X3D Graphics for Web Authors

X3D-Edit Authoring Tool

3 August 2012

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X3D-Edit Motivation

Provide a simple, excellent authoring tool for X3D

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, and help further X3D progress

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

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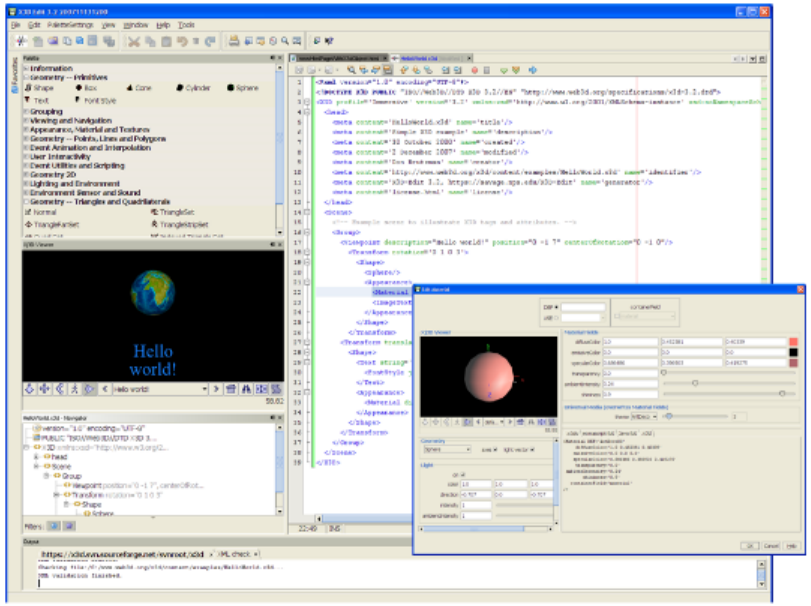
Open Standards for Real-Time 3D Communication

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

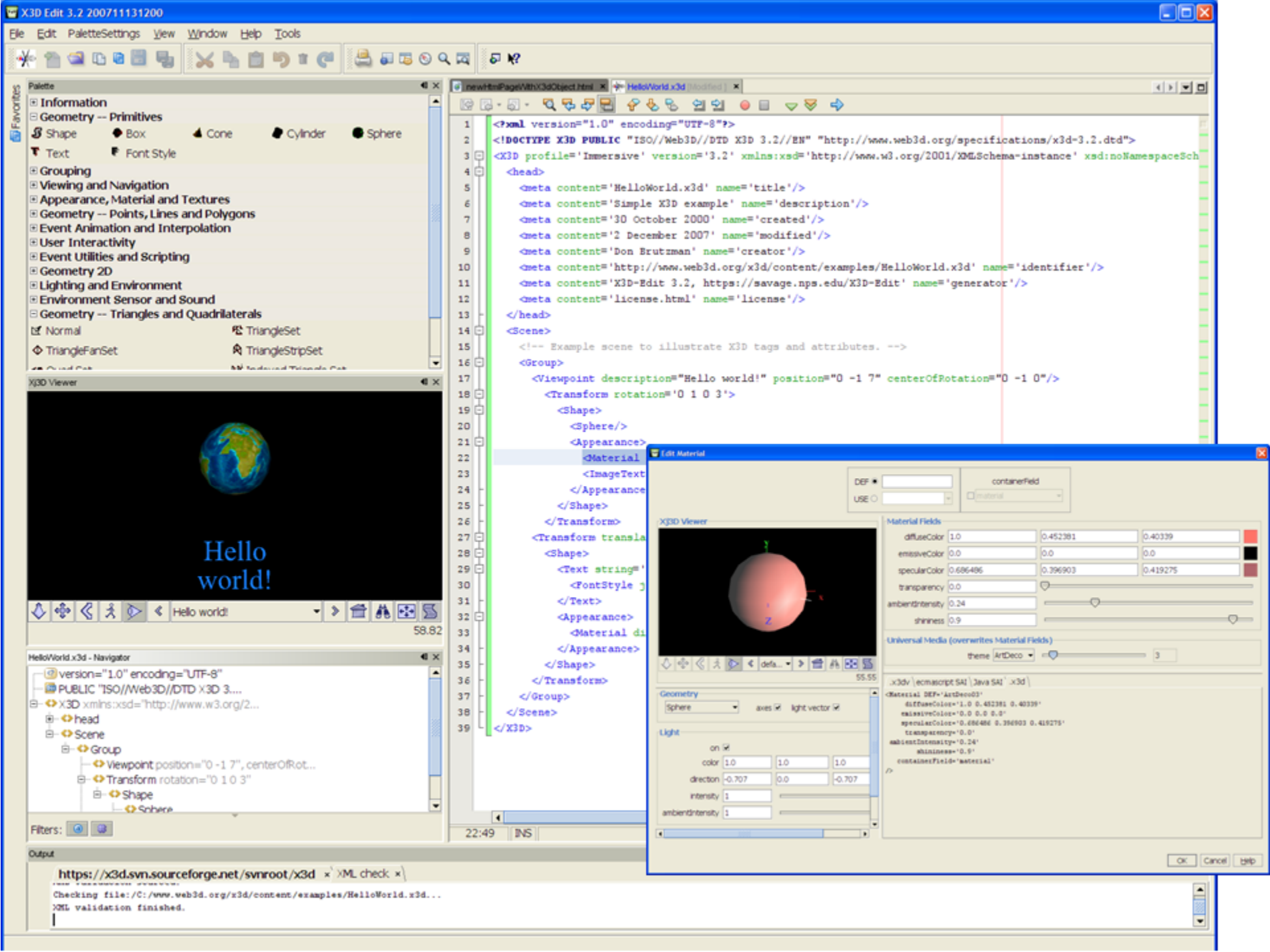


Overview

Download: https://savage.nps.edu/X3D-Edit

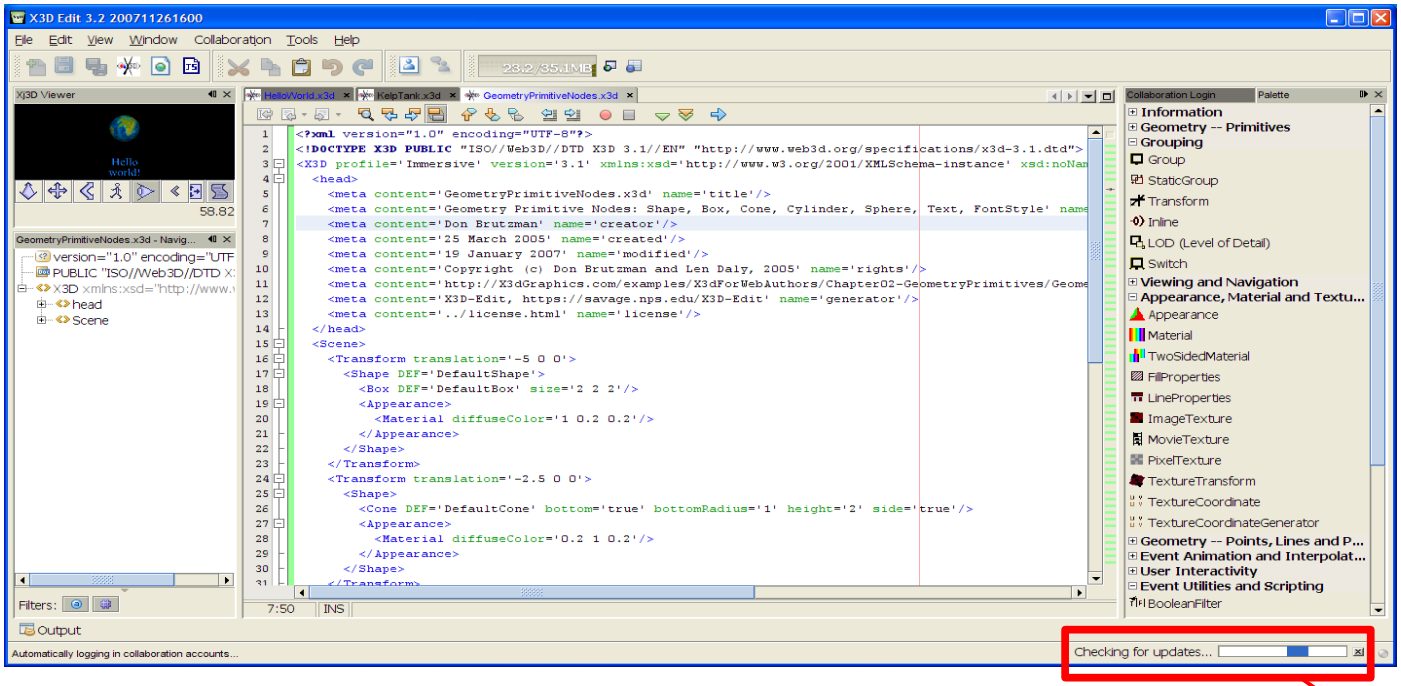
The X3D-Edit 3.2 Authoring Tool for Extensible 3D (X3D) Graphics supports the creation, checking, display and publication of X3D scenes. It is written in open-source Java and XML using the Netbeans platform, making it suitable both as a standalone application and as a plugin module for the Netbeans integrated 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 3.2 200711131200
File Edit PaletteSettings View Window Help Tools
Palette
Information
Geometry -- Primitives
Shape Box Cone Cylinder Sphere
Text Font Style
Grouping
Viewing and Navigation
Appearance, Material and Textures
Geometry -- Points, Lines and Polygons
Event Animation and Interpolation
User Interactivity
Event Utilities and Scripting
Geometry 2D
Lighting and Environment
Environment Sensor and Sound
Geometry -- Triangles and Quadrilaterals
Normal TriangleSet
TriangleFanSet TriangleStripSet
X3D Viewer
Hello world!
Hello world!
58.82
HelloWorld.x3d - Navigator
version="1.0" encoding="UTF-8"
PUBLIC "ISO//Web3D//DTD X3D 3....
X3D xmlns:xsd="http://www.w3.org/2...
head
Scene
Group
Viewpoint position="0 -1 7", centerOfRot...
Transform rotation="0 1 0 3"
Shape
Filters:
newHtmlPageWithX3dObject.html
HelloWorld.x3d
<?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:noNamespaceSch
<head>
<meta content='HelloWorld.x3d' name='title'/>
<meta content='Simple X3D example' name='description'/>
<meta content='30 October 2000' name='created'/>
<meta content='2 December 2007' name='modified'/>
<meta content='Don Brutzman' name='creator'/>
<meta content='http://www.web3d.org/x3d/content/examples/HelloWorld.x3d' name='identifier'/>
<meta content='X3D-Edit 3.2, https://savage.nps.edu/X3D-Edit' name='generator'/>
<meta content='license.html' name='license'/>
</head>
<Scene>
<!-- Example scene to illustrate X3D tags and attributes. -->
<Group>
<Viewpoint description="Hello world!" position="0 -1 7" centerOfRotation="0 -1 0"/>
<Transform rotation='0 1 0 3'>
<Shape>
<Sphere/>
<Appearance>
<Material
<ImageText
</Appearance
</Shape>
</Transform>
<Transform transla
<Shape>
<Text string='
<FontStyle
</Text>
<Appearance>
<Material di
</Appearance>
</Shape>
</Transform>
</Group>
</Scene>
</X3D>
22:49 INS
Edit Material
DEF
USE
containerField
X3D Viewer
Material Fields
diffuseColor 1.0 0.452381 0.40339
emissiveColor 0.0 0.0 0.0
specularColor 0.686486 0.396903 0.419275
transparency 0.0
ambientIntensity 0.24
shininess 0.9
Universal Media (overwrites Material Fields)
theme ArtDeco
Geometry
Sphere
axes
light vector
Light
on
color 1.0 1.0 1.0
direction -0.707 0.0 -0.707
intensity 1
ambientIntensity 1
OK Cancel Help
Output
https://x3d.svn.sourceforge.net/svnroot/x3d
XML check
Checking file:/C:/www.web3d.org/x3d/content/examples/HelloWorld.x3d...
XML validation finished.

X3D-Edit updates

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



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X3D Showcase DVD

Contents

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

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Availability: 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

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X3D

X3D Examples Archives

X3D for Web Authors 244 models

- Textbook on how to design and build X3D scenes

Basic 653 models

- Diverse scenes illustrating various X3D capabilities

Conformance NIST 732 models

- Strictly defined test examples for correct operation

VRML 2.0 Sourcebook 269 models

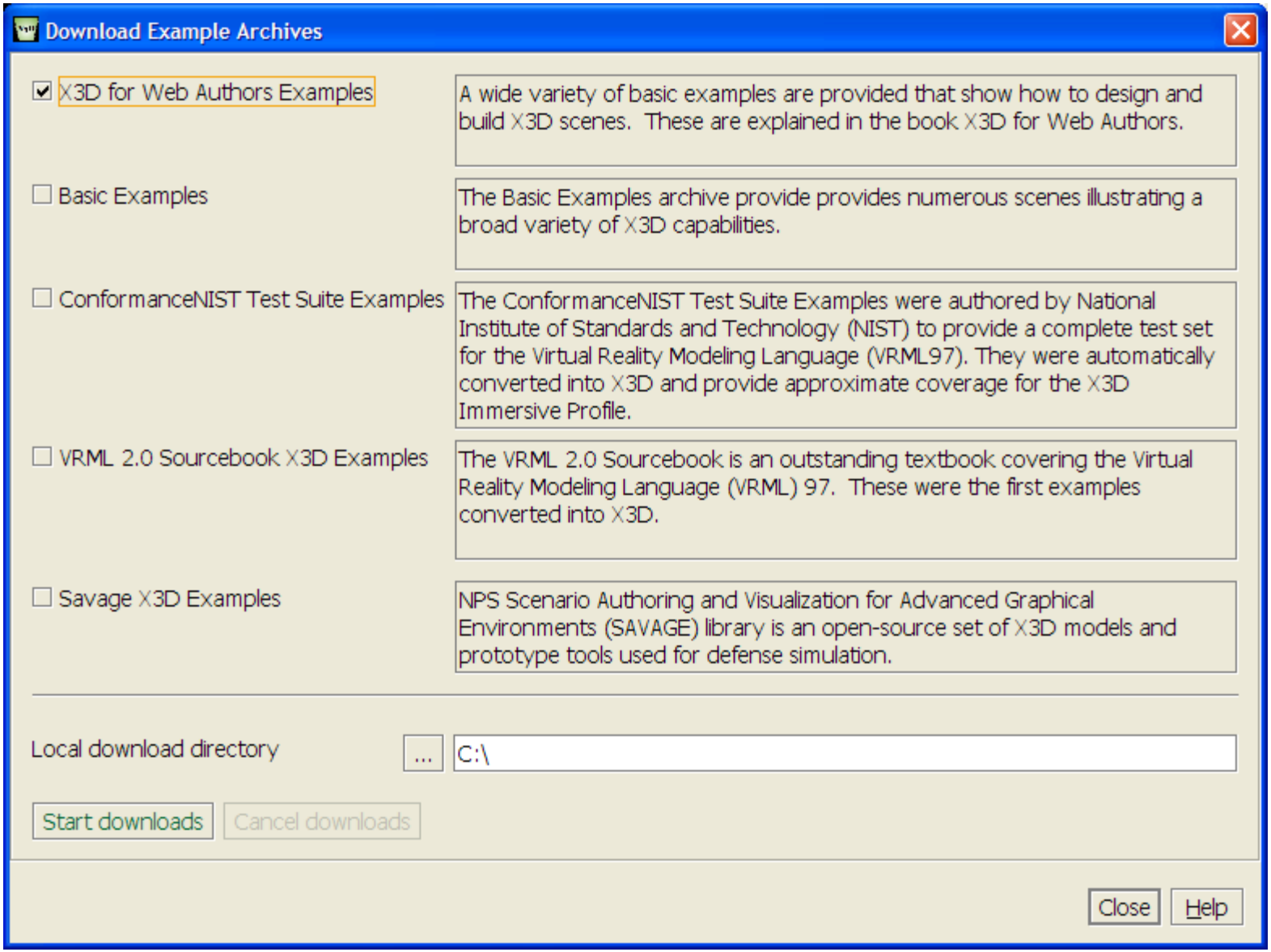
- Textbook on VRML97, examples converted to X3D

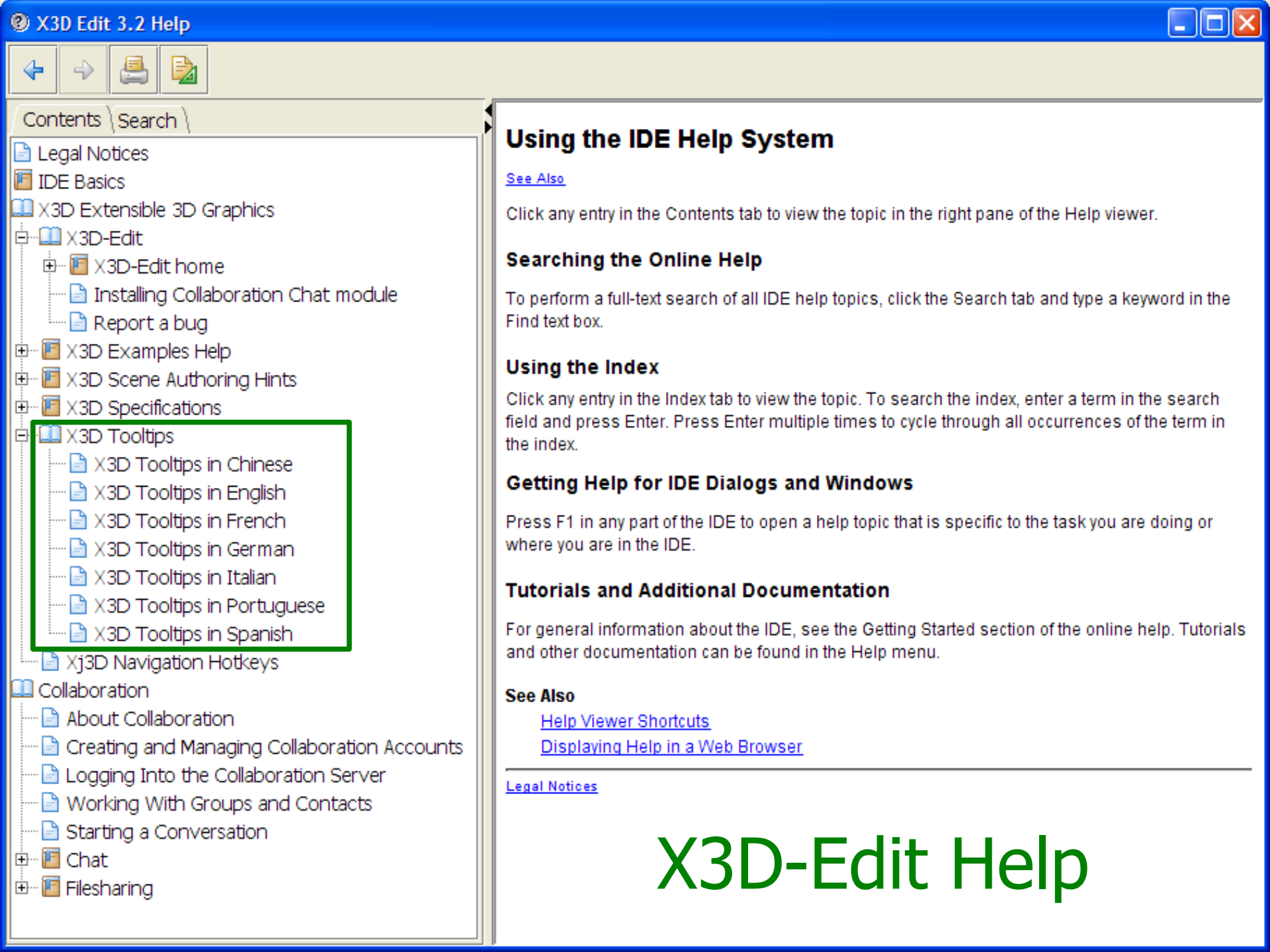
Savage 1181 models

- Open-source military models and tools

3000+ models available

X3D Examples download panel, X3D-Edit




X3D Edit 3.2 Help
Contents
Search
Legal Notices
IDE Basics
X3D Extensible 3D Graphics
X3D-Edit
X3D-Edit home
Installing Collaboration Chat module
Report a bug
X3D Examples Help
X3D Scene Authoring Hints
X3D Specifications
X3D Tooltips
X3D Tooltips in Chinese
X3D Tooltips in English
X3D Tooltips in French
X3D Tooltips in German
X3D Tooltips in Italian
X3D Tooltips in Portuguese
X3D Tooltips in Spanish
Xj3D Navigation Hotkeys
Collaboration
About Collaboration
Creating and Managing Collaboration Accounts
Logging Into the Collaboration Server
Working With Groups and Contacts
Starting a Conversation
Chat
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

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 pages: Plug-in and browser compliance, Tool support for X3D components, X3D Resources: Applications, X3D Implementations, and X3D Plugfest.

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	BS Contact family	FreeWRL, FreeX3D	H3DViewer	InstantPlayer	OctagaVS Player	OpenVRML	SwirlX3D	view3dscene	Xj3D
Versions	v8.0	v1.22.8	v2.1	2.1	v4.0	v0.17.9	v2.1.7	v3.11.0	1.0
Status	Active	Active	Active	Active	Active	Active	Active	Active	Active
X3D Conformance Certification	Interchange Profile	Interchange Profile	none	none	none	none	none	none	Interchange Profile
File Encodings									
XML (.x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
ClassicVRML (.x3dv)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (.x3db)	yes	no	no	partial	no	no	no	no	yes
VRML 97 (v2.0) (.wrl)	yes	yes	yes	yes	yes	yes	?	yes	yes
VRML 1 (v1.0) (.wrl)	no	yes	no	?	?	?	?	yes	?
X3D component list									
CAD geometry	yes	no	no	yes	yes	partial	yes	partial	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes	yes

Tool support for X3D components

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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

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.

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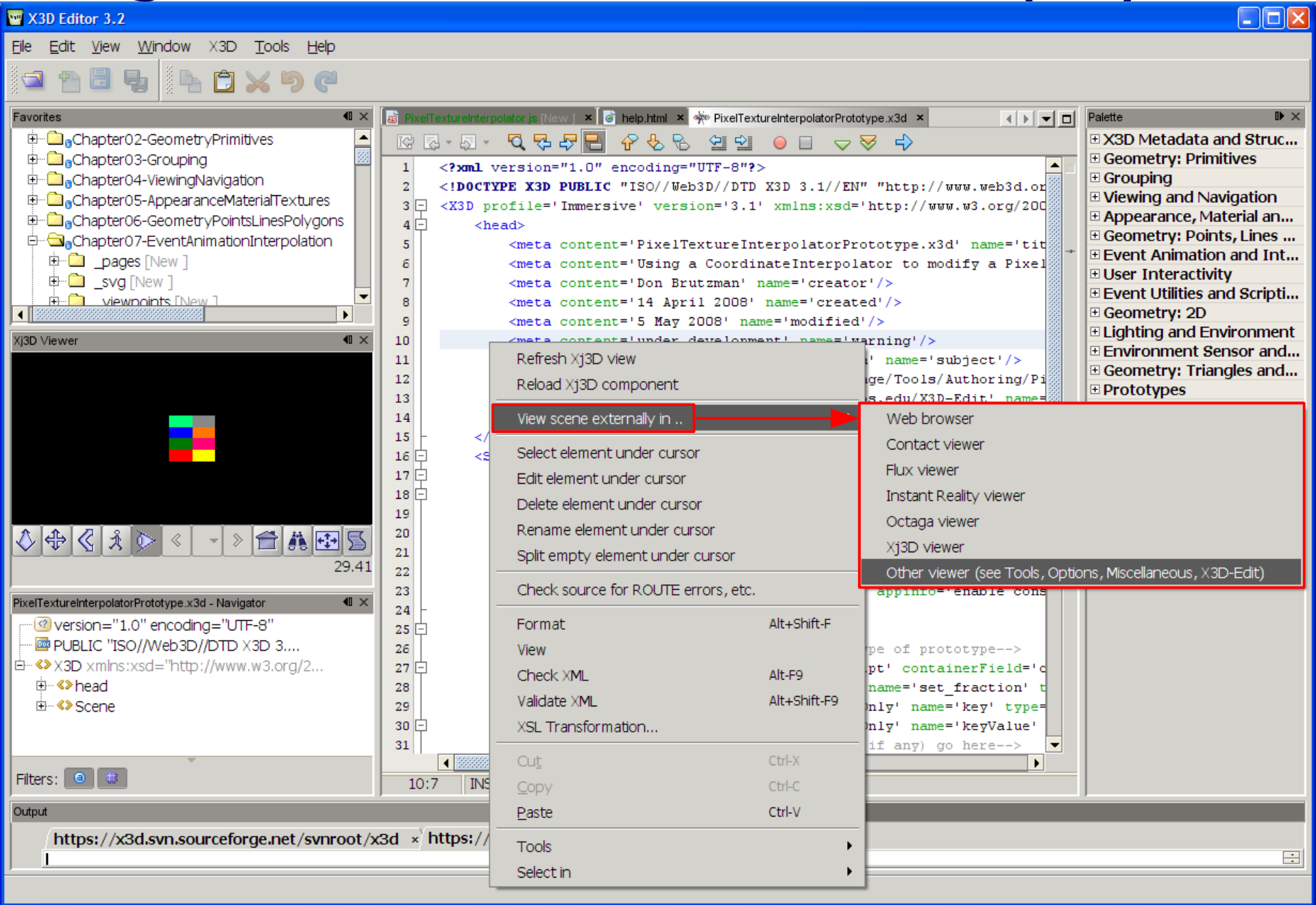
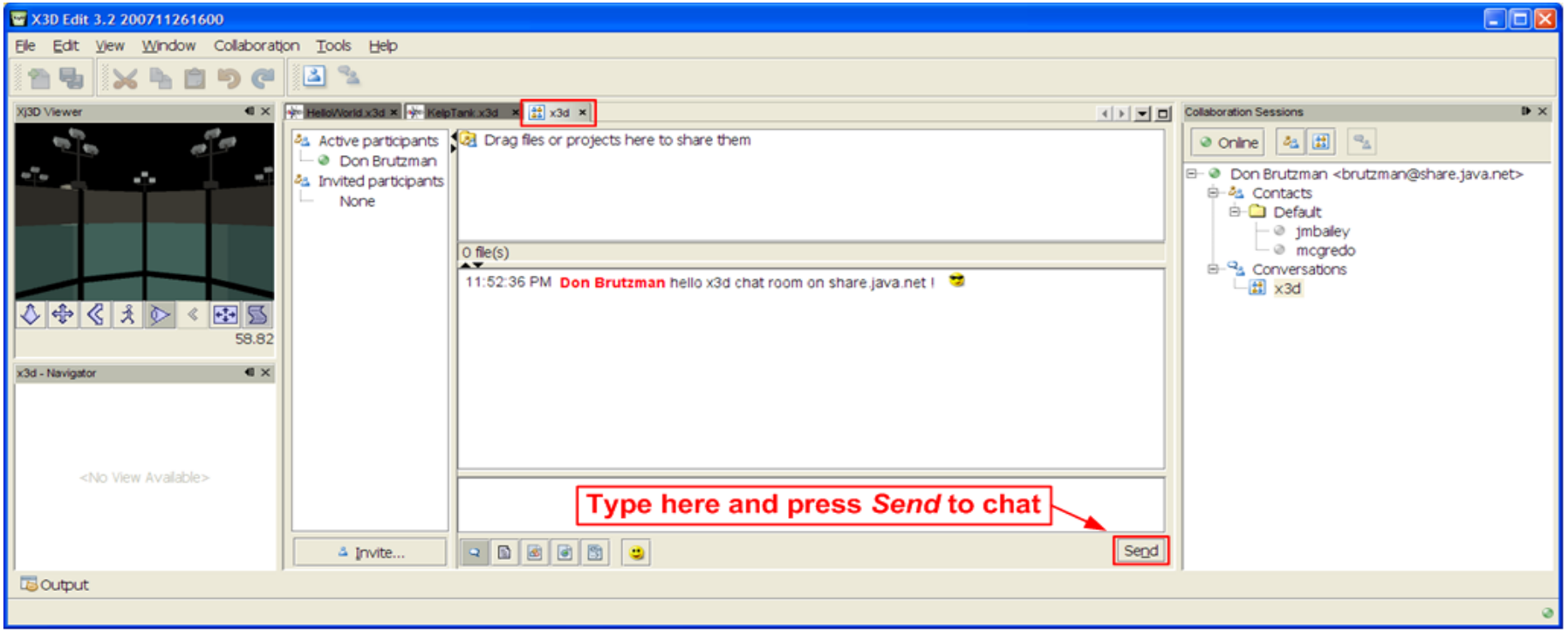
- **partial** some nodes and fields supported
- **level #** which component level number (1-4) is supported (found at end of each component specification)
- **no** no support provided
- ? unknown, need status report

Types	Authoring tools					Conversion tools		
Tools	BS Editor	SwirlX3D Editor	X3D-Edit	Flux Studio	Vivaty Studio	Okino Polytrans	SwirlX3D Translator	Xj3D Filter Chain
Versions	v7.1	v3.0.0	v3.2	v2.1	v1.0 build 900	v5.0	v3.0.0	v2.0
Profiles	nearly Full Profile	TBD	nearly Full Profile	Immersive Profile	Immersive Profile	Immersive Profile	Immersive Profile	nearly Full Profile
X3D Conformance Certification	none	none	Interchange Profile	Interchange Profile	Interchange Profile	none	none	Interchange Profile
File Encodings								
XML (.x3d)	yes	yes	yes	yes	yes	yes	yes	yes
ClassicVRML (.x3dv)	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (.x3db)	yes	no	yes	no	no	no	no	yes
VRML 97 (v2.0) (.wrl)	?	?	yes	yes	yes	yes	?	yes
VRML 1 (v1.0) (.wrl)	?	?	no	partial	partial	yes	?	no
X3D component list								
CAD geometry	yes	yes	yes	no	no	yes	yes	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes
Cube map environmental texturing	yes	no	partial	partial	partial	no	no	no
Distributed interactive simulation (DIS)	no	no	yes	no	no	no	no	yes
Environmental effects	yes	yes	yes	yes	yes	yes	yes	yes
Environmental sensor	yes	yes	yes	yes	yes	no	yes	yes

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

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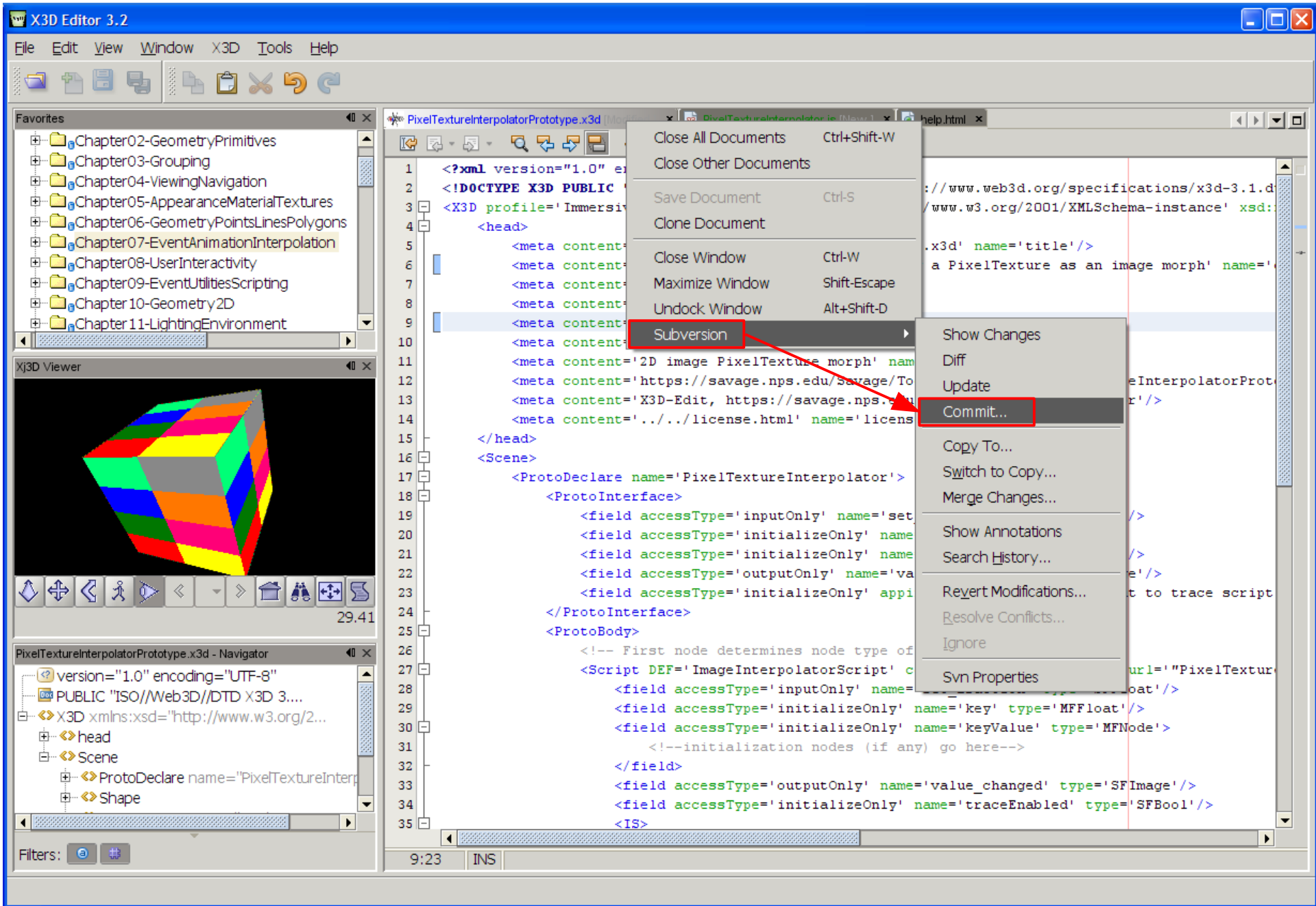
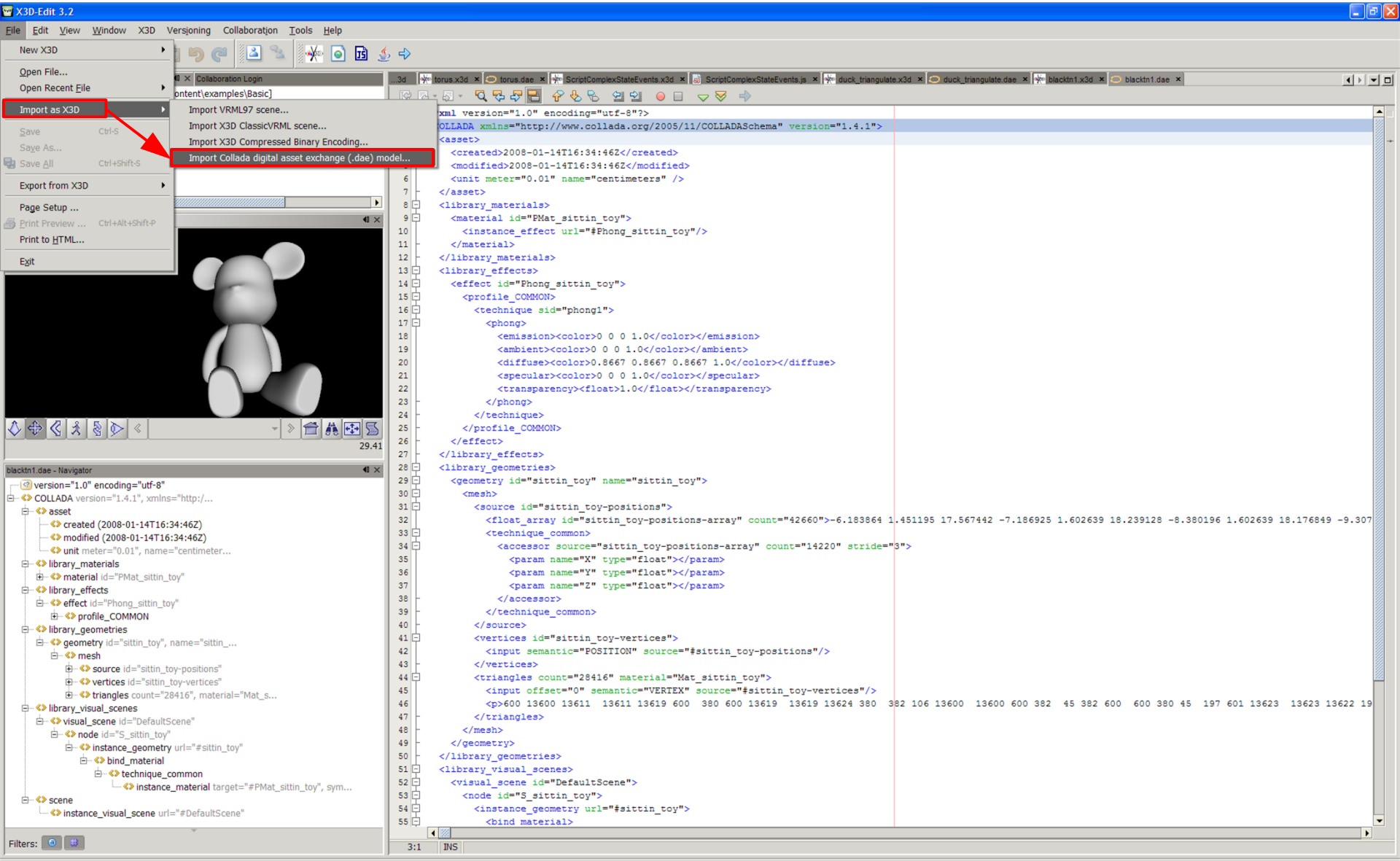
X3D

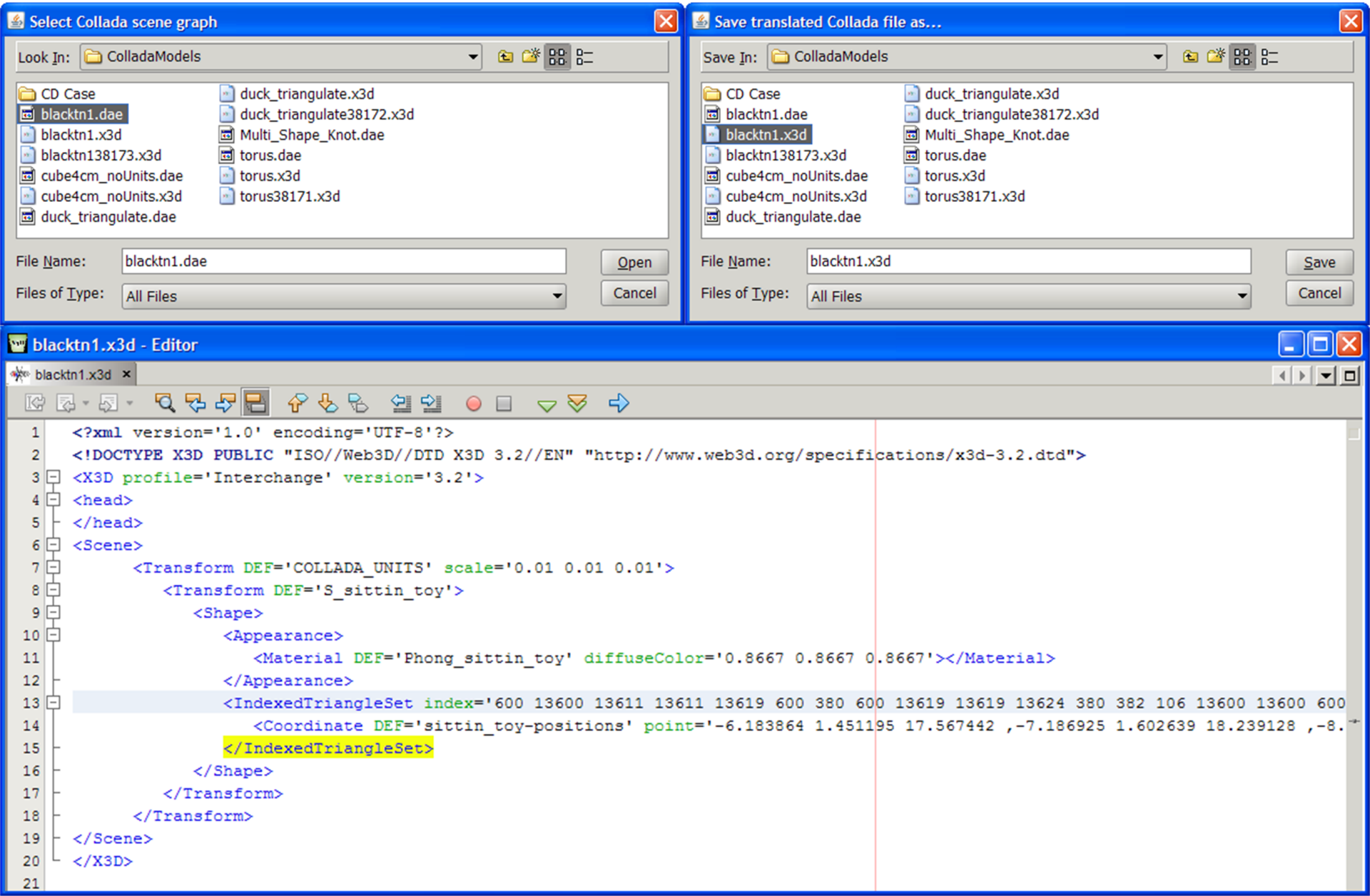
Version control support included



Collada .dae editing support



Collada .dae import to X3D



Distributed Interactive Simulation (DIS) Protocol

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

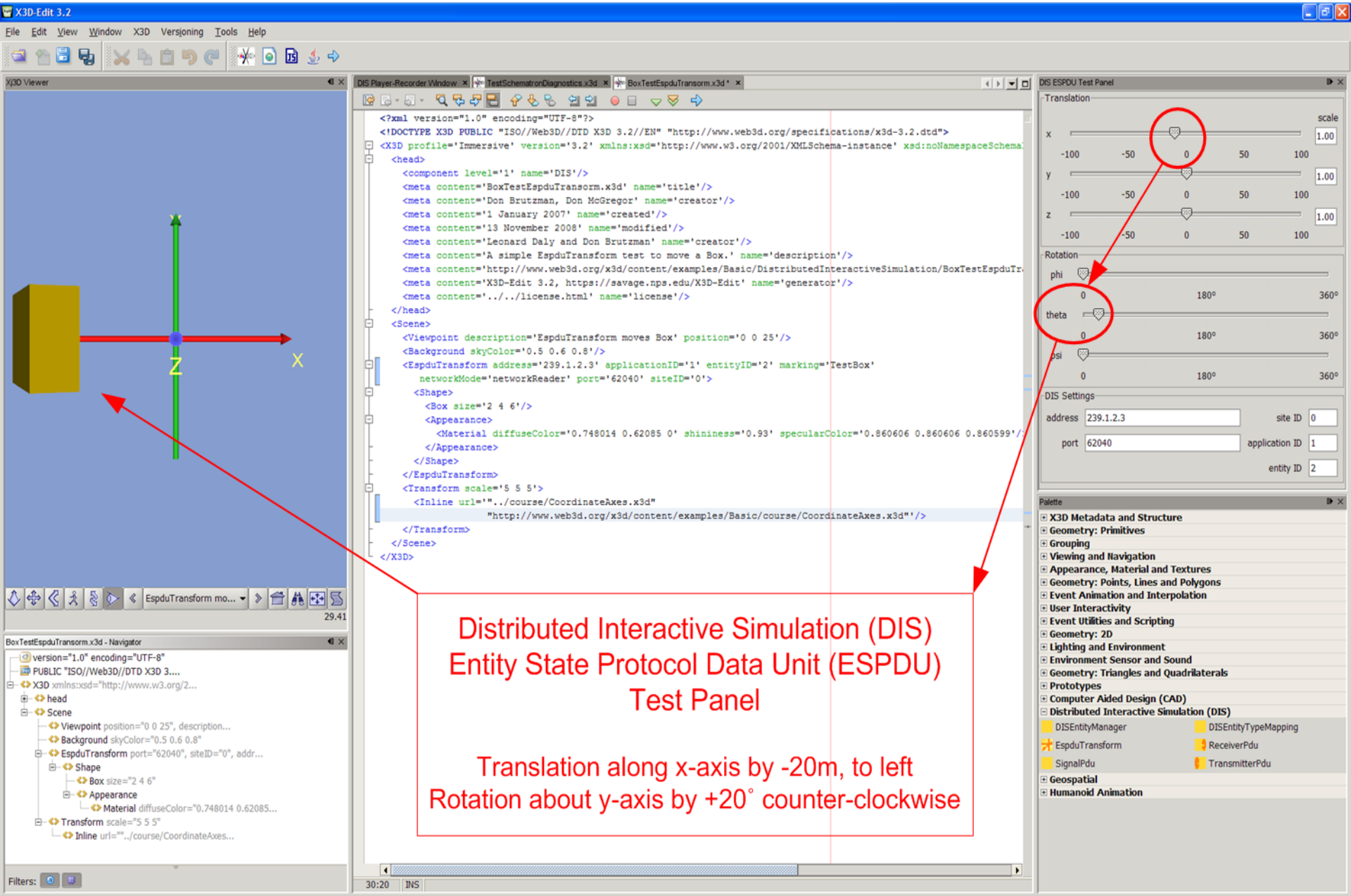
OpenDIS: open source implementations

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

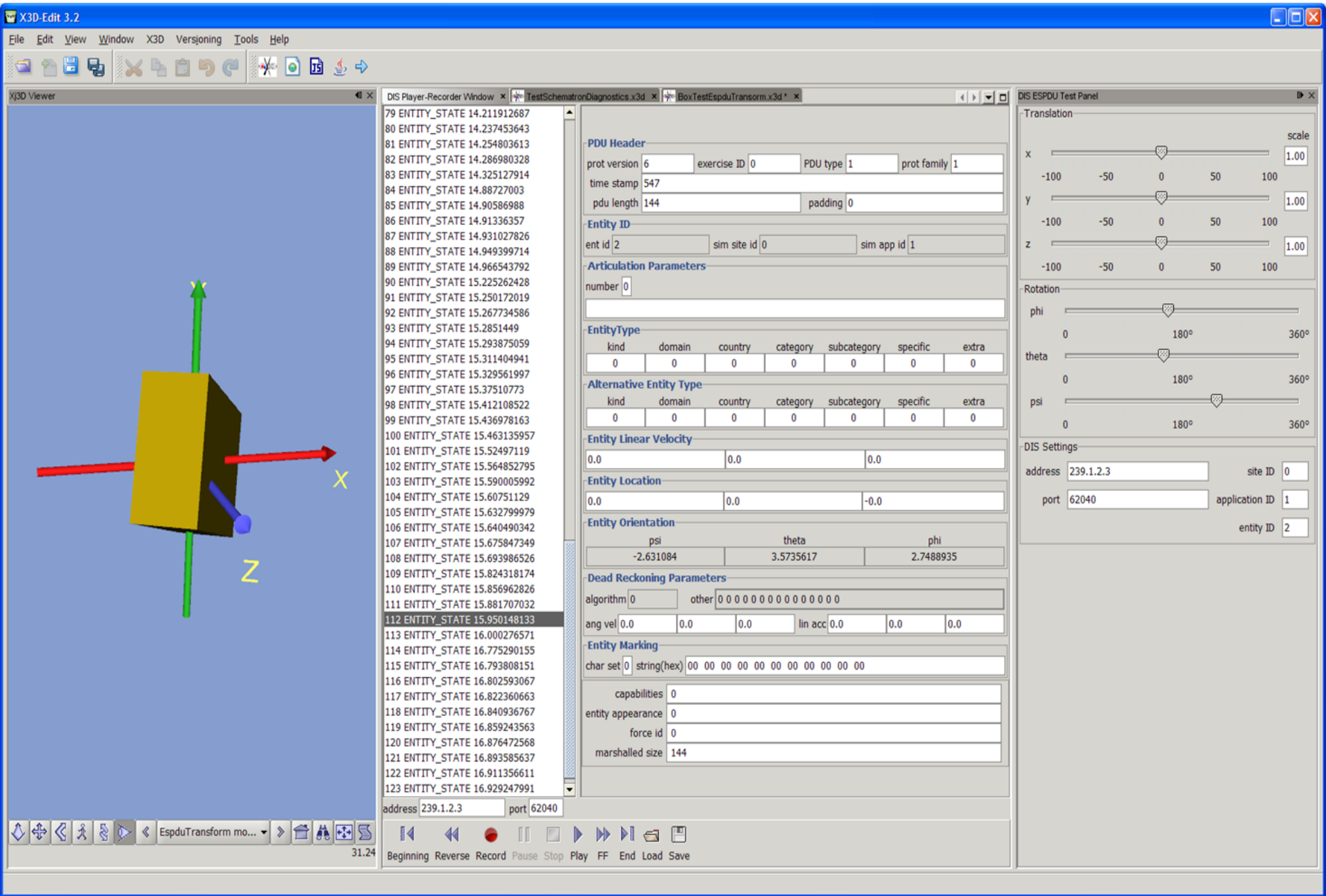
Integrate network test environment into X3D-Edit

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

DIS Networking Test Panel

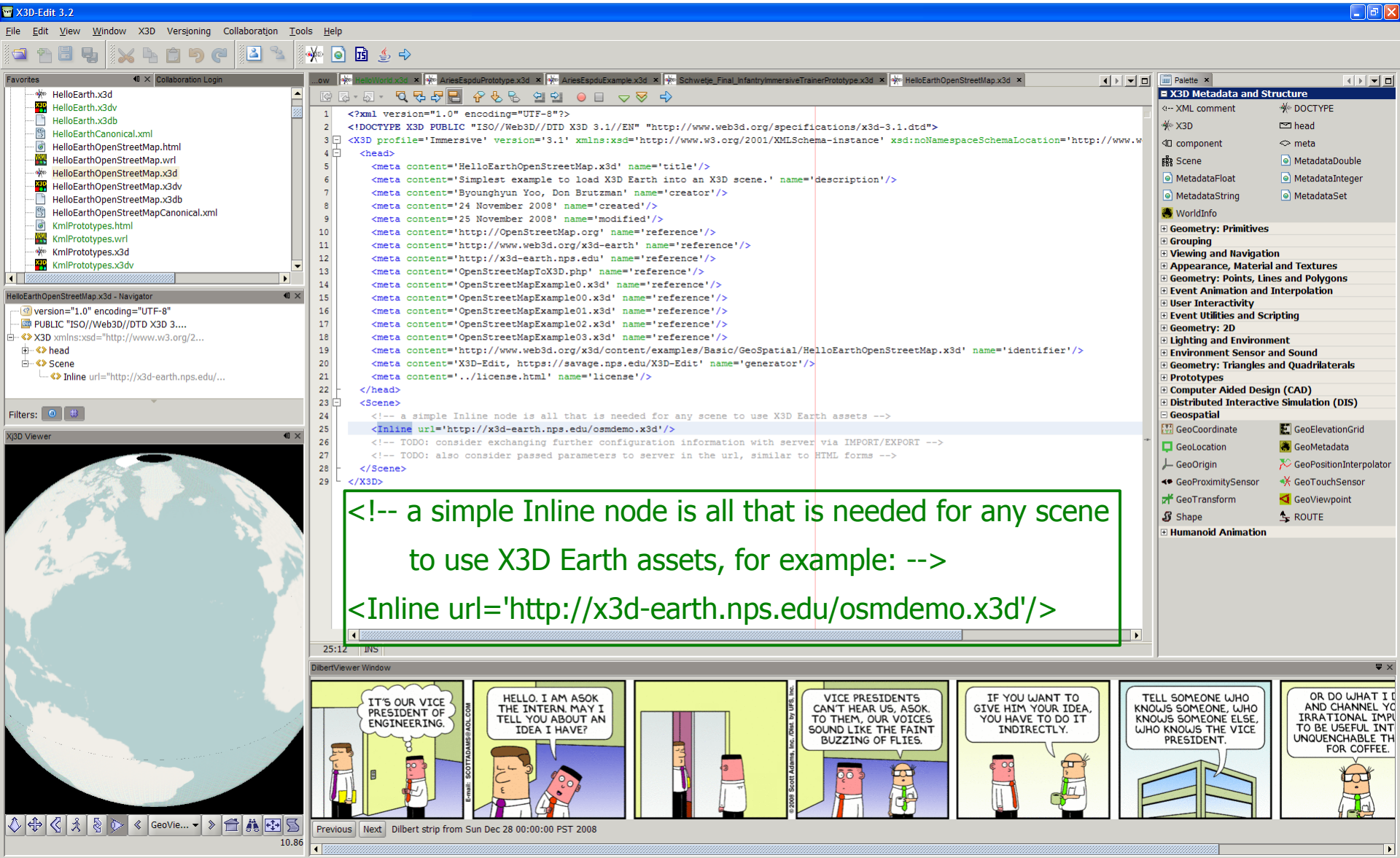


DIS Networking Player-Recorder Panel



X3D Earth, Geospatial Component

Editing and authoring support provided



Humanoid Animation (H-Anim)

ISO standard for human skeletons, skin

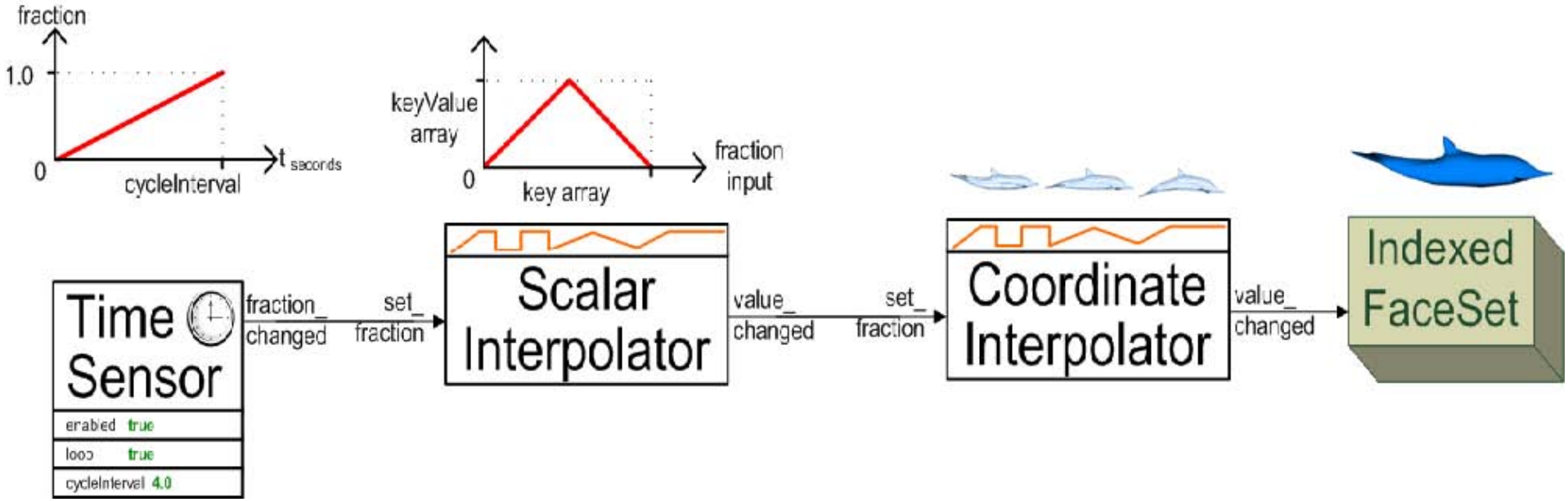
- Supported in X3D-Edit, other tools

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



Edit CoordinateInterpolator

containerField: children

DEF: MorphInterpolator

USE:

Coordinate lists

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

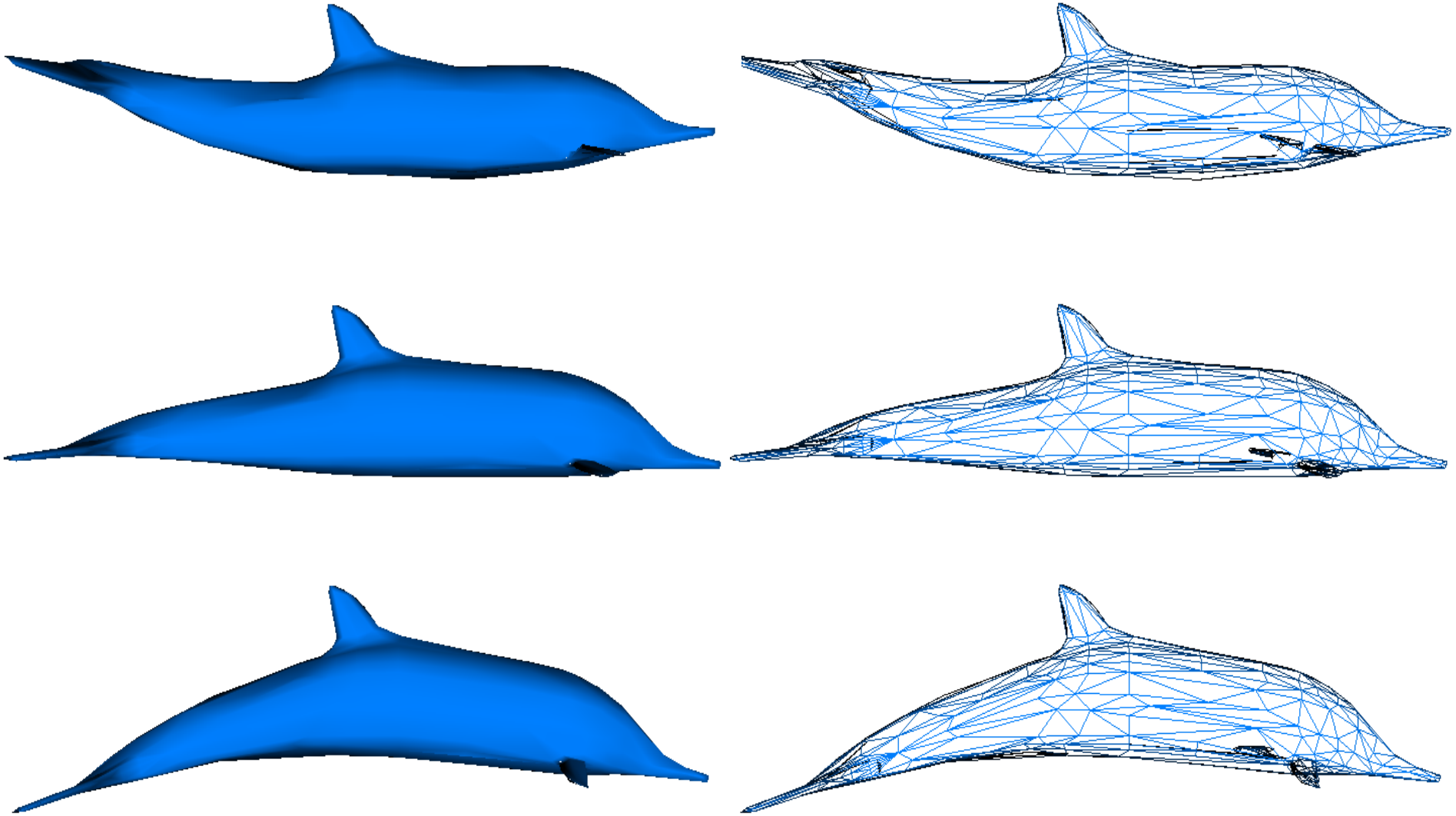
key		0			1			2			3			4			5		
0	0.406	1.049	7.905	0.595	2.957	-10.3...	0.592	2.263	-10.7...	1.246	2.823	5.21	1.352	0.918	5.384	1.336	3.003	-1.028	1.311
0.5	0.406	0.431	7.729	0.595	1.561	-10.4...	0.592	0.769	-10.4...	1.246	2.58	5.322	1.352	0.67	5.216	1.336	3.003	-1.028	1.311
1	0.406	-0.354	7.585	0.595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

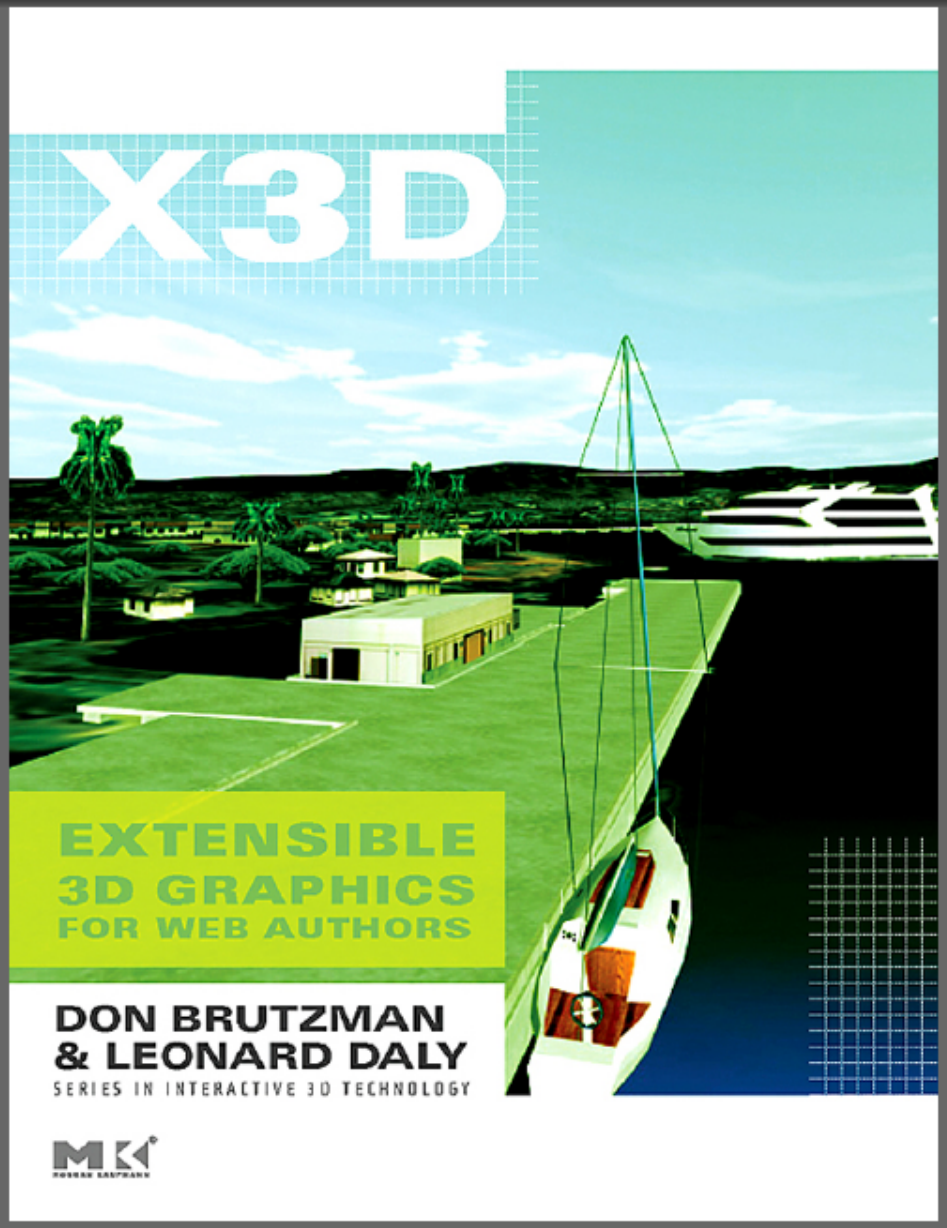
Textbook, slidesets, examples, videos

http://x3dGraphics.com

Bookmarks

Options

- 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



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	

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

Online learning resource: course video podcasts!

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< X3D >

Summary

X3D-Edit is useful for learning, producing, improving and extending X3D scenes

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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Contact

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1.831.656.2149 voice

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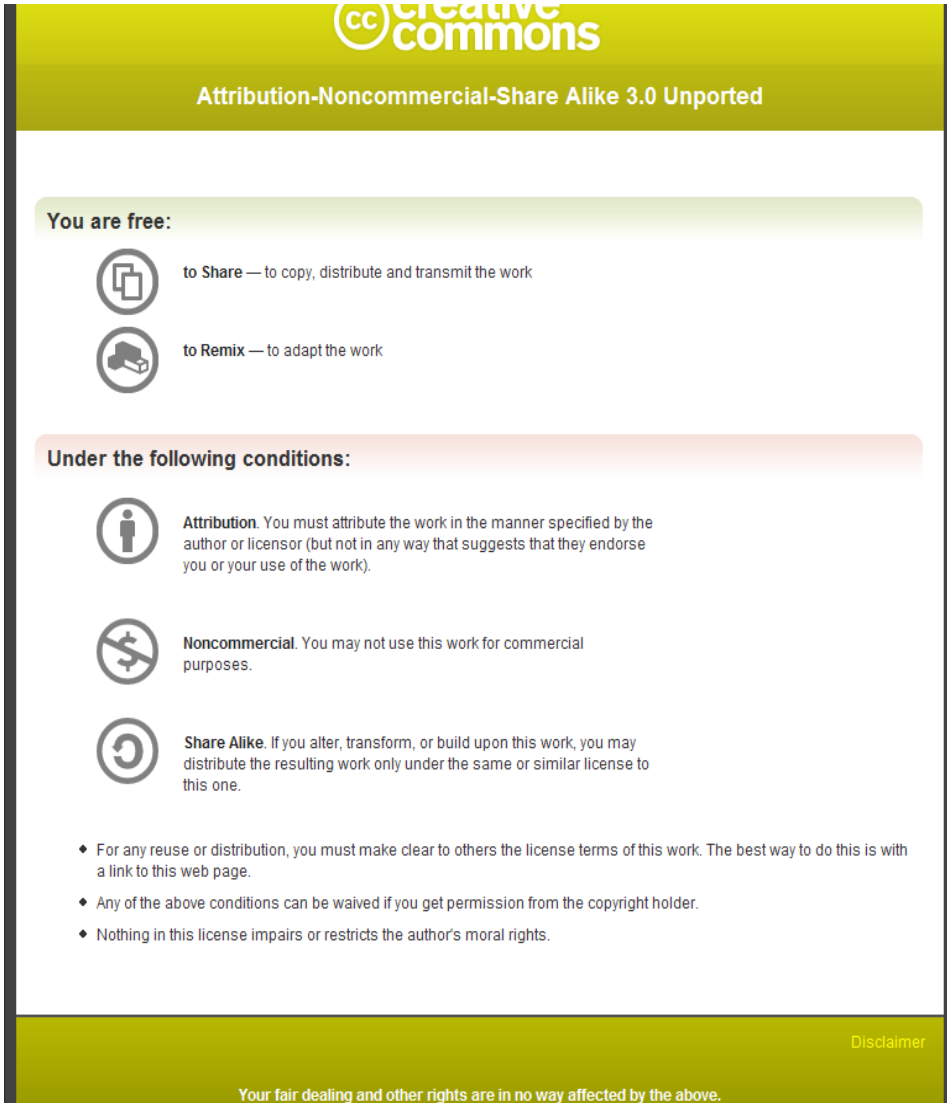

Open-source license
for X3D-Edit software and X3D example scenes

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

X3D Graphics for Web Authors

X3D-Edit Authoring Tool

3 August 2012

Don Brutzman
Naval Postgraduate School (NPS)
brutzman@nps.edu

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X3D-Edit Motivation

Provide a simple, excellent authoring tool for X3D

Teach X3D to anyone who can author HTML

Unlock all of the great work by Web3D partners

Learn by doing, and help further X3D progress

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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

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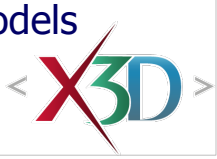
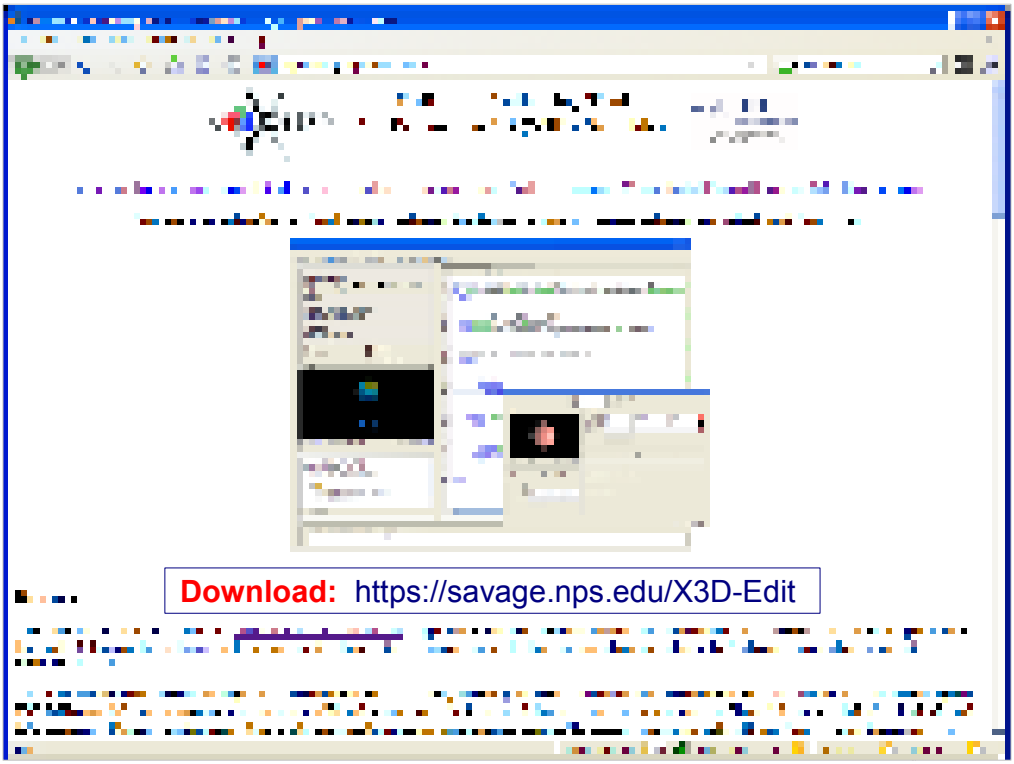
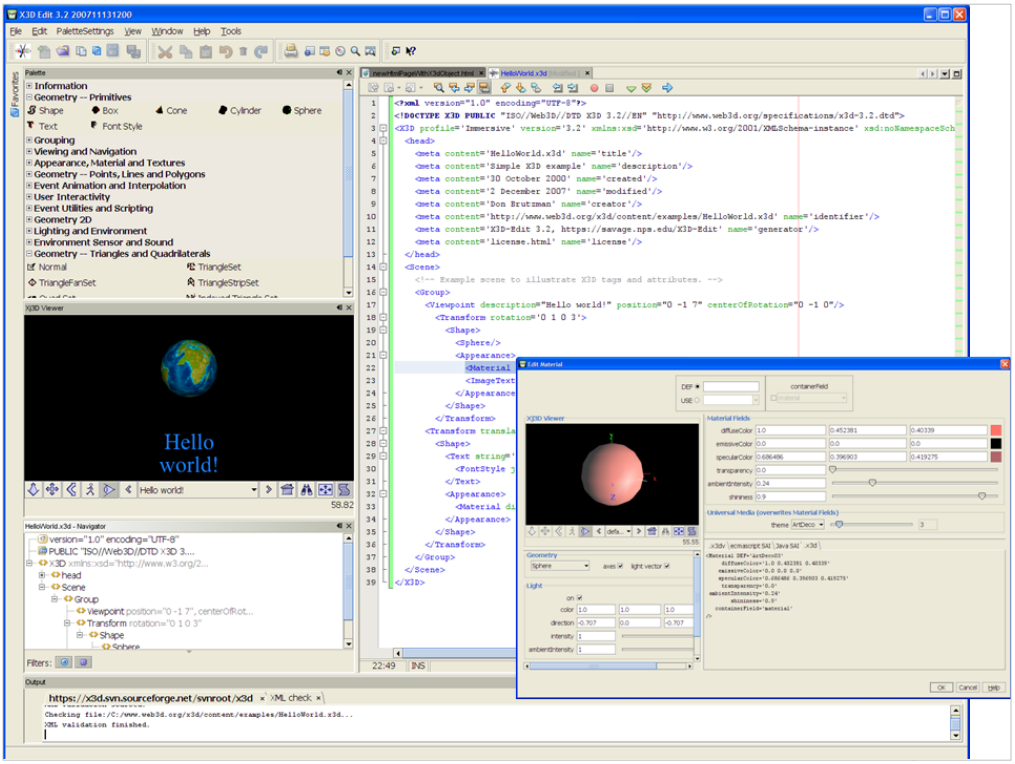


Excerpted and adapted from Chapter 1, *X3D Graphics for Web Authors*
http://x3dGraphics.com



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



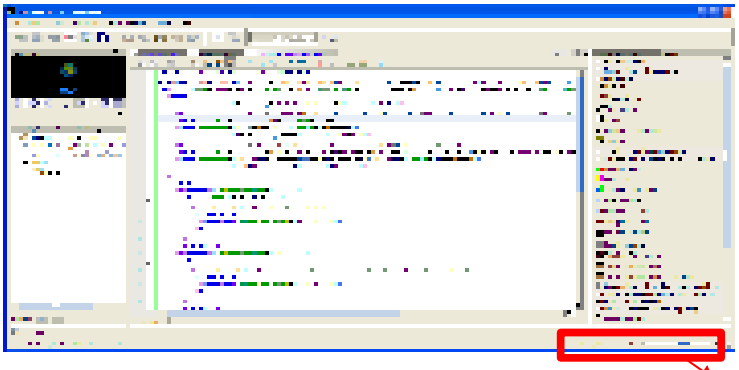
As the name implies, X3D-Edit is primarily oriented towards editing X3D text. Additional features include:

- 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



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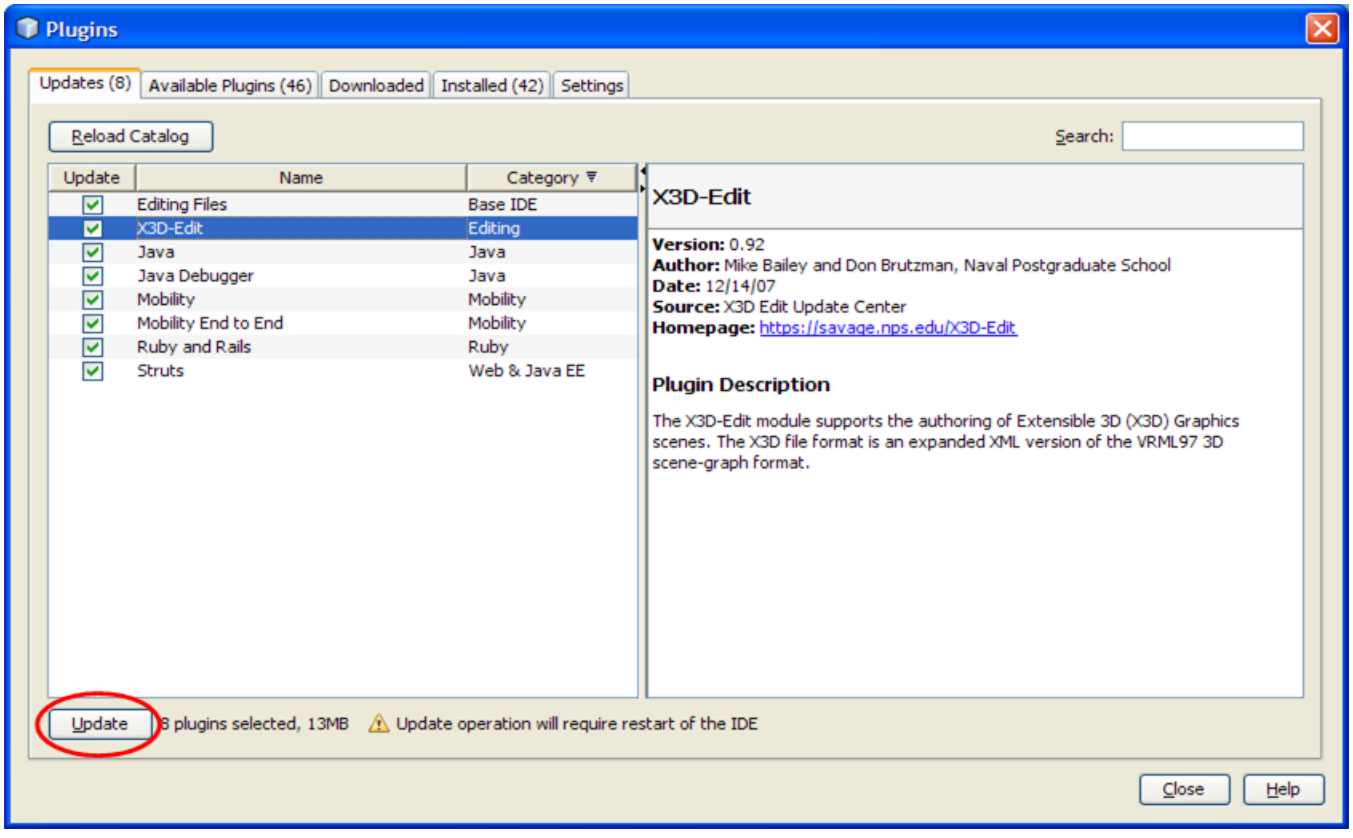
It is also possible to manually trigger an X3D-Edit update, if one is available.

From top menu, select *Tools* > *Plugins* > *Updates* and then click the Update button.



X3D Showcase DVD

Contents

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

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Availability: 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

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X3D Examples Archives

X3D for Web Authors 244 models

- Textbook on how to design and build X3D scenes

Basic 653 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 1181 models

- Open-source military models and tools

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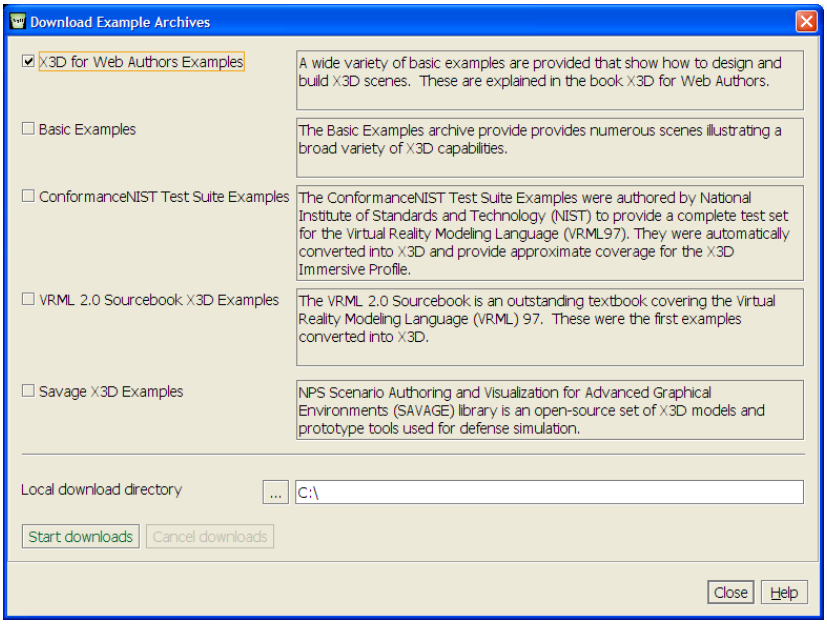
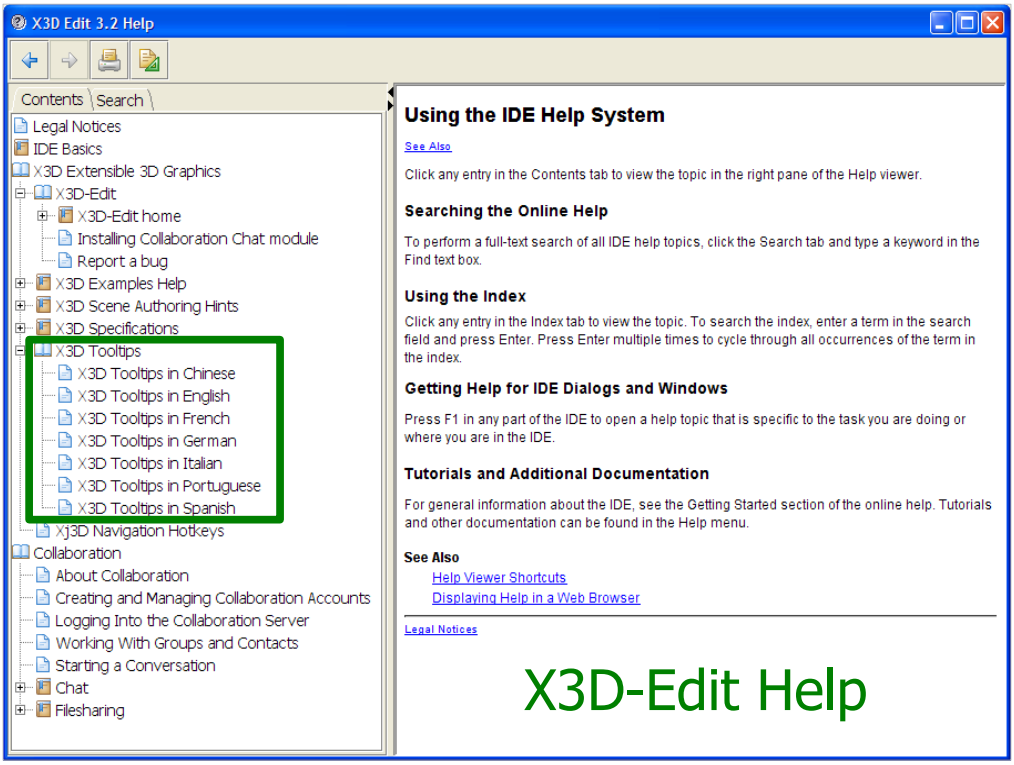
3000+ models available

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

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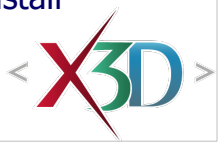
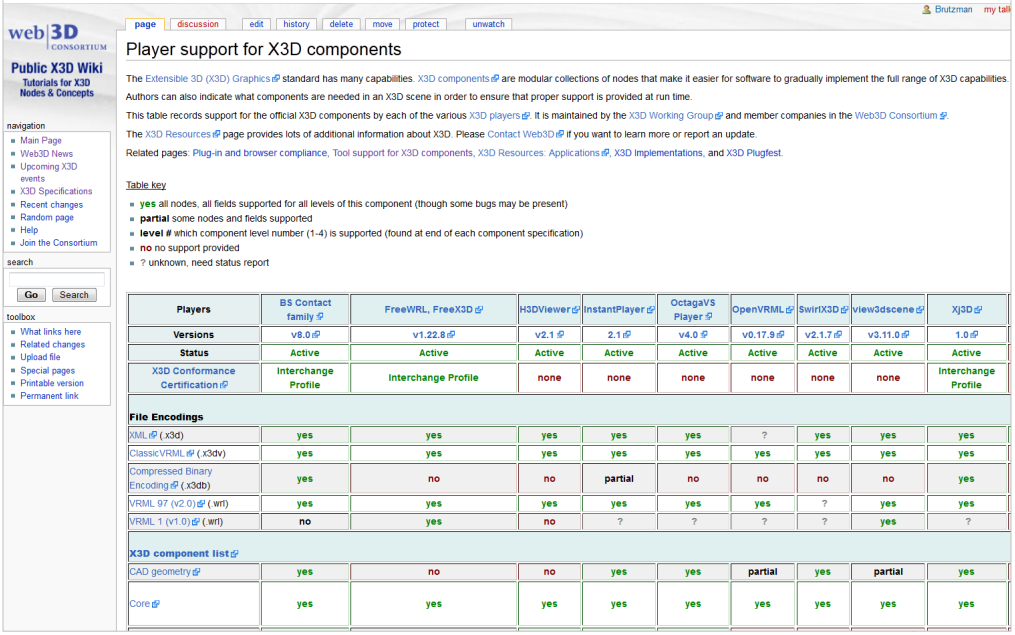


http://www.xj3d.org

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

Player support for X3D components



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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

page | discussion | edit | history | delete | move | protect | unwatch

Brutzman my talk

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 pages: Plug-in and browser compliance, Tool support for X3D components, X3D Resources: Applications, X3D Implementations, and X3D Plugfest.

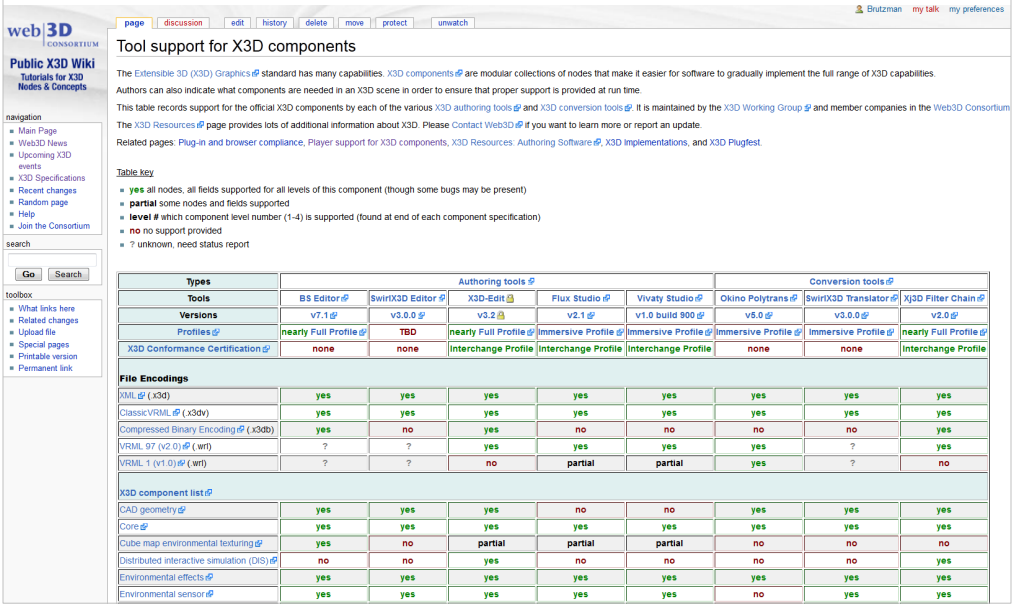
Table key
- **yes** all nodes, all fields supported for all levels of this component (though some bugs may be present)
- **partial** some nodes and fields supported
- **level #** which component level number (1-4) is supported (found at end of each component specification)
- **no** no support provided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

Players	BS Contact family	FreeWRL, FreeX3D	H3DViewer	InstantPlayer	OctagaVS Player	OpenVRML	SwirlX3D	view3dscene	Xj3D
Versions	v8.0	v1.22.8	v2.1	2.1	v4.0	v0.17.9	v2.1.7	v3.11.0	1.0
Status	Active	Active	Active	Active	Active	Active	Active	Active	Active
X3D Conformance Certification	Interchange Profile	Interchange Profile	none	none	none	none	none	none	Interchange Profile
File Encodings									
XML (.x3d)	yes	yes	yes	yes	yes	?	yes	yes	yes
ClassicVRML (.x3dv)	yes	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (.x3db)	yes	no	no	partial	no	no	no	no	yes
VRML 97 (v2.0) (.wrl)	yes	yes	yes	yes	yes	yes	?	yes	yes
VRML 1 (v1.0) (.wrl)	no	yes	no	?	?	?	?	yes	?
X3D component list									
CAD geometry	yes	no	no	yes	yes	partial	yes	partial	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes	yes

Accessed 13 December 2008

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

Tool support for X3D components



Brutzman my talk my preferences

page | discussion | edit | history | delete | move | protect | unwatch

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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
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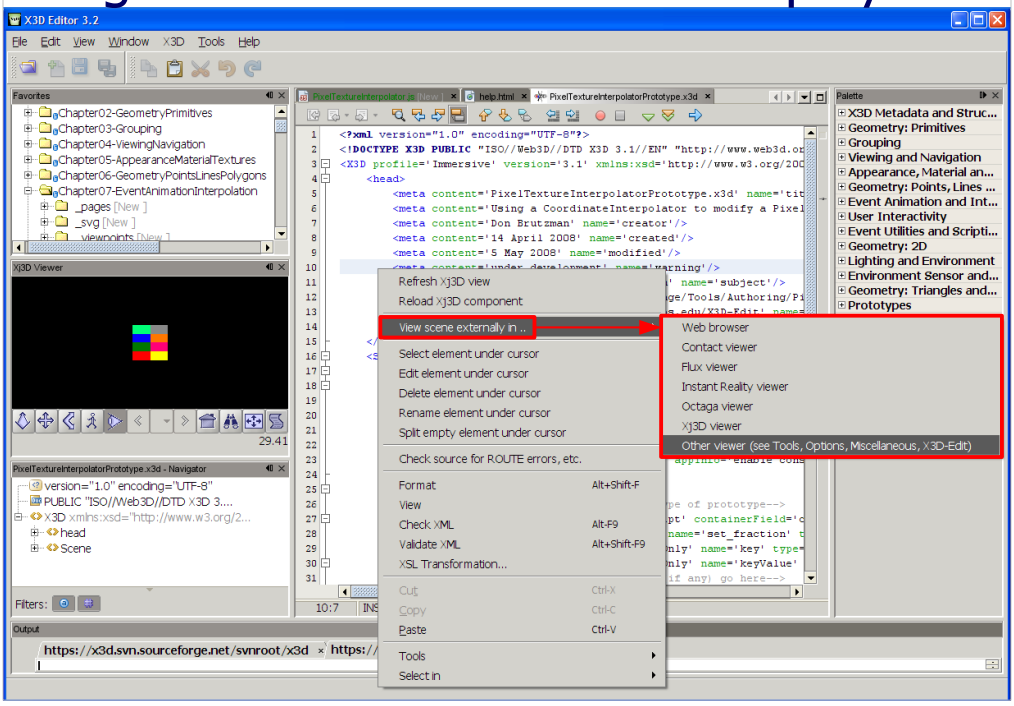
- **partial** some nodes and fields supported
- **level #** which component level number (1-4) is supported (found at end of each component specification)
- **no** no support provided
- ? unknown, need status report

Types	Authoring tools					Conversion tools		
Tools	BS Editor	SwirlX3D Editor	X3D-Edit	Flux Studio	Vivaty Studio	Okino Polytrans	SwirlX3D Translator	X3D Filter Chain
Versions	v7.1	v3.0.0	v3.2	v2.1	v1.0 build 900	v5.0	v3.0.0	v2.0
Profiles	nearly Full Profile	TBD	nearly Full Profile	Immersive Profile	Immersive Profile	Immersive Profile	Immersive Profile	nearly Full Profile
X3D Conformance Certification	none	none	Interchange Profile	Interchange Profile	Interchange Profile	none	none	Interchange Profile
File Encodings								
XML (.x3d)	yes	yes	yes	yes	yes	yes	yes	yes
Classic VRML (.x3dv)	yes	yes	yes	yes	yes	yes	yes	yes
Compressed Binary Encoding (.x3db)	yes	no	yes	no	no	no	no	yes
VRML 97 (v2.0) (.wrl)	?	?	yes	yes	yes	yes	?	yes
VRML 1 (v1.0) (.wrl)	?	?	no	partial	partial	yes	?	no
X3D component list								
CAD geometry	yes	yes	yes	no	no	yes	yes	yes
Core	yes	yes	yes	yes	yes	yes	yes	yes
Cube map environmental texturing	yes	no	partial	partial	partial	no	no	no
Distributed interactive simulation (DIS)	no	no	yes	no	no	no	no	yes
Environmental effects	yes	yes	yes	yes	yes	yes	yes	yes
Environmental sensor	yes	yes	yes	yes	yes	no	yes	yes

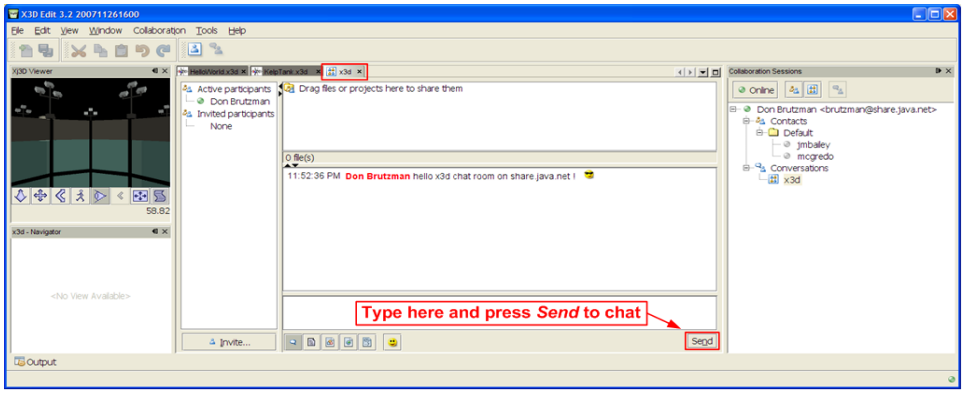
Accessed 13 December 2008

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

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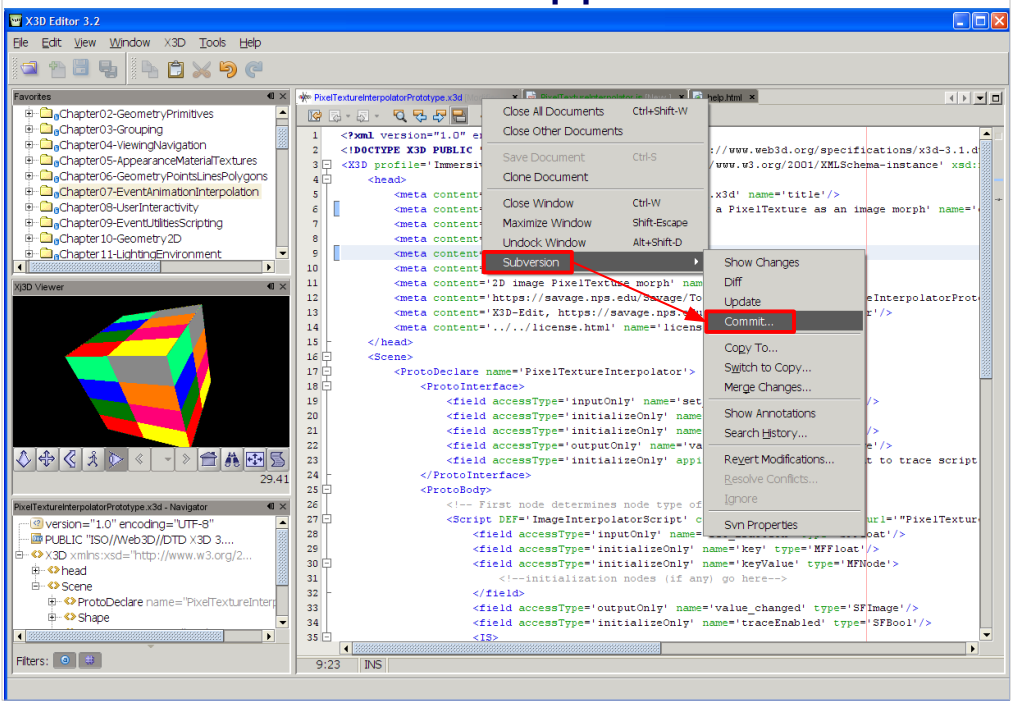
X3D-Edit collaboration chat installation page available at

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

Version control support included

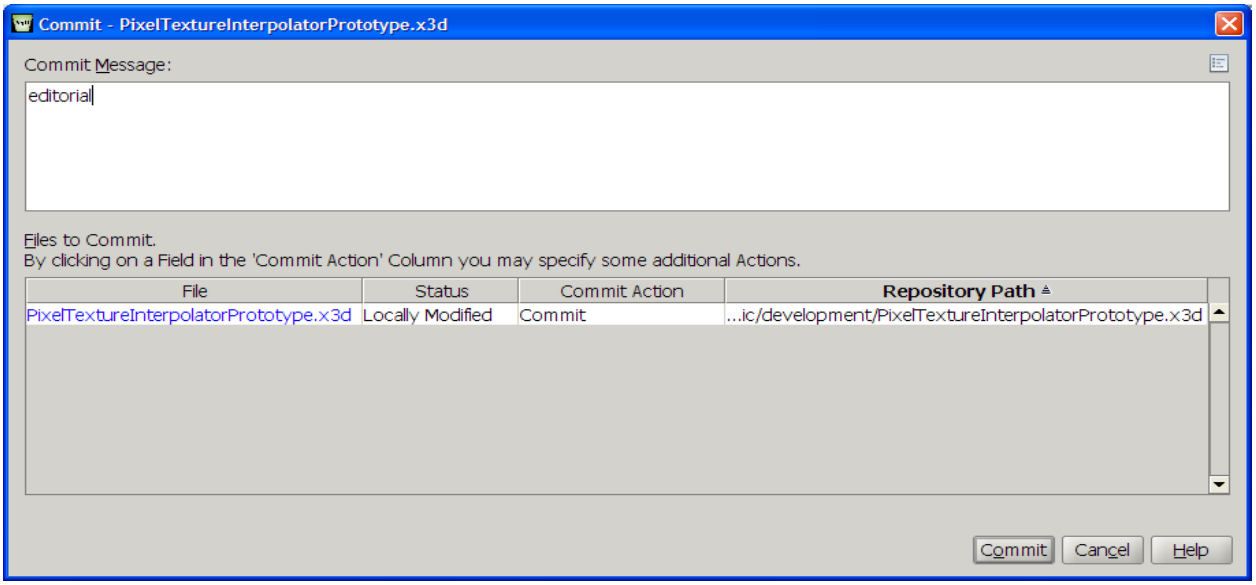


Version control allows multiple authors to share updates and work together. Prerequisite: you must have the Collabnet subversion client installed.

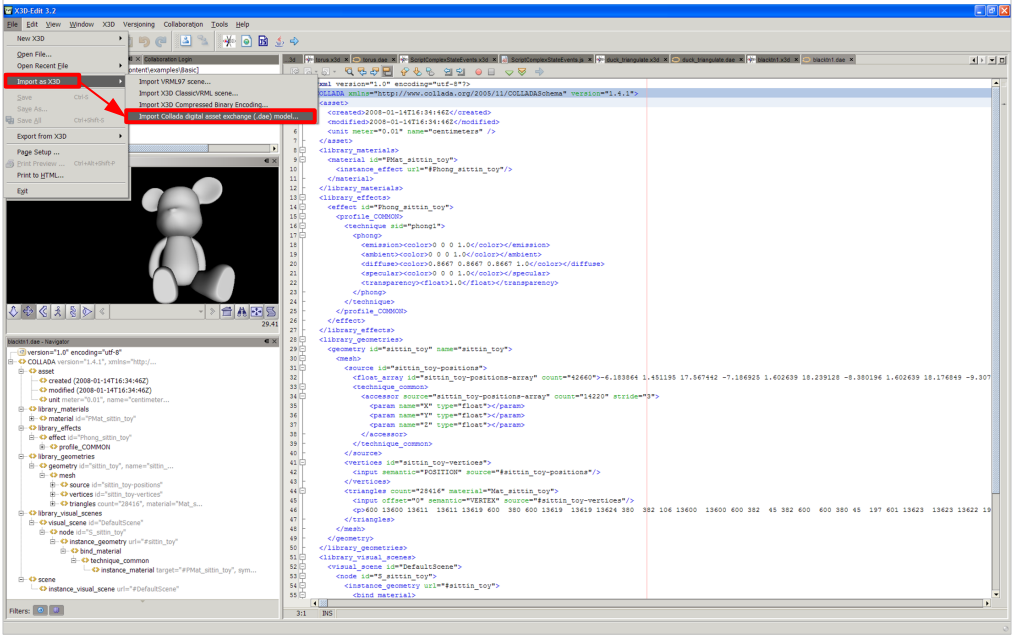
If the file being edited is under version control, the Netbeans platform detects that and offers Subversion or CVS version control (as appropriate) without further setup.

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

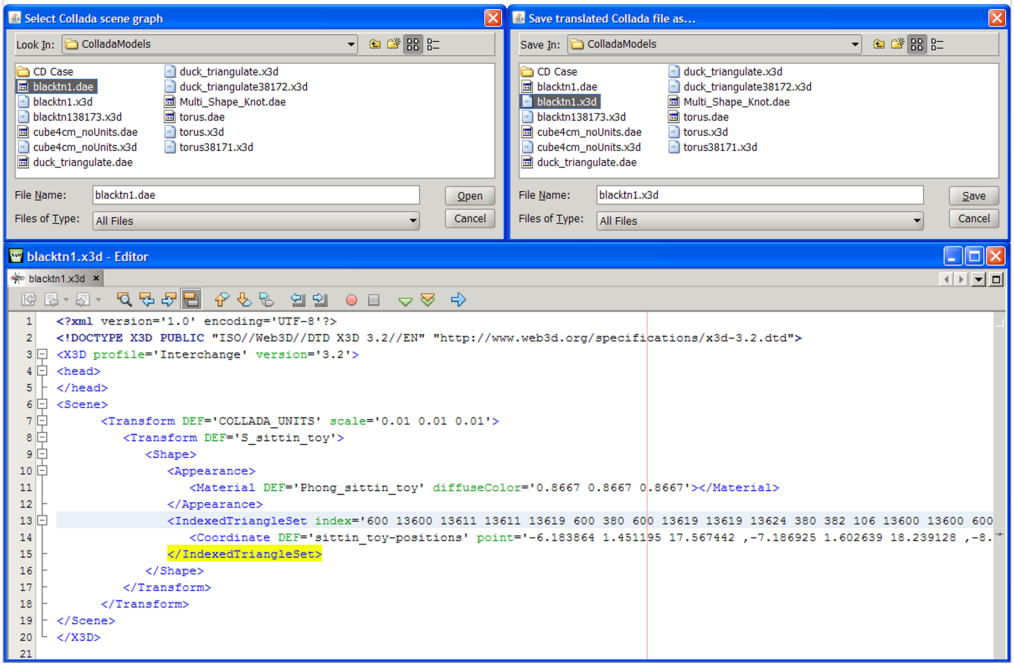
http://x3d.svn.sourceforge.net/viewvc/x3d/www.web3d.org/x3d/tools/X3dEdit3.2



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

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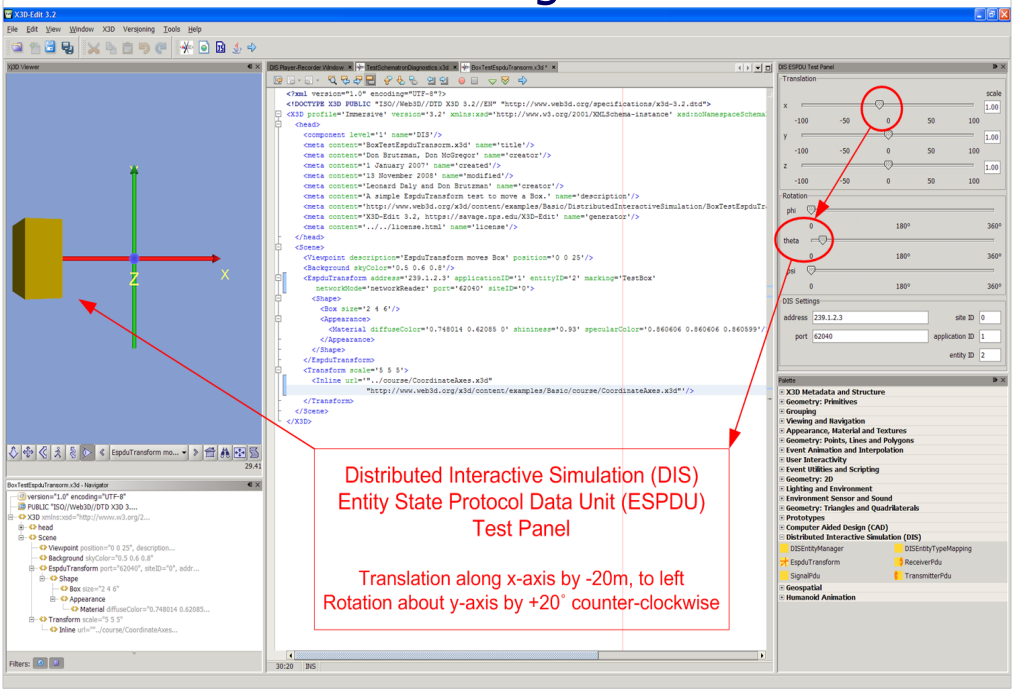
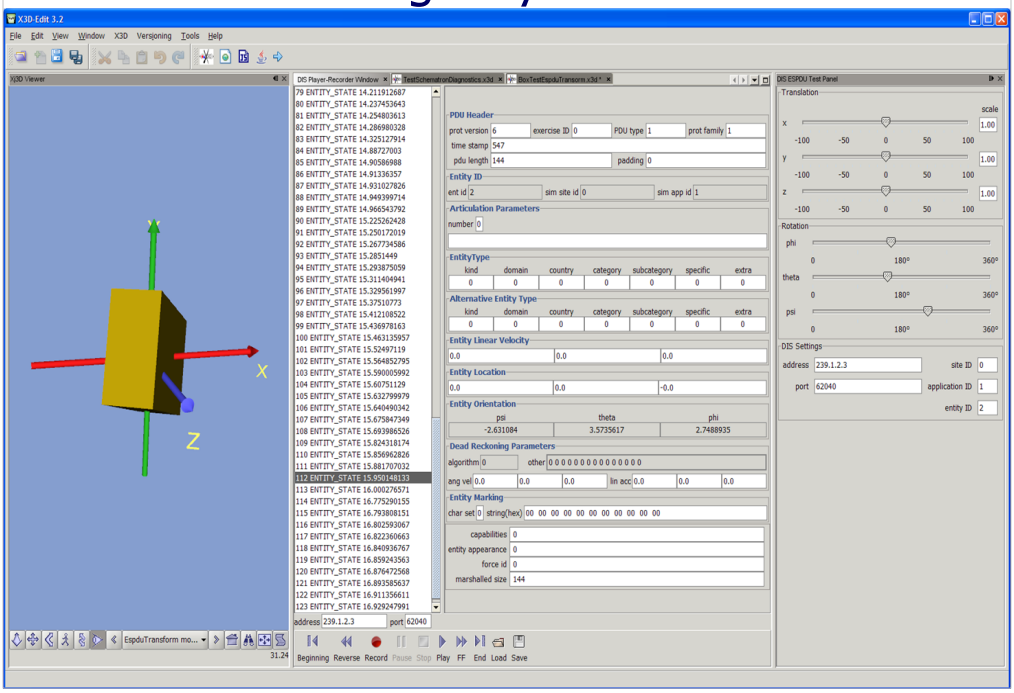
DIS Networking Test Panel

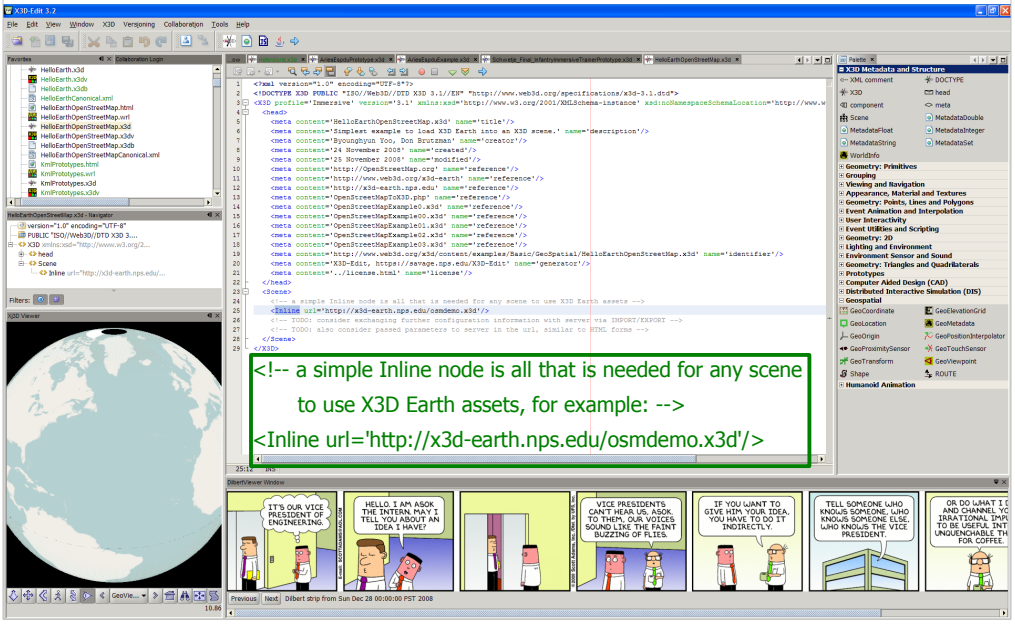


DIS Networking Player-Recorder Panel



X3D Earth, Geospatial Component

Editing and authoring support provided



Humanoid Animation (H-Anim)

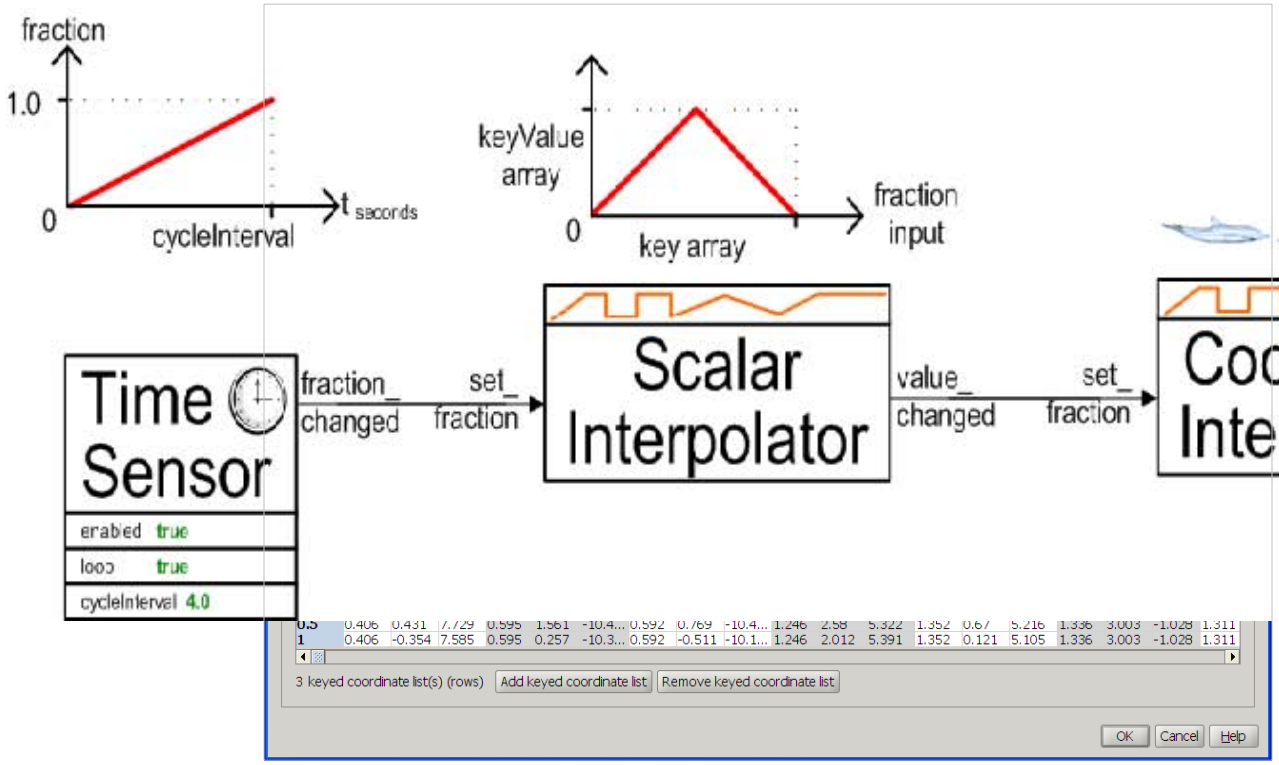
ISO standard for human skeletons, skin

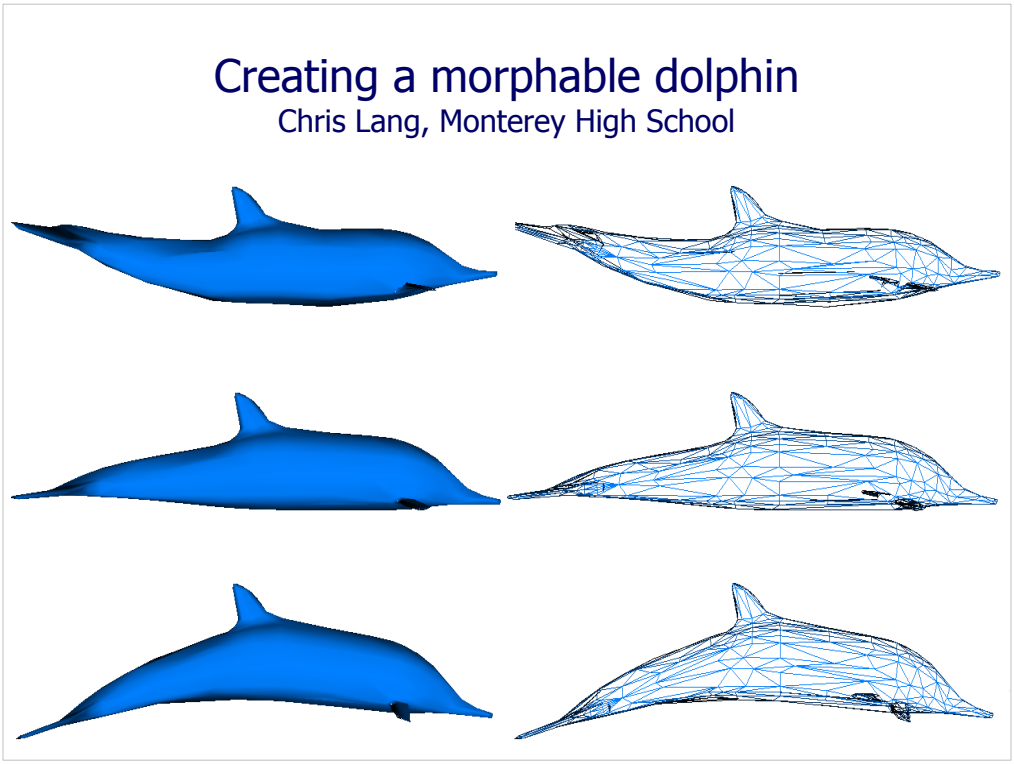
- Supported in X3D-Edit, other tools

Examining support for non-humanoid skeletons

NPS working on composable, reusable behaviors

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


fraction
1.0
0
cycleInterval
t seconds
keyValue
array
0
key array
fraction
input
Time
Sensor
enabled true
loop true
cycleInterval 4.0
fraction_
changed
set_
fraction
Scalar
Interpolator
value_
changed
set_
fraction
Coordinate
Interpolator
3 keyed coordinate list(s) (rows)
Add keyed coordinate list
Remove keyed coordinate list
OK
Cancel
Help



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

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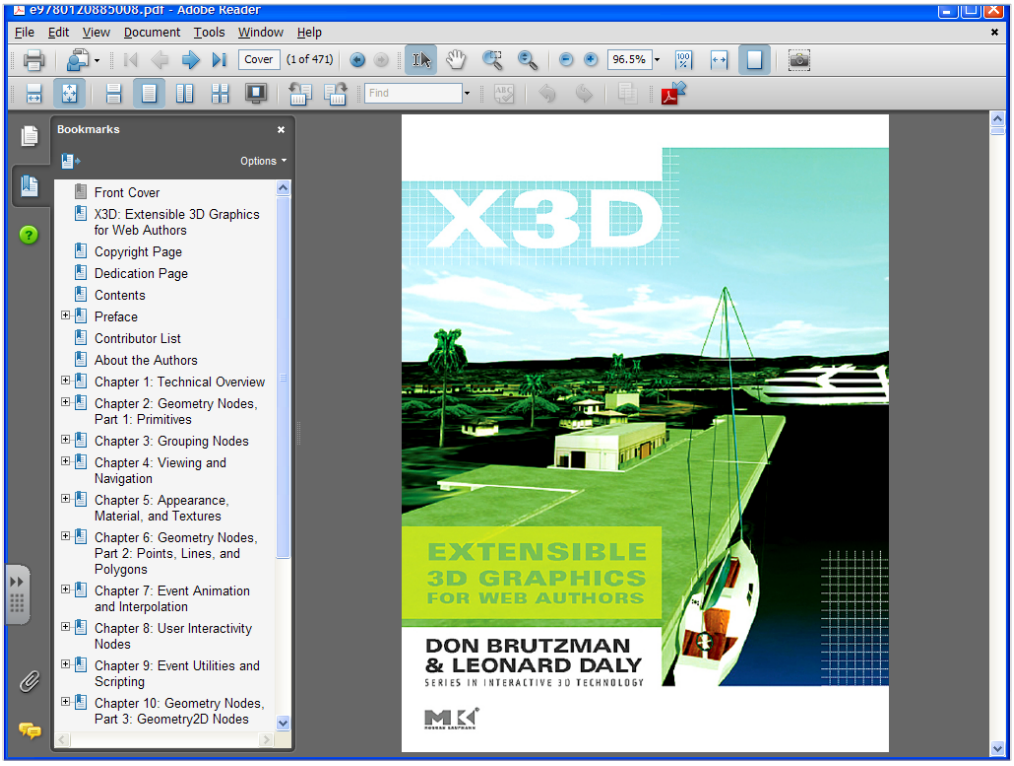
File Edit View Document Tools Window Help
Bookmarks
Options
Front Cover
X3D: Extensible 3D Graphics for Web Authors
Copyright Page
Dedication Page
Contents
Preface
Contributor List
About the Authors
Chapter 1: Technical Overview
Chapter 2: Geometry Nodes, Part 1: Primitives
Chapter 3: Grouping Nodes
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
X3D
EXTENSIBLE
3D GRAPHICS
FOR WEB AUTHORS
DON BRUTZMAN
& LEONARD DALY
SERIES IN INTERACTIVE 3D TECHNOLOGY

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	

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

Online learning resource: course video podcasts!

Summary

X3D-Edit is useful for learning, producing, improving and extending X3D scenes

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

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brutzman@nps.edu

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Monterey California 93943-5000 USA
1.831.656.2149 voice

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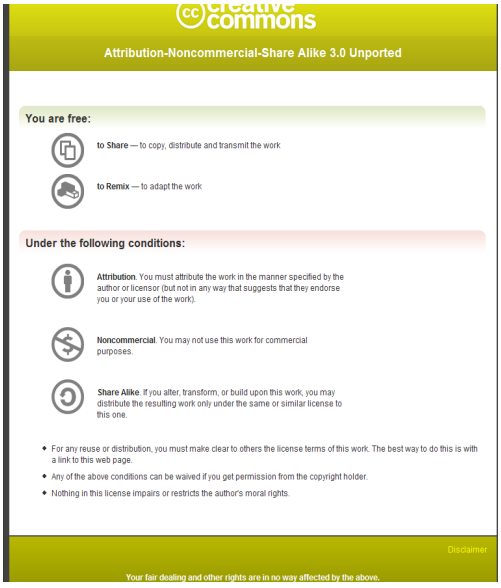

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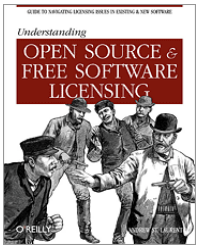

Andrew M. St. Laurent, *Understanding Open Source and Free Software Licensing*, Oreilly Publishing, Sebastopol California, August 2004. http://oreilly.com/catalog/9780596005818/index.html

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