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## Introduction

The **Virtual Reality Modeling Language** (VRML) is a language for describing multi-participant interactive simulations -- virtual worlds networked via the global Internet and hyperlinked with the World Wide Web. All aspects of virtual world display, interaction and internetworking can be specified using VRML. It is the intention of its designers that VRML become the standard language for interactive simulation within the World Wide Web.

The first version of VRML allows for the creation of virtual worlds with limited interactive behavior. These worlds can contain objects which have hyperlinks to other worlds, HTML documents or other valid MIME types. When the user selects an object with a hyperlink, the appropriate MIME viewer is launched. When the user selects a link to a VRML document from within a correctly configured WWW browser, a VRML viewer is launched. Thus VRML viewers are the perfect companion applications to standard WWW browsers for navigating and visualizing the Web. Future versions of VRML will allow for richer behaviors, including animations, motion physics and real-time multi-user interaction.

This document specifies the features and syntax of Version 1.0 of VRML.

## VRML Mission Statement

The history of the development of the Internet has had three distinct phases; first, the development of the TCP/IP infrastructure which allowed documents and data to be stored in a proximally independent way; that is, Internet provided a layer of abstraction between data sets and the hosts which manipulated them. While this abstraction was useful, it was also confusing; without any clear sense of "what went where", access to Internet was restricted to the class of sysops/net surfers who could maintain internal cognitive maps of the data space.

Next, Tim Berners-Lee's work at CERN, where he developed the hypermedia system known as **World Wide Web**, added another layer of abstraction to the existing structure. This abstraction provided an "addressing" scheme, a unique identifier (the Universal Resource Locator), which could tell anyone "where to go and how to get there" for any piece of data within the Web. While useful, it lacked dimensionality; there's no *there* there within the web, and the only type of navigation permissible (other than surfing) is by direct reference. In other words, I can only tell you how to get to the VRML Forum home page by saying, "<http://www.wired.com/>", which is not human-centered data. In



fact, I need to make an effort to remember it at all. So, while the World Wide Web provides a retrieval mechanism to complement the existing storage mechanism, it leaves a lot to be desired, particularly for human beings.

Finally, we move to "perceptualized" Internetworks, where the data has been sensualized, that is, rendered sensually. If something is represented sensually, it is possible to make sense of it. VRML is an attempt (how successful, only time and effort will tell) to place humans at the center of the Internet, ordering its universe to our whims. In order to do that, the most important single element is a standard that defines the particularities of perception. Virtual Reality Modeling Language is that standard, designed to be a *universal description language for multi-participant simulations*.

These three phases, storage, retrieval, and perceptualization are analogous to the human process of consciousness, as expressed in terms of semantics and cognitive science. Events occur and are recorded (memory); inferences are drawn from memory (associations), and from sets of related events, maps of the universe are created (cognitive perception). What is important to remember is that the map is **not** the territory, and we should avoid becoming trapped in any single representation or world-view. Although we need to *design to avoid disorientation*, we should always push the envelope in the kinds of experience we can bring into manifestation!

This document is the living proof of the success of a process that was committed to being open and flexible, responsive to the needs of a growing Web community. Rather than re-invent the wheel, we have adapted an existing specification (Open Inventor) as the basis from which our own work can grow, saving years of design work and perhaps many mistakes. Now our real work can begin; that of rendering our noospheric space.

## History

VRML was conceived in the spring of 1994 at the first annual World Wide Web Conference in Geneva, Switzerland. Tim Berners-Lee and Dave Raggett organized a Birds-of-a-Feather (BOF) session to discuss Virtual Reality interfaces to the World Wide Web. Several BOF attendees described projects already underway to build three dimensional graphical visualization tools which interoperate with the Web. Attendees agreed on the need for these tools to have a common language for specifying 3D scene description and WWW hyperlinks -- an analog of HTML for virtual reality. The term Virtual Reality Markup Language (VRML) was coined, and the group resolved to begin specification work after the conference. The word 'Markup' was later changed to 'Modeling' to reflect the graphical nature of VRML.