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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.

# VRML

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## VIRTUAL REALITY MODELING LANGUAGE



Shortly after the Geneva BOF session, the www-vrml mailing list was created to discuss the development of a specification for the first version of VRML. The response to the list invitation was overwhelming: within a week, there were over a thousand members. After an initial settling-in period, list moderator Mark Pesce of Labyrinth Group announced his intention to have a draft version of the specification ready by the WWW Fall 1994 conference, a mere five months away. There was general agreement on the list that, while this schedule was aggressive, it was achievable provided that the requirements for the first version were not too ambitious and that VRML could be adapted from an existing solution. The list quickly agreed upon a set of requirements for the first version, and began a search for technologies which could be adapted to fit the needs of VRML.

The search for existing technologies turned up a several worthwhile candidates. After much deliberation the list came to a consensus: the Open Inventor ASCII File Format from Silicon Graphics, Inc. The Inventor File Format supports complete descriptions of 3D scenes with polygonally rendered objects, lighting, materials, ambient properties and realism effects. A subset of the Inventor File Format, with extensions to support networking, forms the basis of VRML. Gavin Bell of Silicon Graphics has adapted the Inventor File Format for VRML, with design input from the mailing list. SGI has publicly stated that the file format is available for use in the open market, and have contributed a file format parser into the public domain to bootstrap VRML viewer development.

# VRML

## VIRTUAL REALITY MODELING LANGUAGE



### A Graphical Representation of Inverse VRML Uptake



Change the number in red below to adjust for download rate and/or bandwidth.

**1** The number 1 represents an engineer with an "average" cube \*

CF	Min	fsw	Air	EANx 32%	EANx 36%
80.0	149.12	0			
61.4	114.43	10			
49.8	92.846	20			
41.9	78.102	30	180		
36.2	67.402	40	120		
31.8	59.275	50	80.0	147.0	192.0
28.4	52.9	60	57.0	92.0	123.0
25.6	47.774	70	40.0	65.0	79.0
23.4	43.543	80	30.0	49.0	59.0
21.5	40.001	90	24.0	37.0	45.0
19.9	37	100	19.0	30.0	35.0
18.5	34.409	110	16.0	25.0	29.0
17.3	32.154	120	13.0	20.0	n/a
16.2	30.178	130	10.0	17.0	n/a
15.1	28.202	140	8.0	n/a	n/a