X3D Graphics for Web Authors

X3D-Edit Update

Web3D Consortium Korea Chapter
Seoul, 7-8 December 2009

Don Brutzman
Naval Postgraduate School
Monterey California USA
Motivation

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, help further X3D progress
X3D Showcase DVD

Contents

- Viewers
- Examples
- Content Creation Tools
- Case Studies
- Resources
- Join Web3D Consortium

Features

The Web3D Consortium develops royalty-free open standards like Extensible 3D (X3D) Graphics. X3D is used for communicating 3D on the Web between applications, platforms and web services.

Web3D members are delighted to present our X3D Showcase, which is a DVD filled with introductory resources. X3D can help you accomplish your real-time 3D graphics challenges.

- X3D Viewers allow X3D content to display scenes on every major platform, running in your web browser and on mobile devices.
- Examples show innovative X3D content from our member developers demonstrating the diverse use of X3D.
- Content Creation Suite tools help your ideas become interactive 3D content, ready for deployment on the Web.
- X3D Case Studies show how X3D is used by many different industries for many diverse uses (or try the online version).
- X3D News and Events provide X3D-related news stories, code samples, tutorials and X3D-based implementations for developers and the X3D user communities (or try the online version).
- On-line X3D Podcasts (2008, 2007) videos show and tell more about our innovative X3D content developers.
- Web3D 2009 Symposium is the 14th International Conference on 3D Web Technology. The Call for Participation lists topics of interest. It will be held 16-17 June 2009 at Fraunhofer Institute for Computer Graphics, Darmstadt, Germany.
- X3D for Web Authors is a textbook by Don Brutzman and Leonard Daly that provides complete detail how X3D works, helping you learn to build your own projects.

The Web3D Consortium thanks the many individuals listed in the Showcase Credits and Contributor Credits.
X3D Showcase DVD

Production thanks!

- **Web3D**: Anita Havele
- **University of Sao Paolo**: Mario Nagamura, Marcia Kondo, Marcio Cabral, Olavo Belloc, Marcelo Zuffo
- **Naval Postgraduate School**: Byounghyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control for easy updating
X3D Examples Archives

**X3D for Web Authors**
- 246 models
  - Textbook on how to design and build X3D scenes

**Basic**
- 645 models
  - Diverse scenes illustrating various X3D capabilities

**Conformance NIST**
- 732 models
  - Strictly defined test examples for correct operation

**VRML 2.0 Sourcebook**
- 269 models
  - Textbook on VRML97, examples converted to X3D

**Savage**
- 1177 models
  - Open-source military models and tools

Over 3000 models available
X3D-Edit Authoring Tool
for Extensible 3D (X3D) Graphics

Overview

The X3D-Edit 3.2 Authoring Tool for Extensible 3D (X3D) Graphics supports the creation, checking, display and publication of X3D scenes. It is written in open-source Java and XML using the Netbeans 6.7 platform, making it suitable both as a standalone application and as a plugin module for the Netbeans integrated development environment (IDE).

X3D-Edit features include direct editing of X3D scenes using the XML (.x3d) encoding, embedded visualization of scenes using the Xj3D viewer, XML validation using X3D DTD grammars, X3D Schema grammars and X3D Schematron rules, drag-and-drop palette for X3D nodes, popup panels for node editing, and extensive help resources. Further features include ClassicVRML and X3D compressed binary encoding support, encryption and digital-signature authentication using XML Security standards, and additional X3D scene authoring support.

X3D-Edit 3.2 is stable and available for public use. Current capabilities are summarized in the X3D-Edit Update presentation.
X3D-Edit updates

Icon in lower-left corner of screen indicates when updates are available for automatic installation

Plugin available: click
X3D Examples download panel, X3D-Edit

- **X3D for Web Authors Examples**
  A wide variety of basic examples are provided that show how to design and build X3D scenes. These are explained in the book X3D for Web Authors.

- **Basic Examples**
  The Basic Examples archive provides numerous scenes illustrating a broad variety of X3D capabilities.

- **ConformanceNIST Test Suite Examples**
  The ConformanceNIST Test Suite Examples were authored by National Institute of Standards and Technology (NIST) to provide a complete test set for the Virtual Reality Modeling Language (VRML97). They were automatically converted into X3D and provide approximate coverage for the X3D Immersive Profile.

- **VRML 2.0 Sourcebook X3D Examples**
  The VRML 2.0 Sourcebook is an outstanding textbook covering the Virtual Reality Modeling Language (VRML) 97. These were the first examples converted into X3D.

- **Savage X3D Examples**
  NPS Scenario Authoring and Visualization for Advanced Graphical Environments (SAVAGE) library is an open-source set of X3D models and prototype tools used for defense simulation.

Local download directory: C:\

[Start downloads] [Cancel downloads]
Using the IDE Help System

See Also

Click any entry in the Contents tab to view the topic in the right pane of the Help viewer.

Searching the Online Help

To perform a full-text search of all IDE help topics, click the Search tab and type a keyword in the Find text box.

Using the Index

Click any entry in the Index tab to view the topic. To search the index, enter a term in the search field and press Enter. Press Enter multiple times to cycle through all occurrences of the term in the index.

Getting Help for IDE Dialogs and Windows

Press F1 in any part of the IDE to open a help topic that is specific to the task you are doing or where you are in the IDE.

Tutorials and Additional Documentation

For general information about the IDE, see the Getting Started section of the online help. Tutorials and other documentation can be found in the Help menu.

See Also

Help Viewer Shortcuts
Displaying Help in a Web Browser

Legal Notices
Viewing alternatives for X3D

Default built-in viewer is open-source Xj3D
  • High performance, implemented using Java OpenGL

Can launch current scene into web browser
  • Displays using any of your installed plugins
  • “Launch all viewers” simplifies comparison testing

Can also launch into standalone applications
  • Configuration panel simplifies download, install
Player support for X3D components

The Extensible 3D (X3D) standard has many capabilities. X3D components are modular collections of nodes that make it easier for software to gradually implement the full range of X3D capabilities. Authors can also indicate what components are needed in an X3D scene in order to ensure that proper support is provided at run time.

This table records support for the official X3D components by each of the various X3D players. It is maintained by the X3D Working Group and member companies in the Web3D Consortium.

The X3D Resources page provides lots of additional information about X3D. Please Contact Web3D if you want to learn more or report an update.

Related page: Tool support for X3D components

<table>
<thead>
<tr>
<th>Table key</th>
<th>BS Contact</th>
<th>FreeWRL</th>
<th>Helian</th>
<th>InstantReality</th>
<th>Oclala Player</th>
<th>OpenVRML</th>
<th>SwirlX3D</th>
<th>Vivity</th>
<th>X3D</th>
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<tr>
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<td>v7.1</td>
<td>v1.21.2</td>
<td>v0.14</td>
<td>beta 5</td>
<td>v2.3.0.2</td>
<td>v0.17.9</td>
<td>v2.1.7</td>
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**File Encodings**
- XML (x3d)
  - yes
- ClassicVRML (x3dv)
  - yes
- Compressed Binary Encoding (x3db)
  - no

**X3D component list**
- CAD geometry
  - yes
- Core
  - yes
- Cube map environmental texturing
  - yes
- Distributed interactive simulation (DIS)
  - no

```
## Player support for X3D components

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Tool support for X3D components

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This table records support for the official X3D components by each of the various X3D authoring tools and X3D conversion tools. It is maintained by the X3D Working Group and member companies in the Web3D Consortium.

The X3D Resources page provides lots of additional information about X3D. Please Contact Web3D if you want to learn more or report an update.

Related page: Player support for X3D components

Table key:
- yes: all nodes, all fields supported for all levels of this component (though some bugs may be present)
- partial: some nodes and fields supported
- level #: which component level number (1-4) is supported (found at end of each component specification)
- no: no support provided
- ?: unknown, need status report

<table>
<thead>
<tr>
<th>Tools, versions, and X3D Conformance Certification</th>
<th>Authoring tools</th>
<th>Conversion tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS Editor v7.1</td>
<td>SwivX3D Editor v2.1.7</td>
<td>SwivX3D Translator v2.0</td>
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<td>Interchange Profile</td>
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<tr>
<td>Okino Polytrans</td>
<td>SwivX3D Filter Chain</td>
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<th>Okino Polytrans</th>
<th>SwivX3D Translator</th>
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<td>yes</td>
<td>no</td>
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</table>

X3D component list
Right-click to launch external players
X3D-Edit collaboration chat

XMPP JID for the chat channel is xmpp://x3d@muc.share.java.net
Subscription directions are provided on the installation page
Version control support included
Collada .dae editing support
Collada .dae import to X3D
Distributed Interactive Simulation (DIS) Protocol

Long-running IEEE protocol used in military modeling + simulation applications

OpenDIS: open source implementations

- Java, C++, C#, Objective C
- Also DIS-XML that runs under XMPP jabber chat
- Available at Sourceforge
  http://sourceforge.net/projects/open-dis

Integrate network test environment into X3D-Edit

- Multiple panels completed for record/playback/test
- Goal: aid development, testing of new protocols
Distributed Interactive Simulation (DIS) Entity State Protocol Data Unit (ESPDU) Test Panel

Translation along x-axis by -20m, to left
Rotation about y-axis by +20° counter-clockwise
DIS Networking Player-Recorder Panel
X3D Earth, Geospatial Component

Editing and authoring support provided

<!-- a simple Inline node is all that is needed for any scene to use X3D Earth assets, for example: -->

<Inline url='http://x3d-earth.nps.edu/osmdemo.x3d'/>
Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin
  • Supported in X3D-Edit, other tools

Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors
  • From motion capture (Vicon Peak system)?
  • From different motion formats?
  • More work needed, H-Anim group seems stalled...
Tool and example support
Creating a morphable dolphin
Chris Lang, Monterey High School
X3D for Web Authors

Textbook, slidesets, examples, videos

http://x3dGraphics.com
Availability of book resources

Book available in hard copy or electronic copy

X3D-Edit authoring tool is free for any use
X3D Examples are free for any use
X3D for Web Authors slides and course videos are free for any use

All free assets included on X3D Showcase DVD
Teaching Goals

This work presents Extensible 3D (X3D) Graphics, the open, royalty-free, international standard for 3D graphics on the Web

Book and slideset goals include

• Show Web authors experienced with HTML and XML how to build and connect X3D models
• Teach students principles of Web-capable 3D graphics
• Serve as a ready-reference book for X3D experts

Explain broad principles and specific details of X3D for anyone learning how to build 3D models
CGEMS

Computer Graphics Educational Material Source

- SIGGRAPH Education Committee
- Archives for teaching and learning 3D
- http://cgems.inesc.pt

Jury award, best submission 2008

- Book, course notes, X3D-Edit tool, examples

New learning resource: course video podcasts!
Course Videos: X3D for Web Authors

These video lessons support the textbook X3D: Extensible 3D Graphics for Web Authors, which shows how to build and animate models using X3D.

Primary supporting materials for the book and these video lessons include the X3D-Edit authoring tool, example scenes, and chapter slidesets. Supplementary learning materials include X3D Resources, X3D Tooltips, and X3D Scene Authoring Hints.

These videos were produced as part of two Naval Postgraduate School (NPS) MOVES Institute courses: Introduction to X3D Graphics (MV3204) and Advanced X3D Graphics (MV4205). The course presenter is book coauthor Don Brutzman.

<table>
<thead>
<tr>
<th>Chapter Examples</th>
<th>Session</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Getting Started</td>
<td>Goals and motivation, installing X3D-Edit authoring tool and example scenes, course introduction</td>
</tr>
<tr>
<td>1</td>
<td>Technical Overview 1A</td>
<td>Introduction, historical background, Web3D Consortium, importance of standardization, X3D Specifications and International Organization of Standards (ISO), intellectual property rights (IPR) and open-source software, interoperability considerations</td>
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<tr>
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<td>Technical Overview 1B</td>
<td>Browsers and players, models versus programming, scene graphs, behaviors and events, profiles and components, document metadata, fields</td>
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<tr>
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<td>Technical Overview 1C</td>
<td>Importance of consistency, strong data typing, accessType, XML design patterns for X3D, compressed binary encoding, standards liaison organizations</td>
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<td>Technical Overview 1D</td>
<td>X3D-Edit authoring tool development, functional testing, bug tracking, version control, Netbeans, help system</td>
</tr>
<tr>
<td>2</td>
<td>Geometry Primitives 2A</td>
<td>Shape and geometry nodes, common geometry fields</td>
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<tr>
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<td>Geometry Primitives 2B</td>
<td>Box and Cylinder nodes, X3D Tooltips</td>
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<td>Geometry Primitives 2C</td>
<td>HelloWorld example, Cone Cylinder and Sphere nodes</td>
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<td>Geometry Primitives 2D</td>
<td>Text node for flat 2D strings, launching an X3D scene into one or more external players, multiple-field MFString arrays, handling special characters using XML character entities</td>
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<td>Geometry Primitives 2E</td>
<td>FontStyle node, open-source licenses</td>
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<tr>
<td>3</td>
<td>Grouping 3A</td>
<td>Grouping node concepts, XML encoding</td>
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<td>Inline node, url field</td>
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<td>X3D resources and additional references, Inline node, url fields, level of detail (LOD) node</td>
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<td>Switch node, review grouping node concepts, 3D grid resources</td>
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<td>Viewing Navigation 4B</td>
<td>Viewpoint node, viewing and navigation</td>
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<td>Viewing Navigation 4C</td>
<td>NavigationInfo and Anchor nodes, uniform resource locator (url)</td>
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<tr>
<td>5</td>
<td>Appearance 5A</td>
<td>Material and TwoSidedMaterial nodes, Universal Media materials library</td>
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<td>Appearance 5B</td>
<td>Textures and ImageTexture node, texture coordinates, image copying and flipping to produce a continuously repeating texture, file formats</td>
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<tr>
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<td>Appearance 5C</td>
<td>MovieTexture and PixelTexture nodes, LineProperties and FillProperties nodes</td>
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<td>Appearance 5D</td>
<td>PixelTexture node, SImage data type, PixelTexture image-import tool</td>
</tr>
<tr>
<td></td>
<td>Appearance 5E</td>
<td>More on PixelTexture node, MovieTexture node</td>
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</tbody>
</table>
Summary

X3D-Edit provides many great resources for learning, authoring and using X3D

These community capabilities are good for business, educators, individuals

We welcome your active participation in Web3D Consortium
Contact

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for X3D-Edit software and X3D example scenes

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