Web3D Standards and Beyond: Web3D Medical Futures

Web3D Conference

Medical Workshop

Los Angeles, CA - July 28, 2019

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HL7 and Web3D Partnership

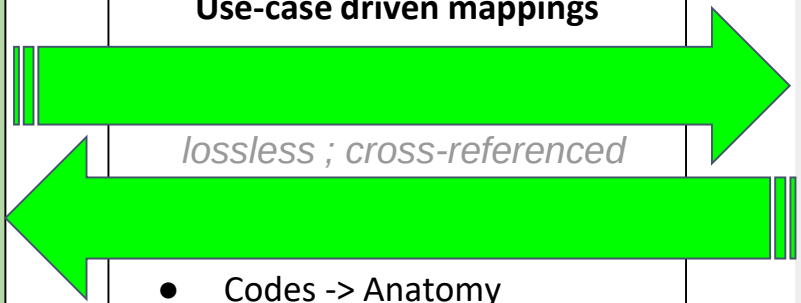
HL7 International and Web3D Consortium liaison agreement to Incorporate 3D Presentation into EHR Applications
May 2018

Pipelines to Exchange Data

HL7 FHIR Endpoint

Health Records:
- DAMs
- DICOMs
- X3D as scene or url

Use-case driven mappings



lossless ; cross-referenced

- Codes -> Anatomy
- Sampled Data timeseries
- Surgical Planning
- X-Ray-Proton Therapy
- Body Scans
- Therapeutic VR
- Physical Therapy
  - Exercise data
  - Motivational VR
- ...

Extensible 3D (X3D)

XML (dtd, xsd)

JSON

Binary

utf8

...

ECMASCRIPT

Java

Components per use case

web3D CONSORTIUM

Desktop - Mobile
- Metadata, urls

VR-MR-AR
- Metadata, urls

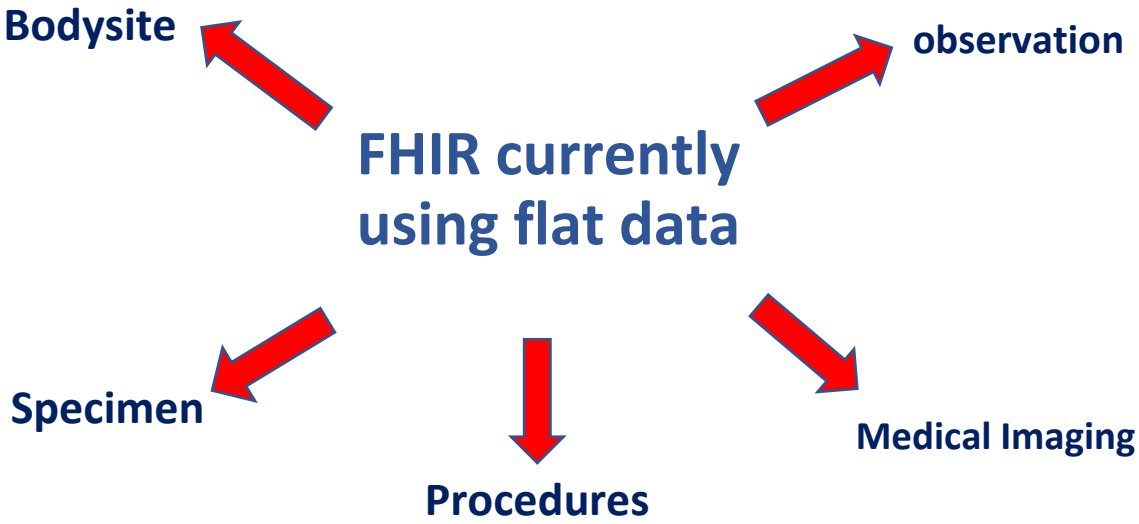
3D Printing
- Metadata, urls

GIS
- Metadata, urls

Human Animation
- Metadata, urls

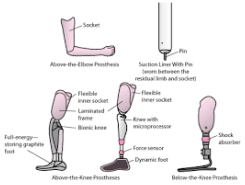
HL7, DICOM: ANSI, ISO *W3C, IEEE* *Web3D ISO-IEC*

Current state of FHIR standards



https://www.hl7.org/FHIR/2015May/resource-types.html

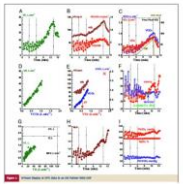
Web3D ways to enhance FHIR
FHIR and multidimensional visualization



Design/body site

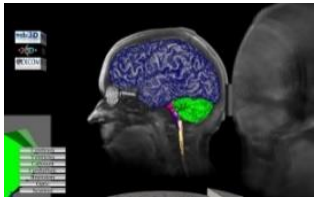
Population Health Data/observation

FHIR and Web3D Combo



3D plots/observation

3D Imaging/imaging study



3D Scanning/specimen

3D Printing/ specimen

FHIR/Web3D - The Web is our platform

All browsers
All platforms

Interoperable/Realtime sharing

Partnering with Web3D and making 3D an attribute to FHIR standards and resources

Industry Standards Unify Communities

HL7 Version 2 & 3

HL7® FHIR®

LOINC

RxNORM

glTF

X3D

WebGL

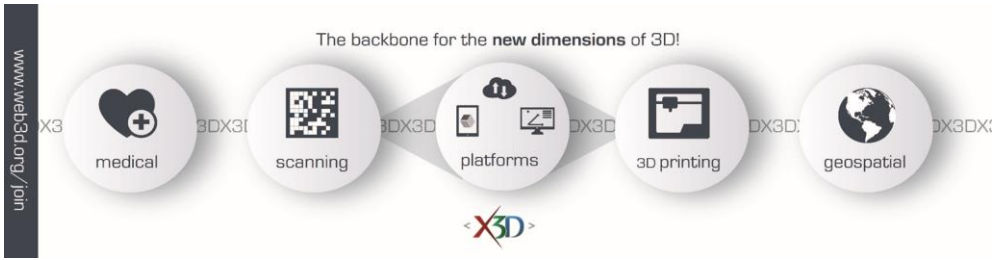
H|anim

Foundation for medical futures?

Two prong approach: Public Health and Precision Health
Generalized and Discovery Based

Improve Visualization
Quadruple Aim (cost, satisfaction, outcomes)
Generic Infrastructure
Bioethics and Security
Broad Impact
Easy Adoption
Influence Policy makers

Simulation
Animation
Virtual Humans
Mixed Reality
3D Printing and Scanning
3D Plots



FHIR/X3D Combo: A backbone for new dimensions in healthcare

Use cases:

1. Cardiopulmonary Pediatric Exercise Testing (CPET) - Bill Kraus(**Duke University)**
2. 3D Plots for CPET -Vince Marchetti(**Kshell)**
3. HL7 and Web3D - Ed Hammond(**Duke University)**
4. FHIR and Multidimensional visualization - Nicholas Polys(**Virginia Tech)**
5. 3D Body Scans - Bioethics, Privacy and Security - Chris Lane(**3dMD)**
6. Volume Rendering - Ander Arbelaiz(**Vicomtech)**