OmniQ Comment Regarding Mass Digitization

The current proposal for "mass digitization" is, fundamentally, a proposal for "mass reproduction" of copyrighted works, and for that reason alone, contemplates a complex, cumbersome and expensive method for dealing with the fallout. But what if lawfully made copies comprised of ink on the material object of paper could simply be converted to ones and zeroes on the material object of a hard drive, but with no reproduction taking place, and therefore no copyright interest implicated? The patent-pending Method For Non-Reproductive Substitution Of The Material Object In Which A Work Is Embodied facilitates precisely that. (Attached.)

There is a big difference between copies and copyrights. That principle has been a part of our copyright law since at least the 1850s, and was codified in the Copyright Act of 1909, currently in Sections 109 and 202 of the Copyright Act of 1976. That principle, encouraging broad dissemination of copyrighted works without the consent of or control by the copyright holder, through secondary, tertiary, and infinite lawful redistributions, has served us well. The problem today is that the material object of "paper storage medium for expression using ink" is increasingly giving way to the material object of "electronic storage for expression using data bits."

It is well established that paper-printed copies may be renewed, restored, refurbished, rebound, and re-covered without the consent of the copyright holder, even if doing so extends the life of a paperback copy on fragile paper far beyond the life-span of a hardback copy printed on high quality acid-free paper. Moving an image from fragile paper to durable tile is non-infringing.[1] Accordingly, the more elegant solution is to for mass digitization is to facilitate and encourage the development of technologies that allow such non-infringing substitutions of the material object in which a work is fixed. The current solution is mass scanning, which makes more copies. The OmniQ solution marries a scanner with a shredder. No copies are made.

OmniQ is a joint venture for the commercial development of a method for non-reproductive substitution of the material object in which a work is fixed. Through a patent-pending invention, OmniQ seeks to, among other things, maintain the viability of, and the public benefit afforded by, secondary markets for the exchange of lawfully made copies of copyrighted works. As technological advances often render copies in certain formats obsolete when the technology needed to access them is going into disuse (for example, a DVD is useless without a DVD player), and as digital dissemination and storage technologies increasingly result in the fixation of lawful copies on material objects that are too cumbersome to redistribute and may share space with thousands or even millions of fixations of other works, a new method is needed to preserve important avenues through which those unable to afford new copies in the primary market may continue to obtain access to lower cost second-hand copies.

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[1] *See, e.g., C. M. Paula Co. v. Logan*, 355 F.Supp. 189 (N.D. Tex. 1973); *Théberge v. Galerie d'Art du Petit Champlain Inc.,* [2002] 2 S.C.R. 336, 2002 SCC 34 (CanLII).

TITLE: METHOD FOR NON-REPRODUCTIVE SUBSTITUTION OF THE MATERIAL OBJECT IN WHICH A WORK IS EMBODIED

The present invention is directed to a method for transferring a work digitally embodied in one material object (or storage medium) to another material object without reproducing the work into another copy. The present invention is also directed to transferring a work between two material objects across a network. The source (at times alternatively referred to herein as a host or origin) and destination medium (at times alternatively referred to herein as a client) could be similar, as in the case where they both are hard drives, or they could be different, as in the case where a transfer is being made from a CD to a hard drive. In all cases, there is never more than one fixation of the work (i.e., never more than one copy of the work) at any one time.

In the method of the present invention, a work that is digitally fixed is transferred without being reproduced into another copy. That is, as the instantiation of work is moved to the new medium, the original instantiation of the work is destroyed or made otherwise unusable in some physical or electronic way. The present invention is directed to works encompassed in a digital embodiment, often referred to as a digital file, such as but not limited to recorded music (sound recordings), video (motion pictures or other audiovisual works), or ebooks (literary works), and may further be directed to works embodied in analog form in the original medium and transferred to the new medium in digital form.

Although the invention applies to all works regardless of whether they are copyrighted, the present invention nevertheless uses certain terms with the present

meanings assigned to them in the U.S. Copyright Act, 17 U.S.C. §101. Accordingly, a "copy" refers to the material object – a tangible medium of expression – in which a work is fixed by any method on any medium, and from which it can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. (The term "copy" will, however, be used to include the term "phonorecord" applicable to sound recordings, as the invention provides no basis for making any distinction.) The term "fixed" means that the work's embodiment in the material object is sufficiently permanent or stable to permit it to be perceived, reproduced, or otherwise communicated for a period of more than transitory duration. (This invention sometimes refers to fixation as being "persistent" in the "memory" of a particular medium, in contrast to remaining un-fixed, or in "volatile memory.") Finally, the term "works" includes all works of authorship such as literary works, audiovisual works, architectural works, musical works, and the like, but without regard to whether they qualify for copyright protection or are in fact copyrighted.

BACKGROUND OF THE PRESENT INVENTION

When a work can be directly perceived from printed paper, transferring it to an alternate preferred medium might be as simple as tearing an article out of a magazine and placing the page in a binder, clipping a newspaper photo to paste into a scrapbook, or re-binding a paperback book with a hardcover binding. When, instead of ink on paper, the work is in machine-readable data on a medium such as a plastic optically-readable disc, reproduction of the work onto another storage medium is simple, but presents its own legal problem; doing so may constitute copyright infringement because

the author of the work enjoys the exclusive right to reproduce the work into copies or phonorecords.

Although every owner of a lawfully made copy of a work is free to redistribute that copy without implicating the copyright owner's distribution right, advances in modern technology, together with trends in consumer hardware, are creating a gulf between the Copyright Act's intent to allow wide dissemination and redistribution, and the ability to make that redistribution a reality. This is most noticeable in two scenarios. First, where copies of the work have been distributed in a format that is no longer accessible, we experience a glut of copies that are no longer useful for the purpose for which they were intended. For example, many motion pictures were distributed on DVDs, and widely disseminated through video stores as sales, resales, or rentals. DVD players were commonplace, and were becoming the norm for personal computers, including laptops. But the trend today is to eliminate the optical drives from laptop computers and other devices, making it harder to enjoy the DVD copy. Although the avenues for enjoying motion pictures through "streaming" public performances may be increasing, the number of titles available for on-demand streaming is but a small fraction of the titles published on DVD. There is, therefore, a growing need for technology to allow continued access to DVD copies without an optical drive.

A second scenario involves the consumer who obtains ownership of a lawful copy of a work by reproducing the work onto the consumer's computer hard drive, such as through purchase or gift of a reproduction by "download" either directly from the copyright owner or a licensed retailer. The work might be a sound recording, motion picture, photograph, or literary work, downloaded onto the consumer's hard drive, and

sharing the same material object as thousands of other works. Although legal, it is wholly impractical to lend, sell or give away a computer hard drive as a means of distributing the copy of that single work, yet a reproduction of the work into another copy risks liability for copyright infringement. The owner of the material object in which a particular work is so embodied may wish to share it with others, as the law intends, but is barred by law from reproducing it (even though reproduction is easy), and barred by physics from redistributing just the portion of the hard drive on which the work is embodied. Thus, the Copyright Act's purpose and the consumer's interests are being frustrated unless the owner of the hard drive is able to move the work embodied in the hard drive from that medium to a medium owned by someone else, or to a more convenient medium (such as a newer computer) owned by the same person, without implicating the reproduction right of the copyright owner.

Although the invention is useful without regard to whether the work is copyrighted, the problem to be solved is most compelling in the case of copyrighted works, in order to maintain the historic balance between ownership of the intangible copyright, on the one hand, and ownership of the tangible copies, on the other.

The Copyright Act intends to encourage the widest possible dissemination of copyrighted works. When each work is fixed in its own separate portable and easily transferable material object, such as literary works in a bound book, sound recordings on a CD, or motion pictures on a DVD, that copyright purpose is fulfilled when an owner lends, sells, rents or gives the material object away to another. Freedom to redistribute such copies has always been an integral part of copyright policy, and Congress codified it in 1909 (currently 17 U.S.C. § 109). That is, one purpose of the Copyright Act is to

assure that copyright holders retain no control over the distribution of lawfully made copies of their works when others own those copies.

Because technological advances have enabled the embodiment of thousands of disparate works sharing a single storage medium, it becomes practically impossible to fulfill that purpose of the Copyright Act. For example, if an original work is written on a portion of a computer's hard drive, it is not practical to lend or sell an entire computer hard drive just to allow someone else access to one of the possibly many works also fixed on it. Further, such a process may introduce new copyright issues relative to other works on the same hard drive. And while it is very easy to reproduce the selected work from the hard drive onto another hard drive, doing so implicates the exclusive right of the copyright holder to reproduce the work into copies and phonorecords. Sending a work by electronic mail, or uploading or downloading the work to or from someone else's hard drive, necessarily involves reproduction of the work into copies.

Some limited exceptions allow for copying these types of works. For example, a "fair use" limitation on copyrights (17 U.S.C. § 107) offers a lawful basis for reproducing a work onto a more convenient medium under certain narrow circumstances. However, there is no bright line rule to follow, as the application of the fair use analysis requires the weighing of several factors beyond the comprehension of the average user, raising the risk of unwitting copyright infringement, on the one hand, or self-censorship out of fear of a lawsuit, on the other.

Substantive objectives of the Copyright Act might be met where a work is reproduced from one object to another, and the original immediately deleted. Doing so might also constitute permissible "fair use" under Section 107 of the Copyright Act, but

the fair use determination is fact-specific, and the legal cost of making the determination is extraordinarily high (as is the risk of guessing the outcome incorrectly) in relation to the value of the copy in question.

The theoretical solution is to achieve the substitution of one hard drive or other material object in one place for another one in a remote location (and/or owned by a different person), but without implicating the reproduction right. To do so successfully, there must not be a reproduction of the work – at all times, only one single persistent copy may be maintained from which the work can be reproduced or perceived. But doing so across a network is laden with pitfalls. First, there is the problem of ensuring that there be no reproduction of the work into another copy or phonorecord; only a single fixation must be maintained at all times. It is not sufficient to reproduce the work into the second copy and then destroy the original. Second, network transmissions are error prone and there is a strong likelihood that re-transmissions will be necessary, yet it is a legal imperative that the works not continue to persist in the original material object, even if only as insurance against flawed transmissions, for that would constitute a reproduction if the work could still be perceived or reproduced from the original medium. This problem is especially complex when the quantity of data is large, as is the case with most high definition media today. Third, in cases where the objective is that the person with access to the work on the new medium return it to the originator, equivalent to traditional rental or lending, transferring the work back to the original material object when done doubles the bandwidth consumed, thereby making such practice inefficient. Fourth, even where a copyright owner (rather than the owner of the copy) seeks to emulate traditional rental with so-called “digital rentals” or “limited downloads” by

authorizing a time-limited reproduction that self-destructs after a period of time, doing so requires a copyright aberration, and potential liability for copyright misuse or under anti-monopoly law, because there is no exclusive right, under the Copyright Act, to limit the life of an authorized reproduction or to prevent the repeated private performance of a work from a lawfully made copy.

Further, it can be difficult for the owner of a lawfully made digital copy or phonorecord to transfer works, particularly copyrighted works (for example, audio or video content such as sound recordings or motion pictures), from one medium to another. For example, because copyright law generally prohibits a consumer from reproducing a copyrighted work into another copy, copy protection may be built into a digital recording. This means that if someone bought a CD containing sound recordings or a DVD containing a movie, the purchaser of that copy or phonorecord may be restricted, such as due to embedded copy protection or other technological protection measures, from copying that sound recording, motion picture, image or literary work to a different and potentially more convenient and easily accessed storage such as flash memory or a computer hard drive. Such a copying process, using current technology, invariably implicates the copyright owner's exclusive right to reproduce the work into copies and phonorecords unless one of the Act's limitations or exceptions applies.

To achieve the desired vigorous dissemination of art and knowledge, the substitution of one material object in which a work is fixed, for another material object bearing the fixation must, in the case of any given copy, be efficient, and at minimal cost.

Currently, it is not uncommon for consumers to just copy the work to a storage drive, also known as "ripping" the work onto another medium, but they may be breaking copyright law in the process, often without realizing it or under the mistaken belief that private, non-commercial copying is permissible. Even making a back up copy of a hard drive where the hard drive has other copyrighted work on it may go against the Copyright Act in some cases. More careful or risk-averse consumers may simply forego the convenience of having the work on different storage than the originally purchased media. The prospects of having to purchase another copy of the work just to be able to enjoy it from a different tangible medium serves no copyright purpose, is met with resistance, and spurs demand for devices or technologies that simply facilitate infringing reproductions.

One approach that has been implemented by copyright holders seeks to mimic the effect of temporarily transferring ownership or possession of a digital medium (a DVD) to persons who, without access to a DVD player, could watch the movie nonetheless. It provides for a licensed so-called "limited download" which is, in fact, a licensed reproduction of the work onto the consumer's hard drive, but where the copyright owner (or its licensee) retains control over how many times (or for how long) the work can be performed privately before it is rendered inaccessible. The difficulty here is that this solution involves a non-statutory extension of the copyright monopoly to activity – private performances – that has never been part of the copyright. Plus, it may involve the copyright owner's destruction of the copy owned by the owner of the computer hard drive; again, extending the copyright owner's control beyond the limits of

the exclusive rights authorized by law (which does not give the copyright owner any right to destroy lawfully made copies owned by others).

Another approach, attempted by a non-copyright owner who owned the DVD copies, provided for a long-distance "virtual" possession (i.e., possession as a right, but not in fact) and remote playback over the Internet through a personal computer. In this scenario, the viewer likely does not retain a copy, obviating the concern over reproduction. However, when done without the copyright holder's permission, in at least one instance a federal court held that such approach infringed the exclusive right to perform the work publicly. Both approaches also fail to meet the legislative intent that copyright owners not retain any control over the redistribution of lawfully made copies owned by others.

In summary, when someone gains ownership of a material object in which a work has been lawfully fixed, the law grants a right to redistribute that work by transferring ownership or possession of the material object in which it is fixed, but not the right to reproduce it onto a different material object without the copyright owner's permission. Under present copyright law, the owner of the lawful copy of a work is entitled to transfer ownership or possession of that copy to another, but if the laws of physics make such transfer a practical impossibility, the owner of the copy is still prohibited from reproducing the work onto another medium to achieve the Copyright Act's desired result of broad dissemination. Any attempt, no matter how technologically easy, to reproduce the work to an alternative or additional medium may be an infringement of the copyright holder's rights, even if the original copy is deleted immediately thereafter.

No known previous attempts have been made to comprehensively solve this problem. With respect to sound recordings, U.S. Patent No. 8,627,500 intended to effect the equivalent of resale of copies (called "phonorecords" in the case of sound recordings) that had been reproduced onto computer hard drives, but the process involved reproducing the work into additional copies before the unwanted copies were deleted, and the company practicing the patented invention was found guilty of copyright infringement.

DESCRIPTION OF THE FIGURES

FIG. 1 depicts a flow chart of a general description of how a media player works.

FIG. 2 depicts a flow chart of a general description of a process of moving a video work from one medium such as a DVD or hard drive to another medium such as a different a hard drive.

FIG. 3 depicts a flow chart of a general description of a process of moving a video work from one medium such as a DVD or hard drive to another medium such as a different a hard drive, with encryption.

FIG. 4 depicts a flow chart of a general description of how a person might receive a digital video that was sent by another person or entity.

FIG. 5 depicts a flow chart of a general description of how a person might return a digital video to the original sender.

FIG. 6 depicts a flow chart of a general description of how a person might begin receiving a work that was sent by another, begin playing it before having received it all, and begin returning it without having played it all.

FIG. 7 depicts a first state of content being transferred from a host and a client.

FIG. 8 depicts a second state of content being transferred from a host and a client.

FIG. 9 depicts a third state of content being transferred from a host and a client.

NON-REPRODUCTIVE SUBSTITUTION OF THE MATERIAL OBJECT IN WHICH A WORK IS EMBODIED

The present invention is directed to a system and method for transferring digital content from a first medium to a second medium while preventing reproduction of the work by assuring that a the digital content is never persistent (never fixed) in more than one medium (material object).

The present invention provides a benefit of the owner of a lawful copy or phonorecord to transfer a copyrighted work fixed in one material object (media) to another material object of their choosing without violating copyright law by reproducing the work into additional copies or phonorecords.

An objective of the present invention is to provide an efficient method for transferring a digital embodiment of a work, such as a media file on a DVD, from a source medium to a destination medium, without infringing a copyright owner's reproduction right in the process. In the method of the present invention, fleeting memory, referred to herein as volatile memory, is used to temporarily store some or all of the content in the same manner as a playback device such as a DVD player might utilize it. The volatile memory may be located at the source medium, the destination medium, some other location, or all three. The file may be transferred at once or in

chunks, with the data in volatile memory removed as the transfer occurs. In the method of the present invention, no more than one persistent version exists at any time and, accordingly, the method prevents reproduction into another copy. As the file comprising the work is transferred to the destination medium, the original embodiment in the source medium is rendered unusable (which is to say, the work is "de-fixed" in that the work can no longer be perceived or reproduced from it), either through erasure or some other known means, before the content is persisted on the destination storage device. The process of the present invention further utilizes encryption and decryption as needed, so as to minimize data being transferred such as when returning the content, yet sufficiently robust to enforce the single fixation requirement to the same degree as in the case of a physical transfer of the material object, such that if the destination medium where the work is eventually fixed is lost or destroyed, the copy of the work can never be recovered, including from the source media.

For reference, we describe how media players typically play back copyrighted works from pre-recorded media. In the example shown in FIG. 1, a motion picture pre-recorded onto a DVD is being played. A similar technique is used for playing a CD, Blu-ray disc, or other such pre-recorded media. A segment of the content is read from the media and placed into volatile memory where it may be necessary to have it decrypted. Even though the segment resides concurrently both on the pre-recorded media and also for a brief moment in volatile memory, the portion in volatile memory is not a "copy" as that term is defined in the copyright Act. The fleeting presence in volatile memory is a necessary step in the process of playing the motion picture from the DVD and, in any event, such volatile memory's fleeting content is a state too unstable and transitory for

the work to be considered "fixed" in a tangible medium from which it can be perceived or reproduced. The segment is typically decrypted, converted into the appropriate format that matches the output device, played, and then erased from volatile memory. In the case of a CD, the output device might be a stereo system; in the case of a DVD or Blu-ray video, the output device might be a TV or monitor.

One embodiment of the method of the present invention is shown in FIG. 2. The method of the present invention includes a controller and a reading device, such as a DVD or CD reader. The controller directs the reading device to read some portion (also referred to herein as a "chunk") of the digital content from the "source medium" (e.g., CD or DVD or other medium) and place the read portion in volatile memory. After the data have been placed in volatile memory, the controller destroys or directs a device to destroy that portion of the digital content on the source medium so that the work can no longer be perceived or reproduced from it. The destruction can take any of several known forms, such as erasure, a physical action to preclude optic reading, or some other known action.

The method of the present invention further includes the steps of writing that portion digitally to persistent storage fixed in a destination medium, and finally clearing the volatile memory. This process is repeated until the entire work has been removed from the source medium and transferred digitally to persistent storage on the destination medium without involving the presence of any further copies or other reproduction. The portion that is read and removed each time could be any subset of the digital content.

In at least one embodiment, destruction can occur after the entire file is transferred.

In at least some cases, the process described above could be more complex, such that data are delivered to a first volatile memory (perhaps associated with the source). Upon being written to the first volatile memory, the data are erased from the source medium as described above. The data are then transported to a second volatile memory, such as one associated with the destination. Upon being written to the second volatile memory, the data are erased from the first volatile memory. The data are then transported to the destination and then erased from the second volatile memory.

In the special case where the subset is the entire media, the process is complete after a single iteration. An alternative embodiment in this case would involve reading the entire digital content of the source medium into volatile memory, using any known method to destroy the original copy or phonorecord, either by destroying the material object in which the work is embodied, such as but not limited to using a shredder (physical or electronic), or by otherwise preventing the work from being able to be perceived or reproduced from the original material object, such as by use of an etcher, and then writing the entire contents from volatile memory to be fixed in persistent storage.

In either case, at no time will there exist more than one persistent fixation of the work in a tangible medium from which it can be perceived or reproduced for more than a period of transitory duration.

The need to decrypt from the original medium may be situation dependent. In at least some cases, the process of decrypting is commonly achieved when the file is read into volatile memory. In some cases, the original data may not be encrypted and it may never be necessary to decrypt it at all.

Another embodiment would be to transfer content agnostically – that is, if the content is encoded in some way, not to decode before transfer. In such cases, any encryption or other technological protection measure would be transferred to the new medium along with the transferred work. However, in at least some circumstances, it may be necessary to decrypt the content to facilitate transfer.

ENCRYPTION

For various purposes, it can be useful to save the data in an encrypted fashion. In order to accomplish this, we introduce an additional step in the method of the present invention after the data has been decrypted, if needed, or by choice not decrypted, from the source medium and split into chunks. For each chunk, a key is generated which is used to encrypt that particular chunk and is associated with that chunk.

Many processes are described in the literature for generating keys and performing encryption. Any of these that are appropriate may be used. A typical procedure might be to generate a random key, which is used as the seed to a secure pseudorandom generator (PRG), which will generate 512 byte values. Each chunk being encrypted can then be thought of as being made up of a series of 512 byte segments where each segments is then xor'd ("exclusive or") with the respective output of the PRG. So the 1^{st} segment will be xor'd with the 1^{st} output of the PRG, the 2^{nd} segment with the 2^{nd} output and so forth. To decrypt, we once again use the key as the seed of the PRG, which is used to generate the same successive values as were generated when encrypting the content, each of which is xor'd with the respective segment of the chunk being decrypted.

KEY SELECTION

It is important to choose a key that is large enough to prevent attackers from launching any kind of an attack such as one of simple brute force. If we choose a key of 512 bytes, which translates to 4096 bits, current literature suggests that if attackers had a quadrillion CPUs at their disposal, it would take them over 10^{100} years to launch a successful attack. What makes it even more difficult in this case is that each chunk has its own random key so the successful decryption of a key only gives access to a single chunk.

TYPES OF MEDIA INVOLVED IN SUBSTITUTION

Thus far, the description relates to substitution of an embodiment of a work from a "hard" medium, such as a DVD, to a "soft" medium, such as a hard disc storage device. Another embodiment of the present invention incorporates transfer of digital content from one soft storage device to a different soft storage device, where a soft storage device is one which has readily replaceable content, such as but not limited to a computer hard drive or a flash drive. For example, rather than transferring a first material object (such as a DVD or hard drive) from one person to another, the embodiment of an individual work in the first material object is transferred (leaving behind no fixation of the work) in the method of the present invention to become written and stored in a material object in the possession of another, without reproducing the work into another copy or phonorecord.

CHUNKING

Using volatile memory, which is to say, a state in which the work is not "fixed" in a tangible medium because it is too fleeting for the work to be perceived or reproduced from it, the data comprising the work embodied in the first material object is broken up into sections, or "chunks", and each chunk may be encrypted with a key. A chunk is some portion of the data representing a portion of the digital content, and could be as small as a few bytes or as large as is manageable for this purpose. A chunk may be (but does not need to be) distinguishable in that it may relate to a distinguishable section of the work, such as a scene from a movie or a song on an album, or might be a defined quantity of data. Although the present invention is applicable to any work of authorship that has been digitally fixed, an illustration using the example of an audiovisual work (a "video") is shown in FIG. 3. As in the earlier embodiment, the transferring content is erased (or otherwise inaccessible) concurrent with the writing on the destination medium.

VOLATILE MEMORY

A core component of the method of the present invention is use of volatile memory. Volatile memory is characterized as memory which does not naturally retain its contents such as Dynamic Random Access Memory (DRAM) which needs power and requires constant refreshing in order for its content to be retained. By its nature, volatile memory is fleeting. It is particularly fleeting in this scenario in that the content placed in volatile memory is cleared upon transfer to the destination medium.

In the context of the method of the present invention, the volatile memory may be resident in one or more locations including a location co-located with or related to the source medium, co-located with or related to the destination medium, or some other location.

When volatile memory is discussed below as being in a particular location, it is done so in an exemplary manner only and, in at least some embodiments, the volatile memory might be physically located elsewhere, as described above.

TRANSFERRING DATA ACROSS A NETWORK

Before transferring content from a host to a client across a network, the content may be segmented into multiple chunks with each chunk being encrypted with its own unique key.

When we wish to transfer content across a network, each encrypted chunk along with its respective key is read into volatile memory on the host where the chunk is decrypted, converted into the destination format and sent along with its respective key to volatile memory in the client. Once the chunk and its key are received by the client's volatile memory, the key associated with the chunk that was sent is first erased from the host's persistent storage, and then both the key and the data for each chunk are stored on the client's persistent storage. By erasing the key on the host associated with an encrypted chunk, that chunk becomes unreadable on the host. At that point, the chunk and its key are erased from the host's volatile memory. Even if the bits comprising the chunks which are encrypted continue to reside in the host's persistent storage, because the keys are no longer known to the host, those chunks are unplayable on the host, and

the work of authorship associated with them is no longer fixed (as that term is defined in the U.S. Copyright Act) in the host because the work can neither be perceived nor reproduced from the host. The chunks and keys are also erased from the client's volatile memory.

All chunks are sent across a network in this way. Chunks may be sent serially, in parallel or staggered. From the moment that the chunk and key together are persisted on a destination (client, in the above example) device (i.e., fixed in a tangible medium of expression at the destination), it is no longer accessible (no longer fixed) on the origin (host, in the above example) device, such that the work is never fixed in two material objects at once. At any given point during the transfer, at most only one fixation of the work is maintained; although it might be partially split between the origin and destination devices. At the point at which the complete work is fixed in the client, no portion of it is any longer fixed in the origin.

RETURNING DIGITAL MEDIA ACROSS A NETWORK

Once the digital content becomes resident in the destination device, it can once again be transferred to a different device, including back to the origin device (assuming, of course, that the origin device remains writable). This may be advantageous in that it can serve as a loan, returnable to the origin.

When the destination (client) wishes to return that single copy of the work back to the origin (host) for each chunk, the controller reads its associated key, or directs the reading of the key, into its volatile memory, the key is sent back to the host and the persistent copy of the key and the associated chunk are erased (or becomes otherwise

unreadable). The host (the new recipient) will then save the key back into its persistent storage at which point the keys are erased from the volatile memory of the client as well as the host. At the point at which the work is once again fixed in the host, no portion of it is any longer fixed or readable in the client. See FIG. 5 as an example.

Once this has been completed for all chunks, only the host can access the work, because the material object in which the work is fixed has been substituted back. In this way, only one persistent accessible copy – only one fixation of the work in a material object – is maintained at all times, even as the tangible medium in which the work is embodied changes. By only sending the key, the amount of data that is returned to the host is significantly reduced.

One utilitarian aspect of this feature is the voluntary return of the copy from client to host, initiated by the owner of the client. Another embodiment is the automated return of the copy (after a specific period of time, or after a specific number of private performances, for example) initiated by the client as specified by the owner of the host. Such aspects are particularly beneficial in loan situations.

SECONDARY DISSEMINATION ACROSS A NETWORK

The present invention is ideally suited to preserving the benefits of secondary markets for lawfully made copies and phonorecords.

The first sale doctrine, as codified in 17 U.S.C. § 109, ensures that those unable to acquire lawfully made copies of copyrighted works at the initial retail price can nevertheless gain access to the works through secondary markets such as resales, rental, gifts and lending of those initial copies. Rather than return the copy to the host,

the embodiment of an individual work in the material object owned by the client (now host2) is transferred to the material object owned by another (now client2), without reproducing the work into another copy or phonorecord. Rather than returning the key to the original host, host2 transfers the copy to client2 in the same manner as the host transferred it to the client. The process could also continue to other clients (client3, client4, etc.) whenever the client has no obligation to return the copy of the work to its host, and is free to become a secondary host, just as, for centuries, people have been free to pass along their copy to someone else. As in the original transfer, the use of robust encryption guarantees that only one copy or phonorecord of the work will exist (thereby protecting the reproduction right), while still protecting the original public policy against allowing the copyright owner to control secondary transfers.

Yet another embodiment is when a host passes its copy of a work onto a client as previously described and once the client has completed its use of the copy, rather than sending it back to the original host, the original host directs the client to send it to another client who has requested that copy of the work. At this point, the original client becomes a host (host2), which sends the content to the new client (client2). This process can continue to multiple clients (client3, client4, etc.) until either no more requests are made for that copy of the work, at which point the client that currently has the copy of the work returns it to the original host, or one of the clients "loses" the copy (e.g., the client media is destroyed), at which point the copy is irretrievably lost.

CONCURRENTLY RECEIVING, PLAYING AND RETURNING MEDIA ACROSS A NETWORK

Another portion of the method of the present invention that is particularly useful is the ability to begin receiving, and then begin playing (i.e., privately performing the work) before all of the work has been received, and later begin returning the work before it has all been played, across a network, while maintaining only a single copy of the work at any given time. At any given point during the transfer, only one fixation is maintained; although it might be partially split between the host and client in a manner akin to handing someone the sports section of the newspaper while continuing to read the business section. See FIG. 6.

In this case, the host first identifies the next set of chunks that need to be sent to the client. FIG. 7 shows the state of the host and the client's digital storage and volatile memory after the chunks have been identified. In the host's digital storage, the first two chunks have been sent and those chunks are no longer playable or reproducible from the host. The next two chunks (3rd and 4th) are the ones identified to be sent next and are shown as boxed in the "Host Digital Storage" element. The client has already received the 1st and 2nd chunks and may play them. The grey highlighted area indicates that the client is waiting for the 3rd and 4th chunks.

Those sets of chunks along with their keys are then read into the host's volatile memory. The chunks are decrypted and converted into the format required for playback on the client. The chunks and their keys are sent to the client, after which the keys are erased from the host's digital storage and then written to the client's digital storage. The chunks and their keys are then erased from the host's volatile memory.

This process has resulted in a new set of chunks and their keys (3rd and 4th) being sent to the client's volatile memory with the keys being erased in the host's digital

storage and written to the client's digital storage. The state of the host and client's digital storage and volatile memory appear in FIG. 8.

Those chunks (3rd and 4th) are only playable on the client. Even though the encrypted chunks exist on the host, because their keys are erased, the work is undecipherable and hence unplayable and un-reproducible from them.

Simultaneously, on the client, the next set of chunks is played. In this case, it will be the 1st and 2nd chunks, which were sent previously and are ready to be played once their turn arrives. Once they are played, the keys are returned to the host and kept in volatile memory there. After the chunks and their keys are erased from the client's digital storage, the keys are returned to the host's digital storage, rendering the associated chunks playable once again on the host. All traces of those chunks and keys are then erased from both the client and the host's volatile memory. The state of the host and client's digital storage and volatile memory is shown in FIG. 9.

The boxed areas show the keys that have been removed from the client and placed back on the host.

Throughout this process, only one fixation of the copyrighted content is maintained even though the embodiment of the work might be split between the host and client (in the same way that two different people may hold separate sections of a newspaper) and may also be kept, unfixed, in volatile memory for a short period of time in the same way a common media player (like a CD player or DVD player) might use volatile memory to render the work.

SUMMARY

In these examples, we have been using video digital content as an example. These processes could be applied equally well to any other digital content, copyrighted or otherwise, whether it be video, audio, images, text, or anything else. In the case of audio, the chunks would be audio chunks; in the case of images, the chunks would be image chunks and so forth.

The present invention provides a method for a person to transfer that person's unique "copy" or "phonorecord" (as those terms are defined in the Copyright Act) over a network without violating copyright law. Most particularly, in the method of the present invention, at most one persistent version of a digital file is ever available. The present invention also allows the content to be returned quickly, minimizing the amount of data transferred. The digital file of an individual work sharing a common medium with many unrelated works can thus be sold or given away, or can be lent or rented and returned easily, without violating copyright law because the work is never reproduced into another copy or phonorecord. Just as the owner of a lawfully made copy that solely occupies a single material object is entitled to dispose of that copy without the consent of the copyright holder, the owner of a copy that occupies space on a material object shared by multiple works is also able to dispose of that single copy without having to transfer possession of the copies of all of the other works sharing space on the material object.

Although the widest applicability may be with respect to dissemination of individual copies of copyrighted works without reproduction, the invention also has the advantage of preventing reproduction of works regardless of the copyright status, such as where the protection of un-copyrighted trade secrets requires that the number of

available copies be controlled even as the location of the copy is shifted from one place to another. The present invention could also be applicable in instances where the equivalent of an "evaluation copy" must be made available to someone while, by securing the automatic return of the copy, the risk that such copy will not be returned is minimized. Finally, the invention could be useful in carrying over to the digital format the added scarcity value visual artists derive from offering limited edition numbered prints, as this invention could allow "print 17/100," for example, to uniquely persist, despite being sold to another, because the buyer is assured that the seller did not retain a copy.

Sample claim

A method for a computer process to transfer a digital content file from a first medium to a second medium without making a multiplication of copies of the work, comprising the steps of:

identifying an encryption key for at least a portion of said file;

determining the presence of any encryption in a digital media file and decrypting the file as needed;

delivering at least a portion of said file to a volatile memory;

destroying said encryption key on said first medium;

delivering at least a portion of said file to a second medium;

destroying the delivered portion of said file on said volatile memory;

repeating the delivering and destroying steps until the entire digital content file is resident in said second medium, and no other.

How A Media Player Works

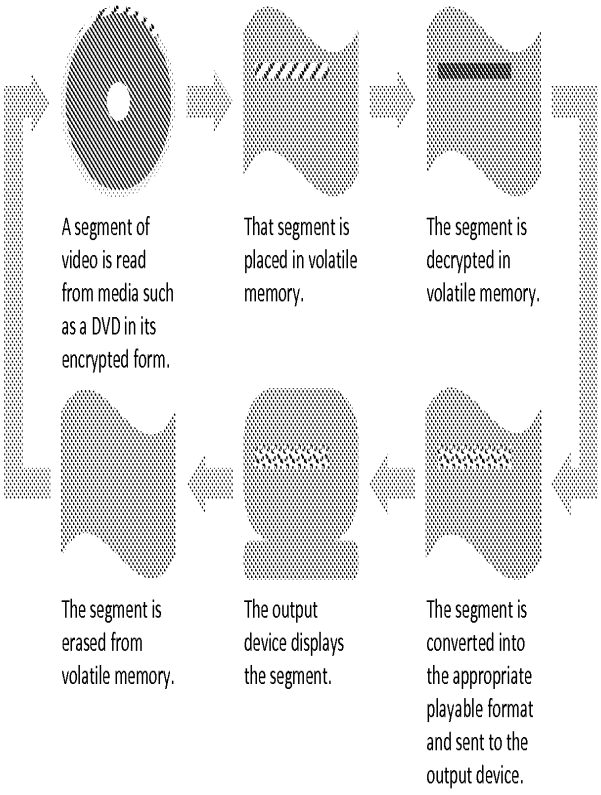

FIG. 1

Moving Video Data To Digital Storage

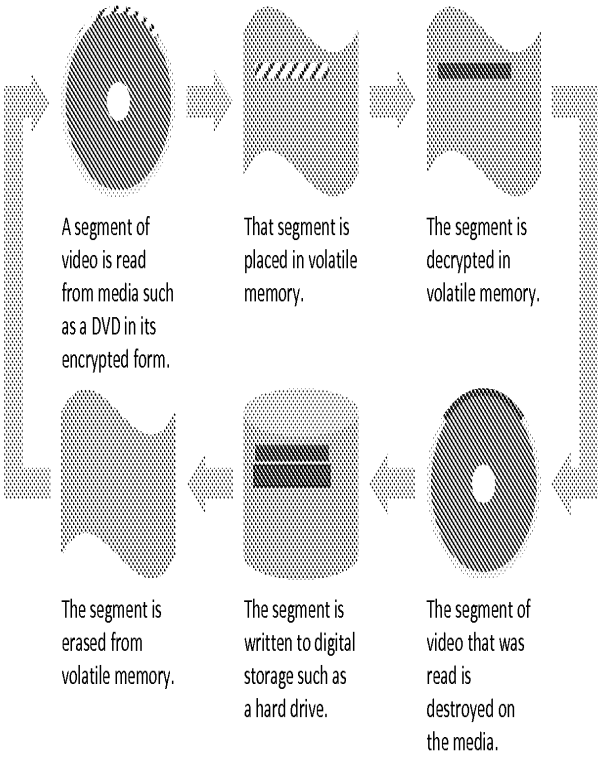

FIG. 2

Moving Video Data To Digital Storage With Encryption

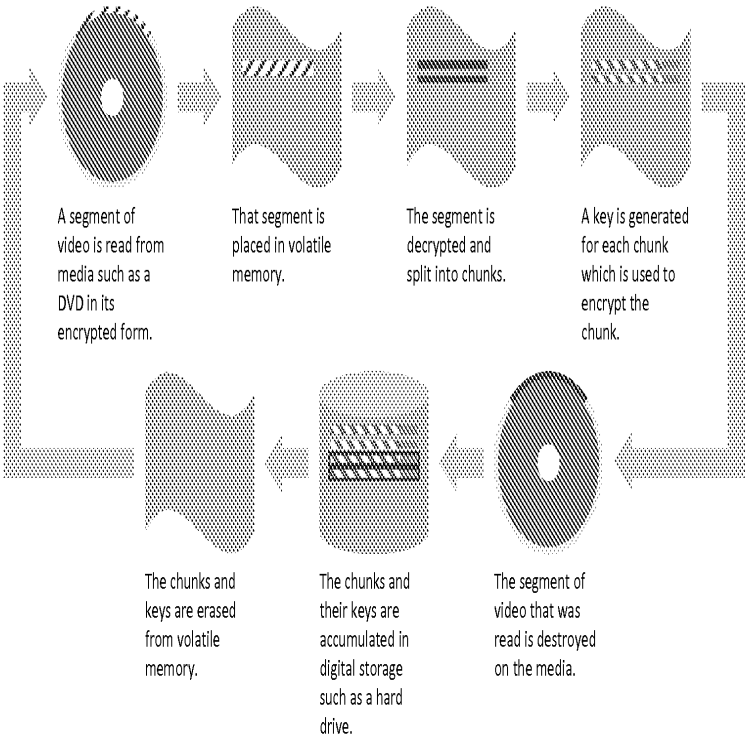

FIG. 3

Sending A Digital Video

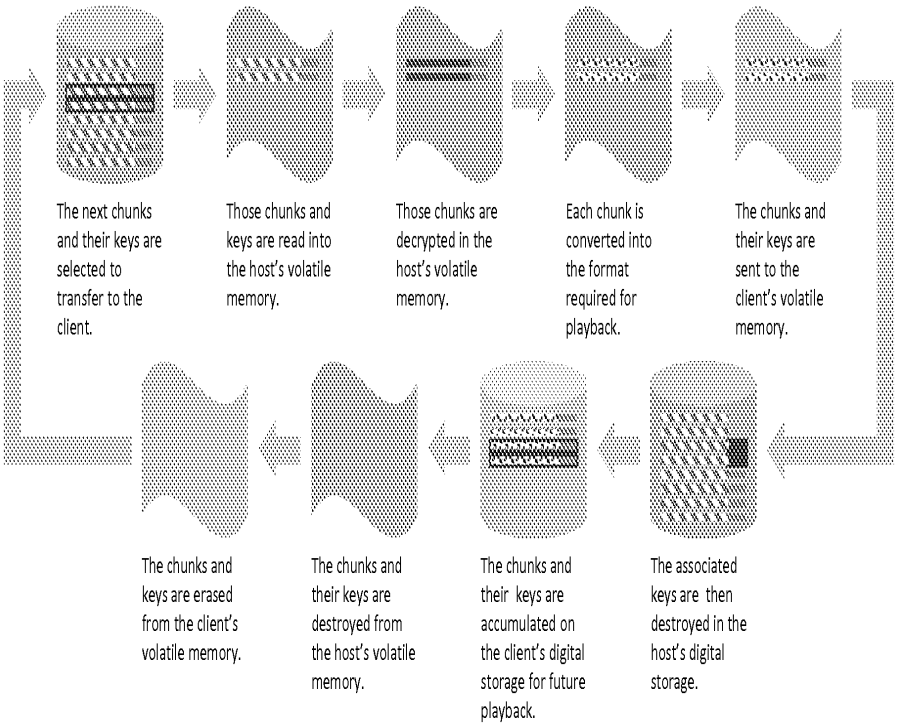

FIG. 4

Returning A Digital Video

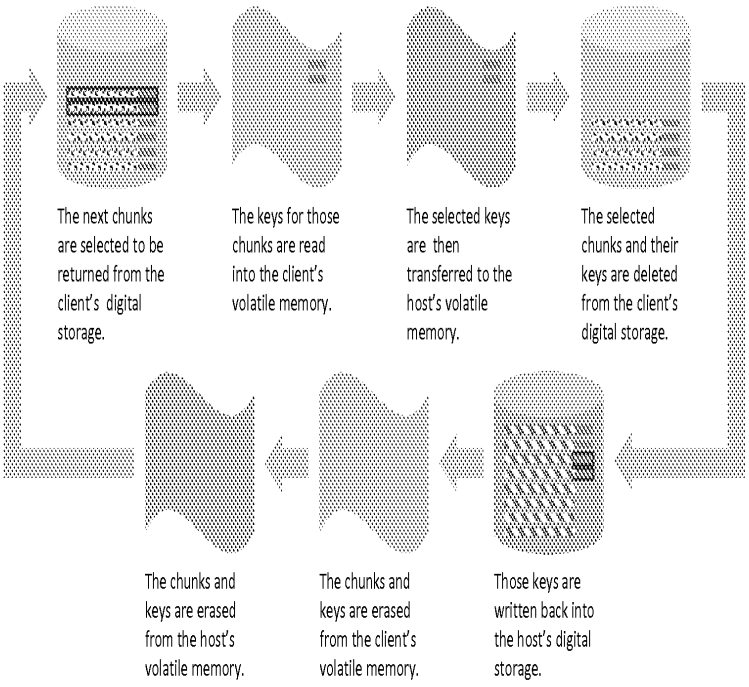

FIG. 5

Concurrently Receiving, Playing and Returning Media

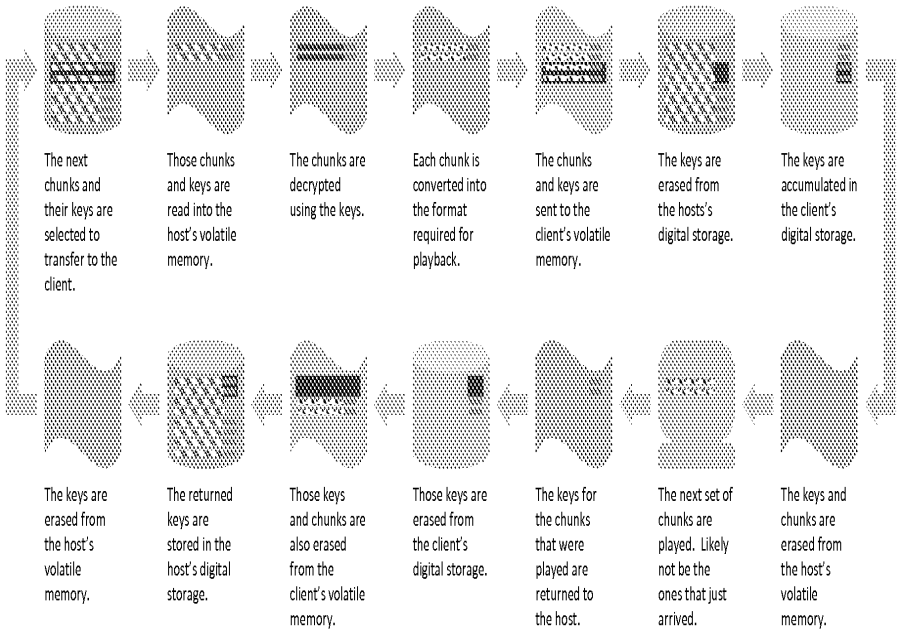

FIG. 6

State of Host and Client 1

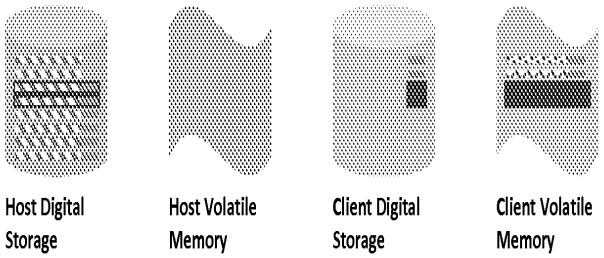

FIG. 7

State of Host and Client 2

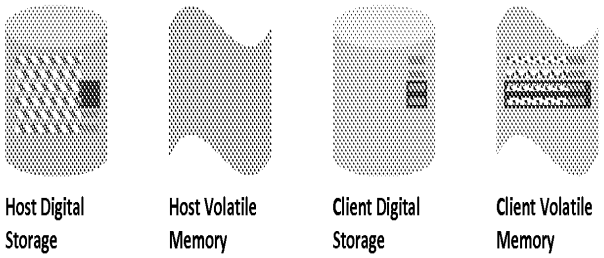

FIG. 8

State of Host and Client 3

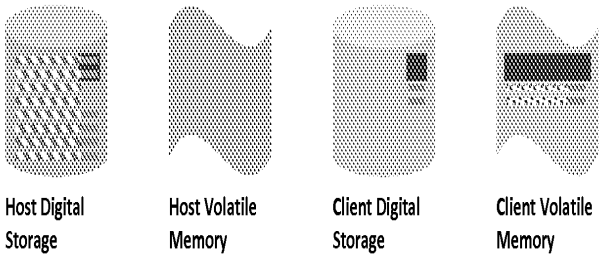

FIG. 9

Electronic Acknowledgement Receipt

EFS ID:	22099037
Application Number:	62149238
International Application Number:	
Confirmation Number:	1091
Title of Invention:	METHOD FOR NON-REPRODUCTIVE SUBSTITUTION OF THE MATERIAL OBJECT IN WHICH A WORK IS EMBODIED
First Named Inventor/Applicant Name:	Johann George
Customer Number:	22440
Filer:	Barry Robert Lewin/LEWIS BROWN
Filer Authorized By:	Barry Robert Lewin
Attorney Docket Number:	8645/002
Receipt Date:	17-APR-2015
Filing Date:	
Time Stamp:	17:05:07
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Electronic Funds Transfer
Payment was successfully received in RAM	$130
RAM confirmation Number	3852
Deposit Account	
Authorized User	

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