

X3D Futures

What is happening, how to get involved!

Web3D 2018 Conference, Poznan Poland

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Web3D 2017, Brisbane: Future of X3D

"**Future of X3D**" [presentation](#) and [detailed notes](#) from Web3D 2017 Conference, Brisbane Australia, 7 June 2017 ([photograph](#)).



Strategy: X3D Version 4 www.web3d.org/x3d4

X3D[®] Version 4 is a major upgrade to the Extensible 3D (X3D) Graphics International Standard that aligns with the HTML5 Recommendation. This is major work in progress, expected to include several future versions. This effort is driven by the [X3D Graphics Working Group](#) with regular community outreach.

X3D is always evolving, and the [Web3D Consortium Standards Strategy](#) carefully guides all these improvements. X3D Version 4 enables authors to publish interactive 3D content anywhere on the Web, without restrictions or plugins.

Next-generation evolution + revolution is combined with archival compatibility of existing legacy content.

- [X3D Version 4.0 Development](#) shows specific details and planned evolutionary changes to the baseline X3D architecture.
- X3D Version 4.1 will add [Mixed Augmented Reality \(MAR\)](#) capabilities.

W3C Workshop on Web and Virtual Reality

Samsung San Jose, October 19-20, 2016; San Jose, CA, USA

White paper: [X3D Capabilities for Declarative Virtual Reality](#)



Keeping track of what is happening

Strategy: X3D Version 4

- <http://www.web3d.org/x3d4>

**Weekly Teleconferences
X3D Working Group**

Technology: X3D Version 4 list of potential specification improvements

- http://www.web3d.org/wiki/index.php/X3D_version_4.0_Development

Web3D Standards

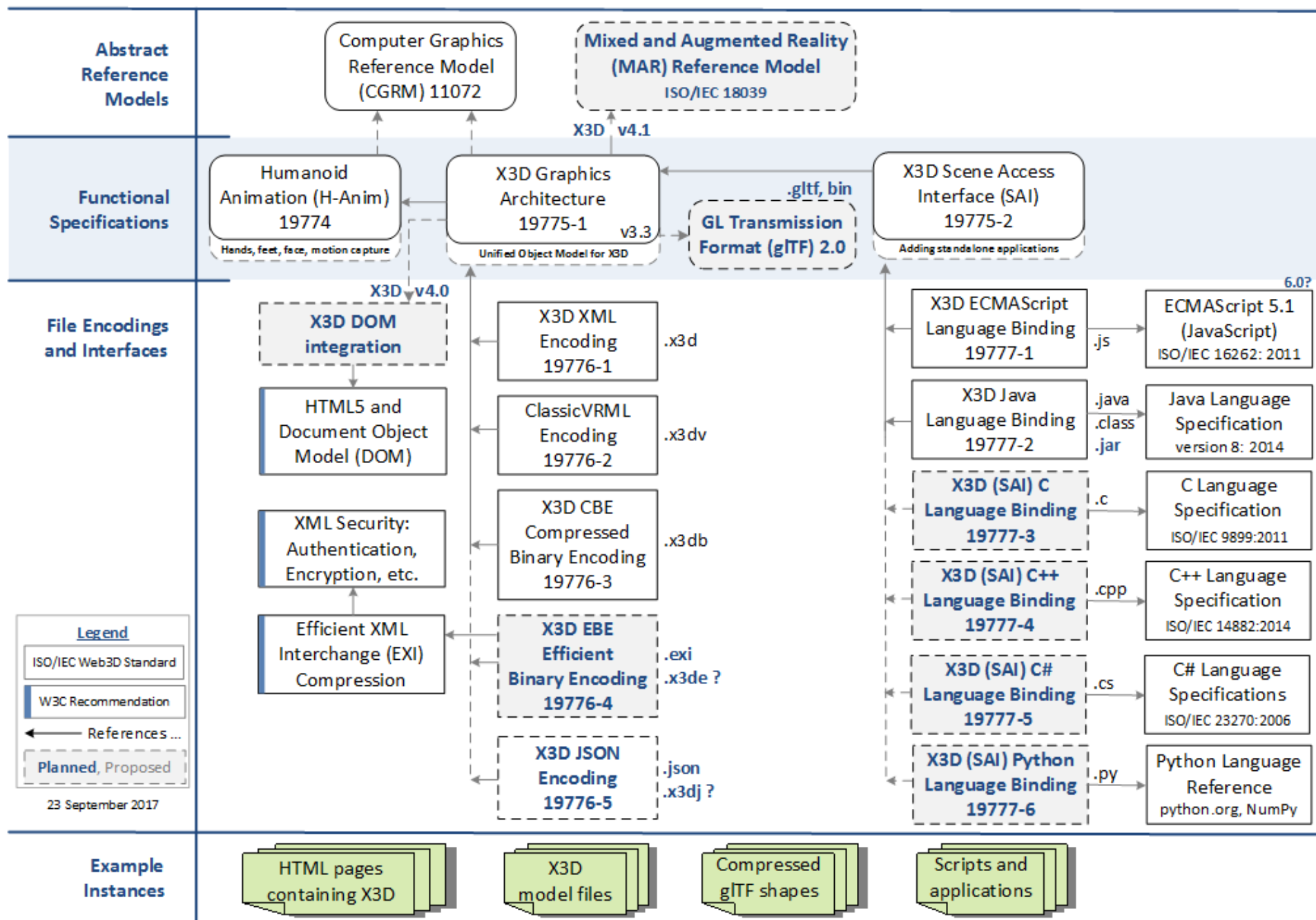
- <http://www.web3d.org/standards>
- <http://www.web3d.org/specifications/X3dSpecificationRelationships.png>

X3D 4 Summary

#1

- Following the path projected by Web3D 2017's Future of X3D session, multiple Web3D Consortium working groups and community participants continue to build on the architectural stability of the Extensible 3D (X3D) Graphics International Standard.
- Two open-source implementations ([X3DOM](#) and [X-ITE](#)) adapt X3D content for HTML5 integration, with excellent results showing compatible event models for user interaction and model animation.
- Virtual, Augmented and Mixed Reality (VR/AR/MR), 3D Printing and 3D Scanning can all use X3D and being explored to good effect.

X3D Graphics Standards: Specification Relationships

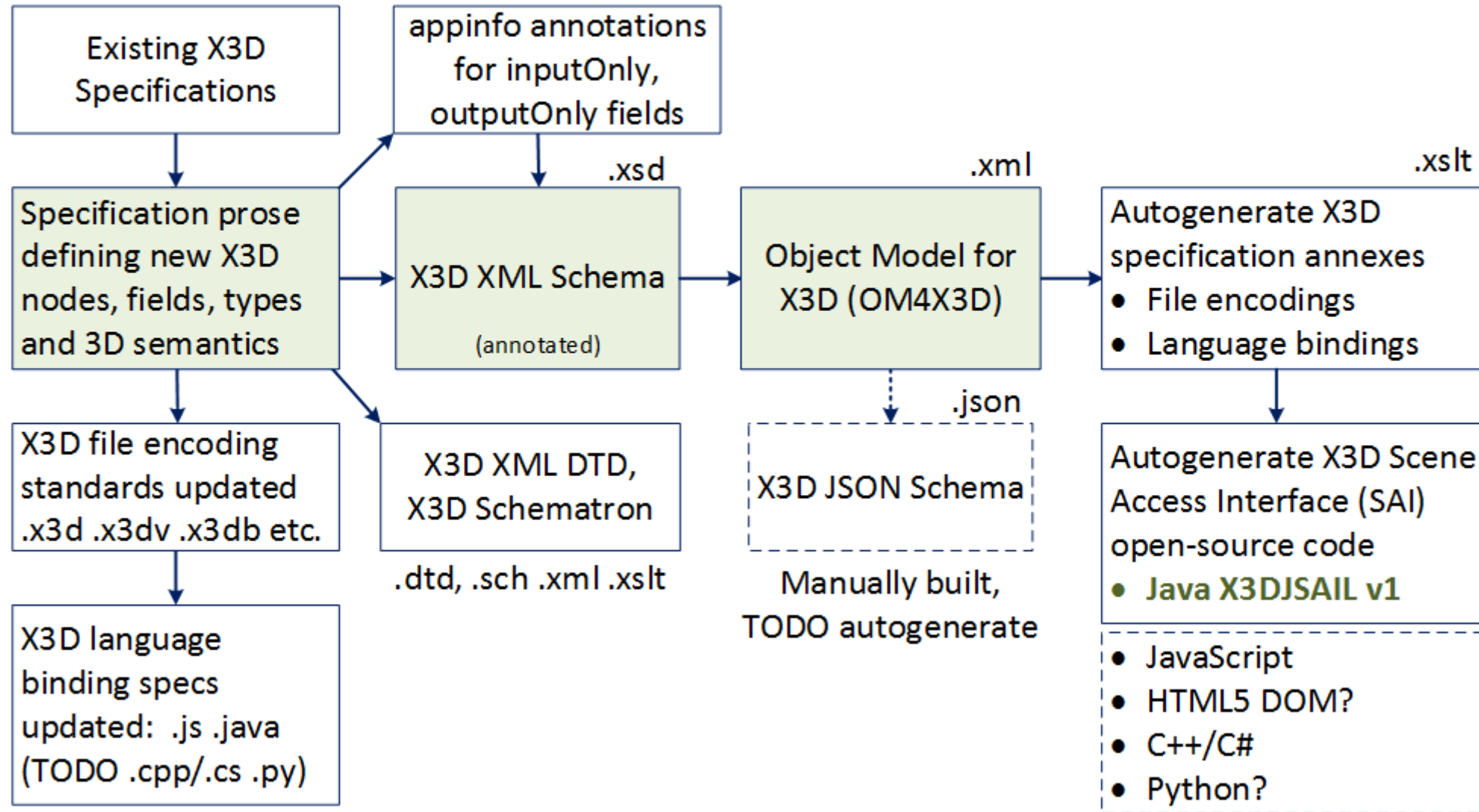


X3D 4 Summary

#2

- Central to these efforts is an [X3D Unified Object Model \(X3DUOM\)](#) that enables consistent implementation and presentation of content across multiple file encodings (XML, ClassicVRML, JSON, binary) as well as multiple programming language bindings (JavaScript, Java and planned adaptations to C/C++/C# and Python).
 - [X3D JSON Loader \(X3DJSONLD\)](#) and [X3D JSON Encoding](#)
 - [X3D Java Scene Access Interface Library \(X3DJSAIL\)](#)
- Second-generation Humanoid Animation (HAnim) is stabilizing motion-capture (mocap) outputs for both general-purpose and human-specific (i.e. medical) usage.

Object Model for X3D: Creation, Autogeneration



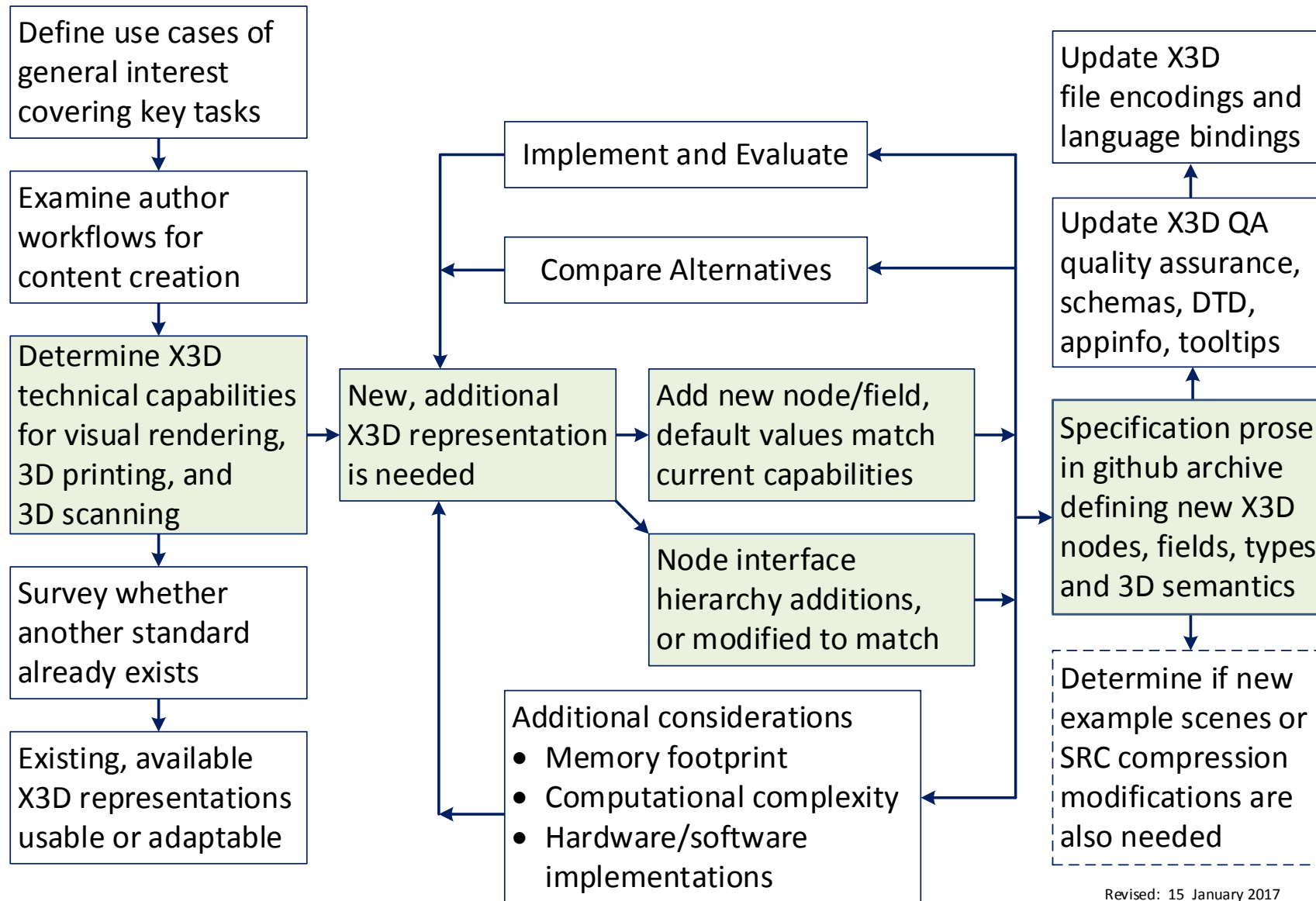
[X3D Unified Object Model \(X3DUOM\)](#)

X3D 4 Summary

#3

- Over two decades of progress are steadily evolving to unlock the promise of 3D Graphics within the Web architecture.
- [X3D Resources](#), [X3D Scene Authoring Hints](#), [X3D Tooltips](#), import/export support, forwards/backwards version compatibility, [X3D Quality Assurance \(QA\)](#) validation tools, and a large corpus of open-source version-controlled [X3D examples](#) are together ensuring that consistent semantics are emerging for 3D on any platform.
- This progress report outlines numerous parallel lines of effort and points out individual opportunities to utilize and extend X3D consistently across multiple domains.

Specification design process for new capabilities



HTML5 and Open Web Architecture

- Harmonization of ID linkages and event models, HTML DOM and X3D
- Composition with Cascading Style Sheets (CSS)
- Compatibility + usage of Scalable Vector Graphics (SVG)
- Accessibility, annotations, internationalization (I18N), etc.
- X3D as presentation layer compatible with Semantic Web
- Linkage of hybrid model data (MOST)

Some aspects are standardization, others simply aligning best practices.

Rendering

X3D version 4, HTML5/DOM

- Inline, ExternalShape:
glTF model
- Physically Based Materials: glTF
- Advanced lighting model
- Shadows and reflections
- Cloud-based, offline rendering

X3D version 4.1, VR/AR/MAR

- Co-develop 3.1 to immediately follow completion of X3D v4.0
- WebVR as baseline capability set
- Composing see-through/360 video, high-definition, green screen, etc.
- Push “settled issues” to X3D v4.0, defer final WebVR support to v4.1

3D Printing and 3D scanning

- 3D Printing: bits into atoms
- 3D Scanning: atoms into bits

Uh, approximately everything?!

CAD Design Printing Scanning Working Group is building profiles

- Geometry requirements essentially complete
- **Metadata and annotations** getting close scrutiny, building exemplars
- Contributing to multi-standard ISO tech committee, Byoung Nam Lee
- Also STEP Visualization group, Soonhung Han, Christophe Mouton

Simple use case: scan, print, view any object

Share via [NIH 3D Print Exchange](#), [Navy/Marine X3D Model Exchange](#)

Audio

White paper: [Strategies for Improved Sound Support in X3D](#)

[W3C Audio Working Group](#)

- Web Audio, Web Midi, Web Audio Processing: Use Cases and Requirements
- MediaStream Processing API

Audio shaders/scripts in combination with configurable pipeline?

Use of audio in annotations

Humanoid Animation (HAnim) + Medical

New Hanim Draft International Standards (DIS) available [online!](#)

- Hanim Architecture (skeleton, skin, hands and feet, precise naming)
- Hanim Motion Animation (e.g. mocap, BVH conversion)
- Tool updates expected by SIGGRAPH Vancouver, August 2018

Medical Working Group also meets regularly

- Liaisons with DICOM imaging, Health Level 7 (HL7), etc.
 - Diverse applications and uses
- Shared strategy: suitable for archival Electronic Health Records (EHR)
 - **Metadata and annotations**, security, compression, ontologies, standards

Bottom lines

An amazing amount of progress is clearly possible, working in parallel.
We have a feasible path forward, good process and good procedures.

Web3D membership has value!

- Can accelerate, focus attention on your project of interest
- Web3D needs you to [Join](#) as a business, university, agency or individual

Community contributions count too!

- Ask questions, review, contribute code and models

**Get involved,
we want you!**

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