X3D Graphics Standards Relationships

**Reference Standards**
- Computer Graphics Reference Model (CGRM) 11072
- VRML97 with EAI 14772
- HTML5 and Document Object Model (DOM)
- GL Transmission Format (gITF) 2.0
- 3D Printing Scanning ISO JTC1
- WebXR Device API
- OpenXR
- Mixed Augmented Reality (MAR) Reference Model
  - ISO/IEC 18038,39,40 series
  - Multiple individual MAR projects
  - Open publication by ISO requested

**Web3D Consortium Architectures, File Encodings, and Programming Language Bindings**

- **Humanoid Animation (HAnim) 19774**
  - Part 1: Architecture, hands, feet
  - Part 2: Motion animation
  - Part 3: Facial model animation
  - Part 4: Internal organ systems

- **X3D Graphics v4.0 Architecture 19775-1**
  - v4.0 HTML DOM
  - v4.1 MAR WebXR

- **X3D Scene Access Interface (SAI) 19775-2**
  - X3D Unified Object Model (X3DUOM)
  - X3D Ontology for Semantic Web Technology

- **Medical content and metadata for health records**
  - HL7 FHIR
  - DICOM
  - IEEE 3D Body Processing

- **XML Security**: Authentication, Encryption, etc.
- **Efficient XML Interchange (EXI)**Compression
- **Fast Infoset (FI)** Compression ISO 24824-1

- **JSON specifications**:
  - IETF RFC/schema, 22275:2018, etc.

- **X3D XML Encoding 19776-1**
- **ClassicVRML Encoding 19776-2**
- **X3D CBE Compressed Binary Encoding 19776-3**
- **X3D EBE Efficient Binary Encoding 19776-4**
- **X3D JSON Encoding 19776-5**
- **.x3d**
- **.x3dv**
- **.x3db**
- **.exi**
- **.json**
- **.exi**

**Example Instances**
- HTML5 CSS pages including X3D
- X3D scenes, model files
- Compressed glTF shapes
- X3D scripts, applications
- SAI libraries X3DUOM

**Legend**
- ISO/IEC Web3D Standard
- ISO/IEC Standard
- W3C Recommendation
- Khronos Standard
- Other specifications
- Planned
- Proposed

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