

**REPORT TO CONGRESS PURSUANT TO SECTION 104  
OF THE DIGITAL MILLENNIUM COPYRIGHT ACT  
[Docket No. 000522150-0150-01]**

**Comments submitted to the U.S. Copyright Office & National  
Telecommunications and Information Administration**

[ Comments also available on the Internet at <http://hdl.handle.net/4263537/section109> ]

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## **Introduction**

By Notice published in the Federal Register of June 5, 2000, the U.S. Copyright Office and the National Telecommunications and Information Administration requested public comments relating to an issue that at first blush might seem relatively straightforward: the meaning and scope of section 109 of the U.S. Copyright Law, title 17 U.S.C.<sup>1</sup> The reality is otherwise. Many newcomers to copyright, particularly in the rapidly developing Internet environment, often misinterpret the meaning of this provision in a very basic way. My comments will address, in general, Section 109(a) of the copyright law (1(e), (f) and (g) of the “Specific Questions” raised in the Request for public comment), and put forward a possible theoretical basis for moving forward that will draw on recent developments in the technology for persistently identifying and accessing information expressed in the form of digital objects.

## **Section 109 & “Copies”**

Fundamental to an understanding of section 109 is an appreciation of the meaning of the term “copy.”<sup>2</sup> From a legal perspective, this is a much misunderstood -- and misused -- word. Many in the emerging information industries simply view “copy” in a lay person’s sense, and are mystified when told that it is defined as a “material object” for copyright purposes.<sup>3</sup> There is an important difference between a copyrighted work, and a physical object in which the work may be fixed. This distinction has important consequences for other sections of the copyright law.

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<sup>1</sup> For ease of reference, citations to sections of the copyright law will be to the informal reprint of the law by the United States Copyright Office, Circular 92 (April 2000).

<sup>2</sup> Section 109(a) limits section 106(3) by generally permitting “the owner of a particular copy or phonorecord lawfully made . . . to sell or otherwise dispose of the possession of that copy or phonorecord.” My comments will focus on “copy” and not “phonorecord.”

<sup>3</sup> Under section 101, “‘Copies’ are material objects, other than phonorecords, in which a work is fixed by any method now know or later developed, and from which the work can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device. The term ‘copies’ includes the material object, other than a phonorecord, in which the work is first fixed;” see also, H.R. Rep. No. 1476, 94<sup>th</sup> Cong., 2d Sess. 61 (1976). For an interesting recent case touching on the meaning of “copy,” see DSC Communications Corp. v. Pulse Communications, Inc., 1999 Copyright L. Dec. (CCH) & 27,886, at 31,272-73 (Fed.Cir. 1999) (discussion of interplay between section 117 and 109).

To illustrate the difference between the general notion of copy and “copy” for purposes of the copyright rights of reproduction and distribution,<sup>4</sup> it is sometimes helpful to use imagery familiar to computer users. My favorite is the image of a “flying toaster” that used to dart across my PC screen while the computer was otherwise idle. With today’s technology, there is no way to move a metal toaster over fiber optic cables or fly it to a satellite for transmission to users. There is also no way to send a piece of plastic, tape, paper, or similar physical object over the Internet. No “copy” of a copyrighted work is transmitted over the Internet. This has important ramifications for other provisions of the law, e.g., if no copy is distributed to the public over the Internet, then the mere act of transmission alone would not serve to publish a work.<sup>5</sup> A mere change of terminology to refer to what has been loosely called a “digital transmission” would not appear to change the situation. There would also be no legal requirement for a copyright notice on information sent via the Internet, unless, of course, it had been previously made available in the form of material objects in sufficient amount to satisfy the requirements for publication.<sup>6</sup>

The misunderstanding may stem from the often interchangeable use of the concept of a copy in the sense of a “reproduction” of a work and copy as the *physical object* in which the reproduction may be fixed. Further elaboration on the difference between a reproduction and a copy may clarify the situation. In particular, it may advance a consideration of section 109 and its relevance, if any, in encouraging the creation and dissemination of information goods and services in a networked environment. The Committee Report on section 109 is helpful in this context. For example, the Report provides the following illustration of the meaning of “copy:”

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<sup>4</sup> Among the exclusive rights of owners of copyright set forth in sections 106(1) and (3) of the law are the rights “to reproduce the copyrighted work in copies or phonorecords” and “to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental, lease or lending;” see e.g. section 201(c) of the law.

<sup>5</sup> As defined in section 101 of the copyright law: “‘Publication’ is the distribution of copies or phonorecords of a work to the public by sale or other transfer of ownership, or by rental lease, or lending. The offering to distribute copies or phonorecords to a group of persons for purposes of further distribution, public performance, or public display, constitutes publication. A public performance or display of a work does not of itself constitute publication;” see also H.R. Rep. No. 1476, 94<sup>th</sup> Cong., 2d Sess., 138 (1976) (“any form or dissemination in which a material object does not change hands-- performance or displays on television, for example--is not a publication no matter how many people are exposed to the work”).

<sup>6</sup> According to the House Committee Report, a work is “published” if one or more copies or phonorecords embodying it are distributed to the public--that is, generally to persons under no explicit or implicit restrictions with respect to disclosure of its contents--without regard to the manner in which the copies or phonorecords changed hands. Id. at 138.

“. . .the outright sale of an authorized copy of a book frees it from any copyright control over its resale price or other conditions of its future disposition. A library that has acquired ownership of a copy is entitled to lend it under any conditions it chooses to impose. . . .Under section 202 however, the owner of the physical copy or phonorecord cannot reproduce or perform the copyrighted work publicly without the copyright owner’s consent.”<sup>7</sup>

Unlike works fixed in the form of a book on paper or as a CD-ROM on a piece of plastic, works such as a game program written in a computer language and made accessible at an Internet site, may potentially be reproduced, performed and/or displayed publicly and otherwise used by millions of users without any payment, or even credit, to the owners of copyright in the work as a whole, or its component parts. Extension of section 109 to such new forms of expression without careful evaluation may have a negative impact on the creation and accessibility of new works of authorship to the detriment of both copyright owners and the public at large.

### **State Contract Law**

The meaning of the term “copy” also has ramifications for the interplay between state contract law and the federal copyright statute. There is a growing body of state contract law that employs the term “copy;” however, the definition of the term differs from that used in the U.S. copyright law. Here I am thinking of the Uniform Computer Information Transactions Act (“UCITA”) that was drafted by the National Conference of Commissioners of Uniform State Laws and approved for enactment in all states at its meeting in July 1999.<sup>8</sup> Without going into the details of prior drafts, for purposes of illustration, I will limit my comments to the current version of what is now known as UCITA. Section 102(20) of UCITA defines “copy” in terms of the “medium” on which information is fixed. However, it is not clear whether “medium” is limited to a physical copy or includes, for example, information expressed in some digital form that is mapped into one or more continuous waveforms (i.e., analog signals) for purpose of transmission to say a remote computer. Since the definition of the term “delivery” in UCITA is intended to cover both “voluntary physical” or “electronic transfer” of possession or control of a copy, does this mean that “medium” for UCITA is not the same as “material object” for copyright purposes? This difference may prove troublesome unless there is some coherence drawn between the differing concepts. Whether “delivery” is the same as distribution, or whether it is broad enough to cover both “distribution” and “public performance,” or some new right, should also be clarified.

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<sup>7</sup> Id. at 79.

<sup>8</sup> For text of UCITA, see <http://www.ucitaonline.com>

There are also important differences between the definition of “computer program” for purposes of UCITA, and “computer program” under copyright law. This may have ramifications for a consideration of a logical unit of information for a possible amendment of section 109. Under UCITA, “separately identifiable informational content” is not included under the definition of computer program; and “informational content” is generally intended to cover information “to be communicated to or perceived by an individual.” The U.S. copyright law does not require that works incorporated in a computer program (works that may be viewed as “informational content” under UCITA) are as such excluded from the scope of the term “computer program” for copyright law purposes. This is a particularly important point where new creative works are embodied in a computer program that is performed on a single computer or on a distributed basis over the Internet; and no protected expression would necessarily be “communicated to or perceived by an individual.”

This recalls the rulemaking proceeding at the Copyright Office with respect to protection of computer programs that incorporate typeface designs. An early regulation required that applicants disclaim data pertaining to the typeface; however, the Office was later persuaded to change this position and found that “computer programs designed for generating typeface in conjunction with low resolution and other printing devices may involve original computer instructions entitled to protection under the Copyright Act.”<sup>9</sup> Even if this arbitrary distinction between computer programs and informational content remains confined to the state level for now, the law in this area continues to evolve. In the event the law embraces the notion of a logical entity that is uniquely and persistently identifiable, it may show the way forward for a reconciliation between the now disparate concepts in UCITA and the federal copyright statute.

The term “copy” also comes into play in such provisions of the UCITA as section 502 on “Title to Copy.” For example, under Section 502(b)(2)(B), “[i]f an agreement provides for transfer of title to a copy, title passes: . . .with respect to electronic delivery of a copy, if a first sale occurs under federal copyright law, at the time and place at which the licensor completed its obligations with respect to tender of the copy.” The commentary on this section further stresses the link between this provision and the federal copyright concept of first sale as follows:

“Title transfers when the licensor completes its obligations regarding tender of delivery, which obligations are spelled out in Section 606. The rule for electronic transfers is the same, but explicitly defers to federal copyright law. Some argue

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<sup>9</sup> Registrability of Computer Programs that Generate Typefaces, Final Regulation, 57 Fed .Reg. 6201 (1992).

that even if there is an intent to transfer title to a copy, an electronic transfer of a copy of a copyrighted work is not a first sale because it does not involve transfer of a copy from the licensor to the licensee. Under subsection (b), state law expressly coordinates with resolution of that issue in federal law.”<sup>10</sup>

It would appear from this commentary that the meaning of section 502 of UCITA may benefit from clarification of the meaning and scope of section 109 of the U.S. copyright law. In any event, a study of section 109 should take into account the possible impact of section 109 on state contract law, and the scope of the preemption of state law by the federal copyright statute in this context. There may also be implications for the copyright law concept of “first sale” that may develop around the concept of a “Transferable Record” as set forth in the Uniform Electronic Transactions Act (UETA); however, it is a bit early to tell how this will evolve.<sup>11</sup>

### **Interplay between Patent & Copyright Law**

Over the last decade, there has been an increasing focus on the application of patent law to the now vigorous information economy. The decision of the U.S. Court of Appeals for Federal Circuit in the case of State Street Bank v. Signature<sup>12</sup> that recognized patent protection for business methods provides some guidance on this emerging area of the law.<sup>13</sup> In the State Street case, the court held that “the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces ‘a useful, concrete and tangible result’ -- a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades.” At first glance the notions of “tangible” and “momentarily fixed for recording” would depart from the normal meanings of these concepts for copyright law purposes. There are other aspects to consider.

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<sup>10</sup> Official Comments on Section 502, reprinted in Electronic Contracting: Current Law and the Uniform Computer Information Transactions Act, at 187 (2000).

<sup>11</sup> For text of UETA, see <http://www.jetaonline.com>

<sup>12</sup> State Street Bank & Trust v. Signature Financial Group, Fed. Cir. No. 96-1327 (1998), at <http://laws.findlaw.com/Fed/961327.html> ; see also AT&T Corp. v. Excel Communications, Inc., Fed. Cir. No. 98-1338 (1999), at <http://www.law.emory.edu/fedcircuit/apr99/98-1338.wp.html>

<sup>13</sup> For interesting discussion of developing law of business method patents, see “Automated Financial or Management Data Processing Methods (Business Methods),” <http://www.uspto.gov/web/menu/busmethp/index.html>

A careful evaluation of the interplay between possible patented processes or method patents, and the products or services produced using such processes or methods is warranted. If the “first sale” doctrine is expanded or extended to include the developing electronic arena (and the need for such a move is still far from clear), then the notion of the unit of information that is to be viewed as the virtual equivalent of the “copy” should be clarified. The developing patent law around the concept of a “data structure” may be a starting point in this context. Care should be taken, however, since traditional copyright-dependent industries today do not usually rely on patents to protect the result of the physical instantiation of their protected works. However, new information economy organizations may opt to follow such a path.

Consider the data structure called a “novel.” When a literary work is expressed as a novel and fixed on paper, normally there is no question raised about patents in this method of structuring the data. The same may be said for what might be viewed as the method of expression itself, e.g., English language and syntax. However, in electronic commerce, where works are often expressed initially in digital form, using new computer languages like Java, there may be patents claimed not just in the method of structuring the data, but in the resulting product itself. The dividing line between what is subject to patent, and expression protected by copyright, is increasingly ambiguous. Indeed the two areas already appear to overlap, at least in part. Certain understandings may need to be reached on when a process or method should be deemed subject matter of patent, and when the copyright law should be preeminent. Anytime someone wants to write the virtual equivalent of a novel or publish a newspaper or express a copyrighted work in some new data structure, there should be some generally understood forms of expression that would not require an author to negotiate a patent license.<sup>14</sup>

### **Communications Law -- Extended**

The Digital Millennium Copyright Act (“DMCA”) marks an important step forward in adapting the U.S. copyright law to meet the capabilities of the evolving information infrastructure; however, one aspect of the existing communications law merits further reflection in the context of a study of section 109. In weighing possible electronic alternatives to the physical copy, some account should be taken of current communications law as it relates to the conventional broadcast, satellite and cable industries. If the notion of a uniquely and persistently identifiable unit of information is found to be generally comparable to a physical copy for purposes of an extended version of any new “first sale” doctrine for electronic commerce, then there should also

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<sup>14</sup> For some general thoughts on this subject, see P.A. Lyons, “Where Electronic Publications and Television Programs are Really Computer Programs: Some Copyright Implications,” Scholarly Publishing The Electronic Frontier, ch. 18, at 299 (1996).

be some discussion of who owns such a “virtual copy” and what rights they may have. In this context, it is important to maintain some logical coherence between any proposed new legislation and the communications law as it has evolved since the enactment of the Communications Act of 1934. An example from the broadcast industry may help to illustrate my point.

In the 1934 Act, Congress recognized that technology existed that would allow someone to receive a broadcast signal, remodulate the signal, and rebroadcast it without permission of the owner of what was called a “program.” There was concern that once such programs were broadcast over the airwaves, the broadcaster would lose control over the material. Since at the time there was uncertainty about the application of the definitions of “copying” and “performance” under the 1909 Copyright Act to a radio broadcast, Congress enacted Section 325 to provide broadcasters, and thus program owners, some degree of protection against the usurpation and redistribution of their valuable programming.<sup>15</sup>

Distinct from copyright rights, one can conceive of a new “communicator’s right” to authorize others to access discrete units of information that may be stored in network-based repositories, or accessed via software “agents” that interact with other such agents. The notion of “access to perform stated operations on sets of sequences of bits” is a potentially important new addition to the provision of communications services which may fit comfortably in the context of the communications law; and, it appears useful for the rules governing authorization for such access to be articulated within the framework of that law. This would allow for the broadening of any such new legislation to cover situations where the material in question is not based on or incorporates copyrighted works or performances of works.

### **Managing Access to Digital Information**

Access to repositories of information expressed in some digital form for storage, processing, retrieval and other stated operations will be a fundamental attribute of business in the future. The notion of what today are called “databases” may prove too limited to adequately describe the dynamic information resources under development or now actually being deployed. I am

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<sup>15</sup> Section 325(a) states in part: “. . .nor shall any broadcasting station rebroadcast the program or any part thereof of another broadcasting station without the express authority of the originating station.” 47 U.S. C., sec. 325(a); see generally J.E. Dunstan & P.Lyons, “Access to Digital Objects: A Communications Law Perspective,” Annual Survey of American Law, 3 N.Y.U. L. Sch. 363 (1994).



attaching a paper prepared by me for a Congress held at Monaco in March 1997, and published in the ASIS Bulletin of December/January 1998.<sup>16</sup> It provides a brief overview of the notion of digital objects (sometimes referred to as packages, containers or, more generally, structured bit sequences) and their supporting technologies. In this context, a digital object is understood as one or more sequences of bits or sets of such sequences that contain “typed data” (to allow the sequences to be interpreted) and include a unique, persistent identifier for the object known as a “handle” (or, in certain instances a “DOI”).<sup>17</sup> There are several implementations of this technology to date in various sectors of the economy such as the publishing industry.

A practical illustration of the general concept of a digital object, and the possible need for further consideration of the legal and procedural framework for the deposit of such objects in multiple repositories, was the subject of a recommendation of the Committee on Intellectual Property Rights and the Emerging Information Infrastructure.<sup>18</sup> While the recommendation referred to the “deposit of digital files in multiple depositories,” the underlying concepts relate more generally to the deposit of structured bit sequences in one or more repositories. Fundamental aspects of such an information infrastructure were described in a paper on a framework for distributed digital object services.<sup>19</sup> With appropriate authentication, storage and access mechanisms in place, digital objects could attain a similar attribute of persistence as a “material object” such as a book printed on paper. This framework represents an important contribution to the emerging information infrastructure and points the way toward managing information in the networked environment.

There is a relationship between the recommendation concerning “deposit of digital files” and the meaning of “copy” for purposes of section 109, as well as the more basic concept of “publication” for copyright law purposes. It is important to recall that section 407 of the U.S. copyright law provides generally that “the owner of copyright or the exclusive right of publication in a work published in the United States shall deposit at the Library of Congress,

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<sup>16</sup> See <http://www.asis.org/Bulletin/Dec-97/lyons.htm> (reproduced in the **Appendix**); this paper was prepared for delivery at the Unesco International Congress on Ethical, Legal and societal aspects of Digital Information, held at Monaco, March 10-12, 1997.

<sup>17</sup> For information and software relating to “handles,” see Handle System at <http://www.handle.net> Information on the DOI may be found at <http://www.doi.org>

<sup>18</sup> The Digital Dilemma, Intellectual Property in the Information Age, Computer Science and Telecomm. Board, National Research Council, at 208-209 (2000).

<sup>19</sup> R.E. Kahn & R. Wilensky, “A Framework for Distributed Digital Object Services” (1995), available at <http://www.cnri.reston.va.us/home/cstr/arch/k-w.html>

within three months after the date of such publication . . . two complete copies of the best edition.” There is also an interplay between section 407 and the requirements for registration of copyright claims that should be considered in this context.

The meaning of the term “copy” came up for discussion at the Copyright Office several years ago in the course of the Advisory Committee on Copyright Registration and Deposit (known as the Accord group). Consideration was given to whether there was a distribution of copies for purposes of publishing works where no actual “copy” of the work was transmitted to the public. The Accord group decided to propose legislation to Congress that would amend section 407 to extend to unpublished, but publicly transmitted works. This proposal did not get very far due to opposition from representatives in the computer program and database industries.<sup>20</sup>

In closing, a study of the meaning of section 109 should take into account the ramifications of any proposed change on the basic concepts underlying the U.S. copyright law as a whole, as well as patent and communications law. The interplay between the federal copyright law and state contract law should also be explored. Any examination of the meaning of this provision should not be carried out in isolation. If the notion of a “virtual copy” (or other similar data structure) that may be “delivered,” “transmitted,” “processed,” “accessed” or otherwise used in a networked environment is to be considered, then it is essential that an analysis of such a proposal be carried out in light of the developing information architecture, including the work that is going forward around the concept of digital objects. In any study of the role of section 109 of the copyright law, however, the primary role of copyright in encouraging the creation and dissemination of works of authorship should be kept uppermost in mind. An effort to expand public access to copyrighted works should not inadvertently lead to a severe limitation on the ability of copyright owners to control the dissemination of their works.

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<sup>20</sup> See Copyright Reform Act of 1993, H.R. Rep. No. 103-833, 103d Cong., 1<sup>st</sup> Sess., at 25 (1993) (proposed study “to determine how to implement an amendment to that section [407] extending the mandatory deposit provisions to unpublished, but publicly transmitted works, including computer programs and online databases”); see also Report of the Advisory Committee on Copyright Registration and Deposit, Co-Chairs R. Wedgeworth and B. Ringer, 86 Copyright L. Rep. (CCH), at 55, n. 14 (1993).

## APPENDIX

### **Managing Access to Digital Information: Some Basic Terminology Issues**

by Patrice A. Lyons

Often, a marked technical advance stimulates a period of intellectual progress. It is widely recognized that the printing press was such a development. Whereas, before this invention, only a few books were laboriously produced, and fewer still were available to the public, the printing press opened the doors for sharing information with a much larger audience. There is little doubt that this new procedure for communicating ideas had a major impact on civilization. Other data structures besides books, such as newspapers, monographs and journals, also emerged to take advantage of the capabilities of the printing press.

In this century, radio and television technology ushered in a yet more diversified medium of communication. In addition to expressing ideas with printed text and illustrations, information could be widely shared in a dynamic form consisting of a series of related sounds and images. While the data structure understood as “the book” played (and continues to play) a leading role in the print-on-paper world, a unifying structure, known as “the transmission program,” facilitates the origination and transmission of information in the broadcast, cable and satellite communications industries. This unit for organizing and identifying information has generally been regulated under communications and trade laws, but it also has implications for the application of copyright law in a communications environment. For example, the North American Free Trade Agreement (NAFTA) makes provision for the protection of “encrypted program-carrying satellite signals.”

#### **Like books and transmission programs in the past, what logical entities are most appropriate to facilitate commerce in creative works in a digital environment?**

Over the last decade, there has been substantial growth in the use of computer networking capabilities for the creation and dissemination of copyright works. Of particular note is the emergence of the Internet. For definition of Internet see

[http://www.fnc.gov/Internet\\_res.html](http://www.fnc.gov/Internet_res.html)

This phenomenon is not a unique situation in the history of intellectual progress. It has been a distinguishing feature of human potential to challenge existing assumptions, to reconceptualize given knowledge and to generate diverse informational materials and artifacts for entertainment, educational, industrial and other purposes. Technology has simply helped to accelerate the process.

The widespread availability of global information systems like the Internet carries with it the potential to generate and share information at a degree of complexity and pervasiveness that was unimaginable until recently. Already, information is being posted on the Net that would otherwise only be available to a restricted group, if anyone knew of its existence. Unlike transmission programs consisting of sounds or images that are produced solely for communication to the public in sequence and as a unit, digital information is inherently malleable. Information expressed as sequences of binary digits (or bits) may be accessed interactively, data streams from widely distributed sources may be intermingled and new works dynamically generated and processed.

There is a growing perception in the research community, and increasingly by leaders in copyright-dependent industries, that data structures are needed to enable the organization and identification of units of digital information for purposes of managing rights and interests in a network environment. Efforts in this direction are well underway. Of particular note is a framework under development that will enable copyright works and other information resources, once configured as "digital objects," to be reproduced, stored, accessed and disseminated over computer networks in this new form of data structure. This architecture grew out of a program organized and led by the Corporation for National Research Initiatives (CNRI) under the sponsorship of the U.S. Defense Advanced Research Projects Agency and with the active participation of the U.S. Copyright Office of the Library of Congress. Fundamental aspects of this information infrastructure were described in a paper entitled "A Framework for Distributed Digital Object Services" by Robert Kahn and Robert Wilensky. It is available on the Internet at

<http://www.cnri.reston.va.us/home/cstr/arch/k-w.html>

Digital objects (sometimes referred to as packages, containers or, more generally, structured bit sequences) and their supporting technologies have emerged as a focus of experimentation. In this context, a digital object is understood as one or more sequences of bits or sets of such sequences that contain "typed data" (to allow the sequences to be interpreted), and include a unique, persistent identifier for the object known as a "handle" (or, in certain instances, a "DOI"). The digital object is intended to be a generic means of structuring information in the digital world. A digital object may incorporate information in which copyright, patent, trade secret or other rights or interests may be claimed, although this need not always be the case. Key infrastructure components of an open architecture that supports digital objects are discussed in a Cross-Industry Working Team (XIWT) white paper entitled "Managing Access to Digital Information: An Approach Based on Digital Objects and Stated Operations" that is available at

<http://www.xiwt.org>

Digital objects may be deposited and stored in a network-based computer system or “repository” for possible subsequent access. Repositories may be operated in a variety of ways, spanning the range from individual storage depots to bulletin boards to broadcast stations on the Internet. From a copyright perspective, it is important to stress that a “handle” identifies a particular logical entity, i.e., a data structure, in which a work or other information has been embodied, but not the underlying information itself.

A unique and important attribute of a digital object embodying a copyright work is the capability of the object to incorporate data about itself. This information or metadata may include conditions for accessing the digital object and/or its underlying content, or an indicator to where such information may be available. The digital object may also enable a negotiation to take place where a user wishes to go beyond any conditions previously set forth in its metadata. This capability is an essential ingredient to enable and encourage the growth of commerce in copyright works in a digital environment.

Several organizations are now building testbeds to implement the digital object framework. These include two at the U.S. Library of Congress and another in the publishing community sponsored by the Association of American Publishers. Information on the publishers’ initiative is available at

<http://www.doi.org>

A key goal in these efforts is to provide an open architecture that allows the identification and management of access to digital information. They seek to make both proprietary and non-proprietary information available in a structured and well-known way with open interfaces, protocols and object structures. A digital object as a structured package of encrypted information may also facilitate the development of flexible and efficient mechanisms for managing rights or interests in a computer network environment. In this context, the keys can be managed and distributed independently from the digital object itself. This capability for managing rights or interests also applies where intelligent agents, structured as digital objects, act on behalf of rightsholders in a network environment to protect works embodied in such objects.

**What is the copyright status of original works of authorship structured as "digital objects"?**

When Congress revised the United States federal copyright statute about 20 years ago, it restated the two fundamental criteria of copyright protection: originality and fixation in tangible form. From the first U.S. copyright statute, which designated only "maps, charts and books," the copyright law has grown to include new forms of expression as creative and worthy of protection. The wording of the definition of fixation, however, limits this expansive intent. It specifically provides that a work is "fixed" in a tangible medium of expression when it is embodied in an authorized "copy" or "phonorecord." Generally, a copy for these purposes is a material object (other than a phonorecord). This limitation is not just a matter of passing interest in the context of U.S. law. The concept of fixation is important, since it represents the dividing line between the application of the federal copyright statute and any protection that may be available under State common law or statute.

What it means to be a copy also came up at the Diplomatic Conference on Certain Copyright and Neighboring Rights Questions convened by WIPO and held in December 1996. Specifically, the following text appears under the Agreed Statements concerning Articles 6 and 7 of the WIPO Copyright Treaty adopted by the Diplomatic Conference: ". . .the expressions 'copies' and 'original and copies' being subject to the right of distribution and the right of rental under the said Articles, refer exclusively to fixed copies that can be put into circulation as tangible objects." While the Conference thus clarified the intended meaning of copies, the meaning of original may require further analysis. In the United States, an original may be deemed to apply to the first fixation of a work in a tangible form; however, many countries extend copyright protection to what are sometimes termed original works without a fixation requirement.

This topic is particularly interesting to consider where "original works of authorship" for purposes of U.S. law (or what are sometimes termed "original works of the mind" under other bodies of law) are created wholly within a global information system like the Internet, and where, in this environment, there may be no material fixation (or copy) generated, much less distributed. A novel interpretation of materially fixed might include a capability that supports "fixation on demand"; however, there would still be some inherent ambiguity about the status of such works prior to their fixation.

The development of a digital object infrastructure may enable the expansion of copyright protection to accommodate works that are not first fixed in a tangible medium of expression, or, in the case of material such as live broadcasts, that are not recorded simultaneously with their

transmission. Introducing the notion of a structured, logical unit, i.e., a “digital object,” may better accommodate the emerging capabilities of digital technology. These include, in particular, the deployment of such dynamic resources as intelligent agents. It may also avoid the use of ambiguous and oxymoronic terms such as intangible copies.

In addition to the existing requirement under U.S. law that an original work of authorship be “fixed in a tangible medium of expression” for federal copyright protection to attach, an alternative criteria may prove very useful in a network environment:

“an original work of authorship structured in a persistent, uniquely identifiable medium of expression from which it may be reproduced, perceived, performed or accessed by any device or process for a period of more than transitory duration.”

For purposes of this proposed new provision, structured may be defined to include digital objects and other equivalent data structures.

A digital object with its unique persistent identifier thus serves much the same purpose as a material fixation under U.S. law. Moreover, this concept may also prove of assistance in countries that extend protection without the need for a fixation. A capability of persistently and uniquely identifying a data structure in which copyright works, or performances of works, are embodied may encourage the development of a new marketplace for copyright works in a digital environment. Of course, where an original work of authorship structured as a digital object is actually fixed in a tangible medium of expression, copyright protection would subsist in accordance with current U.S. copyright law. My proposal would simply offer an alternative basis for protection to attach.

### **Should the processing and communication of bits be viewed as a distribution and/or a performance?**

Questions have been raised about the classification of new creative works like MIDI sequences for purposes of copyright. Are they literary works? Musical works? Computer programs? Sound recordings? Further, what happens when users access a network-based repository of such works on an interactive basis, and the results of such access are disseminated over the Internet? Depending on the nature of the access request, the dissemination may not represent any particular sequence of bits that previously existed in that, or indeed, any repository. This situation is also likely to become increasingly prevalent where complex works, such as knowledge-based systems, are made commercially available over the Internet to provide advice and guidance on a wide variety of topics.

Many information resources (configured as digital objects or not) that are now accessible to the public over the Internet may look and sound like conventional copyright works. Often, the term multimedia is applied to these capabilities, as if these resources were simple compilations of several traditional works, such as music, photographs, films or text, to be treated as what might generally be called data. It may be appropriate to regard these works as a whole as either computer programs or computer databases, or some combination thereof. However, a more accurate, comprehensive and flexible terminology to describe this emerging area is needed that reflects the realities of the underlying technology.

Information in digital form (whether of a purely symbolic or numeric character) is a purely conceptual entity; however, it may be represented as a real entity in the form of symbols or numbers fixed in a material object, where it is usually considered a “literary work” for copyright purposes. In light of the developing capabilities of digital technology, Committee No. 702 of the American Bar Association explored whether it might be helpful to establish a subcategory of literary works capable of behavior, to be called “digital works.” In its 1996 report, the Committee proposed the following definition for discussion purposes: “‘Digital works’ are literary works consisting of an ordered set of symbols from a discrete alphabet, such as computer programs or knowledge structures, that are capable of behavior when processed.”

Such a provision is particularly important where a patented process may be involved in the performance of a digital work subject to copyright or where there may be patents involved in the methods used for structuring data.

If a consensus can be reached on what it means to be a “digital work,” it may lead to a better understanding of what occurs from a copyright, patent and communications law perspective where information represented in some digital format is mapped into a waveform. Terms such as digital communication or digital transmission may not be adequate to describe the situation fully.

It was the Committee’s understanding that, strictly speaking, there are only continuous waveforms (or analog signals) in the real world. A “signal” is meant to be “digital” only in the conceptual sense that it is understood to contain a sequence of discrete symbols or bits. Any sequence of discrete symbols that corresponds to the expression of certain information may be mapped into one or more continuous waveforms. For purposes of copyright, where this ordered set of symbols is viewed as a “digital work,” the mapping of the information into a waveform by any device or process may be viewed as a performance of the work. There may be other performances of works that take place, not just at the source, but at the point of reception and within the network itself, where intelligent agents may be tasked with performing various operations. Certain of these performances may be deemed exempt from copyright liability.



Networks and network servers can generally be either active or passive entities in any communications system. As passive entities, they typically serve to communicate bits without essential change from a source to one or more destinations. As active entities, they have the ability to process the information in arbitrary ways. When the information is encrypted at its source, the processing options along the communications pathways are inherently more limited, but it is still possible to perform a limited set of functions within the network, such as aggregation, selective filtering and disaggregation. Thus, the extent of copyright liability for any given situation should be based upon the nature of the service being provided. There may be classes of operations performed on digital objects that have only a minimal, if any, impact on any underlying copyright works. While strictly speaking performances, such operations might be deemed to encompass the “distribution” of digital objects embodying copyright works. Complex operations would most likely bring into play the copyright right of public performance.

There may be rules and procedures developed for access to digital objects, or repositories of digital objects, that may overlap and impact in practice any copyright and other rights or interests that apply to the underlying information content. In the context of a digital object infrastructure, there has been some discussion of the notion of “access to perform stated operations on a sequence of bits.” Whether, and under what circumstances, such operations should be accommodated under communications laws, and how protection at the digital object level will interact with any copyright, patent, banking, privacy, trade secret and other rights or interests in an object's contents, is an important area for continued discussion and experimentation. Where a copyright work is configured as an encrypted digital object, a new set of capabilities is introduced having great potential for the management of rights or interests in a network environment or even for indicating that there are no restrictions placed on access to digital information.

In summary, this paper has introduced the digital object as a logical structure for organizing information expressed as sequences of bits (like the book or the transmission program in other media). It compares the characteristics of digital objects, i.e., unique persistent identifiers, network accessibility and typed data, to the attributes of fixation in a material object and shows them to be generally equivalent. In addition, it introduces a notion of a digital work as a literary work that is capable of behavior and discusses some of the attributes of encrypted digital objects that may bring into play the copyright rights of distribution, as well as public performance, in a network environment.