Open Standards for Collaborative 3D Visualization

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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.
Founded in 1997

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

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

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

HTML5 Run-Time Engines:
Open source Implementations
X_ITE and X3DOM

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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

Several open source implementations

SDO Partnerships:
- W3C
- ISO
- Open Geospatial Consortium, Inc.
- DICOM
- IEEE 3DBP

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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

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Use Cases: Our members are making it happen

- Siena Cathedral
- Oil Rig
- Aircraft Landing Gear
CAD Workflow

Any CAD Design Tool

- STEP
- VRML

X3D xml

HTML

X3D Browser

Web Server

3D Printing
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

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Who is using X3D?
Strategic Building blocks for stable 3D solutions (ROI)

X3D

- Stability: Durable and well tested
- Extensibility: VRML to X3D V4 – Shaders, Geo, Volume rendering, Scanning 3D Printing - HTML5
- Interoperability: Between systems and platforms
- Stable Development: Vendor Neutral/Consensus
- Leverage Existing Skills: VRML W3C

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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
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- Don Brutzman, Board Member
  - brutzman@nps.edu
- Anita Havele, Executive Director
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BUILD THE NEXT GENERATION 3D STANDARD!

1 JOIN THE WEB3D COMMUNITY
WEB3D.ORG/JOIN

2 USE OUR STANDARDS
X3D, VRML, H-ANIM

3 CONTRIBUTE TO THE STANDARD
WEB3D.ORG/WORKING-GROUPS

4 ENJOY THE BENEFITS OF OPEN STANDARDS
X300M, COBWEB