What is the future of Massively Multiplayer Online Gaming?

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2) Abstract

This paper attempts to briefly describe the text based origins of Massively Multiplayer Online Games (MMOGs), charting the rise of the first MMOGs and the commercial success that they achieved. The paper then moves on to investigate the possible future of MMOGs, taking a parallel with the Star Trek universe to describe how the future could unfold for the games themselves potentially utilizing technologies such as Virtual Reality and tactile feedback devices. A look at the social aspects as well as the technological aspects of, massively multiplayer online gaming is also undertaken. In conclusion some detail is included as to the hardware driven nature of MMOGs specifically related to a self supporting loop between game hardware and games themselves.

3) Introduction

This paper assesses and analyses the state of the Massively Multiplayer Online Gaming industry as it stands in the last quarter of 2003 and the first quarter of 2004. The paper will start with a brief history of the ancestry of Massively Multiplayer Online Games ("MMOGs") and a brief analysis of the availability of both commercially available and "free"[1] MMOGs. The next section of the discussion will move on to assessing the limitations of current and soon-to-be-released MMOGs, focusing on the areas of graphics, network technology, server limitations and social influences. The final section will look at some of the up and coming technologies and methodologies that may facilitate future MMOGs, ending with a summary of a possible future.

3.1) Terms and Definitions

The paper contains a large number of Acronyms that can make reading difficult to follow and unclear. Unfortunately the alternative is to significantly lengthen the paper by expanding the acronyms. Below is a brief synopsis of the acronyms used within the paper and short definitions of their use.

Virtual World

Virtual worlds are persistent implementations of a space or container that can contain both player objects (the gamers) and tangible objects (weapons, health packs, magic spells, bases, houses). Virtual worlds have their own properties such as physics, weather, communication, colour and terrain.

MU* - Multi-User * (Anything)

Any multi-user text based virtual world is referred to as "a MU*", this term is similar to the term *NIX meaning Linux, Unix, HP-UX or AIX.

MUD – Multi-User Dungeon

Sometimes also referred to as a Multi-User Domain it is a game. The name is derived from the first virtual world to be successful[2] . Often with a role-playing element, the term is more specific than MU* because it refers to a specific genre of games rather than any (not necessarily game-oriented) virtual world.

MUSH – Multi-User Shared Hallucination

Many virtual worlds have developed, over time, straying from the role-playing game genre to be come more socially oriented or fantasy oriented, allowing players to act out a fantasy be that pretending to be a dwarf for a week or settling down with a family and having children.

1 The term "free" in this instance refers to the public availability of client and server source code, textures, models and maps for MMOGs, as opposed to the term "free" meaning not charging for something.

2 This game originally called MUD is now referred to as MUD1.

MM – Massively Multiplayer

Technically any game that supports more than 32 players[3] is considered to be Massively Multiplayer. For the purposes of this paper a Massively Multiplayer Game must support more than 500 players at any one time in one virtual world.

MMOG – Massively Multiplayer Online Game

Massively Multiplayer Online Games are Massively Multiplayer by nature, online by the fact that they are played by multiple gamers at any one time whilst connected to a network of some form[4] and games as they have some aspect of fun or enjoyment to them.

RPG – Role Playing Games ("RPGs")

Role Playing Games are games which ask the player to immerse themselves in another role. It does not have to be an online game, board based RPGs like Warhammer[5] were popular long before computer games became popular. This paper refers regularly to MMORPGs - Massively Multiplayer Online Role Playing Games.

FPS – First Person Shooter

First Person Shooter is a computer game only term, relating to games which are viewed from the "virtual" players eyes and generally using some kind of projectile weapon to "shoot" other players, be they computer or human controlled. This paper refers to MMOFPSs - Massively Multiplayer Online First Person Shooters

Mobiles or NPCs – Non-Playing Characters

Mobiles and Non-Playing Characters are computer controlled artificial intelligences, designed to mimic the actions of human players. Their purpose is to provide some challenge to the players or to populate some otherwise unpopulated virtual world.

3.2) Quality of references

Due to the apparent shortage of printed material many hours of were spent trawling the more dynamic Internet resources that were available, this searching yielded many more results than were expected fortunately authors of the papers and articles that were being searched for, are more than likely, by nature, going to be proficient at using computers and the Internet. The main problem with Internet resources is the problem with reliability, thus research was restricted to gathering only select articles from well known gaming resource sites such as GameSpy, sites from less well known authors or sites that provide a high degree of qualitative data and analysis are also included due to the lack of highly accountable and reliable sources.

To aid in the measurement of a sites suitability I have decided upon a grading mechanism to help distinguish between sites that provide different information:

3 Many games support multiplayer elements, whether this is over a network or using multiple controllers connected to one computer. Beyond 32 players the technology involved with hosting such a game becomes far more complex and demanding.

4 For practical reasons the Internet is the most obvious medium, due to the standards implementation of Internet protocols "Internet based" online games could just as readily be run on private networks.

5 Warhammer: http://uk.games-workshop.com/warhammerworld/default.htm

Grade	Definition of grade
A	Site is a recognized resource within the gaming industry and provides qualitative data relating to the dissertation title.
B	Site provides qualitative data relating to the dissertation title
C	Site is a recognized resource within the gaming industry
D	Site provides information that is not substantiated or properly referenced
E	Site does not fill any of the above criteria

The research notes and the sites that I found and rated are detailed in the Bibliography

4) Discussion

4.1) MUD – The origins of massively multiplayer online gaming

Although not the first implementation of a virtual world MUD1, written by Rob Trubshaw, was the first successful virtual world. Rob wrote MUD1 in his final year of a Computer Science degree at the University of Essex. Initially written in MACRO-10 for the DecSystem-10, it rapidly became difficult to maintain. A decision was made to rewrite the game in two separate parts - the game engine and a multi-user dungeon definition language. Crucially this allowed for updates to the game engine without drastically affecting the world itself and visa versa.

In 1980 the development and maintenance of MUD1 was handed over to Richard Bartle. The popularity of MUD1 grew outside of the University of Essex and developed as new technologys allowed individuals and other universitys to interconnect their computers through a number of mediums including ARPAnet (which was to become the Internet) and JAnet the Joint Academic Network.

Meanwhile, Steven Murrell, another undergraduate at Essex University, wrote PIGG which was aptly described by Richard Bartle :

> "This system uses a much more fluid arrangement as far as descriptions go than MUSE, in that the program actually attempts to work them out from other objects/rooms. Thus, upon entry to a room, the program would scan around and describe its contents"
>
> (Bartle, Richard A - A MUSE)

Due to the engine and definition language architecture of MUD1, a number of interested individuals round the world created new worlds based on the MUD1 engine. Thus between 1985 and 1989 a number of MUD's were released including: Gods, AMP, Mirror World, Federation II, Shades and MUD2.

In 1987 AberMUD, was produced by students at the University of Aberystwyth, in 1988 the code was ported to the C programming language, opening up a whole world of opportunities for University's and individuals running AberMUD on UNIX machines worldwide. AberMUD spread like wildfire with incarnations cropping up all over the world. This spawned many derivatives of AberMUD notably: TinyMUD, LPMUD, Gemstone II, Dragons Gate, DikuMUD and TinyMUSH.

These games started to make their way onto the fledgeling online services market. In 1985 GEnie and QuantumLink started putting games at the fore of their online services strategy making Gemstone II and Dragons Gate available to the masses via dial up connections in America[6].

6 Local phone call charges in the UK and Europe were so high at the time that it stifled the online services market.

Initially online services charged per minute. However due to the competition of numerous start-up companies a price war ensued between the major players, resulting in a switch from the pay-per-hour model, that proved lucrative in the early years, to a flat-rate pay-per-month model. This model brought in substantially less per user, made services available to many more users balancing out the costs. These games now in a new business context, would set the future business models for future MMOGs.

4.2) The History of MMOGs

In 1997 Ultima Online[7] (UO) was released heralding a new era for online games, graphics. Although graphical virtual words were not a new thing (Meridian 59 was released a year earlier, with limited success) UO was the first graphical world to achieve commercial success. In 1998 Lineage was released in Korea proving extremely popular, a year after Lineage, EverQuest was released.

EverQuest's success was runaway. By January 2000 it had exceeded the total number of active subscribers that Ultima Online had at the time (Woodcock, B: An Analysis of MMOG Subscription Growth), despite being released 18 months later. EverQuest's subscription levels was to outgrow all expectations setting a standard for future MMOGs.

Since the release of EverQuest many new MMORPGs have been released. Some of them were EverQuest clones but others were more original. Asheron's Call[8] was not as successful as EverQuest, but regardless was never-the-less considered a huge success for Turbine spawning numerous expansion packs and Asheron's Call 2. Dark Ages of Camelot[9] and EVE:The Second Genesis[10] provided a full player driven economy, giving hours of playtime just transporting goods around, the huge universe.

Many games that have been released up until now have been what are considered role-playing games (MMORPGs). However attempts have been made at making other genres of game available in MMO form. Most notably PlanetSide[11] which was the first massively multiplayer first person shooter (MMOFPS). Unfortunately it didn't seem to sit properly with the MMORPG players who felt that it needed some lore and story-telling around the game. Similarly, the FPS players didn't think it could be classified as a true first person shooter because it implemented a Cone of Fire(CoF) system, to replicate recoil and inaccuracy. PlanetSide's other fatal flaw was that it was very resource hungry, often causing poor playability on all but the best machines, limiting its market severely. Other genres like simulations, have made an entrance on to the market The Sims Online[12] being an example.

7 Ultima Online (1997): Electronic Arts Inc. - http://www.uo.com/
8 Asheron's Call (1999): Microsoft - http://www.microsoft.com/games/zone/asheronscall/
9 Dark Age of Camelot (2001): Mythic - http://www.darkageofcamelot.com/
10 EVE:The Second Genesis (2003): CCP – http://www.eve-online.com/
11 PlanetSide (2003): Sony Online Entertainment – http://www.planetside.com/
12 The Sims Online (2003) Electronic Arts – http://www.thesimsonline.com/

An important part of the genre of a game is the lore that surrounds it. Many games choose to create their own lore, story-line and setting from scratch. However, it can be advantageous to use licensed story lines. Some licenses are very strict such as the Tolkien universe implemented in Middle Earth Online[13] and George Lucas' universe in Star Wars Galaxys[14] - both have strict licensing agreements, restricting the content and extendibility of the universe. At the same time, though, a huge amount of advertising comes for free. Middle Earth Online, for example, was slated for release in 2001 to coincide with the release of Lord of the Rings:The Fellowship of the Ring, which would have given it a huge advantage due to the hype surrounding the films. Other sources for lore, story line and setting can come from fairy tales and legends such as the Arthurian story's that inspired Dark Age of Camelot.

In summation, the MMOG market started from small free text based virtual worlds in the 1980's to become a multi-billion pound market, providing a sizeable income and fuelling future developments and advancement in 2004.

4.3) Limitations of Current MMOGs

4.3.1) Graphics

Graphics are classified as the representation of the virtual world in some visual form. Graphics can be done in a number of ways, the most basic form of this is very simple text based MUDs, which describe the characters surroundings. The innate advantage of text based virtual worlds is they deal far more with thoughts and can describe a world that is far closer to the original ideas of the author.

As virtual worlds have developed from their text based origins, they have spawned worlds with graphical representations of users, locations and objects. Initially they were simple 2D overhead views.

13 Middle Earth Online (Unreleased) Sierra - http://www.meo.com/
14 Star Wars Galaxy's (2003) Sony Online Entertainment – http://starwarsgalaxies.station.sony.com/

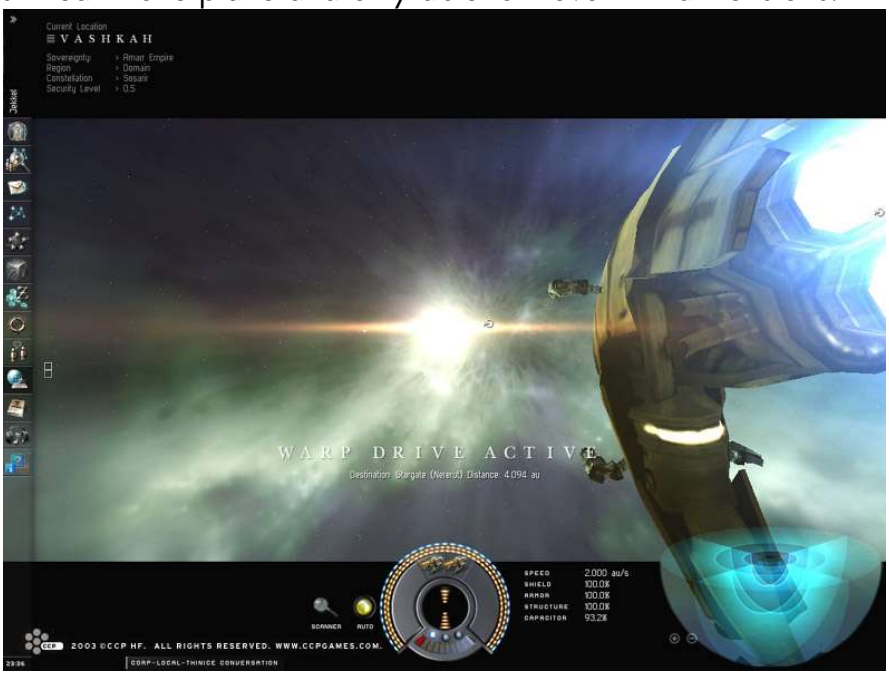
(Figure 1 - Artifact, Samu Games)

Figure 1 shows a 2D virtual world called Artifact, the game is tile based as all of the avatars, buildings and geographical features are self contained within their own graphic that is then displayed on screen.

The inherent problem with 2D virtual worlds is they very much rely on the graphics skills of the artist, users find it hard to get immersed in a 2D virtual world because the game looks unrealistic, for example in this example the scout and his horse are approximately four times the size of the houses. The inherent problem involved is there is no way of representing perspective in 3D so if the designer chose to implement all the graphics to scale the screen would quickly be come cluttered.

(Figure 2 - Astonia III, Intent Software)

The next evolutionary step in virtual world graphics is the so called pseudo-3D or 2½D graphics as seen in Figure 2, these worlds have a fixed third person point of view with on screen characters, objects and geography reprehended as 3D models, thus allowing for perspective and much more accurate scale. Although as with 2D there are limitations to how immersing a world like this is because of the in ability to look around objects as the point of view is fixed in one plane and only able to move in 2 dimensions.



(Figure 3 - EVE:Online, CCP Games)

The final step in virtual world graphics is full 3D graphics as seen in figure 3, this type of graphic allows the user to view an object from any angle and at any zoom, due to the nature of EVE:Online (a space game) the geography of the virtual world is implemented as objects because everything is floating in 3D space.

(Figure 4, Planetside Screenshot)

Figure 4 shows a slight adaptation of the traditional 3D view, this example is a view from the the eyes of the player, and is the primary point of view for first person shooters. This type of view is the closest to what an actual soldier would see, so is the most realistic view

The current state of 3D Graphics are only able to implement the idea of three dimensions on a 2 dimensional monitor, thus the realism of the games themselves is diminished because users have to view the virtual world within a box and thus they can not fully immerse themselves within this world due to the tight restrictions placed on their field of vision.

4.3.2) Memory and Processor Speed

For any MMOG game to run, it needs at lest two computers. Firstly the server where the virtual world actually exists. Then the client, which is what the user sits in front of to access the virtual world.

The client is generally a fairly dumb program, who's only task is to display what the server tells it to display and to respond to the the users input and return that back to the server. And as such the demands placed upon the machine which the client is running on are minimal. This is attested to by the fact that the minimum hardware recommendations for most[15] MMOGs is relatively low (EVE:Online Recommended Specifications, CCP Games).

The primary reason for MMOG clients being fairly simple, is because they can not be trusted. The client is run on a users machine and as such is in an insecure environment. Richard Bartle explains this in his book "Designing Virtual Worlds":

> "Your client software will be hacked. For some virtual worlds (such as those with no game aspect to them), this wont necessarily matter. For the rest, it matters a great deal..."
>
> "...**Important:** Absolutely no decisions with regard to what happens in a virtual world can be delegated to a client."
>
> (Bartle, Richard A: Designing Virtual Worlds, P108-109)

Bartle emphasizes the point that nothing should be left to the client for security reason, of course if security is not important (because users are trusted or clients are "uncrackable") much more can be left to the client to do, increasing client requirements and substantially decreasing the requirements of the server.

An example of this "trusted" client is Sony Online Entertainment's PlanetSide in which all of the hit detection[16] is done within the client, the primary reasoning behind this decision was so that objects would be considered to be where they are displayed to be rather than where the server knows they are, which could be in a disparate location if the player has decided to make an unexpected change of direction.

As the client does so little in implementing game logic and controlling characters other than the one that is played by the user servers require the most processing and memory. What is considered to be "the server" is often actually a cluster of servers all communicating with each other to share player data and information about the virtual world:

> "There is a centralized server cluster, located in London, with several proprietary proxy (slave) servers. The proxy servers have dedicated bandwidth to the central cluster. The proxy servers take some of the load off the game logic servers in the cluster by doing data integrity checks and virtual multi casting, making them – in a sense – a software router."
>
> (EVE:Online Server Architecture, CCP Games)

15 The one obvious game which has very high hardware specification's is PlanetSide which is a special example because the client handles much of the game logic itself to reduce lag and to increase the pace of the game.

16 Hit Detection – the task of detecting if two objects (in PlanetSide's case characters and weapons fire) come into contact with each other or "hit"

There are a number of other architectures, and the specifics of all of these architectures is far to complex to go into in this paper. Games manufacturers tend not to release information about their servers, but it is known that these servers are considerably more powerful than any client computer, and the primary limitation to current MMOGs is the financial limitations, it costs thousands of pounds per day to run these servers. Fortunately MMOGs have a ready source of income from subscriptions which more than covers the costs of server maintenance's.

As the industry currently stands, the primary limitation for MMOGs is server side hardware, as the number of players that exist in a virtual world increases so to do the number of possible interactions between players, this is what puts the extended load on to the servers, additionally as with most of the computer industry today the limitations for the servers are not technical, they are financial... given enough money it would be a matter of pure expense and expertise (which of course has to be paid for) to create a server that can support ten times the number of maximum players[17] (EVE Getting More Popular?, Gamers Sanctuary) in one virtual world.

4.3.3) Network Traffic and Lag

After covering the basic of client and server architecture the technology that connects clients to the server and other servers in a server group together need to be looked at. As most if not all MMOGs are played over the Internet they generally all support using one of the two common Internet Protocols, TCP (Transfer Control Protocol) and UDP (User Datagram Protocol).

Transfer Control Protocol is a connection based framed protocol, this means that to be able to transmit data using TCP a connection must first be established between the client and the server, when data is going to be sent it needs to be fitted into a frame or packet, which contains information about what sequence the packets were sent in, which connection they pertainto and error checking information. If there is corruption somewhere between transmission and reception, the TCP protocol re-requests the packet from the client. All of this checking and connection creation does provide a very reliable data path between the client and the server but it also adds a large overhead to the data being sent and in some instances can cause a certain amount of lag within the game.

Another option that is available is the User Datagram Protocol, these are also split into packets (or datagrams) but there is not connection mechanism the packets are sent out in a constant stream unchecked and unconfirmed. UDP is a significantly faster protocol than TCP but it has no built in mechanisms for ensuring that the data is getting to the server or back to the client again.

In general most games use a mixture of both TCP and UDP, this means that they can maintain a constant control connection between client and server using TCP, while sending instant action and critical messages using UDP.

17 The current record for the maximum number of players in a virtual world stands at 7250, held by EVE:Online on 15th February 2004

"Lag" is the prevention of packets from flowing freely between the client and the server, there are three forms (how bad is the lag?, Lansid) of lag that are most prevalent in online gaming:

- **Server Lag**

  Server lag is caused when the server is attempting to manage a massive number of players in a relatively small area, this varies from game to game as some games contain more action and movements that have to be communicated with the client. For example: PlanetSide has a full range of emotions and hand signals, where as EverQuest has far fewer similar features and thus can fit more characters into one virtual area.

- **Video Lag**

  Video lag is caused by physical limitations of the machine that the client is being run on, this could be a under powered graphics card, too little memory or CPU power. In general this is the most prevalent form of lag because it is the most obvious, symptoms of video lag include slow screen redraw rates and jerky and inconsistent animation.

- **Connection Lag**

  Connection lag is when the Internet connection that between the client and the server has become congested and data is taking an inordinately long time to get between the client and the server.

The main problem is even with the best code for connecting client and server together, there is always going to be times where the Internet will be slower for some reason, be that a new patch from Microsoft or the latest virus blocking e-mail servers with hundreds of thousands of messages. When this happens something called "lag" happens, this is when the flow of information from the server to the client is temporarily stopped or partially restricted, so the client is unable to perform its normal actions, because it needs the information from the server. This has a number of effects between tanks temporarily flying through the air until their correct position is updated, to characters suddenly being killed at unexpected times, because the client had not received the message that they had died.

In many situations lag does not cause a problem because the client has a certain amount of prediction logic, which guesses what the location of a character is, or the level of their health based upon what has happened up until this point. This prediction goes a long way to help produce a smooth game play that players expect from a game whilst allowing games to be operated over a less than reliable medium.

Communication between multiple servers in a cluster is an entirely different matter. Clusters have to operate as one in many situations and their internal architecture is geared as such that if one server was to fail, another would be able to take its place. The technology that links the computers in a cluster is going to be very high speed networking, most probably running using either TCP or a custom Protocol designed for speed and efficiency without the over head of TCP.

The primary technical limitation of the networking hardware that connects the clients to the servers is, unlike graphics, memory and processing power, the clients Internet connection. A users Internet connection can range from anything between a 33K modem to a 100megabit JAnet[18] connection, as such MMOGs must be designed to be able to take full advantage of a fast connection without disadvantaging the users of slower modem connections. Game logic can be used to prevent the slower connections from being swamped by too much data, but the primary source of advancement is in streamlining and compression techniques to reduce the total amount of data been transferred between client and server.

4.3.4) Social Aspects

By their very nature MMOGs are very sociable, most MMORPGs and MMOFPSs allow you create temporary groups of people in squads or gangs so that everyone can share a common chat room, vehicle access and share any rewards from killing other players. Many games also allow for persistent groups of people in outfits, guilds or corporations. These in-game mechanisms for social interaction are designed to promote the social facets of the game.

Many MMOGs are designed in such a way that as the game progresses it gets harder and and harder to carry on the game on your own, and you have to work as a team to advance your character beyond the level that you can get to by your own means.

The theory behind current MMOGs is that players go through stages when they play a MMOG (Bartle, Richard A: Designing Virtual Worlds, p171)

- **Griefers** — People who play as bullies, trying to get their own way whether they upset anyone else or not.
- **Networkers** — People that play the game to interact with as many people as possible. Including but not limited to people they have not met before.
- **Friends** — People who play the game primarily to interact with people who they have known for a long time. These groups of people will probably stay together from one game to the next. Examples of these groups of people are SarDuKar[19] and OcPS[20]

18 JAnet – Joint Academic Network : http://www.ja.net/
19 SarDuKa - http://www.sardukar.org/
20 OcPS (Overclockers Player Services) – http://www.oc-ps.co.uk/

- **Griefers** — People who play as bullies, trying to get their own way whether they upset anyone else or not.
- **Politicians** — People who attempt to get into roles where they are in command of other people.
- **Planners** — People who organise themselves and decide that they are going to go do it, either on their own or part of leading a group of other people.
- **Scientists** — People who explore the virtual world and experiment on it in a thorough and methodical way.
- **Hackers** — People who explore the world through their own means almost totally by their own natural feelings.
- **Opportunists** — People who play to please themselves, and do what ever they want, when they want.

Most players either start playing a game as an opportunist or a "greifer", and then progress to "networker" or "scientist", "politician" or "planner" then "friend" or "hacker". The model is not quite as simple as this, however the general progression through the player types is generally followed.

In general the people at the top of the scale (the "newbies") are the primary source of revenue for games developers, and the type of player that marketing wants to pull in. Unfortunately they are also the people who are playing the game for themselves by nature, either pleasing themselves taking any opportunity they can to do or bulling people into playing the way they want them to play, thus these types of player are not the types of player that will encourage other people to join the game.

As you move further and further down the scale, the number of players dwindles as they move on to other games, until you get to the end of the scale and you have two types of person the friend (or more likely group of friends), who plays semi-regularly with a group of friends or the hacker who often weaves his way through the world helping out newbies. These two classes of player are the people who actually make a virtual world into a social place, they have got to a level in the game where they are no longer able to advance themselves so they spend time helping others to advance or just enjoying the social aspect of multiple people living out a life in a virtual world.

Eventually a MMOG will get a good balance of relatively inexperienced players and advanced players (often called wizzies[21]) once this happens, Unfortunately the hype that was originality associated with the game has long been lost to bigger and better games, thus only the games that can maintain a large player base last for more than a couple of years. Very few games have reached this stable status, some good examples would be Ultima Online and Everquest, both of which are still going strong today.

21 Wizzies is intended as a gender non-specific Wizard or Witch, i.e. A person who has administrator status in the game but is not one of the design or development team.

4.3.5) Summary of The Current Limitations of MMOGs

As a general rule, many MMOGs have a limited life span that generally lasts from when the game is first released to a couple of months after the "newbie hose"[22] has finally run out. There is also an element of a critical mass within the player base, if after a number of months after release a game hasn't met a certain number of active subscribers chances are it never will and as such the game is doomed to failure. The primary reasoning behind this is that any MMOG can not hold its own with only computer controlled characters to play with. Virtual worlds need real people to play in, additional they also need enough players to make it look popular. If a player joins a world sees that there is no one here and leaves after 2 minutes, someone else comes along one minute later, thinks the same thing and disappears off again, there may be 400 users using the server in any one day and yet they will never see each other and probably never play on the server again.

4.4) Future of MMOGs

Massively Multiplayer Online Games are a fledgeling industry as it stands, the progression from MUDs, MOOs and MUSHs to fully fledged multi-billion dollar games has been rapid, but what can happen in the future. This paper has already shown that the boundaries are being pushed by MMOGs as it stands, what technical advantages.

4.4.1) Middleware

One of the most important advancements in development of MMOGs is the use of middleware. Any game can be split up into smaller "areas of responsibility", such as graphics engine, physics engine, server engine and character database. Most MMOGs are very similar and they may very well be able to share one or more of the same engines.

There are a number of engines commercially available to do one or more of the roles. A good example is the MathEngine's Karma physics engine employed in a number of high profile games:

> "...eagerly anticipated titles at the show integrating the latest version of Karma Physics. The line-up includes Sony Online's highly anticipated massively multiplayer online first-person action game, PlanetSide™; Atari's Enter The Matrix™ and UbiSoft's Rainbow Six 3 – RavenShield™"
>
> (Renderware Press Release)

Many other games share other engines for example the Turbine II game engine and rendering engine are used in Asheron's Call 2 and Middle Earth Online (The Turbine 2 Engine, Microsoft Games Insider) this is an example of a game engine that was developed in house by turbine for Asheron's Call 2 and then licensed out to Sierra to produce Middle Earth Online.

22 Newbie Hose is a term used to describe the almost constant stream of new players to a game, primarily through hype and word of mouth.

4.4.2) MMOG Frameworks

As the MMOG market has matured, separate engines have been produced by a number of software publishers. Often they have been developed in-house for a project, and then licensed out once the concept and implementation had been proven.

There are companies, that have dedicated time and resources to creating MMOG engines as a whole package or framework, the premier producer of such MMOG frame works is BigWorldTech, who describe their product as follows:

> "The BigWorld™ Technology represents the most scalable and customizable Massively Multiplayer Online Game (MMOG) middleware available anywhere in the world…
> …It's a total solution to one of the most complex game development problems facing the games developer community."
>
> (BigWorldTech - The Complete MMOG Soloution)

The essence of projects like BigWorld Techhnology is to create an entire functional framework for a MMOG, then allow developers to flesh it out with important aesthetic aspects such as textures, models, game logic and audio effects. This frees the developers and designers up from the complexities of implementing the various components of a MMOG.

BigWorld Technology realised when they started the project to create this framework that most MMOGs followed a certain pattern. They generally have characters, items, terrain, inventory space, vehicles, physics and weather, all of these were then implemented together in the game engine. The graphics engine is responsible for rendering the textures and models that the the developers have integrated into the game engine. The server engine is responsible for implementing the server logic, checking characters are where they are meant to be, controlling in game non-player characters and managing the user and character databases.

BigWorld Technology went one step further by implementing a client engine and a server engine, providing a even higher level of abstraction, the idea is that no longer does the designers have to worry about coding anything at all, BigWorld Technology provides tools to create the models, textures and game logic, then to embed them into their client and server.

4.4.3) Future Genres

As it stands the most prevalent form of MMOG is a MMORPG, the primary reason for this is MMORPGs are far less demanding than other genres, although there are a number of genres which have made an appearance on the MMOG scene:

Genre	Games	Description
First Person Shooter	• Planetside • Face of Mankind • WWII Online	First person shooters require quick reactions from players to in game events, as such the traditional MMOG architecture where the server controls everything holds back the pace of the game, because the action must be slowed down to compensate for the lag.
Simulations	• Second Life • There • The Sims Online	Simulations are generally implemented in such a way that the player interacts with non playing characters who do the mundane tasks that the players do not want to do themselves, simulations are often very self-centric games that encourage you to accumulate wealth and goods, for a simulation to work in a Massively Multiplayer Environment the traditional paradigm has to be changed.
Super Hero	•City of Heros	The super-hero genre is a relativity newcomer, it is not the normal concept that will transfer to Massively multiplayer online games, as it requires all players to be a super-hero character. City of Heroes is currently still in development so it remains to be seen exactly how it works.
Strategy	•Shattered Galaxy •Battle for Wesnoth	Strategy games have not really been very prominent in the MMO world, perhaps because the genre has been all but eclipsed by traditional MMORPG games.

The main problem with adapting existing genres to the MMOG market is the players are often sceptical about new genres, and as most MMOGs require a fairly large outlay in terms of buying the game and paying for subscriptions, so new untested genres often fail to reach a critical mass.

4.4.4) Improvements on Existing Platforms

As a MMOG becomes popular it gains a dedicated player base, these are the people who will not leave the game unless they are forced to either, by the servers being switched off or personal circumstances. These players are the die-hard fans of the games they will often have multiple characters. These people will often of reached the highest level of the classification (p16-17) and either be playing in a persistent group of friends, primarily socializing, or playing as a "hacker" helping new players, and just attempting to have fun by bending the rules slightly.

This player base is the strongest asset a game has after its newbie hose has run dry, if enough of the dedicated players stay around then the owners of the servers can afford to carry on running them. If the player base is very big (such as EverQuests) then the developers can afford to continue adding to the game making it interesting for newbies again.

The innate facility built into any online game is the update engine. This piece of technology has to be included in any MMOG because inevitable there will be bugs in the game and they will need to be fixed, this same update engine though can be used to deliver new content to the clients allowing for the game to be added to when the developers create another object, character class, room or area of terrain.

The MMOG industry has already shown us that there is a realization with in the market that these long time players do exist, more and more publishes are taking advantage of this player base by releasing sequels to highly popular games such as Asheron's Call 2[23], Everquest 2[24] and Lineage II[25]. Due to the existing player base sequels get a head start above new releases as they get new users to join the game as well as maintaining a good proportion of older users.

A possible future for MMOGs may be a collaboration between similar smaller company's to produce and manage a MMOGs

4.4.5) Expansion Culture

Expansions are add-ons to existing products, their main purpose is to add a substantial amount of content to an existing game. Often the developers will charge some money for the expansion, while on the surface this looks like a good way to extend the game while funding developer activities, unfortunately the promise of extended game play, more features, items and character skills rarely lives up to expectation.

23 Asherons Call 2 (Microsoft) : http://www.microsoft.com/games/ac2/default.asp?c=0
24 Everquest 2 (Sony Online Entertainment) : http://everquest2.station.sony.com/
25 Lineage II (NCSoft) : http://www.lineage2.com/

The primary problem with the expansion culture that has been adopted by many MMOG developers, is it adds an extra cost on top of reasonably high subscription charges, the promise of new content and new areas to explore often entices people to return to the game just to play the new expansion. Unfortunately more often than not these returning players are disappointed because the game has not drastically changed since they last played it.

Another solution to adding content to a game, that has been employed by some of the more visionary companies such as Crowd Control Productions (CCP) who slowly release content into their game EVE:Online, additionally the new features are released as parts of a tie into a huge story arc.

4.4.6) Virtual Reality

In the Star Trek films created by Gene Roddenbury, there was a device known as a "holo emitter" that had the capability of re-processing photons (light) to create solid 3D objects and avatars that humans could interact with, when combined with the advanced artificial intelligences that are an integral part of Star Trek a "Holo Deck" is created. A "Holo Deck" is essentially a three dimensional visual display unit.

Within the films and series in the Star Trek franchise there are a number of times that the occupants of the Star Trek universe have used the Holo Deck for a number of purposes, realization of engineering models, training for real life situations and playing multi-player games. Although the "Holo Deck" and its component "Holo Emitter" is a fictional technology it is a reality that some interface mediums other than those which we are accustomed to at the moment are going to be come available in the future.

With different technologies, comes different options and challenges for MMOG developers, the ability to totally interact with a Virtual World is a very appealing prospect to many games who feel like their hands are tied to their desks and they are unable to realise the full potential of a virtual world. The technology to actually produce a 3D working model of a virtual world and project it in such a way that the objects and other avatars can be manipulated just by contact, is a long way away. However other technologies such as 3D glasses, not only a working technology but a product(XForce 3D Glasses), which project a different image into each eye giving a stereoscopic view of the three dimensional objects within the game.

Although 3D projection equipment can deal with the visual aspects, what you see and hear is only half of what the world actually consists of, there are your other senses touch for discovering the temperature, texture or weight and for feed back from events such as gun recoil. In the film Minority Report[26] the main character played by Tom Cruise uses a special glove to manipulate a surround screen with information, the glove controlled the screen, when the screen could not be controlled the glove would provide feedback to tell the user the end of the screen had been hit.

26 Minority Report (20th Century Fox and Dreamworks Pictures) : http://www.minorityreport.com/

A final point brought up by the Star Trek parallel is the concept of safety, if the objects in the virtual world can be held and touched as if they were real, what happens about virtual bullets, are they also able to be fired from a gun to kill a human? Or are they disabled in some way, what if this was overridden for some nefarious purpose? There are many ethical questions involved with realistic Virtual Worlds, unfortunately these are out side of the scope of this paper.

4.4.7) Player Immersion

Immersing players into a video game is what MMOGs are about, instead of using traditional artificial intelligences to provide the player with a challenge the games developers for Massively multiplayer online games create a world for players to choose whether to fight each other, taking the risk of losing to a human combatant of fight the non playing characters. It is because if this diversity that MMOGs have become so popular, the human touch that other human players give a game goes a long way to improving the immersion of the game.

Many players of modern MMOGs use separate voice communication software to talk to each other while they are in game, a number of MMOGs have similar technology built into their game engine enabling commanders to instruct their squads in PlanetSide and guilds to coordinate an attack on a monster in EverQuest 2.

Surround sound helps aid immersion of players by making them feel like the sound is coming from around them, giving the player the ability to tell where a combatant or monster is coming from just by hearing them, thus pulling the action away from the computer and into the surrounding environment.

Why do players want to be immersed in virtual worlds? It is a form of escapism, an attempt to hide from the world and the life that the live in the real world and enter a alternate universe where an alternative character can be played out. This is why Role Playing Games are a success because they immerse the user in the world surrounded by lore and stories explaining the history of the world that they exist in.

4.4.8) Future Players

As games become more and more of a social pass time, it is getting more acceptable to play a Massively multiplayer game with a group of friends than ever before. This new acceptance fuels the fledgeling market pushing it into a new world. Is this going to change future gamers? They will of grown up with virtual worlds being a toy something to do, this could mean their attitudes towards MMOGs may be more superficial choosing the prettiest or most realistic looking virtual world.

Another eventuality that future gamers may be able to play multiplayer games as a sport, a gladiatorial battle between hundreds of competitors from all over the solar system, a game of tennis between the reigning Mars champion and the reigning Earth champion via Yahoo! Broadband? It is not a reality yet but it is a possibility.

4.4.9) The future in short

Essentially the crux of this chapter is to show that MMOGs have many different and variable futures, there is no miracle invention round the corner. The current limitations of MMOGs are:

- Server Hardware – with such a huge number of players playing on one server, it is financially infeasible to implement many of game play aspects that off-line games have, in the future hardware will get cheaper and games will employ more scalable coding techniques to implement the game play elements.
- Client Hardware – users machines today are primarily multi-purpose machines they are not designed specifically for computer games, they are designed to run word processors, spreadsheets and databases as well as entertainment products like games and DVDs. In the future the client technology might be dedicated, for example a VR suit rented from the publisher of the game as part of your subscription.
- Network Hardware – a huge stumbling point for MMOGs is their inability to utilize the fastest technology. connecting client and server together because they have to cater for the lowest common denominator, forcing many design aspects of a game to be downsized of removed entirely from the final product.
- Social Aspects – it is considered to spend a large amount of time in front of a computer, and many people who have not grown up with the Internet, don't see the possibilities for communication and socialization that MMOGs provide, as a new generation of Internet born children grow up and gain positions where they can influence the MMOG market more and more social games may turn up.

4.5) Summary

This paper has investigated a number of possible futures for MMOGs, there is no way of seeing a direct path that MMOGs might take. It is largely going to depend on the state of the technology, MMOGs are high demand applications and as such will push the development of the hardware to support them. In turn this will increase the demand for newer better MMOGs to run on the new hardware, this cycle is sure to keep pushing the boundaries of what is possible.

The future holds a huge amount in store for MMOGs the technical limitations placed upon the games in the present time are going to be moved as technology improves. 3D graphics will improve, human-computer interaction devices will change and evolve, and social views of games will no doubt change.

5) Conclusion

From the time that Roy Trubshaw wrote the first incarnation of MUD, through the release of the first commercial Virtual Worlds like Ultima Online and Everquest to the cutting edge Massively Multiplayer First Person Shooters PlanetSide and Face of Mankind. This paper has charted out the text based origins of MMOGs through to the incarnation of the first graphical virtual worlds.

The paper has tried to make some prepositions as to the future of the market and the games themselves there is a limited amount that can be said about the future for it has not happened. However, since game development first started for computers hardware has attempted to stay one step ahead of the games industry so as to provide the best graphical, audio and tactile feedback that the player expects.

Software tools such as BigWorld Technology's products, are going to help get the most out of current hardware, due to the fact that the engine can be constantly developed between uses, as development of the game engine does not stop when the game has been implemented.

It is only fair to conclude that the trend of games fueling hardware development and hardware in turn fueling games will continue on. Thus the future of Massively Multiplayer Online Games will most likely be tied to the future of graphics, hardware and tactile hardware.

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