

# The Xj3D Browser: Community-Based 3D Software Development

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## 1 Introduction

This presentation outlines the development process of the Xj3D browser. Xj3D is an open source API for developing X3D and VRML 97 applications. It is also the sample implementation and test bed for the next generation VRML specification known as Extensible 3D (X3D). Indeed, Xj3D was initiated by the Web3D Consortium to provide input to the X3D authors and the 3D graphics community with input concerning problems and ambiguities with the specification.

## 2 The X3D Specification

X3D is an open, royalty-free standard for networked, real-time 3D graphics. People in the VRML community were given the opportunity to provide input through the Web3D Consortium's various mailing lists. Moreover, companies established their own working group to identify the features they required in the specification. As the process developed, however, it became apparent that a small team of contributors would form the core participants.

From the beginning, it was clear that X3D involved a major reconsideration of the VRML97 specification. Various parties expressed competing desires. Initially, work on X3D began with a focused group of people selected from existing VRML-based companies. However, this effort collapsed due to economic problems. After an extended period of slow progress, a collation of academics, smaller companies and individuals was formed to move the specification process forward.

## 3 The Goals of the Xj3D Browser

Xj3D was started with a donation of source from Sun Microsystems in 1998 and currently is a project of the Web3D consortium's source task group. The code-base has four main goals. The first is to discover and identify problem areas in the X3D specification. The second is to provide a platform for the community to test new ideas for possible incorporation into future specifications. The third is to make it easier for other software to import and export 3d graphics data. The final goal is to develop a production quality browser.

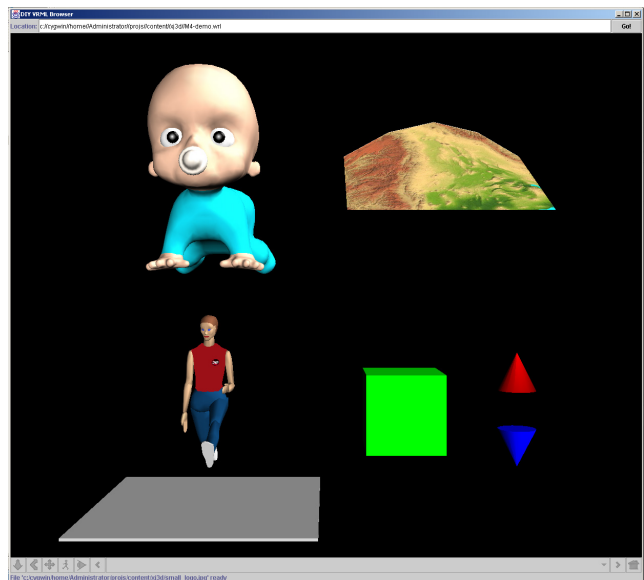
## 4 The Xj3D Development Process

Originally, Xj3D was based on source code for a VRML 97 browser that was developed at Sun Microsystems. The Web3D Consortium designated the Source Code Management Working Group headed by Alan D. Hudson of Yumetech, Inc. as the body responsible for developing a code base that would become the test bed for the X3D specification.

The Web3D community believed strongly that the development of Xj3D had to be an open process that was linked to the evolution of the X3D specification. To achieve this goal, the development of the code-base would be managed over the Internet. The Source Management Working Group established an online CVS repository where individuals working on the code would be able to send and track any changes. A mailing list was

opened to allow interested parties to participate in creating Xj3D, and the web3d.org website made all the latest releases available for download..

Early in the process, however, it became apparent that the project required more impetus from a central source. Yumetech took on the role of lead developer and project supervisor. The company's lead programmers performed an assessment of the original code-base and determined that a completely new base for Xj3D would be necessary to make it easier to use and more efficient. The M2 release was completed for the 2001 SIGGRAPH Conference. Since then, Yumetech has overseen and participated in developing two more releases.



## 5 Assessment of the Community-Based Development Model

The community-based development model for the Xj3D source code has proven to be successful. The Source Code Management Working Group list and the Java 3D mailing lists provide a wealth of suggestions, feature requests, bug reports and fixes that would not be available if development were done in a closed environment.

Moreover, the open process used to create Xj3D has directly influenced the evolution of the X3D standard. As different elements of the specification are implemented in the browser, ambiguities and problems in the specification become apparent. The Xj3D browser developers are able to point to specific parts of X3D and offer changes to improve it. Thus the Xj3D development process provided a real grounding for the development of the X3D specification.

## References

"Xj3D Open Source VRML/X3D Toolkit."  
[http://www.web3d.org/fs\\_workinggroups.htm](http://www.web3d.org/fs_workinggroups.htm).