Economic consequences of software crime

In 1996 worldwide illegal copying of domestic and international software cost $15. 2 billion to the software industry, with a loss of $5. 1 billion in the North America alone. Some sources put the total up-to-date losses, due to software crime, as high as $4. 7 trillion. On the next page is a regional breakdown of software piracy losses for 1994. Estimates show that over 40 percent of North American software company revenues are generated overseas, yet nearly 85 percent of the software industry's piracy losses occurred outside of North America. The Software Publishers Association (SPA) indicated that approximately 35 percent of the business software in the North America was obtained illegally. In fact, 30 percent of the piracy occurs in corporate settings. In a corporate setting or business, every computer must have its own set of original software and the appropriate number of manuals. It is illegal for a corporation or business to purchase a single set of original s!

oftware and then load that software onto more than one computer, or lend, copy or distribute software for any reason without the prior written consent of the software manufacturer. Many software managers are concerned with the legal compliance, along with asset management and costs to their organizations. Many firms involve their legal departments and human resources in regards to software distribution and licensing.

Information can qualify to be property in two ways; patent law and copyright laws which are creations of federal statutes, which are subject to Constitutional authority. In order for the government to prosecute the unauthorized copying of computerized information as theft, it must first rely on other theories of information-as-property. Trade secret laws are created by provincial law, and most jurisdictions have laws that criminalize the

violations of a trade-secret holder's rights. The definition of a trade secret varies somewhat from province to province, but commonly have the same elements. For example, the information must be secret, not of public knowledge or of general knowledge in the trade or business. A court will allow a trade secret to be used by someone who discovered or developed the trade secret independently if the holder takes adequate precautions to protect the secret.

In 1964, the National Copyright Office began to register software as a form of literary expression. The office based its decision on White-Smith Music Co. v. Apollo, where the Supreme Court determined that a piano roll used in a player piano did not infringe upon copyrighted music because the roll was part of a mechanical device. Since a computer program is textual, like a book, yet also mechanical, like the piano roll in White-Smith, the Copyright Office granted copyright protection under the rule of doubt.

In 1974, the government created the Natural Commission on New Technological Uses (CONTU) to investigate whether the evolving computer technology field outpaced the existing copyright laws and also to determine the extent of copyright protection for computer programs. CONTU concluded that while copyright protection should extend beyond the literal source code of a computer program, evolving case law should determine the extent of protection. The commission also felt copyright was the best alternative among existing intellectual property protective mechanisms. CONTU rejected trade secret and patents as viable protective mechanisms. The CONTU report resulted in the 1980 Computer Software Act, and the report acts as informal legislative history to aid the courts in interpreting the Act.

In 1980, the Copyright Act was amended to explicitly include computer programs. It now states that it is illegal to make or to distribute copies of copyrighted material without authorization, except for the user's right to make a single backup copy for archival purposes. Any written material (including computer programs) fixed in a tangible form (written somewhere – i. e. printout) is considered copyrighted without any additional action on the part of the author. Therefore, it is not necessary that a copy of the software program be deposited with the National Copyright Office for the program to be protected as copyrighted. With that in mind a copyright is a property right only. In order to prevent anyone from selling your software programs, you must ask a (federal) court to stop that person by an injunction and to give you damages for the injury they have done to you by selling the program.

The Software Rental Amendments Act was approved in 1990. This Act prohibits the commercial rental, leasing or lending of software without the express written permission of the copyright holder. Another amendment to the Copyright Act was passed in 1992. This amendment made software piracy a federal offense, and instituted criminal penalties for copyright infringement of software. The penalties can include imprisonment of up to five years, fines up to $250, 000 or both for unauthorized reproduction or distribution of 10 or more copies of software with a total retail value exceeding $2, 500 or more.

According to federal law duplicating software for profit, making multiple copies for use by different users within an organization, and giving an unauthorized copy to someone else is prohibited. Under this law if anyone is caught with the pirated software, an individual or the individual's company

can be tried under both civil and criminal law. A Civil action may be established for injunction, actual damages (which includes the infringer's profits) or statutory damages up to $100, 000 per infringement. The criminal penalties for copyright infringement can result in fines up to $250, 000 and a jail term up to five years for the first offense and ten years for a second offense. When software is counterfeit or copied, the software developer loses their revenue and the whole software industry feels the effect of piracy. All software developers spend a lot of time and money in developing software for public use. A portion of every dollar spent in purchasing original softwar!

e is funneled back into research and development of new software.

Software piracy can be found in three forms: software counterfeiting, which is the illegal duplication and sale of copyrighted software in a form that is designed to make it appear to be a legitimate program; Hard disk loading, whereby computer dealers load unauthorized copies of software onto the hard disks of personal computers, which acts as an incentive for the end user to buy the hardware from that particular dealer; and downloading of copyrighted software to users connected by modem to electronic bulletin boards and/or the Internet. When software is pirated the consumer pays for that cost by new software and/or upgrade version being more expensive.

Federal appellate courts have determined that operating systems, object code and software contained in ROMs are protected by copyright. Some lower federal courts have also determined that microcode (the instructions set on microprocessor chips) and the look and feel of computer screens is subject to copyright protection. Which has created major problems for the

widespread development of multimedia applications with regards to clearing copyright for small elements of text, images, video and sound.

The United States Government has been an active participant in protecting the rights of the software industry. When the Business Software Alliance (BSA) conducts a raid, Federal Marshals or local law enforcement officials participate as well. An organization known as the Software Publishers Association (SPA) is the principal trade association of the PC software industry. SPA works closely with the FBI and has also written an enforcement manual for the FBI to help them investigate pirate bulletin board systems and organizations (audits). With the help of the FBI, the result of enforcement actions resulted in recoveries from anti-piracy actions totaling $16 million since the program started in 1990.

The Software Publishers Association (SPA) funds an educational program to inform individuals and corporations about software use and the law. This program provides all PC users with the tools needed to comply with copyright law and become software legal. The SPA also publishes brochures free of charge about the legal use of software for individuals and businesses. Also available to help corporations understand the copyright law is a 12-minute videotape, which is composed of the most commonly asked questions and answers to them. The video tape is available in French and Spanish and all together over 35, 000 copies of the tape had been sold.

The SPA has also compiled a free Self-Audit Kit with which organizations can examine their software use practices. Included in the kit, is a software inventory management program designed to help an organization track their

commercial software programs that are on all their hard disks. The program searches the PC's hard disk for more than 1300 of the most common programs used in business.

Also available is the SPA Software Management Guide which helps companies audit their current software policies, educate employees about the legal use of software, and establish procedures to purchase, register, upgrade and backup computing systems. The guide, in addition, provides an Internal Controls Analysis and Questionnaire. The guide also contains all of the SPA's current anti-piracy materials.

The software industry is facing the challenges of more sophisticated network environments, greater competition among software companies along with hardware manufacturers. At this moment more software than ever before is distributed on a high volume, mass marketed basis. There are many types of software out on the market and the amount is increasing every day. They range from graphical user interfaces for application programs such as mass-market spreadsheets, to more sophisticated technical software used to design integrated circuits. The use of software plays a more vital role in our daily lives than it ever has. Such as embedded software, which is critical to equipment in such locations as a doctor's office or an automotive shop. The instrument and devices found there depend more and more on software, because software provides the flexibility to meet the many different needs to the end user. As our lives our shaped and enhanced more by technology, there is already a greater demand that impacts the software industry.

One of the main concerns of the software industry is how to deal with the issues of software licensing. More and more customers want customized software suited for their business or personal need, and expect the software development firms to accommodate to their wishes. The other side of this issue is that software development firms are concerned with unrealized revenue and excess costs in the form of software piracy, unauthorized use, excess discounts and lengthened sales cycles. For the customer and the software development firm, all of these have high administrative costs in regards to software programs. Software licensing policies were originally a result of software developer's need to protect their revenue base in the face of potential piracy. Product delivery for software is made up of a number of different components, which are referred to as software licensing. The following factors are taken into consideration when determining a cost for a software license; physical delivery pricing, metric discounts, license periods support and maintenance, license management Tech support, change in use bug fixes and Platform Migration Product enhancements.

The most commonly found type of software license found in business is known as a network license. There are four types of categories that are classified as a network license. Concurrent use licenses authorize a specified number of users to access and execute licensed software at any time. Site licenses authorize use at a single site, but are slowly being phased out and replaced by enterprise licenses. Enterprise licenses cover all sites within a corporation because of more virtual computing environments. Node licenses are also slowly being phased out because they are mainly used in a client/server environment, since the licensed software may be used only on a

specified workstation in which a user must log on to in order to access and execute the software application. Currently the trend in a network system is to use measurement software, which allows vendors to be more flexible in licensing arrangements. This management software monitors and restricts the number of users or clients who may access and execute the application software at any one time. This is significant because a user pays only for needed use and a vendor can monitor such use to protect intellectual property. A new type of license that is emerging is known as a currency-based license. This type of license works on the basis that it provides to the end user a specified dollar amount of software licenses. This allows licenses to cover different business application software, so long as the total value in use at a given time is less than the amount stipulated in the license. Another type of license emerging is known as a platform-independent licensing. Which permits software to be used on a variety of different computer systems within a business, instead of buying a different license for each version of the same software used by different systems. The most common type of licensing is known as shrink-wrap, the concept behind this that the licenses terms are deemed accepted once the end user breaks a shrink-wrap seal or opens a sealed envelope containing the software.

A reason for these new types of licensing is that when software licensing was first introduced, the software development firms assumed that most businesses would use the software for a 8 to 10 hour period. Yet, did not take into consideration that with the advancement of technology, more businesses would want a floating license across the world for 24 hours. This made it so it was not cost effective for the software development firm. A

floating license is a license that is made available to anyone on a network. The licenses are not locked to particular workstations, instead they float to modes on the network.

Shareware, freeware and public domain are different types of software available to the end user, and are distinguished by different rules about how programs may be distributed, copied, used and modified. The term shareware refers to software that is distributed at a low cost, but which usually requires a payment after a certain time period and registration for full use. Copies of this software are offered on a trial basis, the end user is free to try a scaled down version of the program. If the end user wants the shareware program, included in the program is information specifying how to register the program and what fee is required. Once registered the end user will typically receive a printed manual, an updated copy of the software (often with additional features), and the legal right to use the program in their home or business. The advantage that shareware has is that it lets the end user thoroughly test a program to see if it's useful before making a purchase. The !

authors of shareware programs retain their copyright on the contents, and as other copyrighted software should not be pirated.

Freeware is also distributed at a very low cost and like shareware is found mainly on the Internet. The authors of the freeware program do not expect payment for their software. Typically, freeware programs are small utilities or incomplete programs that are released by authors for the potential benefit to others, but the drawback to this is that there is no technical support.

Public domain software is generally found on the Internet and is released without any condition upon its use. It may be copied, modified and distributed as the end user wishes to do.

A license manager is a system utility-like application that controls or monitors the use of another end-user application. It is generally implemented to protect intellectual property (meaning to stop illegal copying) and/or to become more competitive by offering new ways in which to evaluate, purchase and pay for software. Since the license manager controls the number of application users, there is not a need to control the number of application copies. This process lets the end user run one or more applications between machines, without violating the terms of the license agreement.

SPA has created a program that companies can use to help discover and correct problems before they result in legal actions, fines and also negative publicity. The eight point program is as follows:

1. Appoint a software manager to implement and monitor all aspects of company software policy.

2. Implement a software codes of ethics for everyone to adhere to. The ethics

should state that copyrighted software, except for backup and archival purposes, is a violation of the law.

3. Establish a procedure for acquiring and registering software. Determine your companies software needs, evaluate software packages, and also have supervisors approve the plans. Keep the lines of communication open.

4. Establish and maintain a software log. The log should state the date of when the software was acquired, the registration of it, serial number, network version, location of where the software is in use, where the original is, licensing agreement and the location of the original disks.

5. Conduct periodic audits or on an as needed basis comparing the software log and/or other purchase records.

6. Establish a program to educate and train your employees about every aspect of software and its uses.

7. Maintain a library of software licenses and provide users with copies of the agreement.

8. Having done the above seven points, the company can benefit by having obtained software legally, receive full documentation, technical support when needed and also upgrade notices.

Patents do not cover specific systems, instead they cover particular techniques that can be used to build systems or particular features that systems can offer. Patent grants the inventor a 17 year monopoly on its use. Once a technique or feature is patented, it may not be used in a system without the permission of the patent-holder even if it is implemented in a different way. Since a computer program usually uses several techniques and provides many features, it can infringe many patents at once. A

computer program is built out of ideal mathematical objects whose behavior is defined, not modeled approximately, by abstract rules. An example of this is when Borland International, Inc. complained that a federal court decision gave Lotus Development Corp. the benefit of patent protection to Lotus 1-2-3 menu commands and their order, but failed to require Lotus to meet the requirements of patent law, including novelty, examination and contribution to the prior art. The Supreme Court sided with the decision that one entity cannot own the user interface to programs. This would include such components as file formats, menu structures and programming languages.

Software license agreements emerged as the most popular means of protection of proprietary rights in computer software. They coexist with other forms of intellectual property rights as patent and copyright. Software license agreements serve several functions in transactions involving the transfer of computer technology. One of the most important legal functions is the protection of the proprietary rights of the licenser in the transferred software. Other functions include controlling the revenue generated by licensed software and determining the rights and responsibilities of the parties regarding the performance of the licensed technology. Issues related to these functions include the applicability of Article 2 of the Uniform Commercial Code, including offer and disclaimer of warranties, determining the appropriate types of licenses to utilize, such as single users/CPU licenses, Site/enterprise licenses and network/concurrent licenses.

Trade secret, copyright and patent law are static forms of protection in the sense that they may exist independently of any underlying business transactions and do not necessarily require any transfer of intellectual

property from one party to another. Whereas, the need for a license agreement usually arises as one of the contractual forms of protection when the underlying business transaction involves the transfer of intellectual property, such as computer software. Transactions involving the transfer of computer software are subject to both federal and provincial laws. Generally, provincial law governs contractual and trade secrets aspects of the transaction, while federal law governs aspects related to patent, copyright and antitrust issues.

Each province has its own version of a trade secret, the common thread through these province-specific laws is that if you show that you are seriously treated information as confidential and that the confidential information helped your competitive position, you can stop others from using it if the information was improperly acquired by them, and even collect damages from the wrongdoers.

A computer is useless without software. The two types of software typically found on a computer are operating systems software and application software. Operating system software provides an interface that makes it easier to develop programs for the system by reducing the amount of code that must be written. The operating system acts as an interface between the computer hardware, application programs and the end user. Application software consists of one or more computer programs that fulfill a specific function for the user like word processing, bookkeeping or financial analysis.

Two legal cases recently within the last few years has brought to light the controversy regarding the copyright protection of software elements. Until

1992, most of the federal courts followed the decision in Whenlan v Jaslow Dental Laboratory as a precedent for similar cases. Whenlan, a small software company wrote a accounting program for Jaslow Dental Laboratory company. Jaslow rewrote the software to run on personal computers and proceeded to sell the product. The software was identical to Whenlans in the data structures, logic, and the program structure, except for the source code. Jaslow argued that the duplicated elements were part by the of the idea – not the expression. The court in response felt that the data structures, logic, and the program structure comprised to make a single function of a computer program, therefore copyright protection should be given to those elements also.

In 1992, this protection was weakened by Computer Associates v. Altai, Inc. , when Altai a software developer was accused of copying various modules of a software package developed by Computer Associates which controlled the running of applications on IBM mainframes. The court rejected Whelan's premise that a computer program embodies one function because programs are made up of sub-routines that contain their own idea. The court recognized that this would narrow the scope of software copyright protection and found this in accordance with the Government's intent of computer programs with copyright. This is why currently software copyright is not as broad as it once was.

All the above mentioned licenses and anti-piracy precautions cost billions of dollars each year, in both direct and opportunity costs. These costs are shared by anybody that is involved with any aspect of the software industry. As the future of approaches, more and more people are gaining experience

with technology. That experience doesn't come without a price. That price is the power to manipulate technology for personal gain which usually results in a detriment -typically financial-to others.

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