version 3.3

File Format and Rendering Engine



HAnim Version 2

Humanoid Animation

**X3D standards and HANIM
Ratified by
ISO/IEC JTC 1/SC 24**

What is X3D?

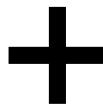
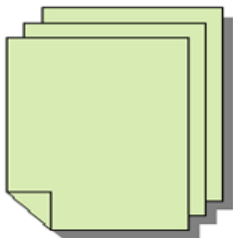
Second Generation VRML

XML encoding of VRML

A complete Solution for 3D on the Web

* Enterprise 3D *

Real-Time * Web Based * Interactive * Animation * Extensible * Scriptable



File Formats:

XML, ClassicVRML, Binary, JSON

APIs: Javascript, Java, C#, C++, C, Python

HTML5 Run-Time Engines:

Open source Implementations

X_ITE and X3DOM

**Meshes * Lights * Cameras * Materials * Textures * Shaders * Annotation * Volume *
Audio/Video * AR/VR * Security * Metadata**



Fundamentals of X3D



- **Open source and royalty-free ISO standard**
- **Modular components, Extensible, Scriptable**
- **Efficient and Scalable**
- **Quality Assurance tools for conformance**
- **Interoperable with other standards (Khronos, OGC, DICOM, W3C)**
- **Secure (Binary Encryption, Digital Signature, Compression)**
- **Platform Agnostic (All platforms all browsers)**
- **Stable that stands the test of time (Archiveable)**





Web3D Standardization Process

Volunteers and Members work together on Standards

Web3D Working Groups:

X3D

Medical

Geospatial

Mixed Reality

Heritage

Semantics

Design Printing & Scanning

SDO Partnerships:



Several open source implementations

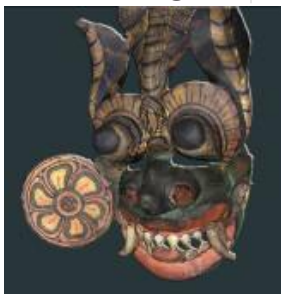
International Mobilization



- International member community
- Annual Outreach -Web3D Conference (25 years)
 - Research and industry practices shared
- Annual SIGGRAPH
 - Exhibit and outreach to the graphics community
- VR Hackathons worldwide
 - Encourage innovation
- Showcases & Regional meetings
- X3D and members appear regularly at:
 - IEEE VR, Supercomputing, MMVR, IITSEC
- X3D an enabler in many domains

X3D: Used in many Industry Verticals

Cultural Heritage



Geospatial



CAD



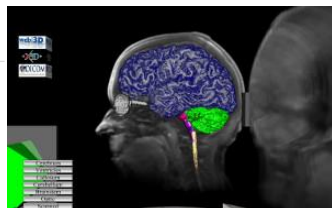
3D Printing



Mixed Augmented Reality



Medical



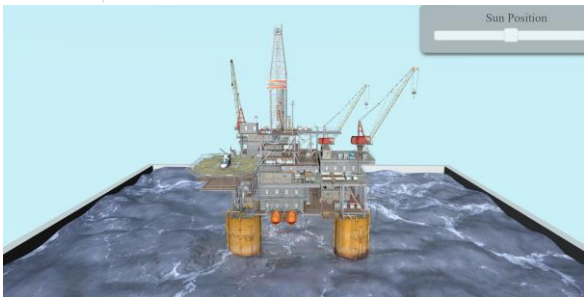
HAnim



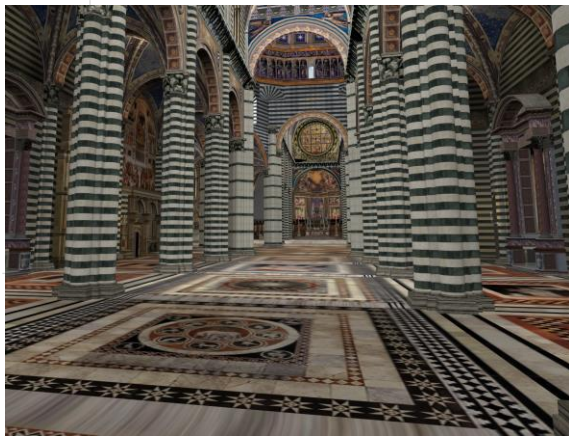
3D Scanning



Use Cases: Our members are making it happen



Oil Rig

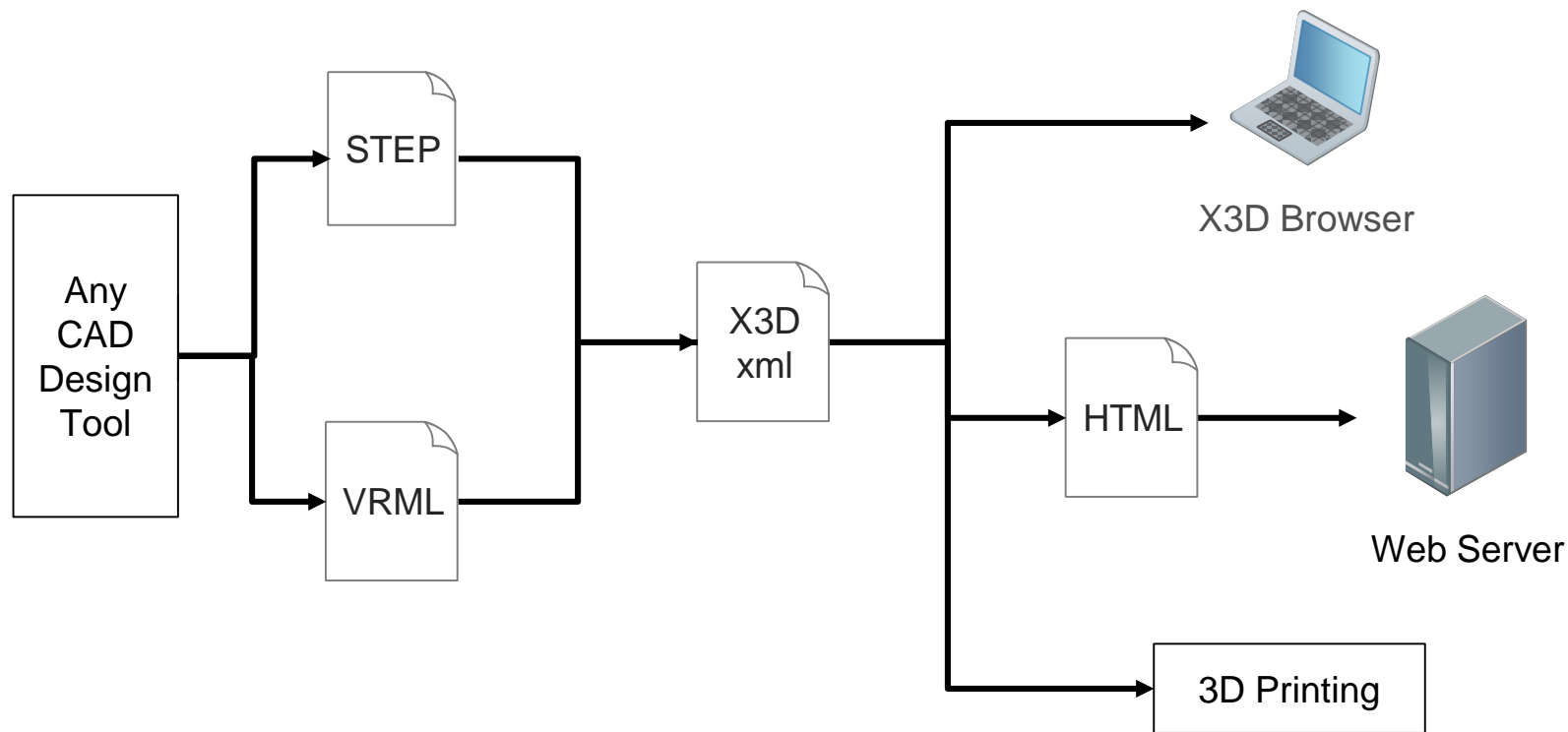


Siena Cathedral

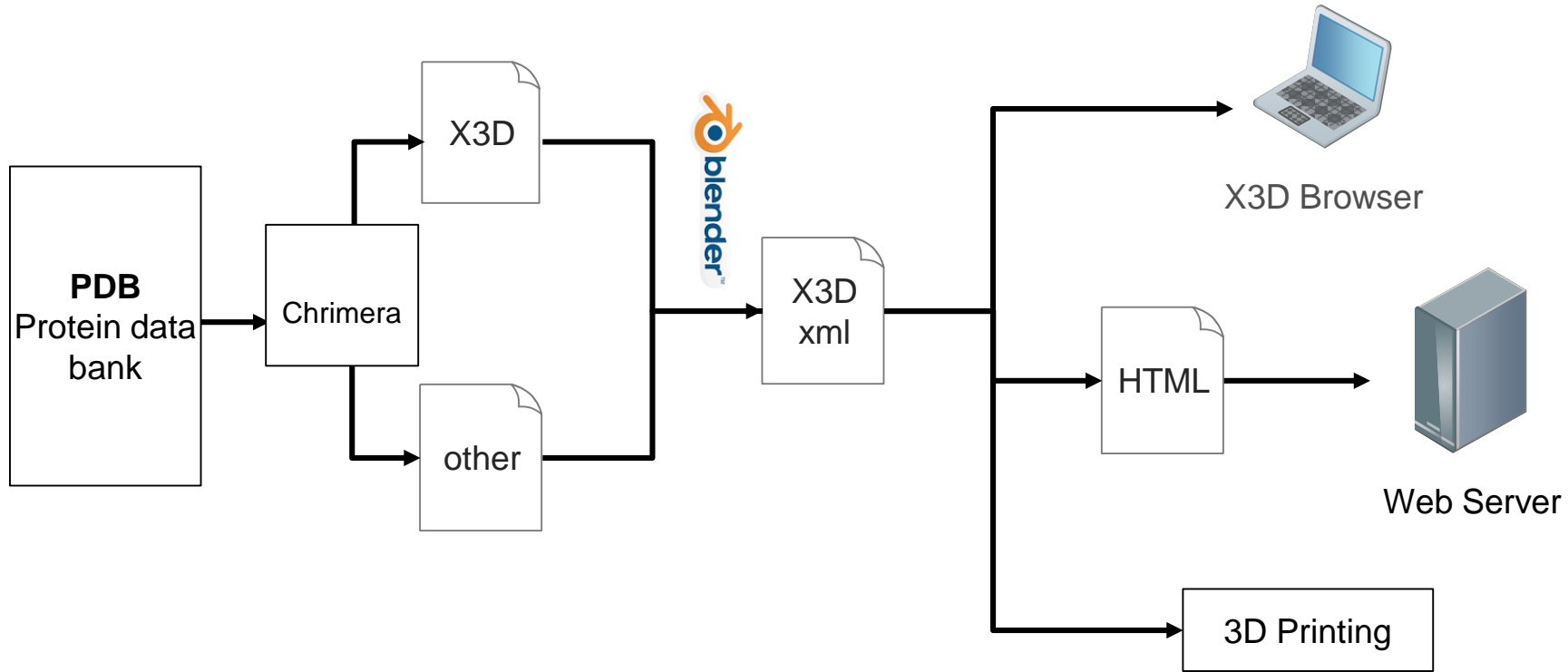


Aircraft Landing Gear

CAD Workflow



Scientific Visualization Workflow



X3D is Evolving - X3Dv4 Highlights

Always backward compatible

X3Dv4 in Development

[X3D Unified Object Model \(X3DUOM\)](#)



Version 4 Features

Improve the search-ability of 3D models.

3D printing of models

3D scanning of objects, and toolchain workflow support for point clouds

CAD interoperability includes model structure with complete metadata.

Annotation

Volume visualization

glTF Capabilities

Archival publishing of cultural and natural heritage

Open-source implementations, [X3DOM](#) and [X_ITE](#)

Available to members since 2018 in github
<https://github.com/Web3dConsortium>

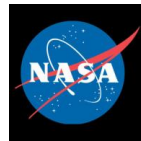
Timeline

Dec 2019 - Feature set freeze

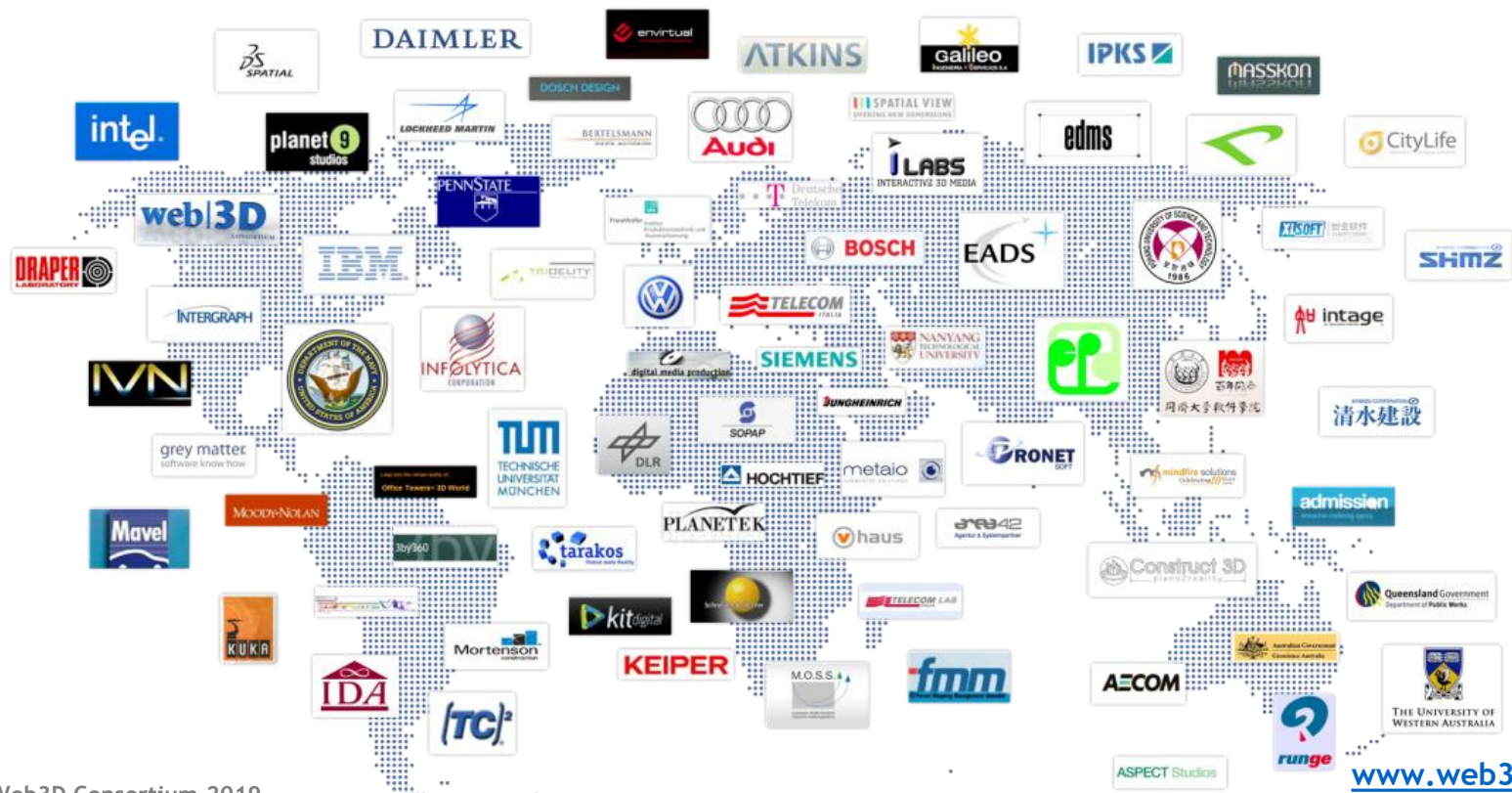
Draft 2020 - ISO Ratification

Released [public draft](#)

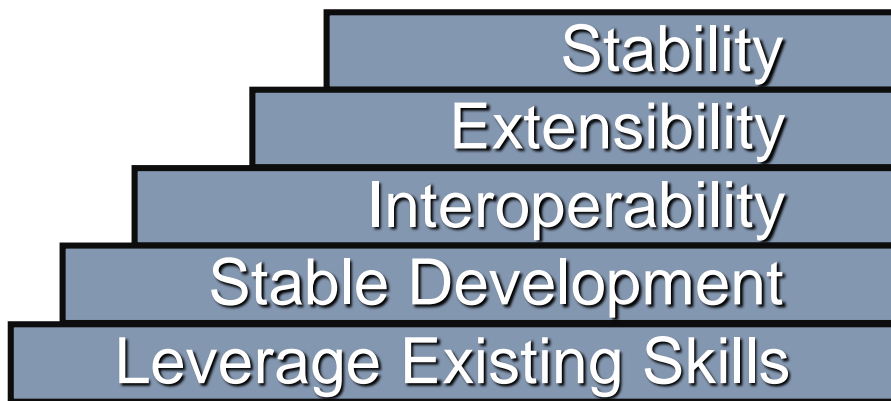
Authors have the archival stability of a well-tested long-lasting specification to build upon
www.web3d.org



Who is using X3D?



Strategic Building blocks for stable 3D solutions (ROI)



X3D

Durable and well tested

VRML to X3D V4– Shaders, Geo, Volume rendering, Scanning 3D Printing - HTML5

Between systems and platforms

Vendor Neutral/Consensus

VRML W3C

Take-Aways

ISO study showing the benefits of open standards

1. Address open standard in your planning
2. Recognize the ecology of data representations and file formats
3. Build a process of understanding how open standards can improve or impact your business
4. Evaluate available open standard options and organizations
 - Membership benefits
 - Working group structure
 - Outreach opportunities
 - IPR Policies
4. Focus on long-term goals to protect your investment



Join and Participate

Would you like to join in?

- Participants always welcome
 - <http://www.web3d.org/join>

What are we overlooking?

suggestions are always welcome

- x3d-public@web3d.org

Join us at

- [Web3D 2020](#) June 24-26 – Seoul, South Korea
- [SIGGRAPH 2020](#) July 19-23 – Washington D.C.

Contact

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Thank You for Considering Web3D Standards!

We look forward to the chance to work together

Resources and contacts

- **Web3D Website**
 - <http://www.web3d.org>
- Nicholas Polys, President
 - npolys@vt.edu
- Don Brutzman, Board Member
 - brutzman@nps.edu
- Anita Havele, Executive Director
 - anita.havele@web3d.org



BUILD THE NEXT GENERATION 3D STANDARD!

- 1
JOIN THE WEB3D
COMMUNITY
[WEB3D.ORG/JOIN](https://web3d.org/join)
- 2
USE OUR STANDARDS
[X3D](#), [VRML](#), [H-ANIM](#)
- 3
CONTRIBUTE
TO THE STANDARD
[WEB3D.ORG/WORKING-GROUPS](https://web3d.org/working-groups)
- 4
ENJOY THE BENEFITS
OF OPEN STANDARDS
[X3DOM](#), [COBWEB](#)

