

# What is VR?

The definition of Virtual Reality can be a bit tricky, and the semantics might differ according to what generation you ask. For example, a kids site <http://kids.infoplease.lycos.com/ipka/A0771238.html> defines virtual reality (VR) as “A technology that allows you to experience and interact with images in a simulated three-dimensional environment. For example, you could design a room in a house on your computer and actually feel that you are walking around in it even though it was never built. (The holodeck in the science-fiction TV series Star Trek: Voyager would be the ultimate virtual reality.) Current technology requires the user to wear a special helmet, viewing goggles, gloves, and other equipment that is wired to the computer.” Obviously, the bar is set rather high, as kids might expect something liken to the holodeck from their desktop computer. For the purpose of this paper, however, a more narrow definition of Virtual Reality (VR) will be considered. We will consider VR as defined by <http://isdale.com/jerry/VR/index.html> “A computer mediated, 3D environment with viewer control over viewpoint (position, orientation, zoom) Presentation is primarily visual, possibly augmented with audio, haptics, etc. Some degree of interaction with the environment is desirable. I don't require goggles, gloves, full sensory immersion, etc.”

This type of VR has been further delineated into the category of Window on Worlds System (WoW). WoW uses a conventional computer monitor to display the visual world. This is sometimes called Desktop VR or a Window on a World (WoW). This concept traces its lineage back through the entire history of computer graphics. In 1965, Ivan Sutherland laid out a research program for computer graphics in a paper called "The Ultimate Display" that has driven the field for the past nearly thirty years. According to Sutherland "One must look at a display screen as a window through which one beholds a virtual world. The challenge to computer graphics is to make the picture in the window look real, sound real and the objects act real." [quoted from Computer Graphics V26#3]

## Creating Desktop VR

According to Jerry Sutherland

<http://isdale.com/jerry/VR/WhatIsVR/noframes/WhatIsVR4.1-Availab.html> there are two major categories for the available VR software: toolkits and authoring systems. Toolkits are programming libraries, generally for C or C++ that provide a set of functions with which a skilled programmer can create VR applications. The programming libraries are generally more flexible and have faster renders than the authoring systems, but you must

be a very skilled programmer to use them. One example of a toolkit is VRML - Virtual Reality Modeling Language. VRML is a programming language that supports graphical animation of virtual spaces of World Wide Web pages. Detailed three-dimensional images can be created with small programs, allowing the programs to arrive quickly at users computers and be viewed easily with special VRML browser applications. More about VRML can be found at <http://www.cms.dmu.ac.uk/~cph/VRML/>

Authoring systems are complete programs with graphical interfaces for creating worlds without resorting to detailed programming. These usually include some sort of scripting language in which to describe complex actions, so they are not really non-programming, just much simpler programming. An example of an authoring tool for VR is Quick Time VR Toolbox. This authoring suite offers three applications which can be used to create desktop VR. QT ObjectWorx creates 3D objects in which the user can use their mouse to rotate and explore around the object. Pano Worx can be used to create 360^ panoramas in which the user can use their mouse to manipulate the perspective a degree they view. Finally, Scene Worx is used with either of the previous applications to create links and hot spot in 3D objects and panoramas. A comprehensive explanation of how to use this software can be found at <http://www.edb.utexas.edu/teachnet/QTVR/>

For a more comprehensive review of VR authoring software, please visit <http://isdale.com/jerry/VR/WhatIsVR/noframes/WhatIsVR4.1-Availab.html> Authoring software is categorized according to price and capability. Useful commentary on user interface and ease of use are provided. Or try <http://www.cms.dmu.ac.uk/~cph/VRML/#software> for links to specific VR software producers.

## **Resources**

<http://isdale.com/jerry/VR/index.html>

This site is created by a technical writer for VR News Magazine, and is definitely the place to start if you are interested in learning more about VR.

<http://www.dcs.ed.ac.uk/home/mxr/objects.html>

This page offers a WWW interface to a collection of freely available 3D object files which have been compiled for their applicability to real-time graphics applications, and virtual reality (VR) in particular. All material here is freely-available.

<http://www.mheim.com/index.html>

This site is beautifully designed and is a source for books, seminars, articles and conferences on VR. Plus a groovy Tai Chi link!

<http://www.inworldvr.com/products/index.html>

InWorld specializes in providing custom 3D applications and content quickly and on budget. This site has many excellent demo's which my nine year old buddy found fascinating.

<http://www.hitl.washington.edu/kb/onthenet.html>

This is a comprehensive site of research and resources for VR technology.

<http://www.apple.com/quicktime/>

Apple's home page for QTVR. You can get downloads here.

## **Sites that use VR**

<http://www.apple.com/quicktime/qtvr/>

Examples from Apple of sites that use VR. This is the cream of the crop! You must visit virtual Vancouver!

<http://www.conexus.si.edu/vrtour>

A Virtual Tour of the National Museum of the American Indian Exhibitions Creation's Journey and All Roads Are Good.

<http://www.worldserver.com/turk>

Ken Turkowski's Web Page. He is one of the original QTVR programmers. His web site has some wonderful QTVR examples and links. It also offers some QTVR calculators that help you determine the QTVR lens parameters for a given camera and decide how many pictures to shoot with a given lens.

<http://www.usexpo98.org/introvr.htm>

Take a virtual tour of the U.S. pavilion at the Lisbon World Expo of 1998.

<http://www.tourvision.com/qtvr/>

View panoramic images of various areas including Old Sacramento, K Street and the Plaza.

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