

X3D Graphics for Web Authors

X3D-Edit Update

SIGGRAPH ASIA

Singapore, 10-13 December 2008

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Naval Postgraduate School

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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** for X3D content can 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 initial ideas become interactive 3D content, ready for deployment on the Web.
- **X3D Case Studies** showcase 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 topic areas 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*: Byoungyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control
for easy updating

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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

X3D Examples Archives

X3D for Web Authors 299 models

- Textbook on how to design and build X3D scenes

Basic 610 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 1226 models

- Open-source military models and tools



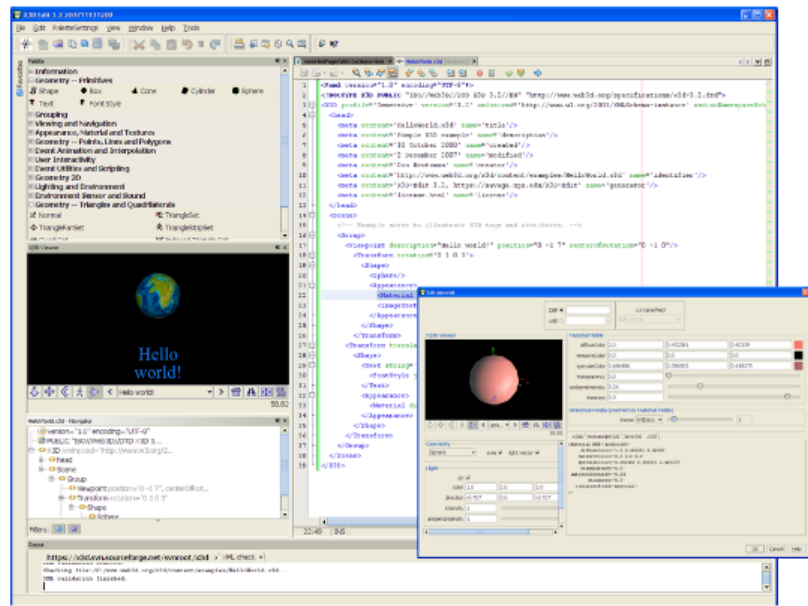


X3D-Edit Authoring Tool for Extensible 3D (X3D) Graphics



[Overview](#) | [Acknowledgements](#) | [Book](#) | [Chat](#) | [Downloads](#) | [Features](#) | [Issue Tracking](#) | [Licenses](#) | [Mailing Lists](#) | [Plugins](#) | [Support](#) | [X3D Help](#) | [Contact](#)

X3D-Edit is an Extensible 3D (X3D) Graphics authoring tool for simple error-free editing, authoring and validation of X3D scenes.



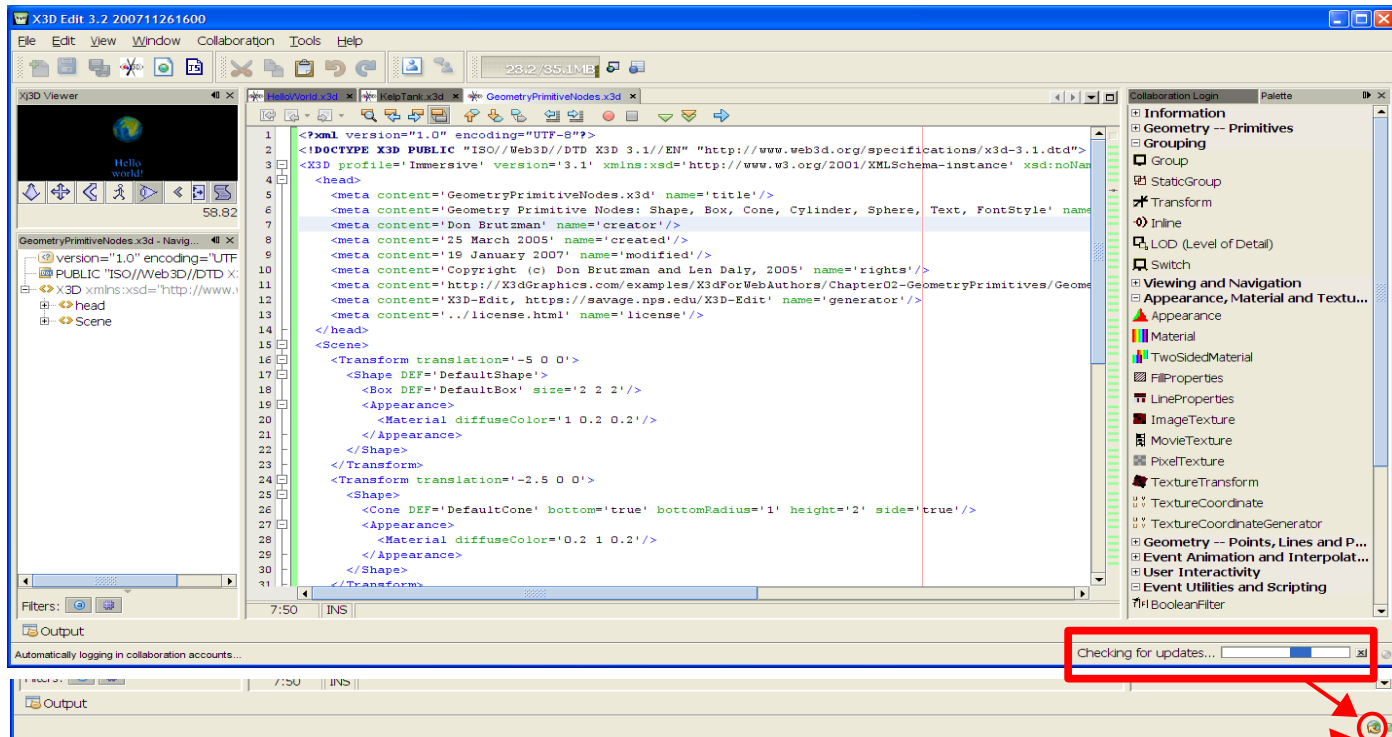
Overview

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](#) platform, making it suitable both as a standalone application and as a plugin module for the Netbeans integrated development environment (IDE).

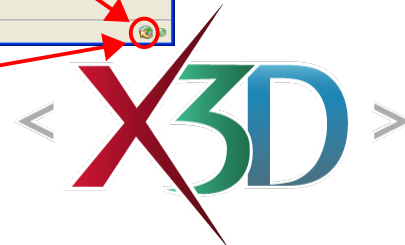
X3D-Edit features include direct editing of X3D scenes using the XML (.x3d) encoding, embedded visualization of scenes using the [Xj3D](#) viewer, XML validation against X3D DTDs and Schemas, drag-and-drop palette for X3D nodes, popup panels for node editing, and extensive help resources. Planned features 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 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

Download Example Archives

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 provide 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:



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- Legal Notices
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 - Logging Into the Collaboration Server
 - Working With Groups and Contacts
 - Starting a Conversation
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 - Filesharing

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](#)

X3D-Edit Help

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

Player support for X3D components - Web3D.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.web3d.org/x3d/wiki/index.php/Player_support_for_X3D_components

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web3D CONSORTIUM

Public X3D Wiki
Tutorials for X3D
Nodes & Concepts

Player support for X3D components

The [Extensible 3D \(X3D\) Graphics](#) 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 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

Players, versions, and X3D Conformance Certification	BS Contact	FreeWRL	Heilan	InstantReality	Octaga Player	OpenVRML	SwirlX3D	Vivaty	Xj3D
	v7.1	v1.21.2	v0.14	beta 5	v2.3.0.2	v0.17.9	v2.1.7	v1.0 build 900	1.0
	Interchange Profile	Interchange Profile	none	none	none	none	none	Interchange Profile	Interchange Profile
File Encodings									
- XML (.x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
- ClassicVRML (.x3dv)	yes	yes	no	yes	yes	yes	yes	yes	yes
- Compressed Binary Encoding (.x3db)	no	no	no	partial	no	no	no	no	yes
X3D component list									
CAD geometry	yes	no	no	yes	yes	partial	yes	no	yes
Core	yes	yes	partial (not Proto)	yes	yes	yes	yes	yes	yes
Cube map environmental texturing	yes	partial	no	yes	yes	no	no	partial	no
Distributed interactive simulation (DIS)	no	no	no	no	no	partial	no	no	yes

navigation

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search

Go Search

toolbox

- What links here
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- Special pages
- Printable version
- Permanent link

Downloads Master_LeongTh...

Done

Now: Overcast, 55° F Fri: 60° F Sat: 51° F

Tool support for X3D components

Tool support for X3D components - Web3D.org - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://www.web3d.org/x3d/wiki/index.php/Tool_support_for_X3D_components

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Tutorials for X3D Nodes & Concepts

page discussion edit history move watch

Tool support for X3D components

The Extensible 3D (X3D) Graphics [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 authoring tools](#) and [X3D conversion tools](#). It is maintained by the [X3D Working Group](#) and member companies in the [Web3D Consortium](#).

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- no** no support provided
- ?** unknown, need status report

Tools, versions, and X3D Conformance Certification	Authoring tools				Conversion tools		
	BS Editor	SwirlX3D Editor	Vivaty Studio	X3D-Edit	Okino Polytrans	SwirlX3D Translator	Xj3D Filter Chain
	v7.1	v2.1.7	v1.0 build 900	v3.2			v2.0
	none	none	Interchange Profile	Interchange Profile	none	none	Interchange Profile
File Encodings							
- XML (.x3d)	yes	yes	yes	yes	yes	yes	yes
- ClassicVRML (.x3dv)	yes	yes	yes	yes	yes	yes	yes
- Compressed Binary Encoding (.x3db)	no	no	no	yes	no	no	yes
X3D component list							

Done

0:4

Right-click to launch external players

The screenshot displays the X3D Editor 3.2 interface. The main window shows an XML file named `PixelTextureInterpolator.js` with the following content:

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.1//EN" "http://www.web3d.org/2008/09/x3d.dtd" [
<X3D profile='Immersive' version='3.1' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance'>
  <head>
    <meta content='PixelTextureInterpolatorPrototype.x3d' name='title' />
    <meta content='Using a CoordinateInterpolator to modify a PixelTexture' name='description' />
    <meta content='Don Brutzman' name='creator' />
    <meta content='14 April 2008' name='created' />
    <meta content='5 May 2008' name='modified' />
    <meta content='under development' name='warning' />
  </head>
  <scene>
    <!-- ... -->
  </scene>
</X3D>
</!DOCTYPE>
```

A right-click context menu is open over the XML content. The menu items are:

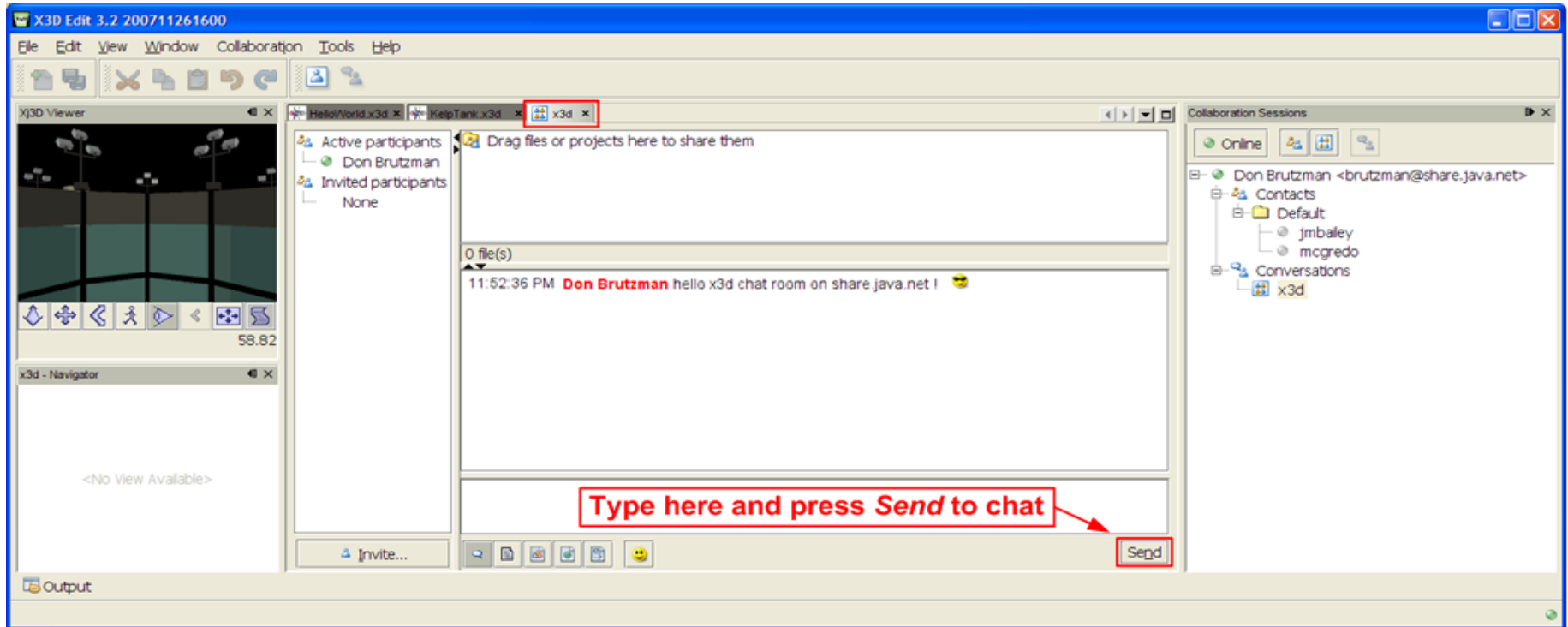
- Refresh Xj3D view
- Reload Xj3D component
- View scene externally in ..** (highlighted with a red box and arrow)
- Select element under cursor
- Edit element under cursor
- Delete element under cursor
- Rename element under cursor
- Split empty element under cursor
- Check source for ROUTE errors, etc.
- Format (Alt+Shift-F)
- View
- Check XML (Alt-F9)
- Validate XML (Alt+Shift-F9)
- XSL Transformation...
- Cut (Ctrl-X)
- Copy (Ctrl-C)
- Paste (Ctrl-V)
- Tools
- Select in

The **View scene externally in ..** option has opened a sub-menu with the following options:

- Web browser
- Contact viewer
- Flux viewer
- Instant Reality viewer
- Octaga viewer
- Xj3D viewer
- Other viewer (see Tools, Options, Miscellaneous, X3D-Edit)** (highlighted with a red box)

The interface also shows a Favorites panel on the left with a tree view of project folders, an Xj3D Viewer window displaying a 2D color checker, and a Palette panel on the right with a tree view of X3D metadata and structures.

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

The screenshot shows the X3D Editor 3.2 interface. The main window displays the XML code for a ProtoInterface and ProtoBody. The 'Subversion' menu is open, highlighting the 'Commit...' option. The 3D viewer shows a colorful cube.

File Edit View Window X3D Tools Help

Close All Documents Ctrl+Shift-W
Close Other Documents
Save Document Ctrl-S
Clone Document
Close Window Ctrl-W
Maximize Window Shift-Escape
Undock Window Alt+Shift-D
Subversion

- Show Changes
- Diff
- Update
- Commit...
- Copy To...
- Switch to Copy...
- Merge Changes...
- Show Annotations
- Search History...
- Revert Modifications...
- Resolve Conflicts...
- Ignore
- Svn Properties

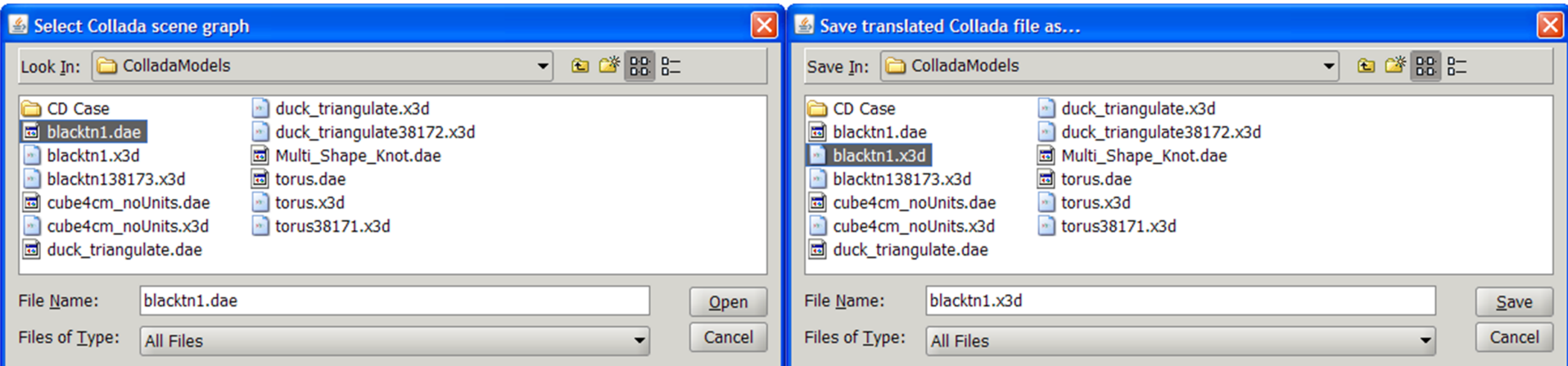
```
1 <?xml version="1.0" encoding="UTF-8" ?>
2 <!DOCTYPE X3D PUBLIC "-//Web3D//DTD X3D 3.1.dtd" "http://www.w3.org/2001/XMLSchema-instance" xsd:
3 <X3D profile='ImmersiveInteractiveAuthoring' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' >
4 <head>
5 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
6 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
7 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
8 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
9 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
10 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
11 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
12 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
13 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
14 <meta content='X3D-Edit, https://savage.nps.edu/X3D-Edit/' name='generator' />
15 </head>
16 <Scene>
17 <ProtoDeclare name='PixelTextureInterpolator'>
18 <ProtoInterface>
19 <field accessType='inputOnly' name='set' />
20 <field accessType='initializeOnly' name='key' type='MFString' />
21 <field accessType='initializeOnly' name='keyValue' type='MFNode' />
22 <field accessType='outputOnly' name='value_changed' type='SFImage' />
23 <field accessType='initializeOnly' name='traceEnabled' type='SFBool' />
24 </ProtoInterface>
25 <ProtoBody>
26 <!-- First node determines node type of
27 <Script DEF='ImageInterpolatorScript'>
28 <field accessType='inputOnly' name='set' />
29 <field accessType='initializeOnly' name='key' type='MFString' />
30 <field accessType='initializeOnly' name='keyValue' type='MFNode' />
31 <!-- initialization nodes (if any) go here-->
32 </field>
33 <field accessType='outputOnly' name='value_changed' type='SFImage' />
34 <field accessType='initializeOnly' name='traceEnabled' type='SFBool' />
35 </IS>
```

Collada .dae editing support

The screenshot displays the X3D-Edit 3.2 application interface. On the left, a 3D viewport shows a white teddy bear model. A red arrow points from the 'Import as X3D' menu item to the 'Import Collada digital asset exchange (.dae) model...' option. The main window is split into two panes. The left pane shows a tree view of the scene's structure, including assets, materials, effects, and geometries. The right pane shows the corresponding COLLADA XML code, which defines the scene's metadata, materials, effects, and the geometry of the teddy bear.

```
xml version="1.0" encoding="utf-8"?>
<COLLADA xmlns="http://www.collada.org/2005/11/COLLADASchema" version="1.4.1">
  <asset>
    <created>2008-01-14T16:34:46Z</created>
    <modified>2008-01-14T16:34:46Z</modified>
    <unit meter="0.01" name="centimeters" />
  </asset>
  <library_materials>
    <material id="PMat_sittin_toy">
      <instance_effect url="#Phong_sittin_toy"/>
    </material>
  </library_materials>
  <library_effects>
    <effect id="Phong_sittin_toy">
      <profile_COMMON>
        <technique sid="phong1">
          <phong>
            <emission><color>0 0 0 1.0</color></emission>
            <ambient><color>0 0 0 1.0</color></ambient>
            <diffuse><color>0.8667 0.8667 0.8667 1.0</color></diffuse>
            <specular><color>0 0 0 1.0</color></specular>
            <transparency><float>1.0</float></transparency>
          </phong>
        </technique>
      </profile_COMMON>
    </effect>
  </library_effects>
  <library_geometries>
    <geometry id="sittin_toy" name="sittin_toy">
      <mesh>
        <source id="sittin_toy-positions">
          <float_array id="sittin_toy-positions-array" count="42660">-6.183864 1.451195 17.567442 -7.186925 1.602639 18.239128 -8.380196 1.602639 18.176849 -9.307
        </float_array>
        <technique_common>
          <accessor source="sittin_toy-positions-array" count="14220" stride="3">
            <param name="X" type="float"></param>
            <param name="Y" type="float"></param>
            <param name="Z" type="float"></param>
          </accessor>
        </technique_common>
      </source>
      <vertices id="sittin_toy-vertices">
        <input semantic="POSITION" source="#sittin_toy-positions"/>
      </vertices>
      <triangles count="28416" material="Mat_sittin_toy">
        <input offset="0" semantic="VERTEX" source="#sittin_toy-vertices"/>
        <p>600 13600 13611 13611 13619 600 380 600 13619 13619 13624 380 382 106 13600 13600 600 382 45 382 600 600 380 45 197 601 13623 13623 13622 19
      </triangles>
    </mesh>
  </geometry>
</library_geometries>
<library_visual_scenes>
  <visual_scene id="DefaultScene">
    <node id="S_sittin_toy">
      <instance_geometry url="#sittin_toy">
        <bind_material>
          <instance_material target="#PMat_sittin_toy", sym...
        </instance_material>
      </instance_geometry>
    </node>
  </visual_scene>
</library_visual_scenes>
<scene>
  <instance_visual_scene url="#DefaultScene">
  </instance_visual_scene>
</scene>
</COLLADA>
```

Collada .dae import to X3D



The image shows the "blacktn1.x3d - Editor" window. The title bar indicates the file name "blacktn1.x3d". The editor displays the following XML code:

```
1 <?xml version='1.0' encoding='UTF-8'?>
2 <!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.2//EN" "http://www.web3d.org/specifications/x3d-3.2.dtd">
3 <X3D profile='Interchange' version='3.2'>
4 <head>
5 </head>
6 <Scene>
7     <Transform DEF='COLLADA_UNITS' scale='0.01 0.01 0.01'>
8         <Transform DEF='S_sittin_toy'>
9             <Shape>
10                <Appearance>
11                    <Material DEF='Phong_sittin_toy' diffuseColor='0.8667 0.8667 0.8667'></Material>
12                </Appearance>
13                <IndexedTriangleSet index='600 13600 13611 13611 13619 600 380 600 13619 13619 13624 380 382 106 13600 13600 600
14                    <Coordinate DEF='sittin_toy-positions' point='-6.183864 1.451195 17.567442 ,-7.186925 1.602639 18.239128 ,-8.
15                </IndexedTriangleSet>
16            </Shape>
17        </Transform>
18    </Transform>
19 </Scene>
20 </X3D>
```

Distributed Interactive Simulation (DIS) Protocol

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

OpenDIS: open source implementations

- Java, 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

- In progress
- Goal: aid development, testing of new protocols

DIS Networking Test Panel

The screenshot displays the X3D-Edit 3.2 interface. On the left, a 3D viewer shows a yellow box in a coordinate system with red (X), green (Z), and blue (Y) axes. The center pane contains XML code for an X3D scene, including metadata and an `EspduTransform` element. On the right, the DIS ESPDU Test Panel provides controls for translation (x, y, z) and rotation (phi, theta, psi) along with settings for address, port, and site ID.

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE X3D PUBLIC "ISO//Web3D//DTD X3D 3.2//EN" "http://www.web3d.org/specifications/x3d-3.2.dtd">
<X3D profile='Immersive' version='3.2' xmlns:xsd='http://www.w3.org/2001/XMLSchema-instance' xsd:noNamespaceSchemaLocation='http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d'>
  <head>
    <component level='1' name='DIS'/>
    <meta content='BoxTestEspduTransform.x3d' name='title'/>
    <meta content='Don Brutzman, Don McGregor' name='creator'/>
    <meta content='1 January 2007' name='created'/>
    <meta content='13 November 2008' name='modified'/>
    <meta content='Leonard Daly and Don Brutzman' name='creator'/>
    <meta content='A simple EspduTransform test to move a Box.' name='description'/>
    <meta content='http://www.web3d.org/x3d/content/examples/Basic/DistributedInteractiveSimulation/BoxTestEspduTransform.x3d' name='generator'/>
    <meta content='../..//license.html' name='license'/>
  </head>
  <Scene>
    <Viewpoint description='EspduTransform moves Box' position='0 0 25'/>
    <Background skyColor='0.5 0.6 0.8'/>
    <EspduTransform address='239.1.2.3' applicationID='1' entityID='2' marking='TestBox' networkMode='networkReader' port='62040' siteID='0'>
      <Shape>
        <Box size='2 4 6'/>
        <Appearance>
          <Material diffuseColor='0.748014 0.62085 0' shininess='0.93' specularColor='0.860606 0.860606 0.860599'/>
        </Appearance>
      </Shape>
    </EspduTransform>
    <Transform scale='5 5 5'>
      <Inline url='../..//course/CoordinateAxes.x3d'>
        "http://www.web3d.org/x3d/content/examples/Basic/course/CoordinateAxes.x3d"
      </Inline>
    </Transform>
  </Scene>
</X3D>
```

**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-Edit 3.2

File Edit View Window X3D Versponing Tools Help

X3D Viewer

DIS Player-Recorder Window

79 ENTITY_STATE 14.211912687
80 ENTITY_STATE 14.237453643
81 ENTITY_STATE 14.254803613
82 ENTITY_STATE 14.286980328
83 ENTITY_STATE 14.325127914
84 ENTITY_STATE 14.88727003
85 ENTITY_STATE 14.90586988
86 ENTITY_STATE 14.91336357
87 ENTITY_STATE 14.931027826
88 ENTITY_STATE 14.949399714
89 ENTITY_STATE 14.966543792
90 ENTITY_STATE 15.225262428
91 ENTITY_STATE 15.250172019
92 ENTITY_STATE 15.267734586
93 ENTITY_STATE 15.2851449
94 ENTITY_STATE 15.293875059
95 ENTITY_STATE 15.311404941
96 ENTITY_STATE 15.329561997
97 ENTITY_STATE 15.37510773
98 ENTITY_STATE 15.412108522
99 ENTITY_STATE 15.436978163
100 ENTITY_STATE 15.463135957
101 ENTITY_STATE 15.52497119
102 ENTITY_STATE 15.564852795
103 ENTITY_STATE 15.590005992
104 ENTITY_STATE 15.607551129
105 ENTITY_STATE 15.632799979
106 ENTITY_STATE 15.640490342
107 ENTITY_STATE 15.675847349
108 ENTITY_STATE 15.693986526
109 ENTITY_STATE 15.824318174
110 ENTITY_STATE 15.856962826
111 ENTITY_STATE 15.881707032
112 ENTITY_STATE 15.950148133
113 ENTITY_STATE 16.000276571
114 ENTITY_STATE 16.775290155
115 ENTITY_STATE 16.793808151
116 ENTITY_STATE 16.802593067
117 ENTITY_STATE 16.822360663
118 ENTITY_STATE 16.840936767
119 ENTITY_STATE 16.859243563
120 ENTITY_STATE 16.876472568
121 ENTITY_STATE 16.893585637
122 ENTITY_STATE 16.911356611
123 ENTITY_STATE 16.929247991

TestSchematronDiagnostics.x3d
BoxTestEspduTransform.x3d

DIS ESPDU Test Panel

Translation

scale

x 1.00

y 1.00

z 1.00

Rotation

phi 0 180° 360°

theta 0 180° 360°

psi 0 180° 360°

DIS Settings

address 239.1.2.3 site ID 0

port 62040 application ID 1

entity ID 2

PDU Header

prot version 6 exercise ID 0 PDU type 1 prot family 1

time stamp 547

pdu length 144 padding 0

Entity ID

ent id 2 sim site id 0 sim app id 1

Articulation Parameters

number 0

Entity Type

kind	domain	country	category	subcategory	specific	extra
0	0	0	0	0	0	0

Alternative Entity Type

kind	domain	country	category	subcategory	specific	extra
0	0	0	0	0	0	0

Entity Linear Velocity

0.0 0.0 0.0

Entity Location

0.0 0.0 -0.0

Entity Orientation

psi	theta	phi
-2.631084	3.5735617	2.7488935

Dead Reckoning Parameters

algorithm 0 other 0 0 0 0 0 0 0 0 0 0 0 0 0 0

ang vel 0.0 0.0 0.0 lin acc 0.0 0.0 0.0

Entity Marking

char set 0 string(hex) 00 00 00 00 00 00 00 00 00 00

capabilities 0

entity appearance 0

force id 0

marshalled size 144

address 239.1.2.3 port 62040

31.24

Beginning Reverse Record Pause Stop Play FF End Load Save

X3D Earth, Geospatial Component

Editing and authoring support provided

The screenshot displays the X3D-Edit 3.2 application interface. The main window shows XML code for an X3D scene. A green box highlights a comment and an inline node in the code:

```
<!-- 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/'/>
```

The interface includes a file explorer on the left, a 3D viewer at the bottom left showing a globe, and a palette on the right for metadata and structure. At the bottom, a Dilbert comic strip is visible.

Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

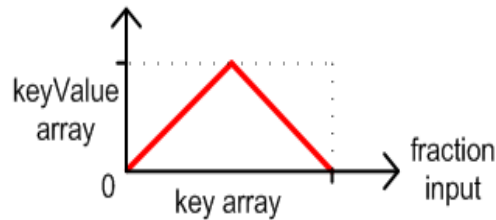
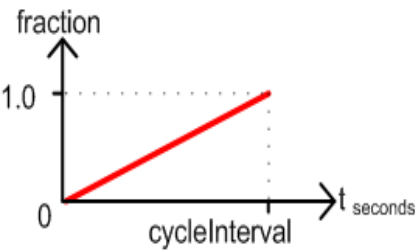
- Supported in X3D-Edit, other tools

Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

- From motion capture (Vicon Peak system)?
- From different motion formats?

Tool and example support



Time Sensor

enabled true

loop true

cycleInterval 4.0

fraction_
changed

set_
fraction

Scalar
Interpolator

value_
changed

set_
fraction

Coordinate
Interpolator

value_
changed

Indexed
FaceSet

Edit CoordinateInterpolator
✖

containerField

 children

DEF MorphInterpolator

USE

Coordinate lists

508 coordinate(s) (column triples) Add coordinate columns Remove coordinate columns

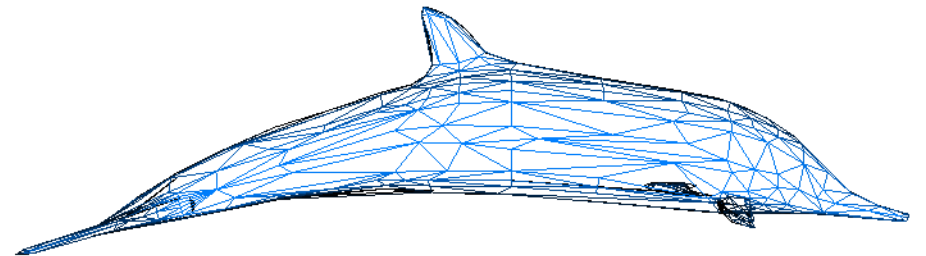
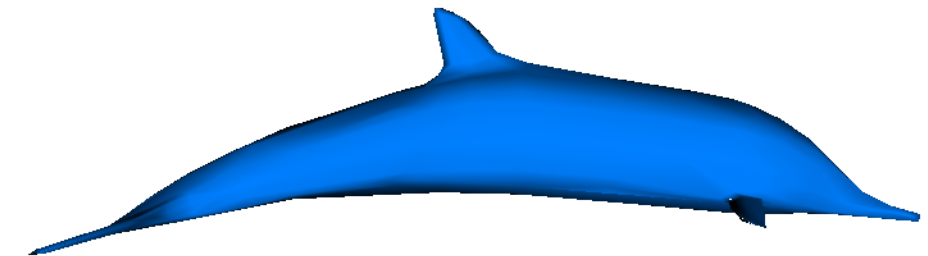
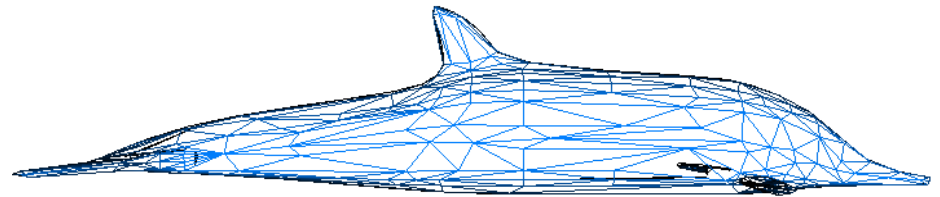
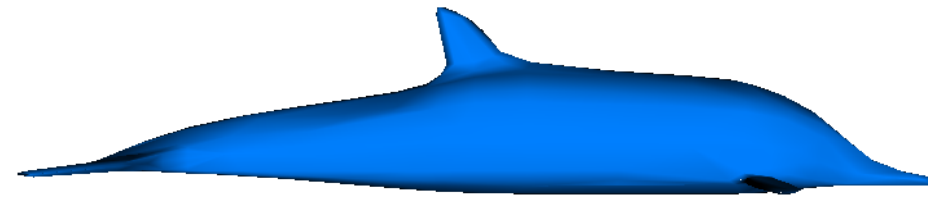
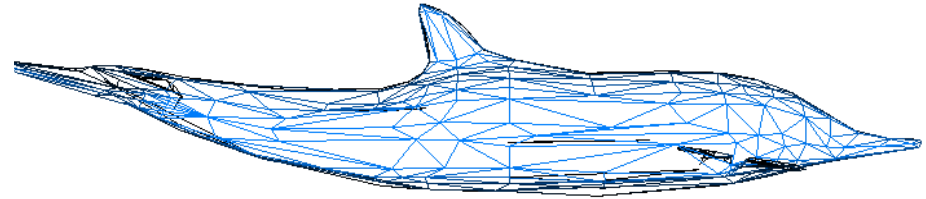
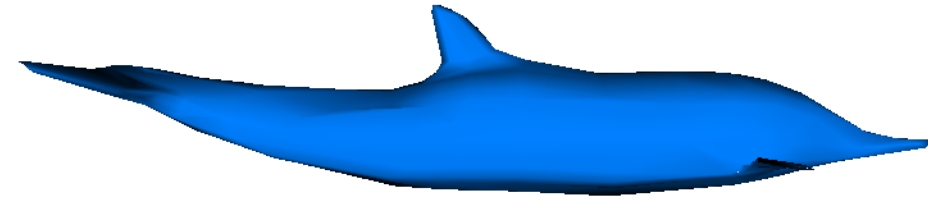
key		0			1		2			3			4			5			
0	0.406	1.049	7.905	0.595	2.957	-10.3...	0.592	2.263	-10.7...	1.246	2.823	5.21	1.352	0.918	5.384	1.336	3.003	-1.028	1.311
0.5	0.406	0.431	7.729	0.595	1.561	-10.4...	0.592	0.769	-10.4...	1.246	2.58	5.322	1.352	0.67	5.216	1.336	3.003	-1.028	1.311
1	0.406	-0.354	7.585	0.595	0.257	-10.3...	0.592	-0.511	-10.1...	1.246	2.012	5.391	1.352	0.121	5.105	1.336	3.003	-1.028	1.311

3 keyed coordinate list(s) (rows) Add keyed coordinate list Remove keyed coordinate list

OK Cancel Help

Creating a morphable dolphin

Chris Lang, Monterey High School



X3D for Web Authors

Textbook, slidesets, examples, videos

<http://x3dGraphics.com>



Bookmarks

- Front Cover
- X3D: Extensible 3D Graphics for Web Authors
- Copyright Page
- Dedication Page
- Contents
- Preface
- Contributor List
- About the Authors
- Chapter 1: Technical Overview
- Chapter 2: Geometry Nodes, Part 1: Primitives
- Chapter 3: Grouping Nodes
- Chapter 4: Viewing and Navigation
- Chapter 5: Appearance, Material, and Textures
- Chapter 6: Geometry Nodes, Part 2: Points, Lines, and Polygons
- Chapter 7: Event Animation and Interpolation
- Chapter 8: User Interactivity Nodes
- Chapter 9: Event Utilities and Scripting
- Chapter 10: Geometry Nodes, Part 3: Geometry2D Nodes



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](#).

Chapter	Session	Description	.pdf
Examples			
0	Getting Started	Goals and motivation, installing X3D-Edit authoring tool and example scenes , course introduction	slides
1	Technical Overview 1A	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	slides
	Technical Overview 1B	Browsers and players, models versus programming, scene graphs, behaviors and events, profiles and components, document metadata, fields	
	Technical Overview 1C	Importance of consistency, strong data typing, accessType, XML design patterns for X3D, compressed binary encoding, standards liaison organizations	
	Technical Overview 1D	X3D-Edit authoring tool development, functional testing, bug tracking, version control, Netbeans , help system	
2	Geometry Primitives 2A	Shape and geometry nodes, common geometry fields	slides
	Geometry Primitives 2B	Box and Cylinder nodes, X3D Tooltips	
	Geometry Primitives 2C	HelloWorld example, Cone Cylinder and Sphere nodes	
	Geometry Primitives 2D	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	
	Geometry Primitives 2E	FontStyle node, open-source licenses	
3	Grouping 3A	Grouping node concepts, XML encoding	slides
	Grouping 3B	Inline node, url field	
	Grouping 3C	X3D resources and additional references, Inline node, url fields, level of detail (LOD) node	
	Grouping 3D	Switch node, review grouping node concepts, 3D grid resources	
4	Viewing Navigation 4A	Viewing, navigation, bindable nodes and binding operations example	slides
	Viewing Navigation 4B	Viewpoint node, viewing and navigation	
	Viewing Navigation 4C	NavigationInfo and Anchor nodes, uniform resource locator (url)	
5	Appearance 5A	Material and TwoSidedMaterial nodes, Universal Media materials library	slides
	Appearance 5B	Textures and ImageTexture node, texture coordinates, image copying and flipping to produce a continuously repeating texture, file formats	
	Appearance 5C	MovieTexture and PixelTexture nodes, LineProperties and FillProperties nodes	
	Appearance 5D	PixelTexture node, SFImage data type, PixelTexture image-import tool	
	Appearance 5E	More on PixelTexture node. MovieTexture node	

Summary

Many great resources are available for learning and using X3D

These community capabilities are good for business, educators, individuals

We welcome your active participation in Web3D Consortium

Contact

Don Brutzman

brutzman@nps.edu

<http://web.nps.navy.mil/~brutzman>

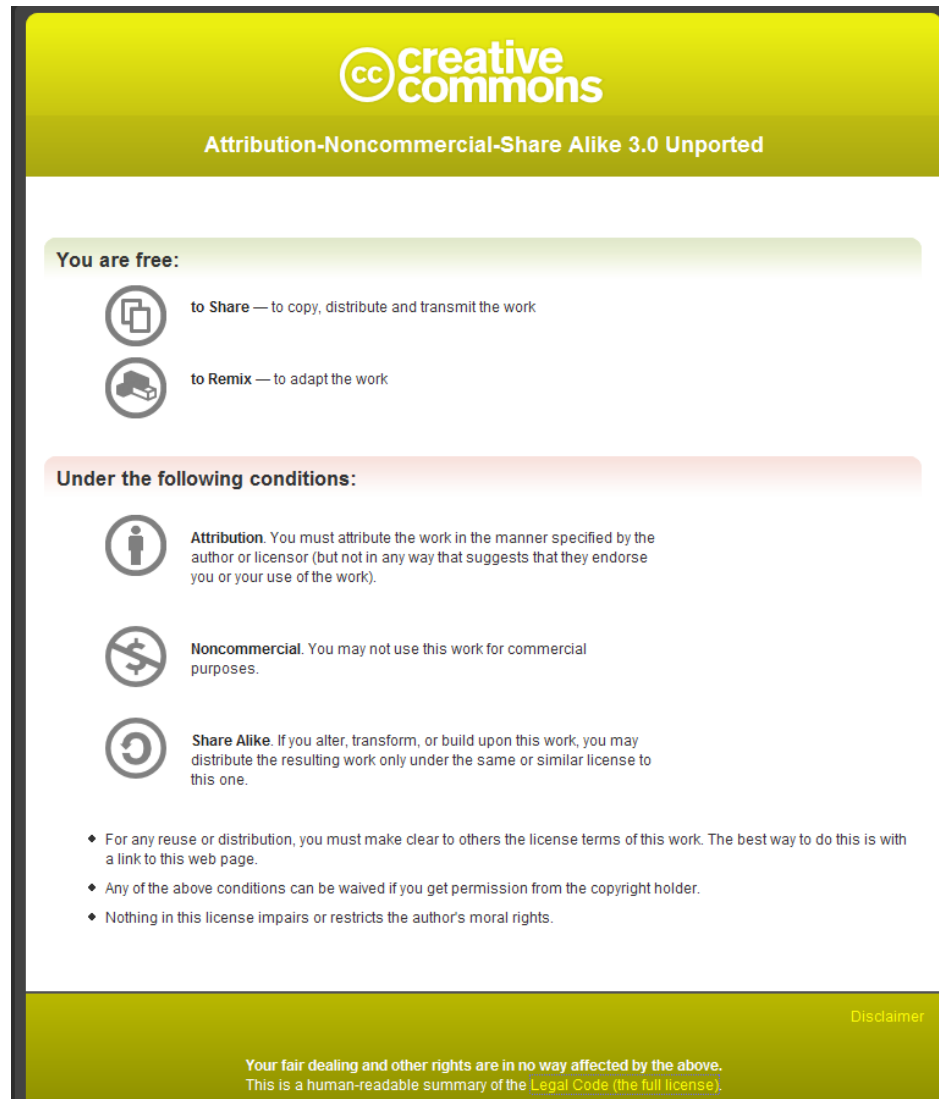
Code USW/Br, Naval Postgraduate School
Monterey California 93943-5000 USA

1.831.656.2149 voice

1.831.656.7599 fax

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Open-source license for X3D-Edit software and X3D example scenes

<http://www.web3d.org/x3d/content/examples/license.html>

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X3D Graphics for Web Authors

X3D-Edit Update

SIGGRAPH ASIA
Singapore, 10-13 December 2008

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** for X3D content can 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 initial ideas become interactive 3D content, ready for deployment on the Web.
- **X3D Case Studies** showcase 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 topic areas 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 products.

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*: Byoungyun Yoo, Jeff Weekley, Don Brutzman

Sourceforge version control
for easy updating

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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.

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



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



Excerpted and adapted from Chapter 1, *X3D Graphics for Web Authors*
<http://x3dGraphics.com>

X3D Examples Archives

X3D for Web Authors 299 models

- Textbook on how to design and build X3D scenes

Basic 610 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

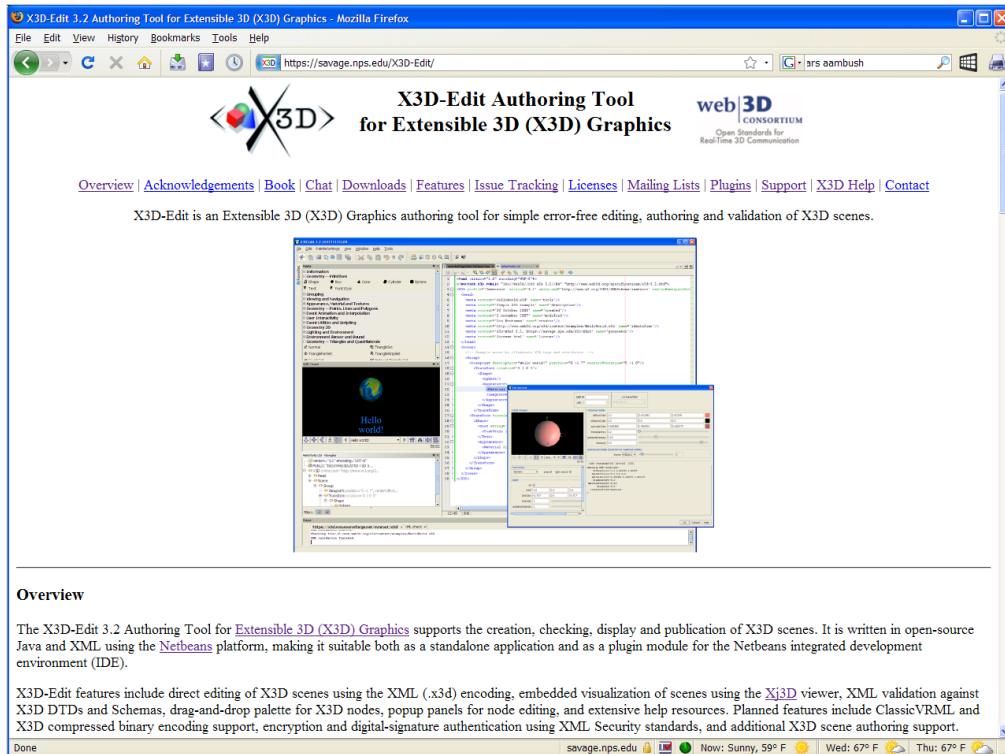
Savage 1226 models

- Open-source military models and tools

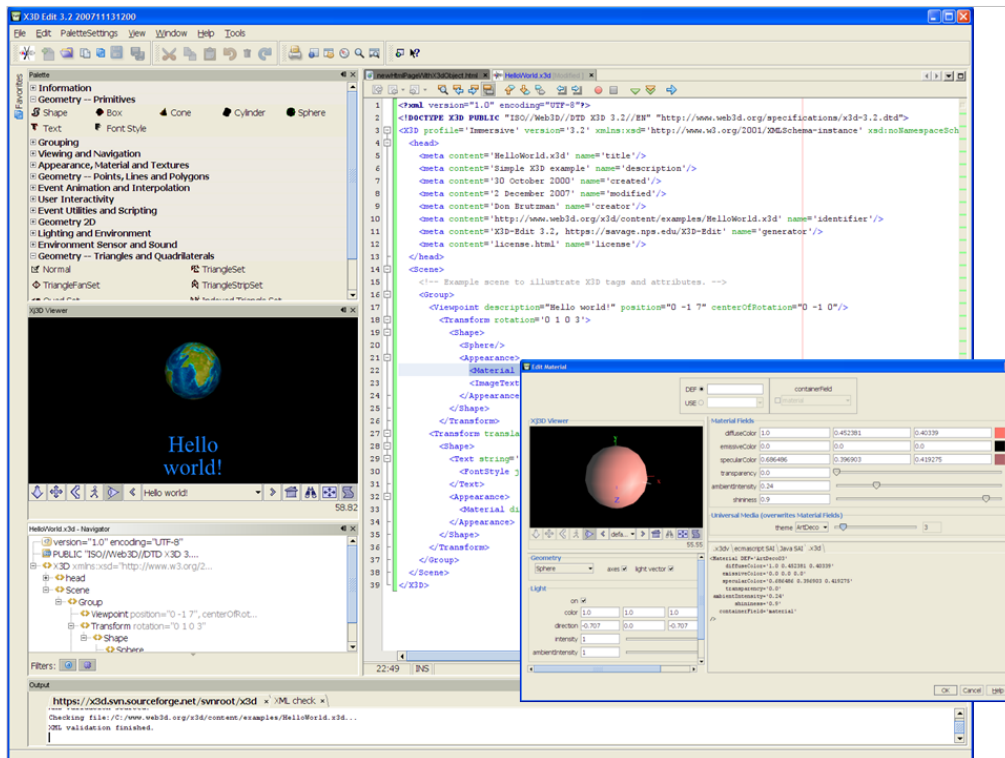
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3100+ models available





X3D-Edit home page is online at <https://savage.nps.edu/X3D-Edit>

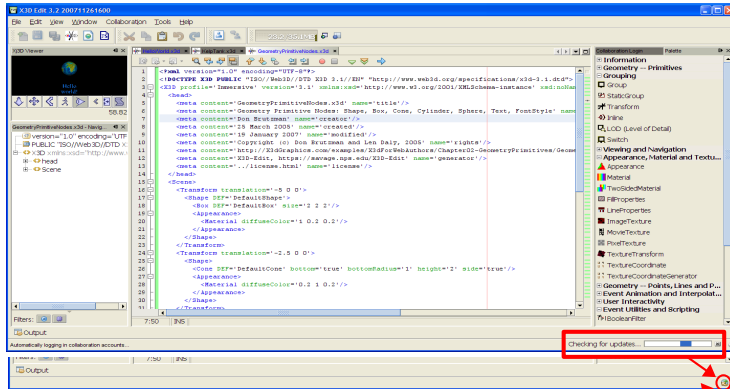


- As the name implies, X3D-Edit is primarily oriented towards editing X3D text. Additional features include:
- Pop-up editors for each node
 - Palette for dragging/dropping new nodes
 - Xj3D scene visualization
 - XML tree view
 - Automatic code completion and element matching
 - Validation and error checking
 - Help system including multilingual tooltips, X3D specifications, examples help and X3D Scene Authoring Hints
 - Automatic updates

<https://savage.nps.edu/X3D-Edit>

X3D-Edit updates

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

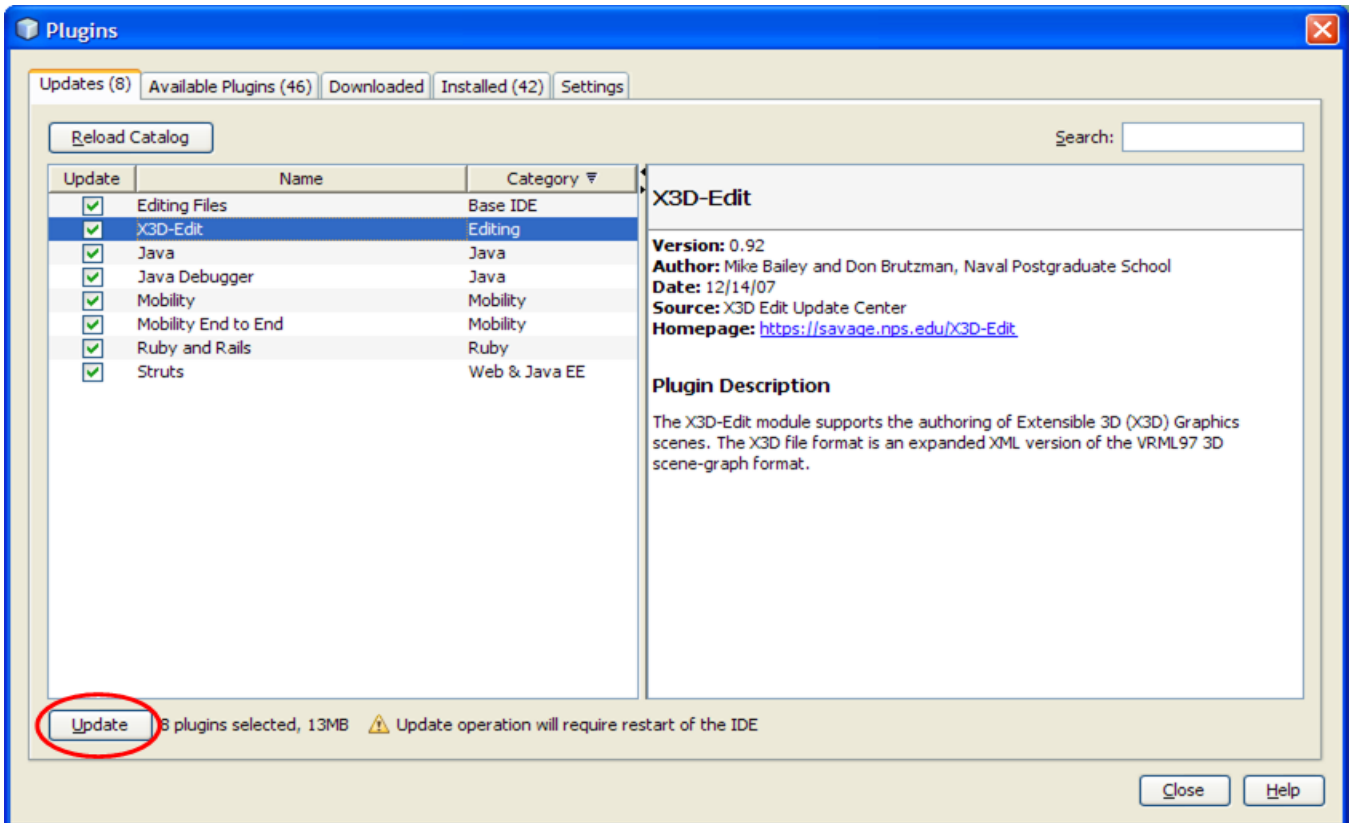


Plugin available: click

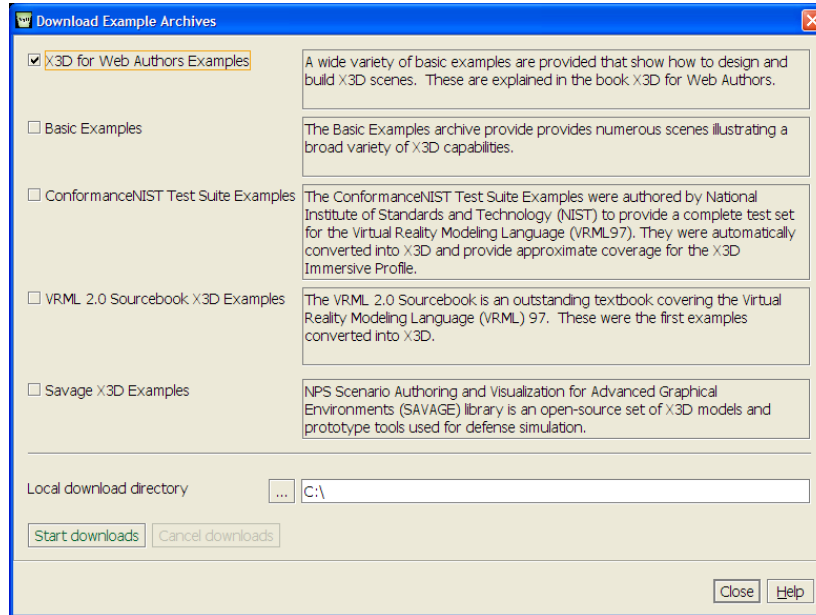


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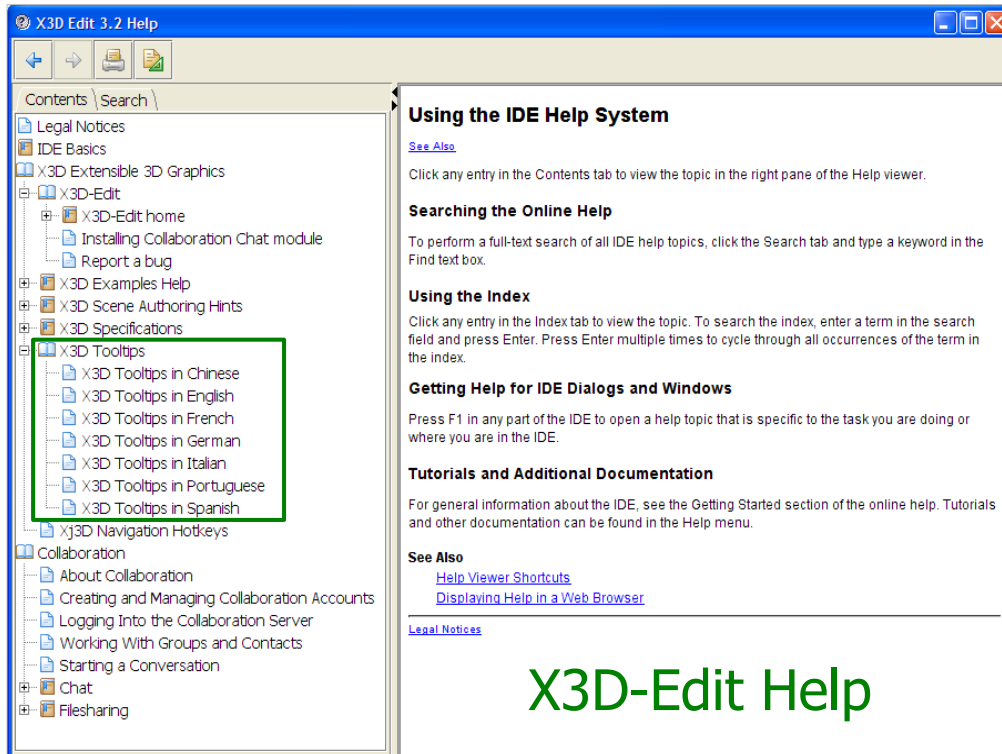
It is also possible to manually trigger an X3D-Edit update, if one is available. From top menu, select *Tools > Plugins > Updates* and then click the Update button.



X3D Examples download panel, X3D-Edit



X3D-Edit includes this download panel. Select the top-level *Examples* menu, then *Download X3D Example Archives*.



F1 or the Help menu launches the JavaHelp system.

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



<http://www.xj3d.org>

<http://www.web3d.org/x3d/content/examples/help.html#Applications>

Player support for X3D components

Player support for X3D components - Web3D.org - Mozilla Firefox

http://www.web3d.org/x3d/wiki/index.php/Player_support_for_X3D_components

Brutzman my talk my preferences my watchlist my contributions log out

web3D CONSORTIUM

Public X3D Wiki
Tutorials for X3D Nodes & Concepts

navigation

- Main Page
- Web3D News
- Upcoming X3D events
- X3D Specifications
- Recent changes
- Random page
- Help
- Join the Consortium

search

Go Search

toolbox

- What links here
- Related changes
- Upload file
- Special pages
- Printable version
- Permanent link

Player support for X3D components

The Extensible 3D (X3D) Graphics [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 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

Players, versions, and X3D Conformance Certification	BS Contact	FreeWRL	Heilan	InstantReality	Octaga Player	OpenVRML	SwirlX3D	Vivaty	X3D
	v7.1	v1.21.2	v0.14	beta 5	v2.3.0.2 B	v0.17.9	v2.1.7	v1.0 build 900	1.0
Interchange Profile	Interchange Profile	Interchange Profile	none	none	none	none	none	Interchange Profile	Interchange Profile
File Encodings									
-XML (x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
-ClassicVRML (x3dv)	yes	yes	no	yes	yes	yes	yes	yes	yes
-Compressed Binary Encoding (x3db)	no	no	no	partial	no	no	no	no	yes
X3D component list									
CAD geometry	yes	no	no	yes	yes	partial	yes	no	yes
Core	yes	yes	partial (not Proto)	yes	yes	yes	yes	yes	yes
Cube map environmental texturing	yes	partial	no	yes	yes	no	no	partial	no
Distributed interactive simulation (DIS)	no	no	no	no	no	partial	no	no	yes

Accessed 13 December 2008

http://www.web3d.org/x3d/wiki/index.php/Player_support_for_X3D_components

Tool support for X3D components

The screenshot shows a Mozilla Firefox browser window displaying the 'Tool support for X3D components' page on the web3d.org wiki. The page title is 'Tool support for X3D components'. The main content area contains text explaining that the Extensible 3D (X3D) Graphics standard has many capabilities and that X3D components are modular collections of nodes. It also mentions that authors can indicate what components are needed in an X3D scene. A table is provided to record support for official X3D components by various X3D authoring tools and X3D conversion tools. The table is organized into two main sections: 'Tools, versions, and X3D Conformance Certification' and 'File Encodings'. The 'Tools, versions, and X3D Conformance Certification' section includes a table with columns for 'Authoring tools' (BS Editor, SwirIX3D Editor, Vivaty Studio, X3D-Edit) and 'Conversion tools' (Okino Polytrans, SwirIX3D Translator, X3D Filter Chain). The 'File Encodings' section includes a table with columns for '-XML (x3d)', '-ClassicVRML (x3dv)', and '-Compressed Binary Encoding (x3db)'. The table rows show support status (yes, no, or none) for each tool and encoding type. A 'Table key' is provided to explain the support status: 'yes' means all nodes and fields are supported, 'partial' means some are supported, 'level #' indicates the component level number (1-4) supported, 'no' means no support is provided, and '?' means unknown status.

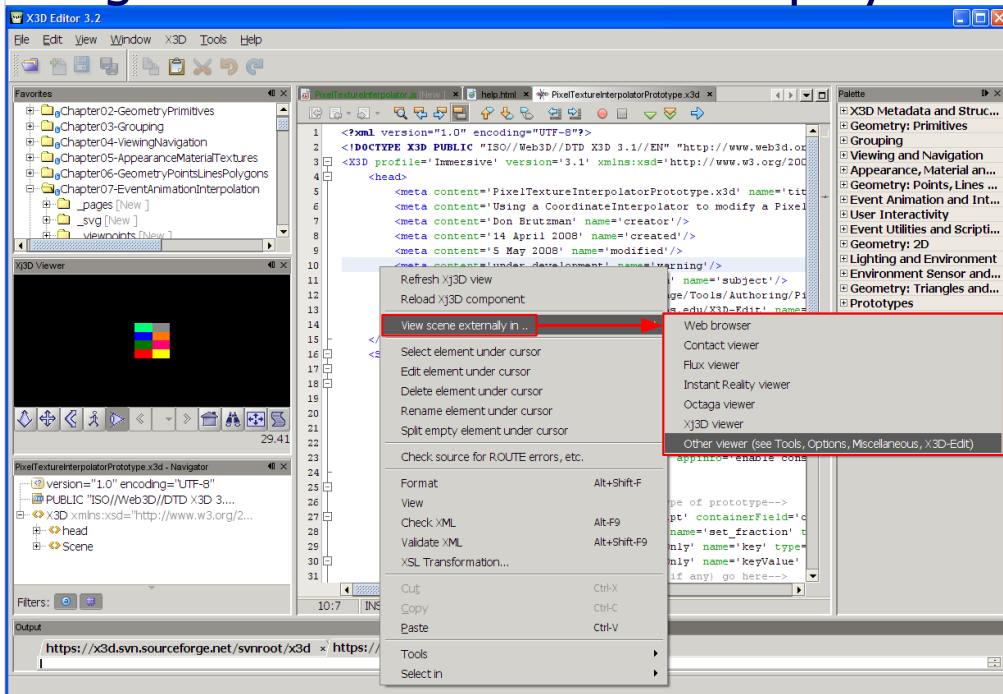
Tools, versions, and X3D Conformance Certification	Authoring tools				Conversion tools		
	BS Editor	SwirIX3D Editor	Vivaty Studio	X3D-Edit	Okino Polytrans	SwirIX3D Translator	X3D Filter Chain
	v7.1	v2.1.7	v1.0 build 900	v3.2			v2.0
	none	none	Interchange Profile	Interchange Profile	none	none	Interchange Profile

File Encodings							
-XML (x3d)	yes	yes	yes	yes	yes	yes	yes
-ClassicVRML (x3dv)	yes	yes	yes	yes	yes	yes	yes
-Compressed Binary Encoding (x3db)	no	no	no	yes	no	no	yes

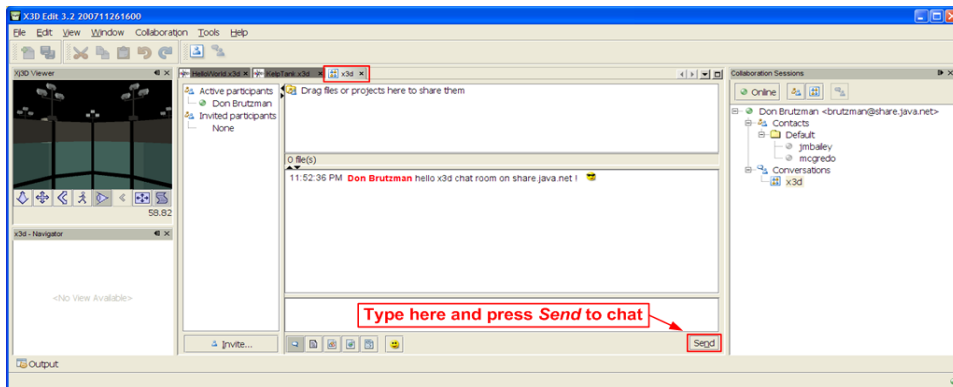
Accessed 13 December 2008

http://www.web3d.org/x3d/wiki/index.php/Tool_support_for_X3D_components

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

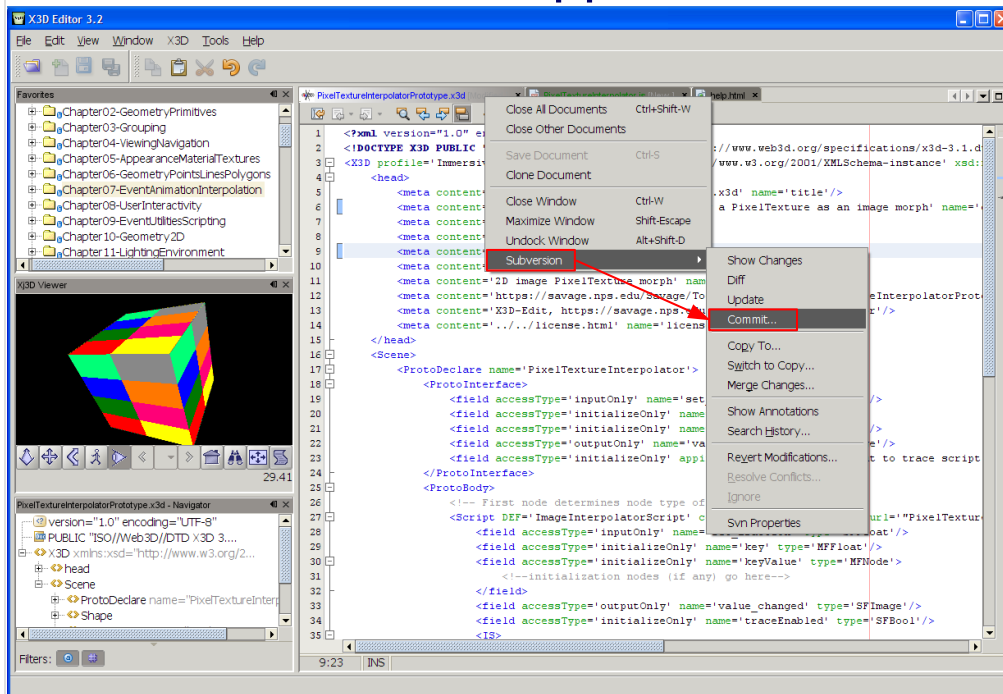
web|3D
CONSORTIUM



X3D-Edit collaboration chat installation page available at

- <https://savage.nps.edu/X3D-Edit/XmppChatCollaborationModule.html>

Version control support included

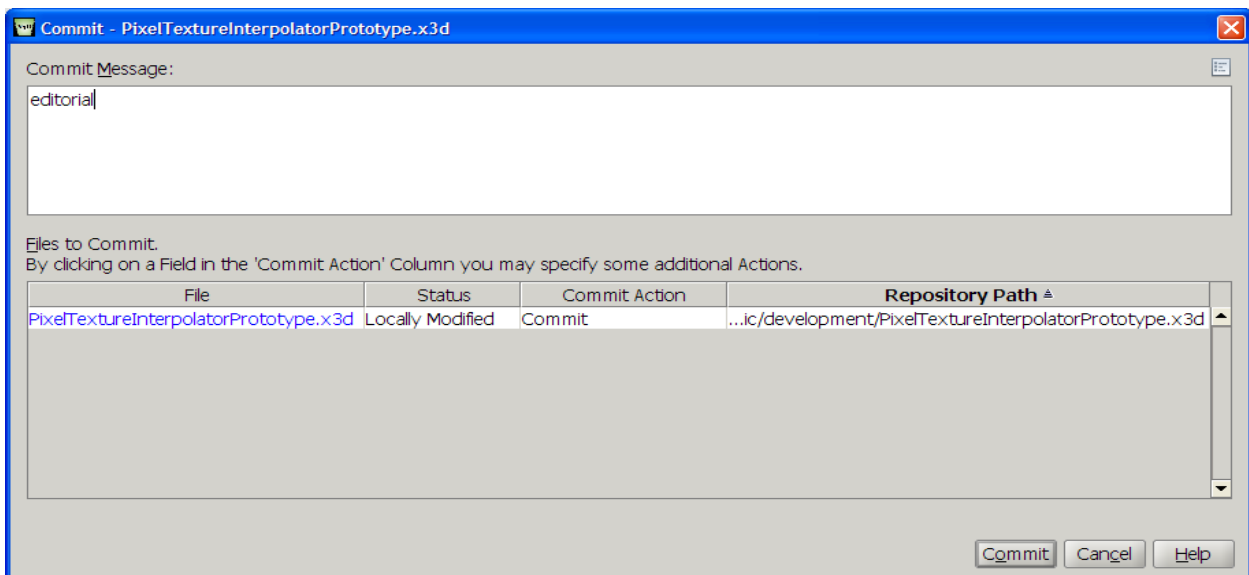


Version control allows multiple authors to share updates and work together. Prerequisite: you must have the Collabnet subversion client installed.

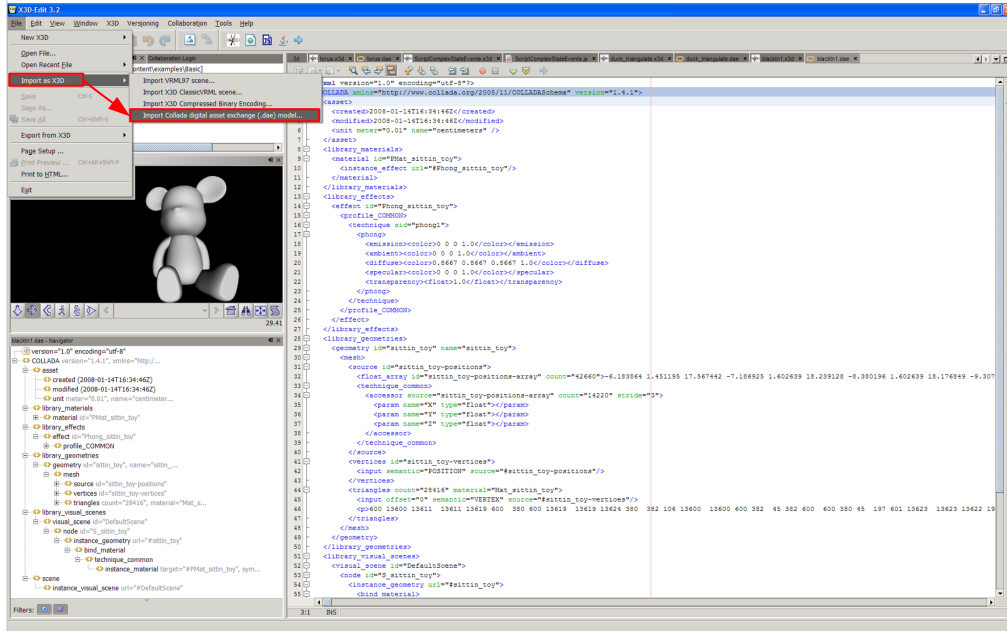
If the file being edited is under version control, the Netbeans platform detects that and offers Subversion or CVS version control (as appropriate) without further setup.

Developers can work with X3D-Edit directly to update, diff (difference compare) and commit any file changes. X3D-Edit 3.2 subversion master source is at

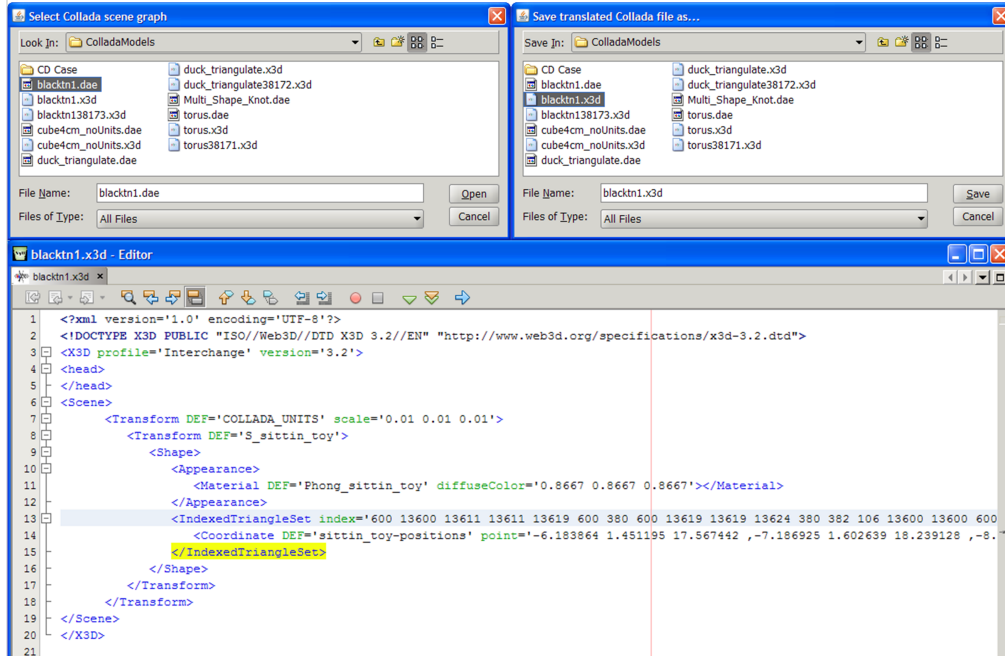
<http://x3d.svn.sourceforge.net/viewvc/x3d/www.web3d.org/x3d/tools/X3dEdit3.2>



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++
- 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

- In progress
- Goal: aid development, testing of new protocols



DIS Networking Test Panel

The screenshot displays the X3D-Edit 3.2 interface. On the left, a 3D scene shows a yellow rectangular prism in a coordinate system with X, Y, and Z axes. The central pane contains XML code for the scene, including metadata and scene elements like <EpdUTransform>. On the right, the 'DIS ESPDU Test Panel' control interface is visible, featuring sliders for Translation (x, y, z) and Rotation (phi, theta, psi), and input fields for DIS Settings (address, port, application ID, entity ID). A red box highlights the Translation x-axis slider and the theta rotation slider. Red arrows point from these sliders to a text box in the center of the interface.

**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

The screenshot displays the DIS Networking Player-Recorder Panel software interface. The main window is titled "DIS Player-Recorder" and contains several panels:

- Entity List:** A list of entities with IDs ranging from 79 to 123, including fields for "ENTITY_STATE" and "address".
- 3D Viewer:** A 3D coordinate system with X, Y, and Z axes. A yellow rectangular object is positioned in the center, with red, green, and blue arrows indicating the axes.
- PDU Header:** Fields for "prnt version", "exercise ID", "PDU type", "prnt family", "time stamp", "pdu length", and "padding".
- Entity ID:** Fields for "ent id", "sim site id", and "sim app id".
- Articulation Parameters:** A field for "number".
- Entity Type:** A table with columns for "kind", "domain", "country", "category", "subcategory", "specific", and "extra".
- Alternative Entity Type:** A table with columns for "kind", "domain", "country", "category", "subcategory", "specific", and "extra".
- Entity Linear Velocity:** A field for "0.0".
- Entity Location:** A field for "0.0".
- Entity Orientation:** A table with columns for "psi", "theta", and "phi".
- Dead Reckoning Parameters:** Fields for "algorithm", "ang vel", "ln acc", and "ln vel".
- Entity Marking:** A field for "char set" and a hex string "00 00 00 00 00 00 00 00".
- Entity Appearance:** Fields for "capabilities", "entry appearance", "force id", and "marshalled size".
- DIS Settings:** Fields for "address", "port", "site ID", "application ID", and "entity ID".

The interface also includes a menu bar (File, Edit, View, Window, X3D, Verspning, Tools, Help) and a toolbar with various icons. At the bottom, there is a status bar with playback controls (Begin, Reverse, Record, Pause, Stop, Play, FF, End, Load, Save) and a "31.24" timestamp.

X3D Earth, Geospatial Component

Editing and authoring support provided

The screenshot shows the X3D-Edit 3.2 interface. On the left is a file browser showing a project structure. The main area is a code editor displaying X3D XML code. A green box highlights the following code snippet:

```
<!-- 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/'/>
```

On the right is a 'Methods and Structure' panel showing a tree view of the scene's components, including 'Scene', 'WorldInfo', 'Geometry: Primitives', 'Viewing and Navigation', and 'Geospatial'. At the bottom, there is a comic strip strip from Dilbert.

Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

- Supported in X3D-Edit, other tools

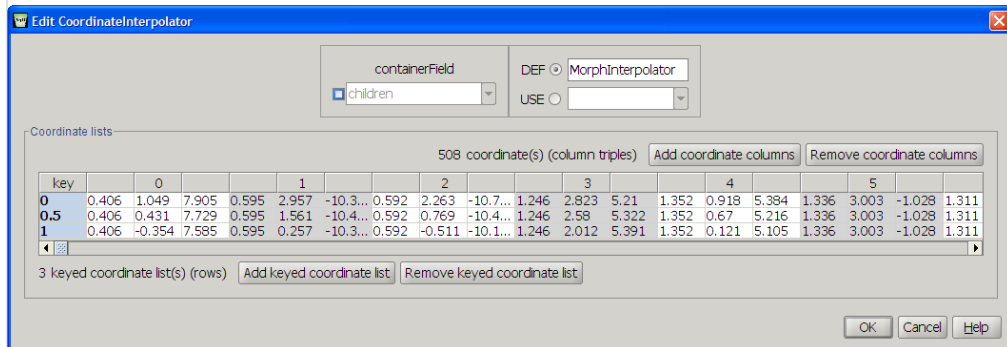
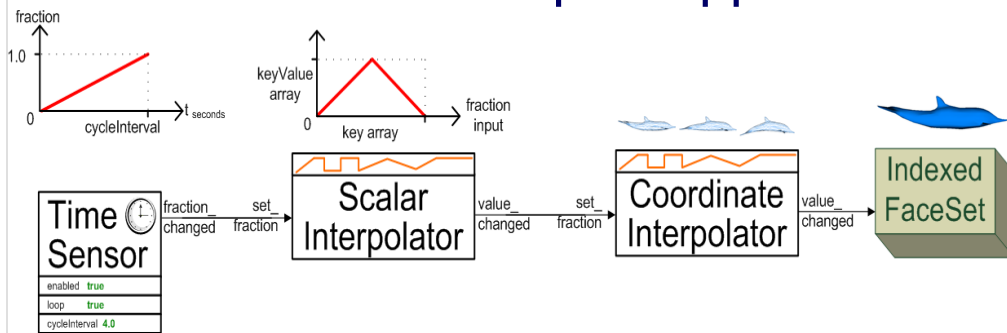
Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

- From motion capture (Vicon Peak system)?
- From different motion formats?

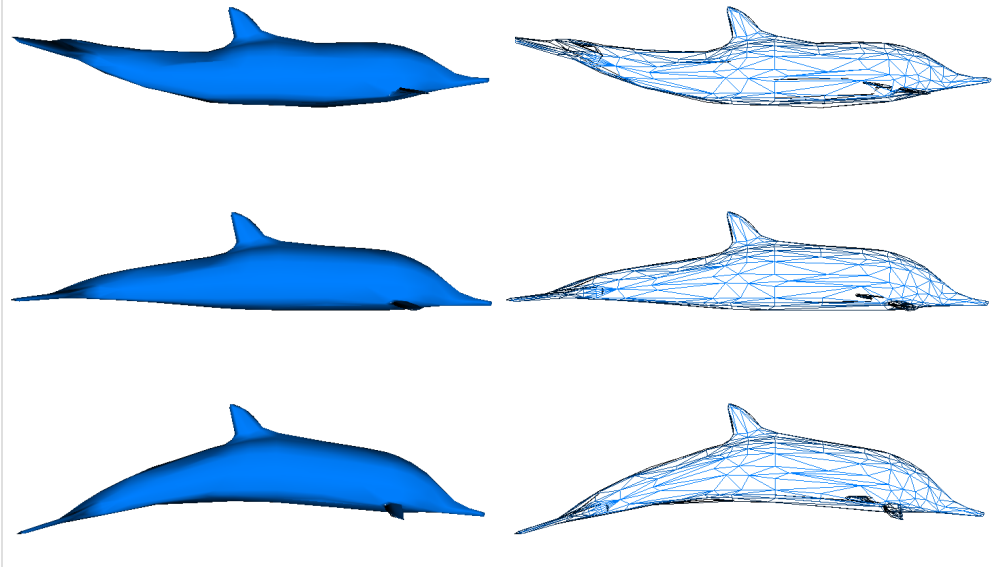


Tool and example support



Creating a morphable dolphin

Chris Lang, Monterey High School



<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose02.x3d>

<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose01.x3d>

<https://savage.nps.edu/Savage/Biologics/Dolphin/DolphinPose03.x3d>

X3jD viewer wireframe mode is toggled with key Alt-w

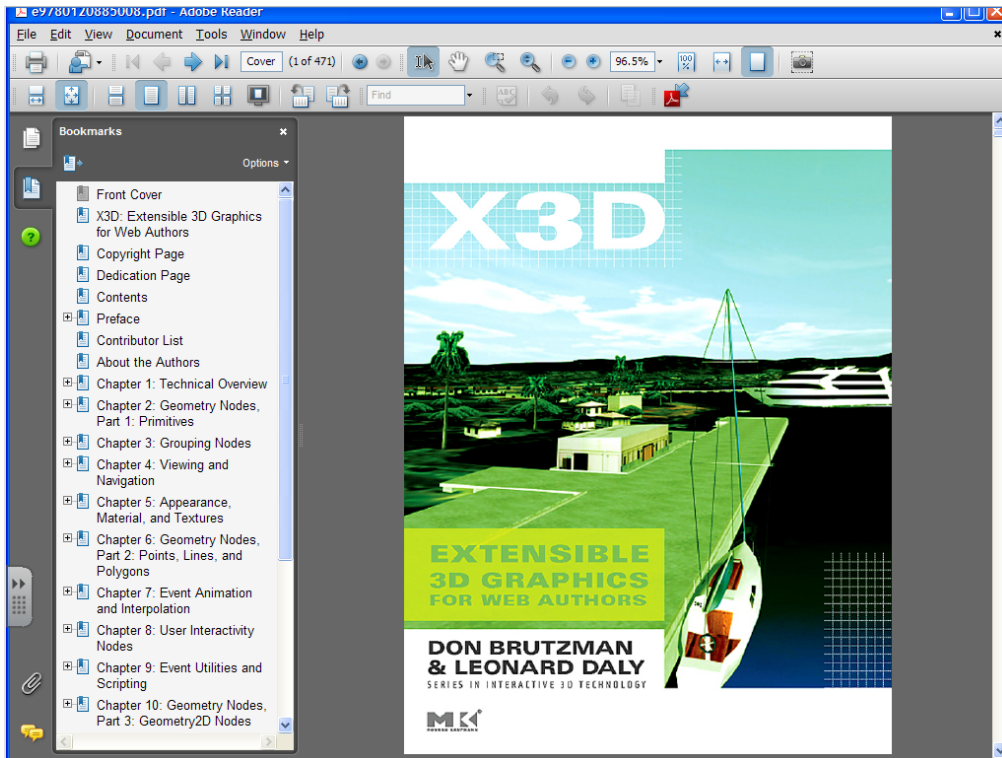
[back to Table of Contents](#)

X3D for Web Authors

Textbook, slidesets, examples, videos


<http://x3dGraphics.com>





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](#).

Chapter Examples	Session	Description	.pdf
0	Getting Started	Goals and motivation, installing X3D-Edit authoring tool and example scenes , course introduction	slides
1	Technical Overview 1A	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	slides
	Technical Overview 1B	Browsers and players, models versus programming, scene graphs, behaviors and events, profiles and components, document metadata, fields	
	Technical Overview 1C	Importance of consistency, strong data typing, accessType, XML design patterns for X3D, compressed binary encoding, standards liaison organizations	
	Technical Overview 1D	X3D-Edit authoring tool development, functional testing, bug tracking, version control, Netbeans , help system	
2	Geometry Primitives 2A	Shape and geometry nodes, common geometry fields	slides
	Geometry Primitives 2B	Box and Cylinder nodes, X3D Tooltips	
	Geometry Primitives 2C	HelloWorld example, Cone Cylinder and Sphere nodes	
	Geometry Primitives 2D	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	
	Geometry Primitives 2E	FontStyle node, open-source licenses	
3	Grouping 3A	Grouping node concepts, XML encoding	slides
	Grouping 3B	Inline node, url field	
	Grouping 3C	X3D resources and additional references, Inline node, url fields, level of detail (LOD) node	
	Grouping 3D	Switch node, review grouping node concepts, 3D grid resources	
4	Viewing Navigation 4A	Viewing, navigation, bindable nodes and binding operations example	slides
	Viewing Navigation 4B	Viewpoint node, viewing and navigation	
	Viewing Navigation 4C	NavigationInfo and Anchor nodes, uniform resource locator (url)	
5	Appearance 5A	Material and TwoSidedMaterial nodes, Universal Media materials library	slides
	Appearance 5B	Textures and ImageTexture node, texture coordinates, image copying and flipping to produce a continuously repeating texture, file formats	
	Appearance 5C	MovieTexture and PixelTexture nodes, LineProperties and FillProperties nodes	
	Appearance 5D	PixelTexture node, SFImage data type, PixelTexture image-import tool	
	Appearance 5E	More on PixelTexture node, MovieTexture node	

Summary

Many great resources are available for learning and using X3D

These community capabilities are good for business, educators, individuals

We welcome your active participation in Web3D Consortium



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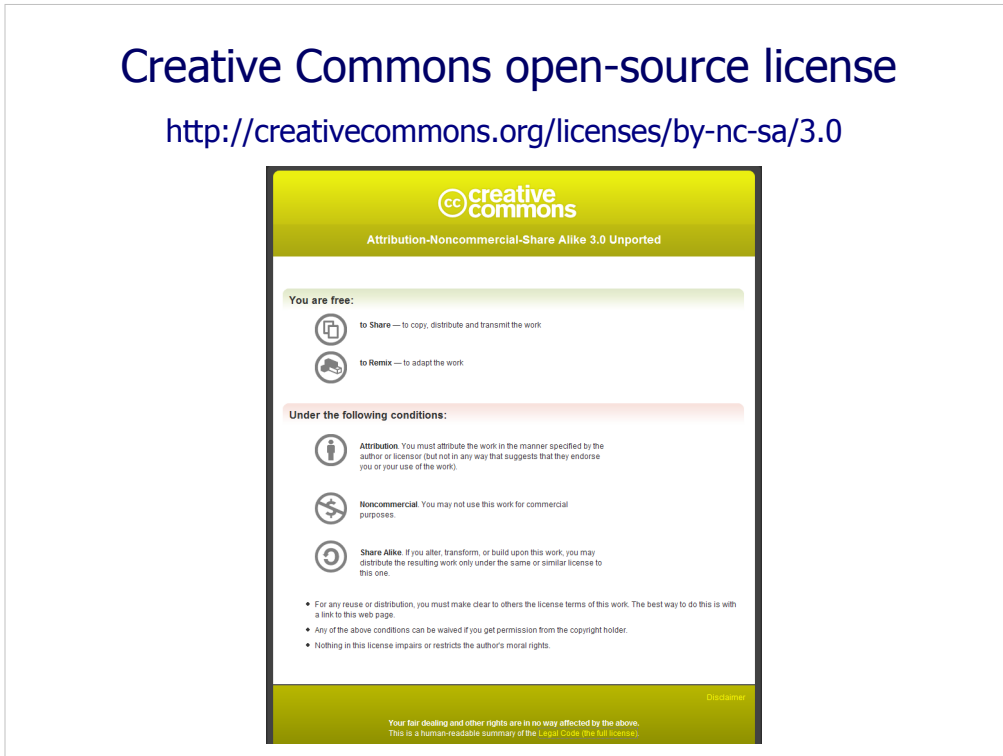
1.831.656.7599 fax

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Open-source license for X3D-Edit software and X3D example scenes

<http://www.web3d.org/x3d/content/examples/license.html>

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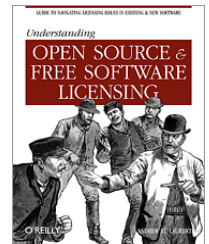
License available at

<http://www.web3d.org/x3d/content/examples/license.txt>

<http://www.web3d.org/x3d/content/examples/license.html>

Good references on open source:

Andrew M. St. Laurent, *Understanding Open Source and Free Software Licensing*, O'Reilly Publishing, Sebastopol California, August 2004. <http://oreilly.com/catalog/9780596005818/index.html>



Herz, J. C., Mark Lucas, John Scott, *Open Technology Development: Roadmap Plan*, Deputy Under Secretary of Defense for Advanced Systems and Concepts, Washington DC, April 2006. <http://handle.dtic.mil/100.2/ADA450769>

