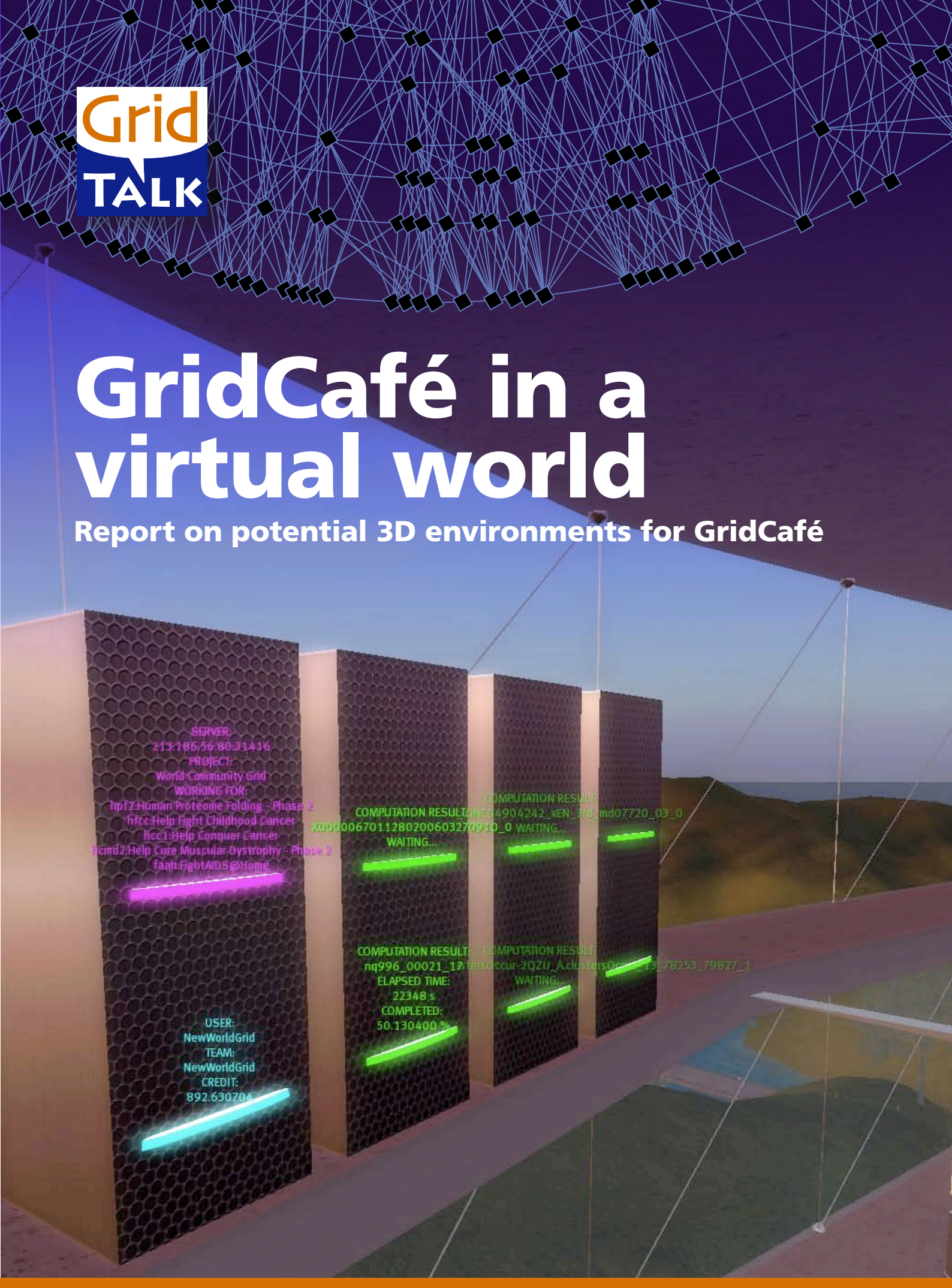
Grid TALK

GridCafé in a virtual world

Report on potential 3D environments for GridCafé



Grid Café in a virtual world : Report on potential 3D environments for GridCafé

GridTalk Deliverable D2.6
Leader partner: APO
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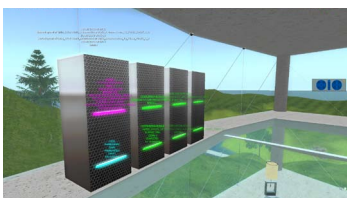


The image on the front cover shows computers working for volunteer grid computing projects such as "fightAids@home", "Human Proteome Folding" or "Help Cure Muscular Dystrophy", in a OpenSim world. The text displays the information from the opensource BOINC client software about the status of each project. The project will be completed by a tutorial about Boinc installation. The project is being run in collaboration with the "Citizen Cyberscience Centre" on the New World Grid.

Abstract

When the GridCafé website was first developed, it was a novel form of science communication that was nominated for awards. We are now considering developing a 3D adjunct to the GridCafé website. We believe this is an interesting option for several reasons:

- A number of educational bodies, such as the Department of Energy, Open University and Artificial Intelligence Learning Centre, have set up science-focussed areas in 3D simulations including SecondLife or OpenSim.
- 3D environments can be a useful educational tool to engage a different subset of the public, and to give a greater depth of information and interactivity than possible with a standard website.
- We have aimed to keep GridCafé at the cutting edge of digital communication. 3D environments now represent this cutting edge.

This deliverable looks at different solutions for constructing a navigable 3D world, compares existing science and education-related content, and examines other issues such as social networks in virtual worlds and newsletters. Other issues, including moderation, the effort required to build the world, potential audience and the possibility of migrating to other technology later are also considered.

We conclude that it would be possible to create a GridCafé virtual environment with the effort and time available during e-ScienceTalk. Such a project would be led by APO. In order to decide on a specific virtual world, factors were compared including the cost to use it, the software needed to visit the site, and the tools available for creating content. These led to the following recommendations:

- e-ScienceTalk would aim to create a simple virtual 3D GridCafé in the first twelve months of the project. The process and results of this would then be assessed before deciding whether to go further.
- The virtual GridCafé would be created in on the OpenSim platform. This uses similar tools and viewer to Second Life, but is without the charging and copyright issues associated with the commercial Second Life.
- Standard 3D tools would be used to create the content, so that it could be transferred to a different platform if OpenSim proves to be the wrong choice.

Introduction

When GridTalk created the current version of the GridCafé website in 2008, we decided on a "3D look" for the new site, in order to give it a novel feel. The 3D characters developed are generally liked, and similar concepts have since been used for other sites. However, with developments in technology and the emergence of increasingly frequent animated 3D images in our daily lives, the question of developing a 'true', animated 3D environment arises. 3D images and simulations are now an important component of eScience, providing a new way to visualize scientific data by giving more direct access to previously invisible phenomena.

For the general public these images are both synonymous with scientific progress and a means to better understand difficult concepts. Accessing, manipulating and even entering these images are ways to create a stronger link with research. In the context of elearning, these images show students things that are impossible to represent otherwise, and promote understanding of complex knowledge. Further, virtual reality and 3D images can be key elements in rendering science attractive and fun.

Encouraged by the reviewers at the GridTalk first annual review, we have undertaken research into the technical solutions for building a 3D adjunct to GridCafé. It is important to note that the current 2D GridCafé would remain, as it offers a different type of experience to the 3D environment, and not everyone has the technology or inclination to access a 3D virtual world.

Although the options for a true 3D web are currently limited, we conclude that it is now possible for GridCafé to take a step in that direction. The experience of many educational providers who use virtual worlds shows what can be achieved, with what tools and at what price. Our detailed research, described in this report, leads us to propose creating an initial version of GridCafé in a virtual world, in addition to the current site. By use a low cost, open source platform, and collaborating with other projects that have already achieved similar aims, we believe it is feasible to complete this work using the resources available to the e-ScienceTalk project. The content, thanks to the collaborative nature of the product, can be developed on the wiki model, with various members of the GridTalk community contributing depending on their skills. As well as being used for eLearning, this kind of virtual world could potentially lead other uses such as meeting spaces or virtual conferences.

Advantages of such a virtual GridCafé include:

- This would give GridCafé the cutting-edge image necessary for a project dedicated to promoting computing in the sciences.
- Using a 3D environment to present scientific research will reinforce the "e" aspect of today's sciences and will benefit the message of e-ScienceTalk.
- This solution could also offer e-scientists a new way to present their results, and hence encourage closer collaboration with projects such as EGI and its users.
- Using a virtual world is also a way to move from passive viewing to interactivity, and hence develop new tools for e-learning about the grid and e-science.
- Visualisations can be an important way of introducing the public to science. A 3D virtual world will give viewers a new approach to scientific images, and hence have a positive impact on the perception of research by the general public and students.
- Learning how to use 3D technology to present and teach sciences in a virtual environment will be of benefit even if the technology evolves; in the same way that graphic design skills remain even if graphic design software changes. This is the example set by Second Life users such as the Open University.
- Virtual worlds are more and more popular for social networking, gaming and learning. If the project is launched soon we will benefit from the impact of using this kind of environment. Waiting too long to introduce 3D technology as an adjunct to GridCafé will make the project appear as a "follower", and we may find we have to move to a 3D solution in the long term anyway, just to keep up with technology.

As well as the advantages described above, there will be issues such an approach needs to address. For example, if we are to develop any areas aimed at children we will need to consider moderation, and how to ensure that the content remains appropriate. Any virtual world we developed could include the ability to ban problematic users. In general, users of virtual worlds need to be aware that avatars may not accurately represent the real person behind them, and to be wary of people met online.

This report details the research and analysis we have undertaken in deciding to proceed with a 3D GridCafé, and the recommendations we have proposed. The next section describes the types of virtual worlds and methods for creating them. We then discuss the criteria we used to decide between different options, and the conclusions to which this led. Finally, the end of the report lists a wide range of sources related to 3D virtual worlds, and discusses some of their main attributes.

Types of worlds and tools - Examples

In this report, we have classified virtual worlds and the tools that produce them into several different categories. Each of the categories is described below, along with examples, in order to introduce the reader to the key concepts and illuminate the later discussion of various options. The full directory begins on page 14.

WV SL OS

VW (Virtual World)- SL (Second Life)– OS (OpenSim) / Virtual Worlds and Distant co-creation

The best known example of a virtual world is SecondLife, created by LindenLab. Many other examples of virtual worlds use the OpenSim environment, while some simulations are created with restricted access for business-oriented products. With these options, exploring a virtual world requires specific software called a client or viewer. Different viewers exist for various virtual worlds and operating systems.
One of the most interesting advantages of virtual worlds like SL or OpenSim compared to "game oriented" virtual worlds is that they allow users to enter in a co-creative process. People do not just follow the strict scenario of a training course, or simply reorganize and play with pre-existing elements of a "sandbox" game; they can add and create new content in a collaborative process. This is called "distant co-creation", and is similar to how a "wiki" works for text. This permits quick development of content and allows users to split the creation of elements depending the skills of the various people involved (3d modelling, design, programming, writing).

SL

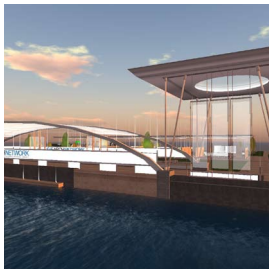
SecondLife
www.secondlife.com

The largest and most famous virtual world (19 Mil. users). The included tools allow users to create their own world and share it with other people. Many examples of venues dedicated to learning and to sciences. The majors limitations are the price of space (but this may change) and some copyright issues (such as who is the real owner of content developed by users).

OS

Open Simulator
www.opensimulator.org

Open Simulator is a 3D Application Server. It can be used to create a virtual environment (or world), which can be accessed through a variety of clients, on multiple protocols. Open Simulator allows you to develop your environment using the technologies you feel work best - the software has been designed to be easily extendable through loadable modules to build completely custom configurations. Open Simulator is released under a BSD License, making it both open source, and commercially friendly to embed in products.

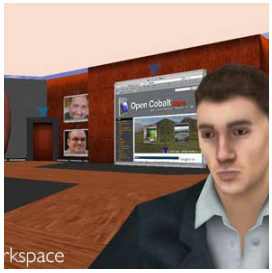


Out of the box, Open Simulator can be used to simulate a virtual environment similar to Second Life (including client compatibility). Other environments, protocols and features are supported via add on modules.

An increase in Open Simulator may partly explain the decrease in the number of venues and users in SL.

"To Stop Second Life's Land Loss, Linden Lab Needs a Non-Commercial Land Option" in NewWorldNotes - Monday, July 26, 2010

WV



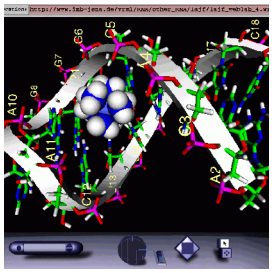
Open Cobalt
www.opencobalt.org

Open Cobalt Alpha is the first step in a long-term project to make a free and open source platform available for constructing, accessing, and sharing virtual workspaces for research and education. This 3D multimedia wiki technology makes it easy to create collaborative and hyperlinked multi-user virtual workspaces, virtual exhibit spaces, and game-based learning and training environments that run on all major software operating systems.

Br

Browser based solutions for 3D web

These solutions use a web browser to access virtual worlds. Usually they need at least a plug-in for the browser, which are not always available for all operating systems. Some use the Adobe Flash technology, others use Java-applets. However, none are very powerful and they are extremely limited compared to "viewer based" solutions. For example, after many years of development the VRML language has not yet produced a viable solution for 3D viewing.
The evolution of this approach is the arrival of "WebGL", a new standard that should allow the use of 3D content directly within browsers. However, it may take some time before real 3D websites are developed with this solution, and the tools and skills needed are not yet known.



Browser based solutions for 3D web
www.opengl.org

Flash 3D : A new development of Adobe Flash to include 3D (by the end of 2010).

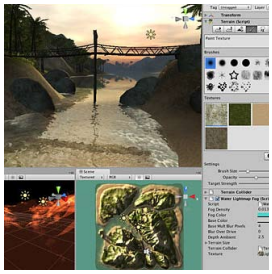
VRML : Many solutions for including 3D models in web pages. This has existed for a long time but has never really succeeded in reaching the general public.

WebGL : A new development led by The Khronos Group, an industry consortium creating open standards. This should allow 3D to be directly included into web browsers.

GE

Game engine solutions and 'serious games'

It is possible to use game engines, which are developed for writers of 3D games, to build virtual worlds with eLearning applications. The final product can require either a specific viewer or just a web browser plug-in. At the border of games and eLearning there are products known as "serious games"; in some case these use 3D game engines.



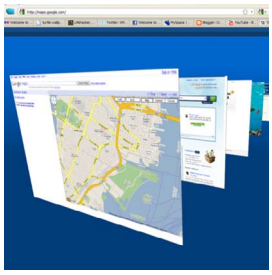
Unity3d
http://unity3d.com/

Unity is a multiplatform game development tool, designed to ease creation of content. It seems to be very powerful but needs a a great deal of time to use. However, it has a beautiful environment and visual effects. It would be difficult to program a virtual world in Unity3D where people can collaborate to create content directly inside the world, like in SL. It could be explored more deeply using the free evaluation program.

Ta

A taste of 3D

Many small pieces software such as add-ons, plug-ins or applets attempt to add a 3D experience to existing web browsers. These are usually limited to showing 3D objects on web pages or to presenting 2D content on 3D surfaces to add some depth. Some 3D avatars can be displayed first on the plane of the page to complete the 3D illusion.



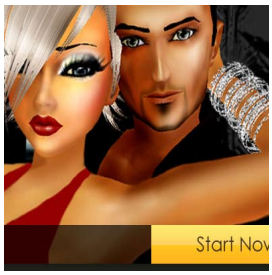
FoxTab
www.foxtab.com

Desecribed as "3D in your browser! FoxTab brings innovative 3D functionality to your Firefox."
This is just a way to display 2D web pages in 3D, which gives a nice visual effect but the content remains in 2D.

SN

Social Networks mixed with virtual worlds

Some virtual worlds are primarily oriented towards social networks. They put the emphasis on the relationship between users and are very limited in the elements that users can create. Personalization is mainly through the purchase of objects for users' environments, or clothes and appearances for their avatars.



IMVU
www.imvu.com

The advertising for this reads, "**Dress Up in Style**: Create your own 3D look. Try on clothes, shoes, hairstyles and more. Shop for the latest fashions! **Meet New People in 3D:** Hang out, chat and have fun in thousands of animated rooms. Meet new friends from all over the world! **Design and Create:** Make your own designs and sell them on IMVU. Create fashion, furniture, rooms and more. Express yourself!"
A world totally focussed on consumption.

Av

Avatars

An avatar is a computer user's representation of himself/herself in the form of a three-dimensional model used in computer games and virtual worlds, or a two-dimensional icon used on Internet forums and communities. Many companies now let people create personalized 3D avatars for use on the web.

Pandorabots (chatbot)
www.pandorabots.com

Pandorabots is an environment for developing and using virtual personalities. It is an experimental software robot hosting service based on the work of Dr. Richard Wallace and the A.L.I.C.E./AIML free software community.
It seems to be possible to create a link between avatar "bots" in the virtual world and "chatbots", in order to obtain automated avatars to help people or to animate virtual worlds.

AR

Augmented Reality and Virtual Reality

Augmented reality (AR) is a term for a live, direct or indirect, view of a physical real-world environment whose elements are augmented by virtual computer-generated imagery. The mix of these techniques with virtual worlds can produce new applications for eLarning. (**http://commoncraft.com/augmented-reality-video**)

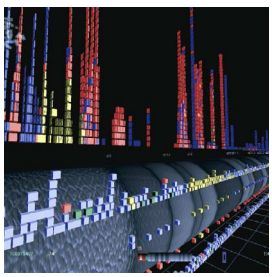
InglobeTechnologies - Augmented reality AR-media Plug-in for Google SketchUp
http://www.inglobetechnologies.com/en/products/arplugin_su/info.php

With AR-media Plug-in, Google SketchUp users are can visualize their 3D models using Augmented Reality directly in the real physical space that surrounds them. It lets users visualize 3D models directly on their desktop, by connecting a simple webcam and by printing a suitable code.

eL

eLearning and eScience

This classification indicates projects or examples involved in eScience or eLearning.



GLOBE 3D Genome Platform
www.gridtalk-project.eu/briefings.htm (info on GridBriefing 8 - eHalth)

When analysing DNA, problems abound due to the massive amounts of data involved. Researchers might have to work with up to 10 million markers on a DNA strand, which is very time consuming without a supercomputer or grid. Tobias Knoch (project leader) describes this project as a 'Google Maps' for genetic information. We held a very positive discussion with him during the eHeath conference in Paris. The project have agreed to help us develop content for a virtual word in OpenSim, if that is what we decide.

Me

Media - newsletter - blog

This classification is for sources of information about, or related to, virtual worlds . It includes blog or newspaper articles that discuss virtual worlds, as well as media programs that take place in virtual worlds.

Science Friday - making science user-friendly
www.sciencefriday.com

Weekly US radio show broadcast simultaneously into Second Life where the host takes questions from avatars live on the show. Very well attended and lively. Recommended by Nature's Elucian Islands. **www.nature.com/secondnature/resources.html**

To

Tools

Gives some examples of tools available to create content, design 3D models, etc.

Archipelis - 3D modeler
www.archipelis.com

"This innovative concept is extremely easy to use: just draw an outline from a background image to make a 3D textured model."
One of the many tools to create 3D models for SL and OpenSim.

AU

Architecture and utopia

When the real turns to fantasy; a crossed view of real life and virtual worlds**.**

Villa Theo Project
www.lavillateo.com

A book presenting architectural research for an ecological house. The 3D tools and the imagination of the architect meet to create a new conception of space.
"It looks like Second Life... nothing new!" is the comment of a visitor of the online presentation of the projet. The creation of a virtual environment is not only a matter of technical and programming skills; the success of the project also depends on reflection about architecture, design and navigation in this new world.

Selecting a virtual world

In order to select a potential solution for a 3D GridCafé, we have examined a number of criteria. These include the cost of hosting the virtual world, ease of development, whether the solution supports collaborative creation of content, and intellectual property issues such as whether the solution is open Source.

One of the key aims has been future-proofing. Technical evolution in computing and information technology is fast and difficult to predict. In our recommendation, we have tried to take this into account as far as possible. Given that this uncertainty is impossible to remove completely, our aim is to adopt a solution offering enough current benefit compared to the investment, while keeping options open for the future.

Our research has concluded that there are five generic options for developing a virtual world:

- **Second Life**, a commercial solution.
- **OpenSim** and similar platforms, which are essentially non-profit versions of Second Life, for example used in education and research.
- Companies that will, for a fee, build and host a virtual world for clients. This is a "**packaged solution**".
- "**Game engine**" software, which games developers buy to create their 3D content.
- **WebGL**, a future standard for writing applications that produce 2D and 3D computer graphics.

A table summarising the pros and cons of an example of each option is below, along with an analysis of the solutions and a recommendation. The table examines: **Second Life**; **NewWorldGrid** in OpenSim (a not-for-profit virtual world); **Reaction Grid**, a company that hosts and develops virtual worlds; **Unity 3D**, a tool for creating 3D games content; and **WebGL**, described above.

Criteria for comparing solutions

The first 3 criteria used to compare options are related to the costs of the tools to create the virtual space, to host it in a virtual world and to develop it. In some cases the real price is difficult to clearly define. For SecondLife, the price to host a region is well defined but the cost of content creation is difficult to establish because all external content uploaded in SecondLife must be paid for. In the case of "packaged solutions", as provided by a number of companies, the client pays for each particular function so a clear budget is difficult to plan. For game engines the prices are well defined but each content developer has to pay for their own copy of the product, which makes the solution expensive for collaborative working. For OpenSim the price is only that of the hosting infrastructure, so is comparable to hosting a web site.

For all solutions the development cost is linked to the project itself, its complexity, and the number and cost of the people involved. In the case of the OpenSim community, our initial explorations have found a number of people interested in helping with a volunteer project, although most of the development could be by the GridTalk team. In the case of "game engines", the difficulty of using the tools and the time this takes can be a problem.

The next 3 criteria are related to content creation by users, communication and collaboration between them. The collaborative aspect of content creation is a major issue for the development of an interesting virtual space. For web sites like GridCafé or GridGuide, this allows different people to add content or translations. On GridCast, individual contributions make the blog interesting and lively, and being able to repeat this in a virtual space is important for its success. SecondLife and OpenSim offer this possibility in their standard mode.

The last 4 criteria are related to the ease of use and copyright. This section includes the number of users of the solution, and whether it requires a specific viewer. As many potential providers of content are non-profit institutions supported by the EC or governments and universities, copyright issues are important aspects of the project development. In this criterion, commercial solutions do not score well. Moreover, many possible contributors of either content or help, are used to working on an open source basis.

Comparison table of criteria

	SecondLife	OpenSim (New World Grid)	packaged solution (ReactionGrid)	Game engine (Unity 3D)	WebGL
Initial cost for tools	0	0	0	880/pu[1]	?[2]
Costs for a region	156€/month	32€/month	80€/month[3]	web hosting[4]	web hosting[4]
Development cost	user/creator cost time[5]	user/creator cost time[5]	≈ 500 for a fixed environnement[6]	developper cost time[7]	developper cost time[8]
Content creation tools, 3D tools	embeded in viewer[9]	embeded in viewer[9]	limited[10]	not in viewer[11]	?[12]
Collaborative creation	yes[13]	yes[13]	no[14]	no[15]	?[16]
Communication tools	yes	yes	yes	yes	?[17]
Community users	large community[18]	growing community[19]	restricted community[20]	? (gamers)[21]	?[22]
Installation	viewer	viewer	viewer	Plug-in	browser native[23]
OpenSource	yes[24]	yes	yes[25]	no	yes[26]
Content and copyright	Possible problems*	creator of content	Possible problems*	creator of content	creator of content

Average price of a 3D region

SecondLife
Full Region 65,536 m2 Installation $700 + $147.50/month
1874Euro first year / 1343 Euros next year

OpenSim (NewWorldGrid)
65536 m² of virtual land. Price: 30 Euros / month + 20 Euros for installation
380 Euros first year / 360 Euros next year

Reaction Grid
(There are many technical upgrades and additional options that make the optimal configuration difficult to calculate) minimum price indicated
75$/month - setup 220$ + minimum option = about 950Euro

Unity 3D
Basic version - free
Pro version - $1200.00 (880 Euros)
Nearly equivalent for Torque3D
Hosting price not included

Nearly equivalent for **Torque3D**
Hosting price not included

Notes:

1 The cost is per user (content creator).

2 No information (price of standard programming tools)

3 Many technical upgrades and additional options that make the optimal configuration difficult to calculate

Mars Mission (Base Educator Annual System)	750.20 (EUR)
Mars Mission (Nitro-Pack)	118.20 (EUR)
Hypergrid Setup	39.40 (EUR)
Inworld Voice Systems	39.40 (EUR)

4 At least the cost of a standard website

5 Time cost of people who develop the sim. From basic users to highly skilled programmers.

6 Standard environments can be bought, like a conference room, with few possible adaptations.

7 The program seems powerful but it needs specialist skills.

8 Unknown, but may need highly skilled programmers

9 All basic tools are embedded in the viewer and accessible to users. External content (3D, images...) can be added in SL and OS but fees are required in the case of SL.

10 The content creation tools seems to be limited to basic content (text, images...)

11 Content creation is only allowed on the development side. Very powerful 3D creation tools available.

12 Unknown, certainly standard web and 3D tools.

13 Embedded tools allow users to create 3D content at the same time and the same virtual location.
A "3D wikipedia" with all the collaborative aspects of a wiki.

15 This kind of environment seems limited to just manipulating existing content.

16 Unknown but we can envisage this kind of development with a highly skilled team.

17 Unknown, but certainly yes.

18 The largest community in a virtual world but has many consumers and proportionately few creators.

19 A small growing community of people highly involved in the process of creating a virtual world.

20 Restricted to the internal use of a company.

21 The developer community seems active. No information about final users of the games.

23 May need the installation of the new version of browsers.

24 Yes but specific developments limit the compatibility with other OpenSim universes

26 The aim of the project is to became an open source standard for the 3D web.

General evaluation of the different solutions

Cost is useful to assess the short and long-term financial implications of different solutions, but also to consider the target market for the platform. For example, technical options in a virtual world focussed on business may not match the needs of the non-profit sector*. An example of such a case is the price for uploading a graphical texture in SecondLife. There is a cost each time a user needs to import an image (a photo, graphic, text, or animated texture) . If the result is not right first time, they will have to pay again to import another file for the same price. That also means that in order to create content, a user needs to have a credit account. This is a major limitation for participative creation of content and makes real control of costs very difficult. For the "Game engine" solution, users who want to create content must download the software, which costs money or has a limited free version. In contrast, the direct cost is much lower in the case of OpenSim, and it appears that some educational institutions have begun to switch to OpenSim because of the price of SL.

The **ease of creating content** is also a major aspect of our choice. This can have a direct impact on the cost of production, through the influence it has on the time needed to create content. Although we were not able directly to test the creation of content within a "**game engine**" like Unity, the documentation, descriptions and screenshots of the product show a complex development environment. This complex environment allows creation of very sophisticated outputs, but must be used by specialists.

On the other hand, the "**packaged solution**" with its ready-to-use approach is limited to very rigid uses of the virtual world. Providers generally propose a typical space such as a conference room, classroom or shop, filled by standard objects like whiteboards (each of which has to be paid for). This dos not allow users to develop their own environment – although they can decorate the walls!

As 3D **WebGL** is new, its ease of development is unknown and even if the technical solution is delivered in a reasonable time, the tools to easily create content and virtual space, support avatars and multi-user environments may take much longer to develop. It is not clear yet whether these creation tools will be accessible only by payable software. Overall, WebGL may be a success, or it may follow the example of VRML, a standard that never really succeeded in reaching the general public.

* see latest news p13

Second Life and **OpenSim** are, for the moment, the only existing solutions with **tools** easy enough to create 3D content for a virtual world. The multiplicity of spaces created by users in SL is a good evidence of this. The way users create content in SL/OpenSim is very interesting. Through their avatar, users directly manipulate the 3D creation tools within the virtual world. This allows multiple users to work together on a project or to teach others how to use the 3D tools (APO had his first lesson in 3D design that way in SL - a special case of e-Learning).

In contrast, with a game engine, the creation of content is a separate process done outside the world and direct co-creation is not possible. WebGL will simply be a platform for adding 3D into browsers, and the question of tools remains open. This could be an opportunity or a problem for GridCafé, depending on the tools developed. Overall, the experience of GridTalk and other professional projects shows the importance of a creation environment where multiple people can participate and add content according to their skills (programs, texts, images).

The **community of users** is an important factor in the success or otherwise of virtual worlds. From this point of view, SL is far ahead of its competitors. In SL's large community, there are not only "passive" users (players) but also many people who create content. The same is true, at a lesser scale, for virtual worlds based on OpenSim. This community implies that there are not only potential visitors available, but also people who can share their experiences and knowledge. In our research, we have found people in the OpenSim community in particular are interested in volunteer projects and ready to help. This could reduce the development time and/or increase the quality of the project for GridCafé.

The community of users is also wide for "game engine" solutions, with 30 million downloads of the Unity 3D plug-in, but the nature of users is more oriented to playing games and they do not generally have skills in content creation for this environment. For "packaged solutions", the business model is to limit client's access to the virtual world. In this kind of world, visitors are reduced to a passive role or they have to attend pre-determined scenarios.

Whichever solution we choose, technical compatibility is important so that people can use the same viewer to go to different virtual worlds. An emerging option called "hypergrid" is being tested, and this should allow people to "teleport" their avatar between different "grids" (the name used for virtual worlds in OpenSim) and possibly between OpenSim and SL[1]. This reinforces our interest in compatibility when choosing a solution.

This leads to the question of the **3D "viewer"**. The best solution would seem to be a fully 3D environment, directly accessible from an internet browser, but such a solution doesn't yet exist. WebGL technology, if it finally happens, will offer 3D capabilities to browsers but the question of tools for building a virtual world using this software remains open. Moreover, some of the major computing players seem to prefer to develop their own solutions, rather than a generic, standardised solution. Adobe, for whom this new technology could be a competitor to its own highly-used software, is developing a 3D version of Flash. A browser-based solution using WebGL may, therefore, not be as simple or cross-compatible as expected. The success of SL, which needs its own viewer, compared to the relative failure of VRML, which allows 3D viewing in a browser by just using a plug-in, shows that the installation of a viewer is not the most important criterion for the success of this type of project.

Whether the technology used is open source or proprietary is a major issue for the independence of the project. The core of SecondLife is open source: this is the reason why OpenSim can develop a highly compatible competitor to SL. The upper layers of SL, such as the viewer, are proprietary, but other open source viewers exist for different operating systems. These capabilities allow for the many existing "packaged solutions" such as "Reaction Grid", who add their own proprietary level that restricts the use of their virtual worlds and turns them in commercial products.

There was no mention of open source code for "game engines" in the accessible documentation we examined (Torque, UnityD, C4engine). That would mean any content produced would have a strong dependency on the product editor. Open Source products have the advantage of enriching the base product with new functions. SLOODLE a SL adapted version of Moodle (a Learning Management System - 37,970,346 users)[2] or the integration of Ballview (a molecular modelling and visualization application)[3] in SL, are two examples of why open Source is interesting, not only from the point of view of costs but also for compatibility reasons. Using open Source would allow the project to reach a large community of people, potentially benefit software research in the sciences, and possibly garner the support of institutions involved in open Source development. An open Source solution can also avoid the potential problem of **copyright** [4], which may be a major obstacle to collaboration with some institutes or research centres.

1/ This seems technically feasible but not an opportunity for the business oriented world of SL.
2/ See SLoodle - Moodle p.31
3/ See Ballview p.17
4/ See "Open call for expert legal opinions on content ownership" p.27

Recommendations

We have concluded that the commercial "packaged solution" is expensive, with poor flexibility. It can be considered as a very restricted version of Second Life or OpenSim. For GridTalk, the supposed ease of use does not counter balance its limitations. In contrast, the "game engine" could give a very sophisticated visual environment and easy installation. However, we do not consider this a good solution for a collaborative environment. The time and difficulty of development may also have a negative impact on the project budget that is greater than the cost of the product itself, unless it is used by a good team of games developers. WebGL is useful in principle, but is currently too uncertain and may not produce the necessary easy to use and inexpensive development tools during the duration of e-ScienceTalk. The development time after these tools become available is also difficult to evaluate. The two technically equivalent remaining solutions, have their own advantages; a large existing community for SecondLife and few technical difficulties. For OpenSim, there is better control of budget and a real opportunity to develop something new. SL's large community can partly be put down to 'first mover' advantage, as the first solution of this kind available, but this may erode as new products are developed.

As a result of the research collected during this study, our main recommendation is to use the **OpenSim** platform to develop a 3D "GridCafé".

Keeping options open for the future

We plan to conduct the project in such a way as to reduce the impact of making a wrong technological choice.

We would conduct an evaluation phase during the first twelve months of e-ScienceTalk, which would include a test simulation. The small cost of such a test solution would have only a minor impact on the general budget of the project.

We would aim to develop as much of the content as possible, including images and 3D models, using standard tools not directly linked to the final environment. This would also facilitate exchanges with projects that don't use 3D environments. In addition, the general conception and architecture of the virtual space (design, organisation, navigation, type of interaction) does not directly depend on the platform, and can be conceived as far as possible so it can be mimicked in an different environment.

Other parts of the content would be shared with the GridCafé web site. The new "Media-on-prim" option, currently in test, allows web pages to be displayed on an object's surface, in the way that a surface might usually have a texture. Therefore, part of the GridCafé web site content could be used directly in the 3D environment. Some special features, like the "Ballview" or "Sloodle" examples, can be developed outside the main program and displayed inside it. Also, the transfer of content between OpenSim and SL is possible under certain copyright conditions, and this compatibility with SL could be useful in order to attract users.

We would then aim to use the lessons learned in this initial evaluation phase, to make a decision on whether to move further with the project. As with the current decision, factors would include audience, ease of use, time for development and cost. If we decided to proceed, the experience of developing this initial environment would be a useful step towards a more advanced 3D environment.

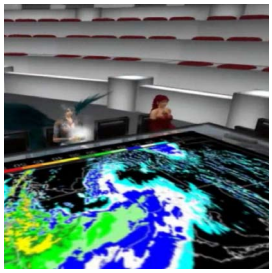
*Latest news : "**...Teen Grid to close**" in Hypergrid Business Sat, Aug 14 2010*
www.hypergridbusiness.com/2010/08/rosedale-promises-meshes-teen-grid-to-close

As far as the Teen Grid is concerned, Rosedale didn't give a firm timeline. He did say, however, that 16- and 17-year olds would be moved to the Main Grid — and that the rest of the Teen Grid would be shut down. He explained that this was because the Teen Grid wasn't growing as fast as the Main Grid.

The immediate reaction to this announcement was negative, with educators speaking up during the question-and-answer session after his speech, and posting on blogs. Some educational institutions have invested quite a bit of time and effort in securing approvals and funding to create a presence in Second Life, said one speaker.

Second Life

SL



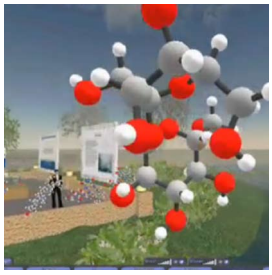
Virtual Worlds Overview
http://www.vimeo.com/9001325

"A short video highlighting governmental efforts in virtual worlds."

A quick and interesting overview about virtual worlds from Second Life to augmented reality.

SL

eL



Science Learning Opportunities in Second Life
www.youtube.com/watch?v=EfsSGBraUhc&feature=related

Second Life is a virtual world developed by Linden Lab accessible on the Internet. A free client program called the Viewer enables its users, called Residents, to interact with each other through avatars. Residents can explore, meet other residents, socialize, participate in individual and group activities, and create and trade virtual property and services with one another, or travel throughout the world.

SL

eL

Science-Related Places in Second Life
https://sites.google.com/site/slscgroupsite/places

This is the website associated with the Science Center group in the virtual world Second Life. Here you can find information about science-related places, events, videos and research in SL.

See also a places list, with 122 locations for science in SL at :
https://sl-science-places.dabbledb.com/page/sl-science-places/vbxOGovy#

SL

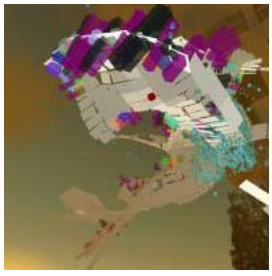
eL

International Space Flight Museum
www.slispaceflightmuseum.org

One of the most highly regarded locations in Second Life, the ISM is a museum hosting exhibits and events about real world spacecraft, rockets and space travel. The in-world organization that manages and develops the museum is the Spaceflight Museum Planning Group, a group of volunteers from around the world who share an interest in spaceflight.

SL

eL



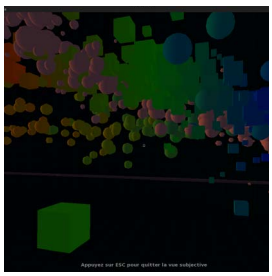
Spatial Information Architecture Laboratory
http://www.sial.rmit.edu.au/Projects/SL_Lost+Found.php

The Spatial Information Architecture Laboratory is a transdisciplinary education and research centre within the School of Architecture and Design at RMIT University.

The Royal Melbourne Institute of Technology
www.rmit.edu.au

SL

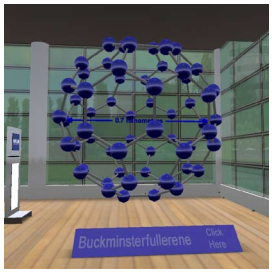
eL



Meta Institute for Computational Astrophysics (MICA) sim
www.mica-vw.org

The Meta Institute for Computational Astrophysics (MICA) is a professional scientific and educational, non-profit organization based in virtual worlds, currently in Second Life, but with an intent to expand its presence in other venues as the VWs evolve. The goals of MICA include exploration, development and promotion of VWs and virtual reality technologies for professional research in astronomy and related fields.

SL eL



Nano Lands
http://nanoisland.wordpress.com/

The National Physical Laboratory has launched NanoLands in the virtual world of Second Life – a place where nano science and technology communities come together to exchange ideas and knowledge.

SL eL

Department of Energy (DOE) Island
http://www.vimeo.com/8543512

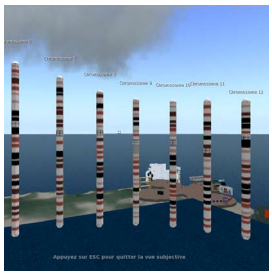
Chase a proton around the accelerator rings at CERN / LHC until they collide inside a detector. Find out about real jobs at the DOE. Models of renewable energy sources.
This is an excellent area, and is a good example of how to develop science-related content in SL.

SL eL

XYZ - Math sculpture garden
http://www.segerman.org/2ndlife.html

According to the creator of the sculpture garden, "Most interesting to me are the in-world tools for building objects, and then scripting those objects to make them do things. To really appreciate them, you probably need to see them in-world. My identity in Second Life, if you wish to find me there, is "Seifert Surface". My home sim is called "xyz"."
Very impressive and shows how 3D models can be created using math functions.

SL eL



Genome Island
Genome (127,129,49)

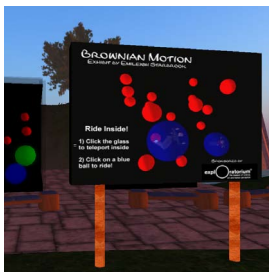
Excellent genetics resource for teachers and students, aimed specifically at undergraduate level, but highly interactive and recommended for anyone interested in genetics. Divided into sections, covering topics including Mendelian Inheritance, Population Genetics and Molecular Genetics.

SL eL

Art gallery at University of Western Australia
http://uwainsl.blogspot.com/2010/06/may-winners-of-uwa-3d-art-design.html

The University of Western Australia developed an Art Gallery inside SecondLife. They regularly organize events and competitions of art and design, with prizes for winning artists.

SL eL



Exploratorium sim
www.exploratorium.edu/worlds/secondlife

What can a museum do in a virtual world that would be difficult—or impossible—to do in the real world? Exploratorium media creators and educators have been exploring this question by experimenting in Second Life. Exploratorium Island in SL has a growing number of interactive exhibits, many of which would be impossible to create on the floor of our real museum. In the future, they plan to do a lot more in this online world.

eL
SL

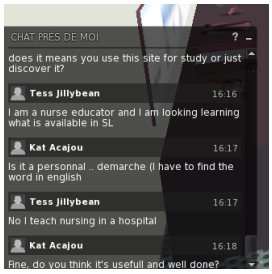
Sydenham crystal palace
http://sydenhamcrystalpalace.wordpress.com

This is a year-long project that started in October 2008, to build a virtual 3D model in Second Life of the Pompeii Court of the Sydenham Crystal Palace. It is funded by JISC in the UK as part of their 'Enriching Digital Resources' theme, a strand of their 'Digitisation' programme.
Supported by JISC (cf) and University of Bristol.

SL
eL

The Medical Media and Design Laboratory at Imperial College London
http://medmedia.wordpress.com

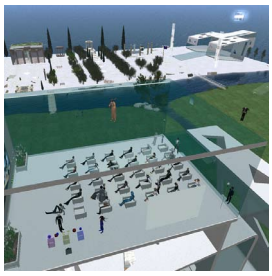
The Medical Media and Design Laboratory at Imperial College London was formed to undertake development and research in Virtual Worlds. It is part of the Division of Surgery, which is world renowned for its pioneering work on surgical skills through simulation, virtual reality, telemedicine and robotic surgery. It develops interactive clinical environments for a wide range of advanced applications in Second Life and compatible platforms. It also manages events and supports a growing community of healthcare innovators, and has been active in Second Life for over 3 years, undertaking several ground-breaking projects.



Discussion with a visitor from the USA, Tess Jellybean (in SL):
"I am a nurse educator and I am looking learning waht is available in SL"
"I plan to do simulation learning in SL for nurses... getting ideas... do you build?"...

An open day of the patient simulation at Imperial College's Second Life medical centre attracted over 1,000 visitors in two days. (in Nature Nature - 2009)

SL

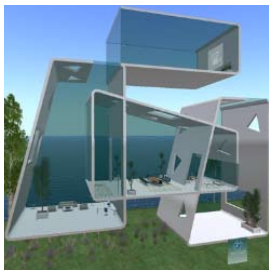


imarginal
www.imarginal.com

A French consulting studio specialised in development of SecondLife content and new media for companies or institutes. They also organize events or exhibitions. They can rent out space on their islands "Neutrino island" and "Neutrino campus". (Note : we have requested a price evaluation to compare with an OpenSim solution)

(see also other "Virtual Real Estate" eg : **www.lionheartsl.com**)

SL
eL



APC Astroparticule et Cosmologie
www.apc.univ-paris7.fr

The astroparticle field is an area of the interface between the study of the large and the small, between particle physics and astrophysics. The APC laboratory was designed to bring together different communities (experimentalists, observers and theorists) involved in this field. As a part of their communication they opened a space in SL.

eL
SL

Plank Satellite launch event
http://friendfeed.com/eurocampus

During the inauguration of The House of Astroparticule it was possible to view the launch of the Planck satellite at Kourou, to visit its virtual replica and to meet with scientists during the conferences that surrounded the event. APC Laboratories' Second Life presence was created by i-Marginal.

www.flickr.com/photos/natachaqs/3531801228/in/set-72157618109327442/

SL

eL

Xingjian - Professor Panda
http://nwn.blogs.com/nwn/2008/10/professor-panda.html

"Here's my very first time attempt at making a Second life video about the Atlas experiment at the LHC which I am totally obsessed with how awesome it is!"

An incredible video that shows how a single user can create high quality content about science in an environment like SL. Also a good example of machinima.

OpenSim

OS

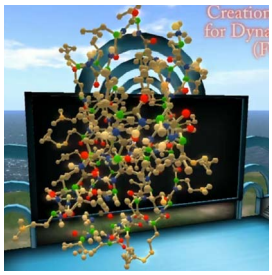
eL

Global Lab - Participatory science in virtual worlds for implementing an eco-friendly society
www.prendingerlab.net

The Global Lab project aims to develop the infrastructure for advanced communication, collaboration, and participatory science based on the 3D Internet. They use the OpenSim open source world simulator instead of SecondLife.
This collaboration is very interesting, and has developed many advanced projects. e.g.; control of a video camera in real life from a virtual world interface.

OS

eL



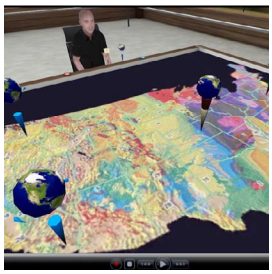
OpenMol
www.prendingerlab.net/globallab/projects/openmol

An example of a GlobalLab project, OpenMol's main purpose is the visualization of molecular dynamics simulation data into OpenSim.
They integrated their virtual world application with BALLView, a popular software for molecular modelling and visualization software.

www.ballview.org - *free of charge under the GPL.*

OS

eL



VastPark
http://www.vastpark.com

Software platform for real time enterprise visualization and collaboration.

"VastPark is virtual worlds technology done right. The framework is simple but powerful, distributed and extensible. It is more than a single virtual world. Instead, it is a scalable and secure platform (Split into 3 components: VastCore, VastSocial and Metaforik) providing software tools, SDK, and APIs so you can configure, maintain, and distribute any virtual worlds solution."

Educational SDK
Enables students to create their own virtual worlds, interactive games, data visualizations and even virtual cities.

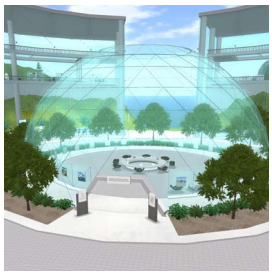
This is a powerful but closed solution, which seems limited for "participative" content development. A price evaluation could be useful. (VastPark is openSource)

Latest news : VastPark not-dead in Hypergrid Business - Aug 13 2010
www.hypergridbusiness.com/2010/08/vastpark-not-dead-serves-top-tier-enterprise-clients

OS
eL

Artificial Intelligence Learning Cente - University of Edinburgh
www.aiai.ed.ac.uk
http://openvce.net
OpenVCE is a community project led by the Artificial Intelligence Applications Institute (AIAI) within the School of Informatics at the University of Edinburgh. It provides open source and freely accessible facilities to support collaboration in a community, linking a web-based Community Portal with a virtual-world based 3D Space. The project has 2 regions, NewVue and NewVCE that can be visited in the New World Grid.

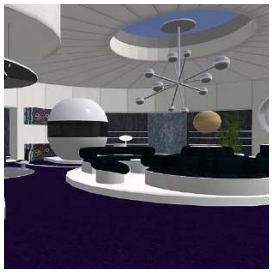
OS



New World Grid
www.newworldgrid.com

A virtual world based on OpenSim technology. The non-profit organisation that runs the project aims to share competences and knowledge. Two solutions are offered to host a virtual world: have its own server (something as simple as a personal computer linked to internet is possible although limited), or be hosted at a minimum price to pay for the server maintenance. They also host some e-learning projects for free.

OS



ReactionGrid Inc
www.reactiongrid.com

ReactionGrid Inc. hosts & develops 3D worlds for education, team building, conferences & expos. They propose to develop 3D virtual worlds for their clients based on OpenSimulation. They also sell 3rd-party products which add functionality dedicated to training and e-learning.

Last news: ReactionGrid discontinues $25 region hosting (in hypergridbusiness 27/07/10)

OS
eL

Island of Physics
On New World Grid

An island dedicated to physics with a reconstruction of the Leaning Tower of Pisa to mark the 500th anniversary of Galileo and the year of astronomy (2009). Its creator, a college physics teacher, regularly updates this sim with new content. APO has met him in RL at CERN, in the context of an educational project (astroparticule detector) run by the French program "Science à l'école" and CNRS. **www.sciencesalecole.org**

OS
eL

Mont Grace priory
http://www.newworldgrid.com/lang/en-us/july-2010-newsletter

Example of an eLearning project hosted by NewWordGrid. The project consists of the reconstruction of Mount Grace Priory, a 14th century building, in order to discover the environment and life of monks during the Middle Ages in England.

OS

How to set up a mini-grid (in HypergridBusiness)
http://www.hypergridbusiness.com/2010/07/how-to-set-up-a-mini-grid/

A mini-grid is a small, standalone OpenSim grid that doesn't require a separate grid administration server. It is small enough so that all its regions can be run on a single computer. For a typical home computer, four regions are plenty. For a high-speed computer or server, you can get nine or sixteen regions into a single mini-grid. A mini-grid is one of the easiest ways to set up OpenSim.

Other virtual worlds

WV
SN

Utherverse
www.utherverse.net

"The Utherverse is the next generation of the Internet - a Virtual World Web of interconnected 3D communities that delivers a user experience that is vastly more enriching and satisfying than the flat World Wide Web that is so popular today."
Seems to be "dating oriented" and limited to that subject. However, it might be useful to analyse the technical and graphical aspects.

WV

HiPiHi
www.hipihi.com

"HiPiHi World is a 3D digital world as rich and complex as the real world, and is created, inhabited and owned by its residents. The residents are the Gods of this virtual world; it is a world of limitless possibilities for creativity and self-expression, within a complex social structure and a fully functioning economy."
Only works on Windows.

WV

realXtend
www.realxtend.org

"realXtend speeds up the development of the global standardized 3D internet of virtual worlds by making the best technology available to everyone, and entirely free of charge. The true value of the interconnected 3D worlds is in the applications, not the platform."

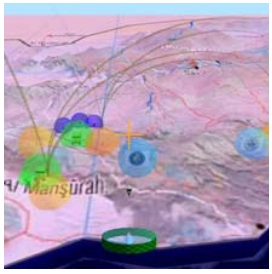
Technically it seems that this could be an alternative to a SL/OpenSim solution.

WV
To
eL

Google earth
http://earth.google.com

Google Earth is a virtual Earth in 3D, where users can share information, data and images. Some of the options for using it include:
Builder maker allows users to add 3D buildings on Google Earth.
SkecthUp* + Google Warehouse lets users create 3D content and share it.
O3D is an open-source web API for creating interactive 3D applications in a browser. It seems to be developed to be complementary with **WebGL.**

WV
eL



Croquet
www.opencroquet.org

Croquet is an open source development environment which aims to provide software developers with a way to build collaborative multi-user online applications that can run on multiple operating systems and devices. It features a network architecture that supports communication, collaboration, resource sharing, and synchronous computation between multiple users on multiple devices.

WV

inworldz
http://inworldz.com

InWorldz is a Virtual World initially based on the OpenSim software. However, efforts are being made to move past this source code and become closer to the Second Life standard.
It is essentially a competitor to SecondLife with the same business model (rent personal space or a region) but without its user base.

* content created with SkecthUp can be export to SL by using Sketchlife www.vrshed.com/sketchlife

Browser based solutions

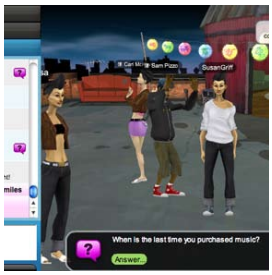
Br

3dxplorer
www.3dxplorer.com/static-v3

"Don't let your web visitors walk away from your website. Engage with them in 3D to do more business. Let them walk into your virtual office. Chat, avatar, VOIP,..Start Free!"

The images on 3dxplorer are nice but the product seems very limited and our first impression wasn't very good. It could be tested more deeply, but its main advantage seems to be that it does not require a plug-in or viewer.

Br
SN



Electric sheep company
www.electricsheepcompany.com

The Electric Sheep Company is an Emmy award-winning creator of virtual worlds and social games for major brands and media companies. They have developed a technical solution that uses flash, is already well support by many browsers and doesn't need extra client software. Very limited but easy to use..

Br

Exit Reality - The entire Web in 3D
www.exitreality.com

ExitReality claims to let you "Enter every website as a 3D virtual world" with its plug-in for web-browser. The plug-in automatically transforms web sites into 3D environments. The results depend on the web page.
It also seems possible to use 3D templates or to develop a complete 3D web site by using 3D tools

Br
eL

Learn Brite - Virtual training
www.exitreality.com

LearnBrite provides safe, interactive multi-user shared environments for virtual training and education.
It's a full 3D environment developed with the Exit Reality solution. It seems to be a pre-created space with limited personalisation options.

Br

Sandy 3D Engine
www.flashsandy.org

A Flash based solution for 3D in a browser, but limited to very small project.

Other solutions of the same kind exist, for example **Papervision** **www.papervision3d.org,** but are not easy to use and will certainly be outdated when **Adobe** launches its own **Flash 3D** solution, which is expected for the end of the year.

Br
SN

Small Worlds
www.smallworlds.com

SmallWorlds is a virtual world aimed at users over the age of thirteen. It has over 3,000,000 registered users.
The virtual world runs inside a web browser, without the need to download or install any other software. SmallWorlds combines media, web content, and casual games inside a 3D virtual world.

Games engines

GE

Realmcrafter
www.realmcrafter.com

A Massively Multi-Player Online Role-Playing Game Creation Engine. It has many functions for creating a 3D environment, and could potentially be used to make a learning and meeting space. However, it is limited compared to virtual worlds like SL or OpenSim. Visually it's also limited, and it seems to only work with Windows.

GE
eL

Entropia Universe
www.entropiaplatform.com

"Entropia is a 3D, virtual universe on the Internet with an environment for social interaction, entertainment and e-commerce. Participants of Entropia Universe enjoy an interactive experience with stunning graphics and a Real Cash Economy."

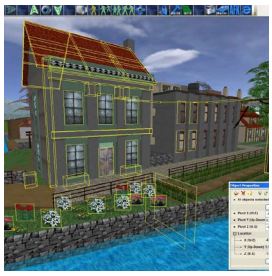
Some specific environments can be developed, such as MindArk and the **ESA** collaboration: **www.youtube.com/user/MindArkPEAB#p/a/u/1/ITUSDHLIBNs**

GE

ActiveWorlds - C4 engine
www.terathon.com/c4engine/

3D Game engine that can also be used for "serious game" development and perhaps multi-user virtual worlds (to be checked).

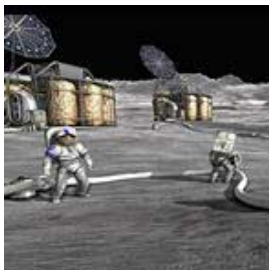
GE



ActiveWorlds
www.activeworlds.com

"ActiveWorlds, the web's most powerful virtual worlds experience". This is a 3D virtual world solution which just requires a plug-in for the browser instead of a viewer. It only works on Windows system. There are tools to construct 3D elements but it seems limited compared to a SL-OpenSim solution. It is apparently used by some communities to develop 3D worlds for meetings, education, and games.

GE
eL



NASA - Moonbase Alpha (serious game)
www.nasa.gov/offices/education/programs/national/ltp/games/moonbasealpha

Moonbase Alpha is a NASA-funded multiplayer game with 20 minutes of play set on a hypothetical lunar outpost in a 3-D setting. This is a proof of concept to show how NASA content – lunar architecture in this case – and a cutting edge game engine could be combined to produce a fun game and inspire interest in STEM education.
A "serious game" from the Learning Technologies at the NASA. (Windows only)

GE

TorqueD
www.torquepowered.com/products/torque-3d

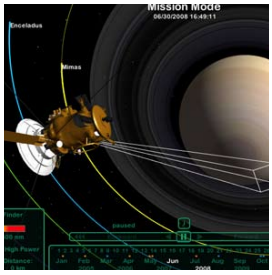
Torque 3D is a game engine that lets users develop virtual worlds for games. It should be able to be used to create eLearning environments.
"Deploy any Torque 3D project from the World Editor to a web browser in seconds with our web publishing option." Torque 3D supports all major browsers and operating systems, including IE7, FF3, OS X and Chrome.

GE

Big World Tech
www.bigworldtech.com

"BigWorld provides a mature middleware platform for developers of Massively Multiplayer Online Games (MMOG) and Virtual Worlds that is fast becoming the industry standard.
The BigWorld MMO Technology Suite is a complete technology solution, consisting of a tightly integrated suite of high performance server applications, tools, advanced 3D client and APIs designed specifically for the fast and efficient creation of MMOGs."

GE
eL



NASA - Cassini
http://saturn.jpl.nasa.gov/multimedia/CASSIE/

Cassini at Saturn Interactive Explorer (CASSIE) version 2: an example of serious game using **Unity 3D**.

GE
Me

Can Unity Save 3D Virtual Worlds? July 14th, 2010
From **Social Times Your Social Media Source**
www.socialtimes.com/2010/07/can-unity-save-3d-virtual-worlds

An article about the uses of game engine software, in this case Unity 3D, as an alternative to Second Life or OpenSim to create new virtual worlds. They compare the slow-growing SL to the increasing interest in social network worlds and the 30 million versions of the Unity3D plug-in installed.

GE
SN

Onverse
http://www.onverse.com/home/about.html

"Onverse is a free online virtual world full of fun people and cool things to do. Unlike 2D social networks that simply give you a profile page, we give you a free 3D home, clothing, furniture and some tools to get you started. It's your new virtual life in a massive virtual world." In beetween virtual world, game and social network. It needs its on viewer. Graphically nice but very limited.

GE

3D Game's devellopement tools used to create virtual worlds

www.friendshangout.com
Another virtual place to explore and evaluate

http://fusionfall.cartoonnetwork.com/splashpage.php
A cartoon style 3D virtual world run by the Cartoon Network. Very popular, with 9 million user accounts.

Social Networks mixed with virtual worlds

SN
Br

bobba bar
www.bobba.com

A virtual bar to meet and make friends. Users can customize their avatar and meet people from all around the world. A social network "world" for smart phones, this is in fact a chat room with different ambiances and avatars.

See also **www.habbo.com,** a web-based world for teens with 15 million monthly users.

SN
Br

Zygma - Farmville
www.zynga.com/games/farmville.php

Grow fruits and veggies and raise animals on your very own farm. A famous example of one of the various social network games from the Zygma company.

SN
SL

Twitpic
http://twitpic.com/ypful

TwitPic lets you share photos on Twitter. Users can post pictures to TwitPic from their phone, the API, or through the site itself. There are also popular twitter clients that have built-in support for TwitPic. This solution can be integrated into SL.

SN

Meez
www.meez.com

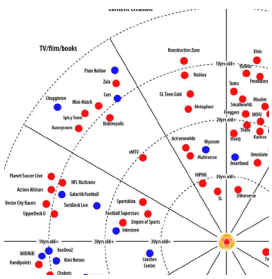
"Explore the virtual neighbourhoods of Meez Nation. Chat. Dance. Discover surprises. Design your own personal 3D space and invite friends over. Or just find a room you want to visit." Between a social network and a virtual world.

SN
Me

Virtual worlds Vs Social network - Le monde
http://playtime.blog.lemonde.fr/2009/08/21/mondes-virtuels-vs-reseaux-sociaux/#xtor=RSS-3208

Article comparing virtual worlds and social networks, discussing how they are used. Some interesting links, data and information.

SN
Me



KZero (in Virtual worlds Vs Social network - Le monde - 08/2009)
www.kzero.co.uk

KZero Worldswide is a consulting service who analyse the emerging sectors of virtual worlds and goods. Best-known as the company that created the 'Universe Chart' - a visual tool for showing growth in the virtual worlds sector along with average user age and year of launch.

Note : We recieved their report: "7 Point Plan for Marketing in Virtual Worlds"

Avatars

Av To

Evolver
www.evolver.com

"The One and Only 3D Avatar Portal
- Model your avatar in 3D without downloading any software or plugins.
- Start with a picture and create you or your friends.
- Make money designing and selling you own custom avatars and clothing."

Interesting, but only one of many avatar creators.

Av

EDF (Electricité de France)
http://bleuciel.edf.com/particuliers-45636.html (select "aides et contacts)

EDF, like more and more websites, uses avatars (also called web agents) to personalize the relationship with users. This image is my "personal" EDF advisor (Laurent). EDF uses the "Living Actor" avatar from **http://cantoche.com** which is very nice but expensive.

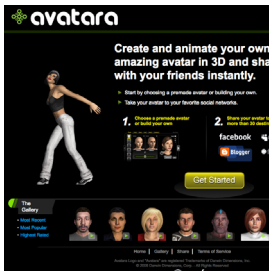
See also **CodeBaby** avatars at: **www.codebaby.com**

Av

Uncany valley
http://en.wikipedia.org/wiki/Uncanny_valley

The uncanny valley is a hypothesis regarding the field of robotics. The theory proposes that when robots and other facsimiles of humans look and act almost like actual humans, it causes a response of revulsion among human observers. The "valley" in question is a dip in a proposed graph of the positivity of human reaction as a function of a robot's lifelikeness.

Av SN To



Avatara
www.avatara.com

Create and animate your own amazing avatar in 3D and share it with your friends instantly.
1. Choose a premade avatar or build your own
2. Share your avatar to more than 30 destinations *(usually social networks)*

The website proposes not only to create an avatar but also to animate it.

Av To

Animeeple
www.animeeple.com

Animeeple is an easy to use character animation tool. Another example of the increasing number of tools to create 3D animated avatars.

See Also **www.digimi.com** who propose a solution to create 3D avatars based on photos of people, in order to personalize the experience of virtual worlds or games.

Av

Franceculture - Radio show about avartars in virtual worlds
www.franceculture.com/emission-contre-expertise-avatar-ceci-est-mon-corps-2010-08-04.html

2010-08-04-"Contre-expertise" questions changing social practices and cultural representations that result in our experience of a virtual lifestyle. If we live outside our own body are we still human?

Illustration : Virtual reality - Alain Milon - 2005

Augmented reality - Virtual reality

AR

Evolve - iMoted
www.evolve.pt/research-a-development/120

The iMoted solution aims to introduce virtual reality environments and new remote control devices into different industrial domains, in particular into systems that can profit from 3D interactions.

http://vimeo.com/3295215

AR

Total Immersion - Augmented Reality Solutions
www.t-immersion.com

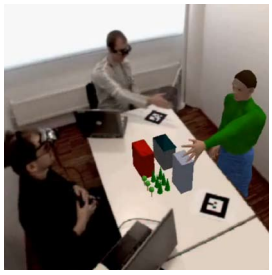
A company specializing in augmented reality solutions. Many very sophisticated projects use this technology developed for business, industry, e-learning and games.

AR

SEAC
www.seac02.it

A flash-based augmented reality solution.
LinceoVR and its associated free viewer support Autostereoscopic Rendering, which lets users perceive 3D depth using proper autostereoscopic displays and screen layers with parallax barriers. They render in a standard autostereoscopic format in real-time. This has limited application for us but would be interesting to test.

AR
Av
SL



VTT Finland - Business from technology
www.vtt.fi

Meeting avatars
Augmented Collaboration in Mixed Environments is a "mixed reality" teleconferencing application based on Second Life and OpenSim.

Augmented Reality techniques are used for displaying virtual avatars of remote meeting participants in real physical spaces. Augmented Virtuality, in the form of video-based gesture detection, enables capturing of human expressions to control avatars and to manipulate virtual objects in virtual worlds.

There are many other applications to discover on their web site.

http://www.vtt.fi/references/avatar.jsp?lang=en

AR
Me

Gateway Art Tower
www.archicentral.com/gateway-art-tower-culver-city-california-usa-eric-owen-moss-15317

A real world tower in LA, which projects images onto a range of screens for viewing by passers-by. "Externally, the tower makes culturally significant content and local event information, along with art and graphic presentations of all sorts, available to in-car audiences who pass the site area travelling on a number of local thoroughfares in the Culver City-West Los Angeles area."

eL SL

The Open University
www.open.ac.uk

The Open University (OU) is the United Kingdom's only university dedicated to distance learning. Most OU courses are available throughout Europe and some of them are available in many other parts of the world. More than 25,000 OU students live outside the UK.

OU have a venue in SecondLife and produce documents about using VW for e-learning :

- Investigating Good Practice in Synchronous, Online Learning
- Open Life: Teaching and Learning in Second Life
- A Place to Meet and Learn Together: The Open University in Second Life
- Pedagogical Effectiveness of 3D Multi-user Virtual Environments

www.open.ac.uk/opencetl/activities/details/detail.php?itemId=474c43b64494a

The Open University in Second Life case study

"Now entering its fourth year in Second Life with plans for further expansion, the OU continues to prove that learning in the virtual world has resulted in tremendous real world success for students, faculty, and administrators."

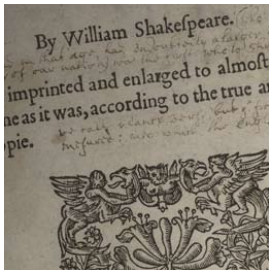
eL

VIA - Virtual Institure of Astroparticle physics
http://viavca.in2p3.fr

The "Virtual Institute of Astroparticle physics" organises virtual courses and lectures on the subject. A good example of the possible use of web, video conference and virtual world for eLeaning.

Last event: lecture about AMS a high Energy Physics detector in Space. (June 25)

eL



See GridBriefing n°10
Digitising culture: Grids and eHumanities

centerNet - An internationnal network of digital humanities centers
http://digitalhumanities.org/centernet/

"The Consortium of Humanities Centers and Institutes (CHCI) and centerNet announce their agreement to pursue joint activities in the digital humanities over the next five years. The focus of this initiative will be the relation of digital technologies to the disciplines in higher education and to the formation of new collaborations and publics."

A meeting was held at King's College, London, on 26th and 27th October 2009, between representatives of the following networks, infrastructure projects, and planning initiatives working with digital technologies in the Arts and Humanities:

- arts-humanities.net www.arts-humanities.net
- ADHO - Association of Digital Humanities Organisations www.digitalhumanities.org
- CLARIN www.clarin.eu
- centerNet www.digitalhumanities.org/centernet
- DARIAH www.dariah.eu
- NoC - Network of Expert Centres in Great Britain and Ireland www.arts-humanities.net/noc
- Project Bamboo http://projectbamboo.org/
- TextGrid www.textgrid.de

eL SL Me

Machinima
http://en.wikipedia.org/wiki/Machinima

Machinima is the use of real-time graphics rendering engines, mostly three-dimensiona, to generate computer animation. The term also refers to works that incorporate this animation technique. Many of them were done using online 3D video games and show the ability of users to misused a game to turn it into a collaborative and creative tool. The **University of Western Australia** organize a Machinima contest.

eL
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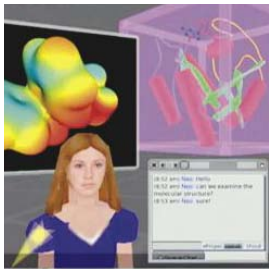


Immersive Education
www.immersiveeducation.org

The Immersive Education Initiative is a non-profit collaboration of universities, colleges, research institutes and companies working to develop open standards, platforms and communities of support for virtual reality and game-based learning.

"After Frustrations in Second Life, Colleges Look to New Virtual Worlds"
"The hype is gone, but not the interest, and professors think some emerging projects may have instructional staying power..."
http://chronicle.com/article/After-Frustrations-in-Secon/64137/

Open call for expert legal opinions on content ownership
http://mediagrid.org/news/2010-04_Call_For_Legal_Opinions_On_Second_Life.html

eL

Institute of digital learning
http://idl.newport.ac.uk/

"Creative approaches to learning online, on mobiles and in virtual worlds.
We work in partnership with Industry, Government, Academia and Third Sector organisations developing flexible learning experiences to meet your knowledge transfer and skills development needs."

eL
SL

Digital Heritage Zone
http://idl.newport.ac.uk/virtual-worlds.htm

Working in partnership with the University of Wales, the Digital Heritage Zone from Newport's South Wales Centre for Historical and Interdisciplinary Studies provides a Web 3D home to the new media and visualisation publications being developed in collaboration with the Institute of Digital Learning.

eL

Scitable
http://www.nature.com/scitable

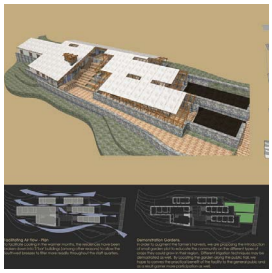
Scitable is a free science library and personal learning tool from Nature Publishing. Scitable currently concentrates on genetics, the study of evolution, variation, and the complexity of living organisms.
It's complemented by Scitable Classroom, an eLarning tool that allows teachers to create classrooms that combine discussions, collaborations and research tools.

eL
OS

3D client for BOINC
www.newworldgrid.com

A 3D client for **BOINC** that allows users to follow the progress of calculations for different projects of the **World Community Grid** (www.worldcommunitygrid.org). When simulation servers are not fully used they automatically work for volunteer computing projects. A future project is to enlarge this capability to other servers of virtual worlds. A collaboration has been launched with the **Citizen Cyberscience Centre** on this topic.

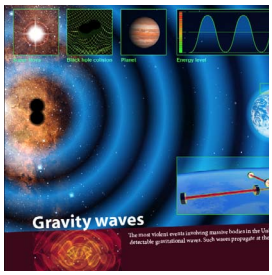
eL SL SN



Studio Wikitecture: Opening Architecture
http://studiowikitecture.wordpress.com/

Studio Wikitecture is an open group composed of individuals from varying disciplines, interested in exploring the application of an open-source paradigm to the design and production of both real and virtual architecture and urban planning.

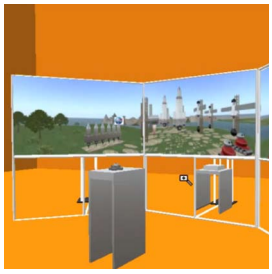
eL



ASPERA
www.aspera-eu.org

We have had contact with the communications coordinator of Aspera about the "Astroparticule House" in Second Life. He noted that, even if an event was a real success, there as still an issue with price and organising the event. He is interested in developing content for ASPERA based on the material APO has already created for them.

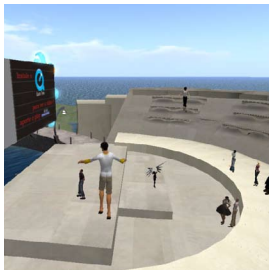
eL SL



Greenbush Labs Blog
http://roots.greenbush.us/

Exploring educational innovation and rich immersive educational environments.
This blog is an interesting source of information about the use of new technology in "EduSim". It includes a recent article on the **v-city project** (**http://vcity.c-s.fr/EN/index.html**) supported by the EC under FP7. There is also information about the use of **WebGL** for the 3D web. "A JavaScript 3D Graphics Library for Next-Generation WWW" in the documents section of the site.

eL SL



Cidade do conhecimento
www.cidade.usp.br/blog/cidade-no-secondlife

Island of the City of Knowledge is a consortium of universities and companies for the development and experimental implementation of new learning technologies.

Gilson Schwartz, professor at School of Communication and Arts, University of São Paulo, created the "City of Knowledge" research program. He blogged on the ***4th BELIEF International Symposium GridCast.***

eL SL

scienceroll.com
http://scienceroll.com/2008/06/24/23andme-in-second-life-live/

Report on a SecondLife conference
23andMe, one of the most famous companies focusing on personalized genetics, presented a slideshow today in Second Life in the latest session of the Scifoo Lives On series. Many other links to explore from this location.

eL SL

JISC - Innovation in the use of ITC for education and research
www.jisc.ac.uk/news/stories/2009/08/secondlife.aspx

This JISC Second Life guide helps lecturers teach in the virtual world
"JISC's new guide to Second Life is written by lecturers for lecturers, to help others to use virtual worlds for teaching. 'Getting Started in Second Life' answers some common questions like how to set up in Second Life, what the rules of the world are, how to plan lessons and how best to help students use it effectively for learning."
Note: JISC is partner of the CCC London Summit **www.citizencyberscience.net/summit**

Media - newsletter - blog

Me SL OS WV GE

New World Notes
http://nwn.blogs.com

A blog dedicated to SL with many interesting information.

Wednesday, July 14, 2010 Other World Notes: Why Second Life Users Should Try Friends Hangout, the Unity-Based Virtual World. ...
http://nwn.blogs.com/nwn/2010/07/page/6/

Me SL

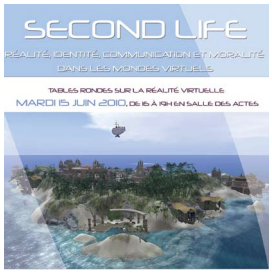
NPG - Nature Publishing group
www.nature.com/secondnature/index.html

From 2006-2009, NPG ran more than 50 events in Second Life, including public lectures, conferences and film premieres. Many of these events were recorded: all the events and related resources are in an archive.

After 3 years of experimenting with Second Life, initially as a community building tool and more recently as a revenue generating venture, NPG has decided to put its Second Life project into maintenance mode for the time being.

It is NPG's opinion that there is a growing demand for cheap, time-efficient alternatives to international travel and both live streaming of real world and online-only meetings will continue to grow. However, we do not believe that Second Life is the ideal solution for virtual conferencing at this time.

Me SL eL



Round table and radio show at ENS about "SecondLife and virtual reality"
www.ens.fr/spip.php?article619

On 15th June 2010, a roundtable about "SecondLife and VR" was organized at ENS (École Normal Supérieur - Paris). Some part of it was also broadcast on radio (**France Culture**). Discussions about the scientific uses of virtual reality, the identity of avatars, the question of copyright issues affecting virtual world...

Me eL

Virtual World Best Practices in Education (proposed by **treet.tv)**
http://business.treet.tv

Treet TV is an entertainment network that serves virtual worlds viewers and producers. Established in March 2007, Treet TV uses a collaborative production model which has resulted in more than 3000 hours of broadcast quality content, all targeting the emerging phenomenon of virtual living.
A part of it is dedicated to education practices in virtual world.

Me SN SL

Gamasutra
www.gamasutra.com/resource_guide/20030916/rosedale_01.shtml

An Interesting source of info about virtual worlds.

"Enabling Player-Created Online Worlds with Grid Computing and Streaming. For our debut project, Linden Lab implemented a distributed grid for computing and streaming the game world which supports a large, scaleable world with an unlimited amount of user-created and real-time editable content. (...)"

Me
WV
eL

Journal of Virtual Worlds Reasearch
www.jvwresearch.org

Vol.1 *I1* - Virtual Worlds Research: Past, Present & Future. *Is2* - Consumer Behavior in Virtual Worlds. *Is3* - Cultures of Virtual Worlds
Vol.2 *Is1* - Pedagogy, Education and Innovation in Virtual Worlds *Is2* - 3D Virtual Worlds for Health and Healthcare ***Is3*** - Technology, Economy and Standards in Virtual Worlds. *Is4* - Virtual Economies, Virtual Goods and Service Delivery in Virtual Worlds. *Is5* - The Metaverse Assembled.

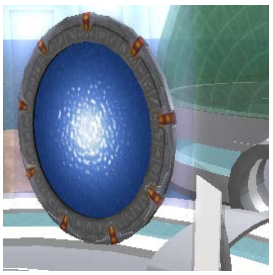
The Metaverse Assembled issue features the best papers from the SLACTIONS 2009 conference, as well as peer reviewed articles sumbitted directly to the Journal. "The metaverse is emerging, through the increasing use of virtual world technologies that act as platforms for end-users to create, develop, and interact, expanding the realm of human cooperation, interaction, and creativity. This issue focuses on applications and developments of metaverse platforms, including: Second Life, OpenSim, Open Croquet."

Me
SL
OS

Hypergrid Business - The magazine for enterprise users of virtual worlds.
www.hypergridbusiness.com

News : July 19 2010: Media-on-a-prim coming to OpenSim in two months. OpenSim designers will be able to replace their clunky in-world interfaces with functional and attractive Web pages.

News : July 18 2010: The OpenSim community is currently in the process of upgrading to Hypergrid 1.5, a more secure version of the **hypergrid protocol that allows teleportation between different grids.**



News Sat, Apr 3 2010 : Educators in primary schools, colleges, and other institutions looking for lower costs, better controls, and no age restrictions are considering **switching from Second Life to its open source alternative, the OpenSim virtual world server platform**. The OpenSim server software can be used to power an entire public grid, or a small, private behind-the-firewall installation, and can be run on an institution's own server or hosted with third-party providers.

Me
SL

Jokaydia Virtual Worlds Wiki!
http://wiki.jokaydia.com

Exploring Virtual Worlds and Games in Education and Training
The jokaydia Virtual Worlds Wiki was created in October 2009 to document the educational uses of a range of virtual worlds and games.

Many interesting links and contents, including **http://gridsurvey.com** (A SL Survey)

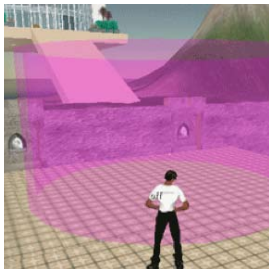
Me
SL

daneel-ariantho
http://daneel-ariantho.blogspot.com/2007/06/at-1st-sl-xpcast-2.html

User blog that describe the experience of a conference with a mix of second life and video conferencing. Interesting to explore and know more about the user experience. Also a good source of information about VW, eLearning, IT and the 3Dweb.

Some examples of tools

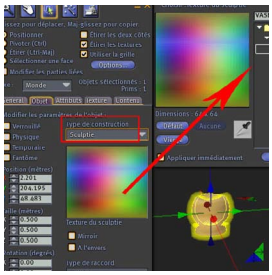
To eL SL OS



SLOODLE - Simulation Linked Object Oriented Dynamic Learning Environment
www.sloodle.org/moodle/

"**SLOODLE** is a free and open source project which integrates the multi-user virtual environment of Second Life with the Moodle learning-management system. **Moodle** is a Learning Management System (LMS) It is a Free web application that educators can use to create effective online learning sites. It also works in OpenSim."
37,970,346 users / 54,648 registered sites - **http://moodle.org/stats**
Martin Dougiamas founder of Moodle at CERN Computing Seminars - 09 August 2010.*

To



Avatars-3d
www.avatars-3d.com

Free resources and tutorial web site for SL community. Avatars, objects, scripts...

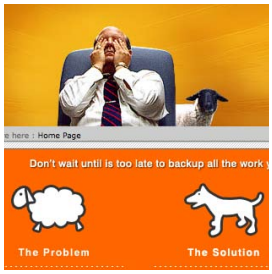
To

Plopp - 3D modeler
www.secondplopp.com

PloppSL allows you to create Sculpted Prims for SecondLife™ easily. Both texture and model are created in one step. Simply paint the front and back side of your model and it will be converted to a Sculpted Prim by PloppSL.

Easy enough to be used by children to create simple 3D models for virtual worlds like SL or OpenSim.

To

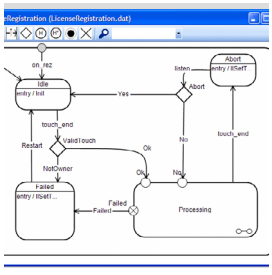


Second inventory
www.secondinventory.com

"Second Inventory allows you to save all your creations directly to your hard drive."

This tool not only allows backup of SL content, it can also be used to easily transfer items created in SL to any other compatible grid.

To



MiceOnABeam - visual scripting
www.miceonabeam.com

"Finally! Visual Scripting for the Second Life world! For those New to Scripting: Draw your scripts graphically and have MiceOnABeam generate most of the LSL code for you!"

The software exists in a free version (limited in complexity) and a "Pro" version. It only works on the Windows operating system.

To eL

xtranormal
www.heiditrotta.com

"A challenge in co-teaching has been to have students explore other possibilities than PowerPoint for training. This week I created a little movie on FAQ's students had regarding their Organizational paper assignment. Below is my attempt using a free online tool called xtranormal found at **www.xtranormal.com**. Even though this tool is very simplistic, it can still be effective. I love animated characters and the research has shown that people identify with them. I would love to have the opportunity to try something more sophisticated such as **Code Baby.**"

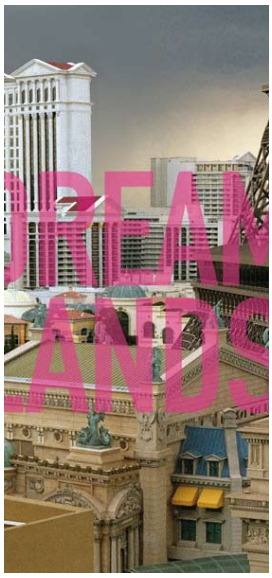
* People from CernIT-OpenLab propose to meet David Horat (CERN fellow) who was involved in the development of Moodle code.

SL

RMB City
www.vitamincreativespace.com/en/project/viewProject.do?id=20059
www.youtube.com/watch?v=9MhfATPZA0g&feature=related

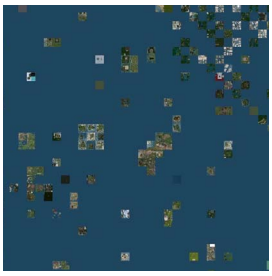
"RMB City is a virtual art community in the online world of Second Life, initiated by Beijing artist Cao Fei (SL: China Tracy) as a public platform for creativity. Officially launched in late 2008 as a laboratory for experiments in art, design, architecture, literature, cinema, politics, economy, society, and beyond, RMB City is lately undergoing a new phase of rebirth and regeneration. Presented at "Dreamlands" exhibit Centre Beauboug.

WV
Me



"Dreamlands" exhibit at Centre Beauboug
www.centrepompidou.fr

Some images that raise the questions of the boundary between virtual and real life.
Las-vegas hotels and other "world landmark" theme parks;
Island for "users" in Dubaï and Second life;
Futuristic city of Walt Disney Epcot and Fritz Lang Metropolis;
Art installation and "real building" (here depicted in SL) in the middle of sands...



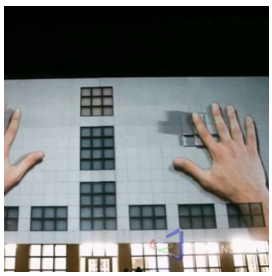
AR
Me

PopUp urbain
www.pop-up-urbain.com/si-les-gamers-cartographiaient-le-monde/

An article about how the video game representation of space gives users new skills to map and represent the world. Would Google street view exist without "first person view" games?

Crystal mesh-Singapour Anexample of a building used as a screen.
vimeo.com/6333551

AR
Me



Urbanscreen
www.urbanscreen.com

The city as a large video screen.