Cheating and Virtual Crime in Massively Multiplayer Online Games

Crime in the online gaming world offers a glimpse of security challenges to come.

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INTRODUCTION

The growth of the Internet over the last decade has led to the emergence of a multi billion dollar online gaming industry. A huge variety of games can be played on the Internet. Massively Multiplayer Online Games (MMOG) have become a powerful force behind the rapid growth of the online gaming industry. The revenues from the MMOG industry were estimated at $8bn in 2006. Blizzard Entertainment, publishers of the popular World of Warcraft game, claims to have over 9 million players[1]. A recent add-on to the World of Warcraft game, called World of Warcraft: The Burning Crusade, became the fastest selling PC game of all time with an astonishing 2.4 million copies sold in the first 24 hours.

It is a very lucrative business. The owners of Blizzard, Vivedi Games, had revenues of almost $1 billion in 2006. More recently, in December 2007, Vivendi Games announced a merger with Activision (another gaming company) – worth $18bn, thus creating a company with a combined revenue of around $3.8 billion.

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WHAT ARE MMOG?

Massively Multiplayer Online Games are based on traditional PC or console games, such as role playing games or first person shooter games, but are played across the Internet. Using the Internet for game play has provided an extra dimension for players. MMOG allow players to collaborate or pit their wits against tens of thousands of other players located globally. Huge online gaming communities have emerged from MMOG, where players can interact with each other and form friendships whilst playing the game.

By far the most popular genre of MMOG

[1] Source: http://www.blizzard.com/press/070111.shtml

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is MMORPG (Massively Multiplayer Online Role Playing Games). MMORPG involve players adopting the role of a fictional character who resides in a virtual fantasy world, designed and hosted by the game provider. This world exists and evolves on a permanent basis, even when the player is away from the game. By controlling the actions of their character and roaming the fantasy world, players earn money and develop skills through the trading of items or completion of certain tasks, such as the killing of opponents. Certain tasks may only be completed via co-operation with other players, which serves to develop the community spirit.

VIRTUAL ECONOMIES

MMORPG have not just led to money being made by the game makers. These games have given rise to the phenomenon of virtual economies, where players pay real, hard currency for in-game, virtual items. Items earned through gameplay, such as weapons, are bought for hard currency through websites, in order for players to increase the power of their characters, and thus progress through the game at a faster pace.

Edward Castronova studied the Everquest MMORPG and found that the Gross Domestic Product (GDP) of the Everquest virtual world was larger than Bulgaria's![2] This seems completely bizarre – how can a computer game world have a GDP greater than a country with approximately 7 million people?

Everquest players take on a profession within the game, and once they have acquired sufficient skill in their profession they can produce virtual items which they trade with other players. For example, iron ore can be smelted into iron, then a sword made out of it, which can then be sold for a profit. This mirrors economic activity in the real world, and leads to "virtual world GDP". However the relationship between virtual and real economies runs deeper than this. Players of MMORPG invest considerable time and effort in order to accumulate virtual items and move up levels. To use an age-old adage, "time is money". Virtual game items possess real economic value – players who don't wish to spend hours playing the game in order to get virtual items can buy them for real money. There have been cases of virtual items being sold for thousands of dollars –

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[2] Castronova, E. Virtual Worlds: A First-Hand Account of Market and Society on the Cyberian Frontier, CESifo Working Paper no. 618, 2001. <http://papers.ssrn.com>.

an island in the Project Entropia game was sold for $26,500! It has been estimated that worldwide annual sales of virtual items exceeded $800m in 2005. $800m for sales of items which don't even exist – not bad!

MAKING MONEY FROM MMORPG

In some MMORPG, virtual item trade is encouraged and supported. An example of this is the game Second Life (http://secondlife.com). The makers of Second Life, Linden Labs, allow any virtual items created by a player to belong to that player. This allows players to create, trade and profit from virtual items as they please. Linden Labs' approach to virtual items is in contrast to other game developers, who explicitly state in their End User Licence Agreements that virtual property belongs to them. Second Life has its own currency, the Linden dollar, with an exchange rate of about 500 Linden dollars to $1.

Many game publishers have attempted to ban virtual item trading in their games, as many legitimate players believe it gives an unfair advantage to well-off players. After much pressure from game publishers, eBay, the largest trader of online game articles, agreed to ban virtual item trading in 2007. However, this has not stopped virtual item trading from flourishing in other places.

Much of virtual item trade is now done through middlemen, with Internet Gaming Entertainment (IGE) being the largest. IGE has an agreement with Blizzard to sell gold and levelling facilities for World of Warcraft. Levelling is where a player hands over his character to a company who takes the customer's character, and plays it constantly for a fixed period to increase the player's level or amount of gold. For example a website http://www.ilevelu.com will increase a player's level from level 1 to 50 in the Lineage II MMORPG for a price of US$325.

IGE has around 100 suppliers – experienced gamers who accumulate virtual items and sell them to IGE. IGE's customers are players wishing to buy virtual items or move up levels. Lots of other less legitimate middlemen websites appear and disappear with regularity. These websites are less scrupulous about the source of their virtual items. Using middlemen makes it easy for players to indulge in what is known as Real Money Trade (RMT) – making real money through playing MMORPG and selling the virtual items accumulated to the middleman in return for cash.

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The potential for RMT through playing MMORPG has attracted the attention of people eager to make a fast buck. Trading of game items for real money has led to criminal gangs seeking to exploit MMORPG and the players who play them.

VIRTUAL CRIMES

- **Farming – sweatshops**

Due to the ease at which virtual items can be traded for real money, there is a clear incentive for people to attempt to accumulate as many virtual items as they can. This has led to the rather alarming growth of "virtual sweatshops". These are gangs of people employed specifically to play MMORPG for often little money, with the sole purpose of "farming" as many virtual assets as possible. Some of this farming is done for RMT, to supply middlemen with gold. Other sweatshops are run for the purpose of providing gold and levelling facilities for players, whilst for some profit is the goal.

Game publishers and players frown upon virtual sweatshops - although playing the game 24 hours a day, 7 days a week is not a violation of the rules, virtual sweatshops can spoil enjoyment for other gamers. Sweatshops which provide levelling and gold facilities are considered unfair by legitimate players, as a player's financial position can be used to advance them through a game.

- **Stealing virtual property**

Rather than spending many hours playing the game trying to accumulate virtual items, why not steal them off someone else? The easiest way to do this is to capture someone's online identity, by stealing their user id and password. This is the method of choice for many cheaters – many players choose weak passwords. Once these are obtained, that player's character can be stripped of their all possessions which can then be transferred to the thief and sold.

- **Malware**

Malware, such as Trojans and keyloggers are used by attackers to steal player's credentials. A study in Taiwan noted the case of 20 players who had their credentials stolen in an Internet café after the owner of the café had installed keyloggers on the machines.

Trojans have been specifically created to obtain credentials for MMORPG. More sophisticated Trojans, such as InfoStealer. Multigame, steal credentials for a number of

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different MMORPG. To make information useful to the attacker, this Trojan sends the player's level and amount of virtual money to the attacker, allowing them to focus on the player's accounts with large amounts of virtual money.

A group of Korean hackers were arrested after stealing 50,000 user IDs by installing Trojans on websites they had compromised. By visiting these websites users would inadvertently be infected with the Trojan. According to Sophos, one of the perpetrators is estimated to have made $150,000 from the scheme.

- **Virtual mugging**

Yes, you can even be mugged in a computer game! This term was first coined when a Chinese man was arrested in 2005 on suspicion of using a bot to carry out a series of muggings in the Lineage II MMORPG. He used a bot to beat up and rob characters, and then sold their possessions for real money. There have also been reports of virtual extortionists who threaten weaker players into handing over virtual or real protection money to avoid negative consequences!!

- **Cheating**

A serious issue facing the developers of MMORPG is the issue of player cheating. Cheating by players giving them an unfair advantage over others results in the degradation of the gaming experience for legitimate players. This problem is exacerbated if no adequate methods are found to detect and sanction cheating players. This will encourage more players to cheat as the chance of being detected or punished is negligible. Evidence has shown these legitimate players will quit the game, thus reducing the numbers of subscribers and the publisher's revenues, and this will affect the long term reputation of the game. This could have serious ramifications for the industry as a whole. Cheating represents a serious threat to the MMORPG industry. If cheating becomes rampant, reduced player numbers will affect the whole industry.

The opportunity for RMT is a powerful incentive for players to look for ways to cheat to accumulate virtual property which they can then sell on. Cheating can take many different forms. "Traditional" forms of cheating such as exploiting a bug or loophole in a game occurred in the game Habitat. A programming error meant that players

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were able to sell virtual items to a pawn shop for more than they paid to buy them from a vending machine. By purchasing from the vending machine and selling in the pawn shop, some players became overnight dollar millionaires.

Bots have become an extremely popular way to cheat. Bots are programs that play the game on behalf of a player. In MMORPG, bots are used to automate the boring parts of the game. Since virtual assets can be traded for currency, it is lucrative for players to accumulate as many virtual assets as possible. By creating bots which "farm" virtual assets, this goal can be achieved.

Using a bot provides a clear advantage to a player. Bots can run forever, without getting bored or tired like a human. The use of bots has become widespread in MMORPG, with a continuous "arms race" between bot developers and game publishers. Game publishers have taken drastic measures to counter bots. The publishers of the Lineage MMORPG employed 150 game "minders" whose sole job it was to monitor the game for bot use, and ban the players involved.

DETECTING CHEATS - CONTROVERSY

Game developers have begun to take measures to detect bots and cheating exploits. PunkBuster is an anti cheating tool designed by Even Balance which does just this. It is based on a client/server architecture. The client runs on the player's machine whilst they are playing the game, and the server software runs on the game publisher's server. PunkBuster operates in a similar manner to anti-virus tools: it scans the player's computer whilst they are playing the game, looking for known cheats and exploits. Periodic status reports are sent to the PunkBuster server, and if suspicious behaviour is detected, a violation is raised, which can cause a player to be removed from the game. PunkBuster also has a facility which allows administrators to request screenshots of currently connected players. These screenshots are then transmitted and stored on the PunkBuster server. Screenshots are used to provide evidence of cheating. But the ability to take screenshots of player's screens raises privacy issues.

Blizzard has created a proprietary anti-cheat tool for World of Warcraft, called the Warden. The Warden has aroused considerable controversy over how it operates. The Warden keeps an eye on every PC running World of Warcraft and tries to determine

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whether it is being used to cheat. Greg Hoglund, a software security expert and author of a book on rootkits, reverse engineered the Warden to examine its behaviour in more detail. Hoglund found that the Warden looked into all the running processes on the player's PC, scanning the code loaded for every running process. He descibes his experience:

"I watched the Warden sniff down the email addresses of people I was communicating with on MSN, the URL of several websites that I had open at the time, and the names of all my running programs, including those that were minimized or in the toolbar. These strings can easily contain social security numbers or credit card numbers, for example, if I have Microsoft Excel or Quickbooks open with my personal finances at the time."

The Warden has aroused controversy regarding the private nature of the information it captures from player's machines. There is no guarantee how Blizzard uses the data that it gathers, how long it is kept or even how safely it keeps it. Having such rootkit-like software resident on a PC represents a cause for concern – if Hoglund's experiences are true, then companies whose employees use their PCs to play MMORPG risk having their private data sent to Blizzard. The Warden may also be the tip of the iceberg – rootkits by their very nature are difficult to detect, so many more MMORPG could be using them to check on players' behaviour completely undetected.

CONCLUSION

The Internet has revolutionised the face of gaming allowing players to play against thousands of others across the world and leading to the growth of MMORPG into a multi billion dollar industry. The popularity and addictiveness of these games is reflected in the trading of virtual items from these games. Players are willing to pay money (sometimes substantial amounts) for things which don't even exist. The prospect of making money through playing a game has led to an increase in cheating by people wishing to make a quick buck. Cheating is a serious problem for game makers, as games rife with cheaters discourage legitimate players. Game makers have taken measures to prevent this by deploying programs which monitor player's computers. The nature of these programs has caused controversy in some quarters due to their intrusive nature.*

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Ron Condon has been writing about developments in the IT industry for more than 30 years. In that time, he has charted the evolution from big mainframes, to minicomputers and PCs in the 1980s, and the rise of the Internet over the last decade or so. In recent years he has specialized in information security. He has edited daily, weekly and monthly publications, and has written for national and regional newspapers, in Europe and the U.S.