PIRACY AND THE PC

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Introduction

Illegal copying of products has been around for many years. Before the Personal Computer (PC), VHS videos and music cassettes were being copied and sold illegally in markets and through other sources. 1"…in the 1980s, VHS piracy reached an estimated $100 million in copyright losses worldwide" With the introduction of the PC's and their associated software, including games used for PC's, another area of pirating opened up.

With constantly advancing technologies and new hardware for the PC not only can pirated software be obtained for PC's but pirated music and movies can also be produced.

Computer Piracy today is said to be costing the software industry over 10 billion dollars and 2"…the Business Software Alliance (BSA) has reported that in 2001 about 40% of the software in use globally was pirated." Film companies are losing £400 million and the music industry's International Federation of the Phonographic Industry (IFPI) announced that global sales of recorded music had dropped by five percent and 5"The decline meant that 2001 was the first year when sales of CDs were lower than the year before since they first hit the shops in 1983." It has also been reported that 4"…an estimated 3.6 billion songs are illegally downloaded each month in the United States." These figures are causing great unease for the companies with interests in these industries. Even though these companies are trying to make their products secure most of will find their products will end up on the black market.

1. Aim

The Aim of this piece of research is to look at which products are pirated for PC's, how these products are being pirated using PC's and how new technologies are being used to aid pirating. Another area considered will look at how companies are trying to tackle the problem of piracy and will examine which methods of defeating piracy are successful and which are failing. It will also investigate which groups of people are committing piracy and why they are doing it.

2. Background

2.1 Piracy before the PC

As stated in the introduction, piracy has been a big problem for some industries even before PCs came onto the market. As early as the 1980's the music and movie industries were losing substantial amounts of revenue due to piracy. Although they tried to stop it, many copied albums and films ended up on the market each year. There was little that the companies could do

Videos had the copyright laws shown first, then a government clip about pirated videos and also, for authenticity, there would be a hologram sticker on the video. All these strategies are good and prove that a video is an authentic original. Unfortunately people go to market stalls and buy very cheap albums and films. They probably know that they are buying illegal copies but will not report what is happening as the price is attractive. Not only were released videos being copied but also pirates were getting video cameras into cinemas and filming new films and then releasing these onto the black market. This enabled people to obtain copies of films prior to their release in their home country.

Attempts were made to crack down on the activities of pirates and there was some success in America. However this did not stop the import of pirated material coming in from other foreign countries where little action was being taken by law enforcement agencies to stop piracy.

3.2 How the PC has developed through time

When personal computers first came on the market in the late 70's they were very basic machines. Most had only a floppy disc drive, 1 kilobyte of ram and 1 megabyte of memory. These early PC's ran word processing software and other tools useful for businesses.

Since then there has been growth in processor speed, ram size and hard drive size. This has lead to software becoming more advanced also growing in size and complexity. There have also been new technological advances that have aided the growth of the PC, an example of this is the CD-ROM. While software was becoming more advanced it was also increasing in file size, this meant more floppy disks where needed for installation. With in the introduction of the CD-ROM putting software onto floppies was made redundant (a floppy disk holds 1.47 megabytes while the first CD-ROMS could hold 640 megabytes.). This gave companies much more space allowing them to put more information into software packages. At this time too sound cards where being released for PC's which enabled PC's to produce a good quality sound output. With these products on the market, the multimedia PC was born. These new PC's were capable of playing music, videos, games and running new varieties of software like encyclopedia programs that are rich in information and pictures. The PC had become device for learning and leisure as well as work. The next big step forward was the modem. This device allows computers to connect to each other through the telephone network and also allow computer owners to access the Internet. The Internet at this time was quite basic and mostly text based with few pictures, but as modem speeds rose, more detail could be put onto websites like pictures, sounds and low-resolution film clips.

Computer technology through out this time was evolving so fast that a new PC system could be obsolete within months of its release. Although 'top of the range' PC's were expensive, PC's that were still relatively new were being

traded in for the latest model and the ‘old’ model became something that the average family could afford. A boom of PC’s in the home, school and workplace started. Today it is estimated that there are 600 million people online.

3.3 Legal Rights for Copying Media

This quote is from The Information Technology Association of America 6“According to the survey, 82 percent of U.S. consumers believe it is legal to back up software and prerecorded music CDs. Seventy-five percent of consumers believe backing up video games is legal and 73 percent of consumers surveyed believe making backup copies of prerecorded videotapes and DVDs is legal.” This statement shows that not everyone is entirely sure about the legal position with regard to backing up legally purchased items. The reality is that current laws are vague and companies are pushing for strict control over consumer copying behaviour.

The main law covering this area is the copyright law. This law was first enacted in 1709 when publishers were up in arms about the loose replication and sale of books without proper compensation to the owner. England's Queen Anne accepted the first Parliamentary copyright law, the Statute of Anne. It gives copyright holders (defined as authors or another authority with proprietary rights to a written work) exclusive rights to distribution and copying for a period of 20 years. This law is now used by poets, painters, novelists, dancers, directors, actors, musicians, singers, and songwriters to protect their interests.

The copyright law is still same today. If someone copyrights their work, then it is illegal for some else to copy the work and profit from it without the owner’s consent.

In the late 70's the notion of software was only a few years old. Software was not really protected as a published entity or as intellectual property until 1980 when the Computer Software Copyright Act of 1980 was created. This defined patent and copyright laws for software. Software is considered the intellectual property of the author or company that has created it. This meant that the owners of the software could now prosecute those who copied software illegally.

However if some one has purchased a product under the copyright law they are allowed to make a copy for personal use. 7"Did you ever make tape recordings of your vinyl records so you could listen to your tunes in the car? A concept in copyright law known as *fair use* makes such activities legal: You can make copies of copyrighted material for your own personal use." A web site called Digital Consumers (www.digitalconsumers.org) has been set up to protect fair-use rights in the digital world and they list what you can do under the fair-use policy (Appendix 1). The two most important rights in this list are "8Users have the right to make backup copies of their content." This is in case your original copy is destroyed and. 8"Users have the right to use legally acquired content on the platform of their choice." This means if you buy a CD you have the right to copy it to minidisc or an MP3 player to listen to it.

As computers and technology have advanced more laws have been introduced. In 1992 the Audio Home Recording Act of (AHRA) was passed. The Recording Industry Association of America (RIAA) quotes 9"In general, the AHRA covers devices that are designed or marketed for the primary purpose of making digital musical recordings. Digital audio cassette players, minidisc players, and DAT players are devices covered by the AHRA. This law will also apply to all future digital audio recording technologies, so Congress will not be forced to revisit the issue as each new product becomes available." Another policy of this act was 10"AHRA requires manufacturers of digital audio recorders and blank digital discs and tapes to pay royalties to the United States Copyright Office ("Copyright Office") for the benefit of

eligible artists and sound recording copyright owners." This was put in place to compensate for the revenue lost on copies being made. These laws also apply in UK.

Another Act has recently been passed and it is causing many problems. The 1998 Digital Millennium Copyright Act (DMCA) has now 11"made it illegal to bypass security measures and create copies of protected content." This is a good act to help crack down on piracy, but it now makes it illegal for someone to backup a product they have legally bought. This is because these products have security measures on them that will have to be cracked to allow a copy to be made. This means people can no longer benefit from the rights they have been given by the fair-use policy.

This is a matter that still has not been resolved, there are court cases going on battling out this issue. One case is where the Movie Picture Association of America (MPAA is a group created by eight top movie studios) is suing a magazine called '2600: The Hacker Quarterly', for recommending a program on the net that let you watch DVDs on a Linux operating system. The case comes down to the fact that the program recommended has to hack the encryption to allow you to play it on Linux. This goes against the DMCA, but the fair-use policy allows you to translate legally acquired content into comparable formats. This means you have the right to watch it through a DVD player, through a Windows DVD player or through a Linux DVD player. The judge in the end ruled the magazine could not publish or provide online links to a source code that descrambles DVD encryption.

This problem will continue until a clear set of laws are passed that all parties can agree to and abide by, in spite of their conflict of interests.

4. Internet

4.1 The Internet's Involvement with Piracy

The Internet is an excellent way for sharing information and data across the globe, but the problem is how much of this data is legitimate.

When people first started using the Internet is was quite basic and mainly text based, but even then you could find sites that were offering copied software for sale. Cracks (programs that allow you to get around anti-piracy protection put on software) were also available and product keys (serial numbers to activate the software) for software. Another problem arising with the use of the Internet was File Transfer Protocol (FTP) servers. These had been established by Internet Service Providers (ISP) so that users could use them to store files so other people have access to them who are on the internet. This is a good way of sharing files but of course problems came with this. In 1996 there was this report from www.cnet.com 12"The Software Publishers Association, the leading industry lobby for fighting software piracy, has filed a lawsuit against Max Butler… accusing him of illegally distributing software on the Internet. The organization said it filed the suit after receiving a tip that Butler illegally distributed software to friends by uploading it to a file transfer protocol (FTP) site operated by Abwam, a small Internet service provider… This form of piracy is about to become very common because FTP sites are springing up all over the place." They were correct. Many FTP servers were used for pirated software, even if the data was removed from the server or the server was shut down the pirated software could be uploaded to another server. The people doing this would also use chat clients like ICQ (a program) to keep in contact with each other. These allowed them to tell people which servers had software to download and also where to find them. Another advantage of using ICQ was that these people could remain anonymous.

Another form of piracy on the Internet is Warez sites. Warez is the generic online name for digital content such as games, movies or software whose copy protection has been defeated by skilled programmers. These sites mainly supply cracks for programs, serial numbers (product keys) and also links to download whole programs, movies and music. These sites were hosted through an ISP, which meant they could be traced and then shutdown. But some had pieces of their website spread over a number of places making them harder to find. Also some people set up their own website on their PC and kept their machine online constantly, these were much harder to trace. But in 2001 13"The U.S. Customs Service, the U.S. Justice Department and law enforcement from the United Kingdom, Australia, Finland and Norway seized more than 130 computers worldwide between Dec. 10 and Dec. 12 as part of the first overt enforcement action in their 15-month investigation, dubbed "Operation Buccaneer," of a Warez group known as DrinkOrDie." This caused upset in the piracy underground as they realized that they could be caught and punished for what they were doing. However it did not stop Warez and many sites can still be found on the Internet.

A new problem also arose from the Internet, MP3's. MP3 stands for Moving Pictures Experts Group (MPEG) Audio Layer 3, MP3 technology was developed by the Fraunhofer Institute in Germany. This MP3 technology allowed you to copy music from CD's to a PC with a very good rate of compression and with little loss of sound quality. A normal track could be over 50 megabytes while MP3s would be about 5 megabytes. This made music easier to download from the Internet. MP3 encoders are easy to obtain from the Internet and people could start backing up all their CDs. In the fair-use policy people are allowed to have backup copies of products they have bought but it does not mention anything about a third party doing the back up. It may be the case that if a product has been bought legally the purchaser has the right to download that product from someone else to keep as a backup.

Many people started putting MP3s on their websites and printed a disclaimer saying that only people who had bought that music legally could download it. Of course no one could check this, so all these MP3s on the Internet were there for anyone to download, whether they had already purchased it or not. Record companies did not like this as they were losing revenue and people could easily find music they wanted and download it free of charge. The record companies soon started making the ISP with were hosting these sites shut them down. But as this was happening a new Internet program came out called Napster. Napster was the first peer to peer file sharing program. Once installed it was possible to share your MP3s with every one else who had installed Napster and they shared theirs with you. Napster soon became very popular and 19" At its height Napster attracted 60 million users" But Napster used a central server that stored all the song titles that were on the Napster network and this proved to be the Achilles heel of Napster. The record industry soon took Napster to court for allowing illegal trade of copied music. The record industry won their case and the Judge ordered Napster to shut down their central server thus bringing down the entire network. This was the start of the peer to peer file sharing, but programs after Napster, like Gnutella and Kazaa, do not use a central server so there is no way to shut them down. These new file sharing programs also let people share any type of file on their PC. When someone downloads one of these file-sharing programs they can get easy access to pirated music, movies and software.

Another threat is the increased use of broadband around the world. This offers ten times the speed of a normal modem connection. This is worrying the movie industry because people can now download movies with a very good picture quality in several hours. Also large software packages can be speedily downloaded. Broadband also is connected 24 hours a day. Some old modem dial up systems would only connect for a short time, long enough to check e-mails and then log off. People may feel if they are paying for this 24 hour

connection, they might as well use it constantly and download films and software, just because they can.

4.2 The problems the Internet Brings

One of the biggest problems with the Internet is the fact that there are very few people policing it. Some police forces have dedicated units and there are some groups run by individuals with special interests who police certain areas, e.g. paedophilia but they are very few compared to the enormous amount of traffic on the Internet. There is no statutory body whose task it is to monitor illegal activity on the Internet. This means many illegal activities go unmonitored such as piracy, terrorism and pornography. There are bodies in place like the Business Software Alliance BSA who are trying to stop the spread of software piracy over the Internet, but this group can only gather information and then pass this on to special police forces, all of this takes a long time so no real instant action is ever taken.

Another problem is the size of the Internet, as stated before there are an estimated 600 million people online. All these people, through the right paths, have a direct link to download pirated software and other media with no one there to stop them. If all these people used the Internet to obtain pirated software then many Software companies would go out of business.

The Internet is a great communication tool and allows people all over the world talk to each other, but again the pirates can use this to their advantage and can find and talk each other easily. Possibly, people who were cracking software by themselves can now talk to a global community of hackers and find out new ways of breaking the security on software.

4.3 What will the future bring

The next big advance for the Internet is the roll out of broadband to the home user, which is backed by the Government. This is currently happening and in October 2002 the one millionth broadband customer signed up. Broadband should be a good service for home users and companies. Software companies could start selling products online, that the user pays for and then downloads. But as stated at the end of section 4.1, broadband also offers the possibility of downloading pirated films and software at greater speeds.

14 “The Prime Minister, Tony Blair, has announced that every primary and secondary school in the country will have broadband Internet access by 2006.” The roll out of broadband is important to the Government and it may be a useful learning aid for schools giving faster connection to large teaching packages. It may also help small businesses who cannot afford high priced lease lines. There may however be disadvantages to broadband for the home user. If they were limited to the amount of time they were connected to the Internet it might discourage, or even prevent them from trying to download large files like films and software.

The future is going to bring faster Internet connections. Already NTL and Telewest are offering a 1megabyte link for home users. This is double the speed of broadband and means, in theory, that it should be possible to download 1 megabyte in a second. Downloading an MP3 would take only a couple of seconds. One problem that comes with Peer to Peer networks is that it does not matter how fast your connection is. The speed of the connection is governed by the source from which the download comes. If they only have a modem then that is the speed at which the transfer occurs.

5. Storage Media

5.1 Development of storage media

While PC's were growing in speed and memory size there was also a push for companies to develop new removable devices on which to store media. These were designed to be able to handle much more data that the floppy disc. Many products came out and some were marketing successes, an example is the zip drive. First generation discs could hold 100 megabytes and second generation could hold 250 megabytes. These discs were re-writeable but were quite chunky and expensive. Another device released was the Sony 120mb drive, this was nearly exactly the same as the normal floppy drive. The discs were the same size as floppy discs but could hold 120 megabytes. The advantage with this was that the drive could also read normal floppy disks, again the 120 disks were expensive. These drives were good for transporting large amounts of data but made it expensive to back up data.

But the storage medium that was most popular was the writeable CD-ROM drive. When these first came out they were expensive to buy, but they kept up with the computer market, and faster CD writers were being released every year causing the prices to fall. Blank CD's have normally been quite cheap but now they can be bought for under a pound. These can hold up to 700 megabytes. This lets customers back up any CD's they have and also allows them to back up large amounts of data on their PC.

There have been many other types of storage device created to transport data. The portable hard drive allows gigabytes of data to be transported between machines, these are of course quite large devices but it is also possible to buy flash memory cards that are only a couple of centimeters in size and are used to help transport data from digital cameras to PC's. There are also devices than are small enough to put on a key ring that can hold over 100 megabytes and can be plugged into any PC's USB port.

MP3 players have also been put on the market. This did not please record companies, these are like Walkmans that you can put your MP3s onto. Some use mini hard drives in them, others use flash cards. Some only let you store MP3s on them while others will let you store any data on them.

DVD writers are available and like CD writers are coming down in price. They are now available for under £200 and blank discs are getting cheaper as well. DVD's can hold 4.7 gigabytes, it is not hard to predict that soon many people will own DVD writers.

5.2 Use of Storage media with piracy

In the past, floppy discs made piracy easy as it was simple to buy blank floppies and everyone had a device to write to floppies. They could then easily copy software and games and then redistribute these back to other people.

This is the same problem with CD writers but today the amount of money companies are losing due to piracy is of great concern. Like floppy discs in the past CD writers are causing a major problem with piracy. In Appendix 2 it is shown that the number of CD writers in the home is rising sharply each year. Everybody who has a one is capable of copying any of their music or software. As prices are so cheap for blank discs, they could be given away. Some people will do this and might give free copies to their friends. Of course people who pirate CD's normally do it to make a profit. Unlike program hackers who try to crack programs and then distribute them on the Internet, CD copiers have factories to create hundreds of copied CDs at a time. This is a global problem. 16"Ukrainian authorities have destroyed about 30,000 pirated CDs in an attempt to prove they are determined to stamp out copyright piracy" 17" Marine police in south China's Guangdong Province have seized 5.2 million pirated compact discs from two vessels, the biggest haul ever captured in a single case." 18" Hong Kong Police Seize Pirated

CDs…officials said Friday they had seized more than 45,000 pirated compact discs valued at $142,000…seizing more than 20,000 video discs, 24,000 video-game CD-ROMs." These are just a few reports about how many pirated CD's have been seized. The estimate for the number of illegal CDs in circulation is well over 100 million. With CD copying not only are software, music and movie companies losing money but also games console companies. They are losing money as their games that come on CD's are also being copied. These reports show that police are having some success in catching these CD pirates but they are not going to be able to stop this illegal business.

Now that DVD's are a mainstream market product, the Movie Industry already knows that many illegal DVD's are available for public sale. Even though previously people could get movies on CD's these had to be compressed to fit onto a CD, this meant some loss of quality. Now with DVD writers people can obtain perfect DVD copies of movies. Appendix 3 shows that there has been a rise in piracy profits from 1999 to 2001. This could be partly due to the new illegal market in DVD copying but could also reflect the fact that anyone could buy a CD writer as their cost had fallen (between these years DVD writers were still very expensive).

Another way of pirating software has been with Apple's iPod. The iPod is a portable MP3 player but allows any file type to be put on to it and also uses a hard drive as its memory. The hard drive size can either be 5, 10 or 20 gigabytes and can only be used with Apple Mac's. The iPods came with a sticker saying 'don't steal music' but someone had different intentions 20" … a computer consultant from Dallas, was browsing his local CompUSA when he saw a young man walk toward him listening to an iPod…. the teenager stopped at a nearby display Macintosh, pulled the iPod from his pocket and plugged it into the machine with a FireWire cable…he peeped over the kid's shoulder to see him copying Microsoft's new Office for OS X suite, which retails for $500. When the iPod is plugged into a Macintosh, its icon automatically pops up on the desktop. To copy software, all the kid had to do

was drag and drop files onto the iPod's icon. Office for MacOS X is about 200 MB; it copies to the iPod's hard drive in less than a minute." This shows how new technologies can be used for pirating. This extract shows how easy it is to copy software with an iPod, but this is Apple's fault because of their lack of security protection between an iPod and an Apple Mac. Companies will have to become more wary as this year Apple have released an Ipod that connects to PC's, with all the possibilities for piracy that this opens.

5.3 Future Storage Media Products

With technologies always advancing and devices getting smaller we could be hearing many more stories like the ipod one where some one can go to a PC, plug in a small device that could have one gigbyte of memory into the USB port and then easily download anything from that machine.

With piracy of CD's and DVD's, one question to be asked is, why when you release a medium like DVD's do companies release a product that lets anyone create DVD's? This is due to ARHA again 21"…AHRA spells out restrictions on how music can be copied. For instance, Sony MiniDiscs and consumer digital audio tape decks must include a chip (called SCMS) that restricts a digital copy from being re-copied -- nipping redistribution in the bud. However, most of the computer software and hardware that pertains to digital music is not covered by the AHRA, because it is not used exclusively for copying music. So CD burners, MP3 encoders, and computer hard drives do not have to include an SCMS chip." As long as you are using the writing device to do something else than create music there are no restraints to what these decives can do. It does not help that these devices are for PC's, as these are great tools for cracking protection on the new software that comes with these new media devices.

The latest disc technology 22"The nine companies promoting Blu-ray Disc technology--a next-generation recordable DVD format using blue-violet lasers--announced Thursday that licensing will begin Feb. 17. Blu-ray Disc

technology allows for 27GB storage capacities on a single-sided 12cm disc. DVDs hold 4.7GB of data" The industry must consider, when this technology is released, is there going to be the same amount of piracy that there has been with CD's and DVD's?

6. Music and movie piracy

6.1 What is happening with music and movie pricay today?

The music industry is losing revenue due to piracy, as mentioned before the main methods of piracy have been due to MP3's on the Internet and the copying of CD's to be sold onto the black market. Music companies try their hardest to stop the copying of CD's but they have to leave it to the police to investigate and prosecute. But they can try and take action against the companies who are using and endorsing MP3s. The RIAA has already managed to have many web sites which had MP3s on them shut down and also had Napster shut down. They then also filed suits against the first Portable MP3 player, the Diamond Rio, which won the case and was allowed to go on sale. They also tried to sue Lycos web pages for hosting an MP3 search engine.

There are of course two sides to this tale, the RIAA say that MP3's are the reason that CD sales are dropping but on the BBC web pages there is this article. 24"Internet piracy is not to blame for falling music sales, a US research company has said. Record sales are down 15% in the US, but Massachusetts-based outfit Forrester Research, which surveyed 1,000 American online consumers, said it saw no evidence of decreased CD buying among frequent consumers of digital music." Even though the number of people surveyed is not great it could still prove that there are other factors involved in falling CD sales. Maybe there is a downturn in the market or perhaps the music industry did not bring out as many CD's as it the did the preceding years.

Its not just the home user that is downloading MP3's but people at work are also download MP3's 25" As many as 80% of companies have music and video files illegally held on their servers as a result of file swapping programs being used by employees." The employees are not only breaking copyright laws when downloading these, there are probably breaking company policies.

The movie industry claims it is also loosing revenue, due to copied DVD's and downloaded films. 26" Deputy Assistant Attorney General John Malcolm said 500,000 movies a day are downloaded illegally." This is a very high figure and can be put down to a program that is available on the Internet called DivX. This is the MP3 of the movie world and allows films to be copied to a PC. Again like MP3's, DivX has a great rate of compression but still keeps the picture and sound quality. The compression of DivX is so good that it means it is possible to copy a DVD onto CD and most films that are on file sharing networks are around the size of 700 megabytes. These can easily be put on to disc. But its not all bad news for the movie industry 27" Spider-Man Peter Parker and the latest intergalactic offering from the George Lucas stable guaranteed booming box office figures throughout last month, which totalled 12.2m - an increase of 30% on the same period last year, making it the highest June on record since 1972… Such successes represent a growing enthusiasm among the film-going public in Britain, who are visiting the cinema more now than at any other time since 1972, according to the CAA. The first half of this year has witnessed a "phenomenal" growth in admissions, totalling 87.7m, a year on year increase of 25%." This proves that the cinema is pulling in customers. Maybe this is because the experience of watching a film at the cinema is much more enjoyable than watching it on TV at home. At the cinema there is the big screen with a very loud surround sound system ensuring you feel more into the film.

6.1.1 How is this piracy happening?

Music piracy is occurring because so far there has been no type of security block put onto CD's and they have been very easy to copy. Because of this back ups can be created that we allowed to own, but also pirates can exploit this and create illegal copies. The Internet, being a new technology to the public, has come along with no laws about what is permitted and what is not. A lot of people thought they were in the right for having MP3's on websites,

believing that if you can record songs from the radio without any fuss, recording music from the Internet is no different and should be allowed.

Unlike CD’s, movies can have many different methods of piracy. When a new film has just been released some video pirates will go into a cinema with a video camera. It is easy know to when a copy has been obtained this way because the picture and sound quality will be poor. There might also be pictures of, and sounds from, the people who were in the cinema at the time of recording. Another way of getting a pirated copy is when a cinema owner is crooked and will let pirates use his cinema when no one is there. This means the camera can be set properly to get the best view of the screen. Again copies made like this will have poor sound and picture quality. People working at cinemas have been known to take the films at night and then get them copied and return them in the morning. These are normally better quality than when recorded at a cinema but it is still possible to tell that it is video footage of a screen with the film being projected onto it. There has been a way of getting good copies of new films, this is with Oscar screeners. These are films that have come out that year and are up for Oscar awards. Before these were of course on VHS but over the past couple of years the people who receive these screeners are now asking for them to be on DVD format. Historically these screeners always ended up being pirated somehow, and now with DVD writers perfect copies of films can be made even soon after they are released.29” Perfect pirated DVD copies of "The Lord of the Rings: The Two Towers," cloned from special Oscar screener discs supplied by the studios to MPAA members in the United States, are circulating in the United Kingdom, the Federation Against Copyright Theft said. Complete with 5.1 surround sound, the DVDs' only blemish is a "for your consideration" Oscar message that pops up every 15 minutes. “

It is very easy to obtain pirated music and movie products on the Internet. It is possible to find them, to download from a site, or download a file sharing program. To buy these pirated goods you could go to an auction site on the

Internet or go to a town market, sometimes you might find a trader who has a little stall set up on a high street.

6.1.2 What is being done to stop this?

The record companies are putting a lot of money and effort into trying to stop this piracy. The British Phonographic Industry and the Recording Industry Association of America (RIAA) are joining the efforts of the International Federation of Phonographic Industries (IFPI) to stop piracy. IFPI, which has members including the big five record labels EMI, BMG, Sony, Universal, Warner, and 1400 record producers and distributors in 70 countries have announced that they will be taking action against hundreds of infringing sites in more than 20 countries worldwide. The IFPI also said it will target two groups, the people who are uploading infringing material onto the Internet, commonly in the MP3 format, to be then downloaded for free or for payment and Internet service providers who may be hosting illegal Web sites and ignoring warning letters informing them that these sites are infringing copyright. This is the first step. The recording industry has also created the 30“Secure Digital Music Initiative (SDMI). SDMI's purpose is to obtain consensus among the recording, electronics and computer industries on a "unified" standard for the secure distribution of music. By "unified," we mean a standard that will insure copyright and anti-piracy protection for every copy sold, irrespective of the delivery method or the medium (CD, DVD, Flash, and hard drive)”. This organisation would have been good if it had been set up as the Internet started, it could have controlled new technologies as they first appeared.

The recording industry wants to make it harder for consumers to directly copy CDs, but it faces enormous hurdles. First, any barriers to copying must be "backwards compatible" meaning the new technologies would have to work on old CD players that don't screen for pirated material, and vice versa.

A couple of anti-piracy music CD’s were put on the market, one type had been made so there was no way it could be played on a CR-ROM drive in a PC, but could be played on a normal CD player. The other type of anti-piracy CD was made so there were errors throughout the whole disc, these errors where only small and should not have changed how the CD sounded but if it was copied the errors could be detected and the copying would be stopped. But these disks caused great upset with the public. People complained about these CD’s as they felt they infringed the fair use rights that let you play CD’s on any CD player including a PC and let you back up your disc. The CD’s when played, would skip tracks, were worse quality than normal and sometime refused to play at all. European versions of ‘Celine Dion's - A New Day Has Come’ have reportedly caused some computers to crash. In some circumstances the CD was said to cause problems when listeners tried to eject. BMG had to replace some copies of ‘Natalie Imbruglia's - White Lilies Island’, because it did not warn customers that the CD would not play on PCs. It also sparked complaints because the CD would not work in some older stereo systems and did not function in DVD players with audio CD capabilities. These first copy protected CD’s did not just affect the users but radio too. 31”It looks like this copyright CD mess the record companies are trying to foist on us is having another unintended effect. It seems some radio stations may not be able to play them either. As many store and play music from PCs, the stations have decided that if a CD doesn't function they are not going to go through any additional effort to make it work. They will simply chuck it from the playlist.” This of course could ruin the chart success of a song if it does not get enough radio air-time. These discs were taken back and the problem is being looked into.

Microsoft has just released some new software aimed at stopping piracy of CDs. The Windows Media Data Session Toolkit allows record labels to put songs onto a copy-controlled CD in multiple layers so that the disc can be played on a stereo and a PC. The software has been adopted by the world's largest independent CD manufacturer, MPO. It said the record labels

Universal and EMI are very interested in it. Microsoft says its software gets around the problems experienced by previous methods of protection by having different layers. The PC layer, laid digitally on a music CD, could be modified to prevent a computer user from burning songs onto another CD. Hopefully when these CD's come out there will not be as many problems as before.

Another piece of software has been created,. SoundJudgment is a tool for organizations that need to control MP3 files on their corporate network, such as corporations, universities and government agencies. SoundJudgment detects music files and the desktop sharing-software used to swap them. When SoundJudgment finds such items it takes a prescribed response to the files, such as reporting, e-mail notification, or optionally, deletion.

The movie industry is also coming up with way to stop piracy occurring. To deter would be thieves and pirates, Mission:Impossible 2 film cans were labeled "Doll House" when originally shipped to theatres. There is also a website at www.reportpiracy.co.uk which has been set up to help cut down on piracy. Some technologies are being developed to help stop films being recorded at cinemas.

Some technologies are being developed to help stop films being recorded in cinemas. A company called Cinea won a $2 million government grant to further develop its Cosmos digital cinema security system, software, and hardware. The package will help studios keep track of how their movies are used while protecting the movies from being filmed. Cinea says its technique modifies the timing and modulation of the light used to create the displayed image, so that frame-based capture by recording devices is distorted. This is like interference bands seen when shooting a computer screen with a video camera. This usually shows lines that are invisible to the shooter's eyes but are an inherent aspect of camcorder technology. This will prevent anyone using any recording made as it will be distorted.

6.2 Can this industry profit from the Internet?

If record companies had controlled the use of MP3s, when the technology first came out, they would have been able to establish constraints. They could have developed means of preventing people from being able to copy their products or devised a way to stop it being posted back on the Internet. They could have used this software to allow people to buy tracks and albums through the Internet and then download them. But this is not the case. Even though the MP3s are associated with piracy they may be being used legitimately. At www.mp3.com it is possible to download free music that people have made and are freely distributing. If the record companies ever manage to solve the problems of piracy with MP3's and CD copying then they should be able to make a good profit from the Internet. However, no matter what they devise there are always people who will find new ways of getting music onto PC's and then onto the Internet.

The movie industry has been lucky as they have been able to watch what has happened to the music industry as it faced the problem of Internet piracy. The movie companies: Sony Pictures, Warner Bros., Universal, MGM and Paramount, five of the seven major studios, have backed a new website called Movielink. This allows people to download the latest video releases for a couple of dollars. The films have the best sound and picture quality. It also has very fast download speeds of up to 380 kilobytes a second. Once downloaded you have 24 hours to watch the video as many times as you want. After this it is not possible to view it. This is hopefully is going to hinder the pirating of films as people will not mind paying a little money as the download will be much quicker and the film will be of higher quality. The downsides to this are that people with a modem connection cannot connect as it would take too long to download the films, also it is only available in America.

7. Software and Games

7.1 What is happening with Software and game piracy?

As mentioned at the start of this document nearly 40% of software in use around the globe is pirated. There are five common types of software piracy. Firstly there is end user piracy, this occurs when a company employee reproduces copies of software without authorisation. End user piracy can take the following forms: using one licensed copy to install a program on multiple computers, copying disks for installation and distribution,

acquiring academic or other restricted or non-retail software without a license for commercial use and finally swapping disks in or outside the workplace. Secondly there is client-server overuse. This type of piracy occurs when too many employees on a network are using a central copy of a program at the same time. If there is a local-area network and programs are installed on the server for several people to use, checks should be made to ensure that the license entitles this type of use. If more users than allowed by the license are operating on it that is "overuse". Thirdly there is Internet piracy. This is when software is downloaded from the Internet. The same purchasing rules should apply to online software purchase as for those bought in traditional ways. As explained before Internet piracy can take various forms. There are pirate websites that make software available for free download or in exchange for uploaded programs, like Warez sites, Internet auction sites that offer copied software, infringing copyright software and Peer-to-Peer networks that enable unauthorized transfer of copyrighted programs. Fourthly there is Harddisc loading. This occurs when a business who sells new computers loads illegal copies of software onto the hard discs to make the purchase of the machines more attractive. Finally there is Software copying, this type of piracy is the illegal duplication and sale of copyrighted material.

The PC games industry also suffers from piracy, mostly Internet piracy but also CD copying. As with music and movies it is easy to go on to the Internet or a file sharing program with pirated software and PC games. Most of these, when downloaded will come already cracked so that when installed they instantly work or will include text explaining how to get the software to run.

The Business Software Alliance BSA has been monitoring piracy for the last decade. Appendix 4 shows a rise in piracy in 2000 and 2001. The BSA claims it was the effects of a worldwide economic slowdown that hit spending on technology particularly hard. Piracy rose in response to the pressure of the curtailed spending during the economic downturn. The rise could also have something to do with the heavy use of file sharing programs.

7.1.1 How is it happening?

When a new piece of software or game is released it will usually have new security measures to stop people copying it. But when it is released it will be leaked onto the Internet and there is a new challenge for hackers to try to crack it. Normally within a few weeks or months they will have succeeded. After this the patch or crack (the piece of software the gets around the security) that the hacker has created will be put on a Warez site and will be freely available to download, probably with the piece of software as well. After this has happened it takes a relatively short time for the software and crack to work its way around the Internet and file sharing programs and counterfeiter rings. Another way that software is distributed is on the front of some computer magazines. They will have demos of software. These demo's will sometimes be cut down versions of the product or the full product with a set time for how long it can be used. This is another opportunity for hackers to show their skills by cracking the time lock on the software and then posting the crack or patch for everyone to use. It may be thought odd to give a whole program away like that on the front of a magazine when the producers know that it could be cracked, but perhaps if a company is

making enough revenue from it business licenses it can afford to give away this program to home users. It will not harm the business if home users are skilled at using the package and then go to jobs saying that they know the package very well.

7.1.2 What is being done to stop this?

The BSA is a group set up to fight against software piracy. They are a group that collects a lot of the information on software pirates and data concerning how much pirated software there is. They have had many successes in defeating the pirates -35 “In one of the largest and most organized cases of European software piracy, the Italian finance police (Guardia di Finanza) supported by the Business Software Alliance (BSA) and the Federation Against Music Piracy in Italy (FPM), have closed down an Internet piracy ring with an estimated turnover of over €60m”. and 36”Amaze Ltd, an IT solutions company based in Liverpool, has paid £28,000 to the Business Software Alliance (BSA). The company was discovered with unlicensed copies of computer software on its company network…company has spent £24,000 on the purchase of software licenses in order to operate legally” The BSA also offers a program called GASP that detects pirated programs on a system and then warns the user about it.

Actions can also be taken in the software to stop it being pirated. Serial numbers or activation keys are now needed for most software. There is also system fingerprinting where an application locks itself to a component on the PC like the CPU, if it then gets copied to another machine it will not work because it was locked to the other CPU. Also another device for stopping piracy is a hardware security device. Hardware-based security keys are physical security devices that must be present for an application to operate. Hardware security keys significantly deter piracy and should be able to be coupled with system fingerprinting for even greater levels of security. Even though these hardware security devices are good, if there is one for each program, there could be dozens to plug in.

PC games makers are also trying to stop piracy occurring. Operation Flashpoint, a game from Codemasters, has anti-pirating software so anyone attempting to play an illegal copy of it will begin with a game that looks and plays just like the real thing. However, over a period of time, the game gradually self-modifies and degrades elements of play to a point where the game is no longer playable.

7.2 What is happening with game console piracy?

There are currently 3 main stream consoles in the market today, Sony Playstation 2, Microsoft Xbox and Nintendo Gamecube. Only the Playstaion and the Xbox are having problems with piracy. Soon after the Playstation 2's release in Japan, a mod chip (a chip to bypass security features on the machine and let copied games be played) had come out. The games were soon being copied and even though the games were originally on DVD's they are being compressed and put on to CD's which can be used with the mod chip in place. The Xbox was also hacked quickly. This was made easier because the architecture of the console is very similar to a PC's and a mod chip was soon released. But after further investigations into the Xbox it was found that a mod chip was not required. All that was needed was to replace the standard retail Xbox BIOS (the chip on the motherboard which tells the Xbox how to behave when it is powered on or rebooted) with a hacked version of the BIOS found in Xbox development kits which will happily boot gold discs, copied DVDs and games from all regions. This requires no hardware modification to the console, someone with the appropriate equipment can open up the machine, alter the BIOS program in a procedure known as "flashing", and you get a chipped Xbox, except with no chip. The Gamecube is the only machine not to have been chipped and this is the console that is lagging in the console market. Could this be because mahines that are that can be chipped are more appealing to consumers? The latest chip that is coming out for the Playstation2 is going to be able to play DivX movies that are burnt onto CDs. It is expected that there will be a rise in the sales of Playstation2

7.2.1 How is it happening?

As was mentioned above when a new console comes out it is soon hacked and the security features are over run. When the Sega Dreamcast came out in 2000, Blockbuster did a deal in America whereby the machines could be hired a month before they were released with a $200 dollar deposit. This seemed to go well as all of them were hired but then most of the Dreamcasts were not returned, they had been taken by hackers. There is a big market for copied console games and getting the machines hacked as soon as possible means more money for pirates. In any market along with the copied music and movies, copied games can be found.

With the Internet and file sharing programs it is also possible to find these copied games and if you have a CD writer you can easily get free games .

7.2.2 What is being done to stop this?

Both Microsoft and Sony are trying to stop production of these mod chips but the companies are fighting back with the claim that the user has a right to make a back up of his game and he will need a mod chip to play these back ups. Distributors defend themselves saying that the chips are not illegal but the pirated titles are. The distributors claim they are not involved with the illegal part. In the end, however, Sony will win because no distributor has enough resources to beat the company in the courts.

The one machine that has beaten the pirates so far is the Gamecube. Instead of using a DVD it has used a different disc. It is like a mini DVD (about 3 ½ inches in diameter) and because nobody has one of these mini DVD writers and cannot go to a shop and buy a mini DVD for under a pound, its seems to be succeeding in defeating the pirates.

8. Which People are doing this and Why?

There are several different types of people indulging in pirating activities. Firstly there are the unintentional pirates who are individuals who purchase software and are unaware of licensing and registration issues. These are people who are not to computer wise and do not know some of the copyright issues of software. Possibly someone who borrows a software program from a friend and then installs it on their machine. These people are gaining from software piracy but are not aware of it.

Secondly there are intentional pirates who can be casual copiers, individuals or organizations that hack and copy software and put mp3 and films on the web, with no intention of financially profiting from this action. These people know they are pirates but feel they are doing something for the users. (like Robin Hoods of the Internet).

Thirdly there profiteering pirates who are individuals or organizations that copy software, films and games with the intention of financially profiting from their actions. These are People who are pirating for a business and are making substantial amount money from it, but also have the high risk of getting arrested.

Finally there is the causal pirate, this is the average PC and internet user, who will grab the occasional MP3 or piece of software if needed or maybe even a film. These are people who don’t mind bending the rules, and presume they wont get into trouble.

9. Is Piracy the Problem?

Asia has highest rate of piracy in the world. In Bangkok, money problems there are so bad that no one ever pays full price for software. It is just too expensive for them. An Oracle database system would cost $25 in Thailand for a pirated copy whereas the real thing would cost around $20,000. Some people say that if the software were cheaper in the first place than there would be no need to pirate it at all. But others feel that if you can't afford to buy the software than you shouldn't have the computer in the first place. It now costs as little as 50 cents to produce a pirate CD. For $10, people can pick up CDs bundled with thousands of dollars worth of illegally copied software. Tumbling Asian currencies are creating huge price advantages, along with declining corporate profits, are conspiring to make software piracy in Asia more tempting than ever. “There is a definite link between a struggling economy and increases in piracy," warns Alex Mercer, an Australian marketing executive at the Business Software Alliance (BSA).

Linux is operating system that is totally free to download and is part of the Free software Foundation (FSF) and of course if all software was free than there would be no piracy.

10. Conclusion

Piracy involves many issues and can not be pin pointed to one problem. A grey area which is causing concern for both industry and consumer is the copyright laws and the fair use rights. New laws should be passed that make it clear what rights the user and the industry have, to stop conflicts from arising. New storage medias that are released should contain a chip, like the minidisc SCMS chip, that stops the device being exploited for illegal copying. A new governing body should be established that supervises new technologies, media industries and the internet, this may help new software to be released legitimately and benefit all parties and users. Nintendo have shown through the Gamecube that it possible to restrict the piracy that goes on in that market. There are people and organizations that will try and hack any new media, for either the Kudos of hacking new software or for the financial benefit. Instead of the media industry suing small companies, for producing software products that infringe on their products, it may be beneficial to converge their ideas together for the shared common interest.

Piracy costs the media millions of dollars, euros and pounds each year. In view of this they should be prepared to finance better protective security and a statutory regulating body.

11. Critical Evaluation

This report has achieved the original aims and objectives that were stated at the beginning of this report. It has also raised other issues that are important in this field. The strengths of this report are that it provides a current insight into computer piracy and the effect it has on the market. It has taken into account most of the industries that are effect by piracy today. Due to the changing environment in which this research is based, it has been necessary to review existing literature and articles on the area using various research methods. It has been necessary to re-visit them through out the duration of the project as developments to the area have been made over the research period. There are areas that could have been enhanced further as the subject area was so large, these included a deeper knowledge of piracy in the past and wider understanding of how this area effects other parts of the world.

The report has a strong structure where each section educates you on an area and builds upon this knowledge. Each chapter has the same outline structure so the reader can easily compare the information they are reading. A weakness in the development of this report was that the majority of sources were from the internet, although some source are reliable (journal articles) some might have been questionable. I could improve this by conducting further research and trying to find books in this area.

The report is a comprehensive piece of work which highlights computer piracy and areas associated with this, it has been of interest to me to develop my knowledge of the area and will hopefully develop the knowledge of those who read it.

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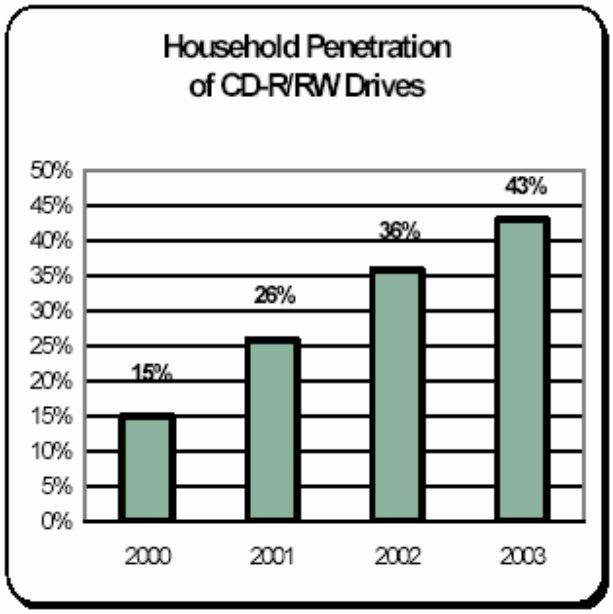
Appendixes

1.



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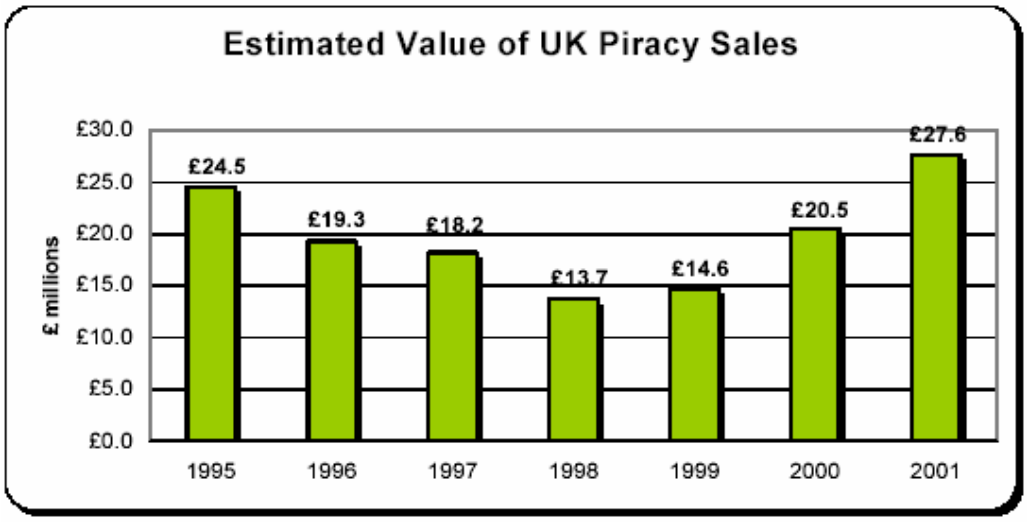

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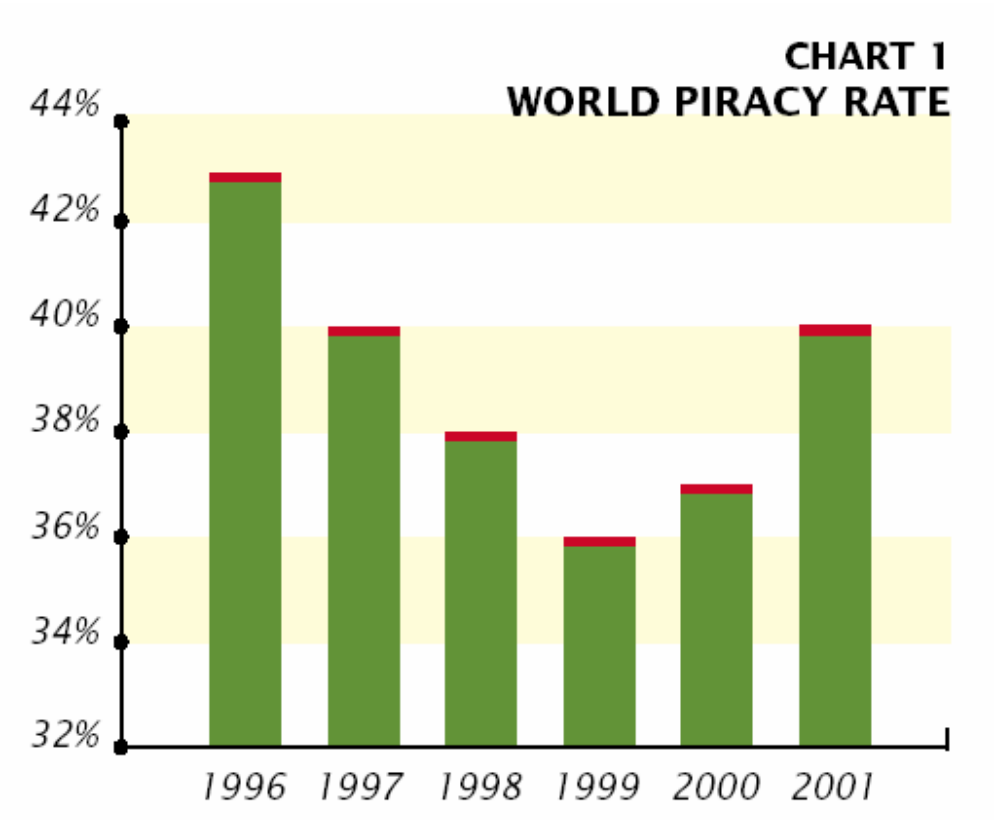
CHART 1
WORLD PIRACY RATE
44%
42%
40%
38%
36%
34%
32%
1996
1997
1998
1999
2000
2001