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## Copyright in Cyberspace IV: Gnutella & the Future of Content

### READINGS

*I was in the pub last night, and a guy asked me for a light for his cigarette. I suddenly realized that there was a demand here and money to be made, and so I agreed to light his cigarette for 10 pence, but I didn't actually give him a light, I sold him a license to burn his cigarette. My fire-license restricted him from giving the light to anybody else, after all, that fire was my property. He was drunk, and dismissing me as a loony, but accepted my fire (and by implication the licence which governed its use) anyway. Of course in a matter of minutes I noticed a friend of his asking him for a light and to my outrage he gave his cigarette to his friend and pirated my fire! I was furious, I started to make my way over to that side of the bar but to my added horror his friend then started to light other people's cigarettes left, right, and centre! Before long that whole side of the bar was enjoying MY fire without paying me anything. Enraged I went from person to person grabbing their cigarettes from their hands, throwing them to the ground, and stamping on them. Strangely the door staff exhibited no respect for my property rights as they threw me out the door.*

--Ian Clarke [posted on Gnutella.com]

In this section, we'll step back and consider -- as a positive matter -- the state of the copyright industry (i.e, "content creation") in eCommerce, and to what extent the present legal rules are helping or hindering our transition to a new economy of content.

### Gnutella & Related Technologies

*What is Gnutella?* Gnutella News (2001).

Eytan Adar and Bernardo A. Huberman, *Free Riding on Gnutella*, First Monday, October 2000.

*'No limits' browser planned*, BBC News, Sunday, 6 May, 2001, 11:16 GMT 12:16 UK

Fred Von Lohmann, *Peer-to-Peer File Sharing and Copyright Law after Napster*, Electronic Frontier Foundation (February 2001)

### The Future

RedHerring, *The State of Digital Entertainment (series)*, Redherring.com, August 15-30, 2001.

Beth Pinsker, *Wary of a Video Napster, Hollywood Plots a TV Crackdown*, Inside, 1/3/2001 17:17

*Kid Rock Starves to Death: MP3 Piracy Blamed*, The Onion (2000).

Lawrence Lessig, *Just Compensation*, The Industry Standard, Apr 09 2001 12:00 AM PDT

David Post, *His Napster's Voice* (May 2001).

William Fisher, *Digital Music: Problems and Possibilities* (October 10, 2000).

## NOTES & QUESTIONS

1. What does the rise of systems such as Gnutella say about the efficacy of the recent attempts to control the online distribution of copyrighted music? Is it fruitless? Or can copyright holders still win?
2. The Von Lohmann piece suggests a number of criteria that software developers can do in the wake of the Napster decision to reduce or avoid liability? Do you think these steps make the predictions of doom and gloom by some of the commentators seem less likely? If software developers use these techniques, what recourse will record companies have? Will the subsequent developments (i.e., to address the limits of the Napster opinion) have a positive or negative effect on eCommerce and the 'net generally?
3. How do you think the future of online content is shaping up? What are the primary concerns we should be thinking about now? Should Congress step in? If so, what should it do?

*Kid Rock Starves to Death: MP3 Piracy Blamed*,



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## What is Gnutella?

Gnutella is a fully-distributed information-sharing technology. Loosely translated, it is what puts the power of information-sharing back into your hands.

When the World Wide Web started, that's how it was. It used to be that I would put up a web page, you would link to it, and I would link to yours. To get around, we would all "surf the links". The web was a web. But shortly after, the likes of [Yahoo!](#) and [Lycos](#) came on the scene to build search engines, or information portals. You go to one place to find all the information. Ideally that would be true. The problem with portals? They stuff you with ads. They are outdated. They basically control the flow of information. (Proven in a recent IBM/Altavista study of the Internet.)

Now, however, Gnutella puts the personal interaction back into the Internet. When you run a Gnutella software and connect to the Gnutella Network, you bring with you the information you wanted to make public. That could be nothing, it could be one file, a directory, or your entire hard drive (I wouldn't recommend this option).

The power behind this is amazing. That data which you have bothered to keep on your hard disk is what you found to be valuable. So when you share it you are sharing what is most valuable on the entire Internet. And you control its sharing. Decide to stop sharing? Go ahead and take those files offline. Want to share more? Select more files and share them. It's really that easy, and the power of sharing information is just unquantifiable.

Gnutella client software is basically a mini search engine and file serving system in one. When you search for something on the Gnutella Network, that search is transmitted to everyone in your Gnutella Network "horizon". If anyone had anything matching your search, he'll tell you.

So, time to give a brief explanation of the "horizon". When you log onto the Gnutella network, you are sort of wading into a sea of people. People as far as the eye can see. And further, but they disappear over the horizon. So that's the analogy. When you log on, you see the host counter start going crazy. That's because everyone in your horizon is saying "Hello" to you. After a while, it stops counting so rapidly, because you've counted most everyone in your horizon. Over time the people in the horizon change, so you'll see the counter move slowly.

If you log in another day, you should see a whole bunch of fresh faces, and maybe you'll have waded into a different part of the network. A different part of the crowd. Different information.

You might say, "Well, what if what I want doesn't exist within my horizon? The horizon never seems to grow beyond 10000 hosts!" True. If the information you want isn't in your horizon, you're out of luck. But hopefully it is. It's a probability game. Fortunately information is duplicated. Everyone's got that joke about the way men choose urinals, for example.

And what of the 10000-user horizon? That's just the network "scaling". The Gnutella Network scales through segmentation. Through this horizoning thing. It wouldn't do to have a million people in the horizon. The network would slow to a crawl. But through evolution, the network sort of organizes itself into little 10000-computer segments. These segments disjoin and rejoin over time. I leave my host on overnight and it will see upwards of 40000 other hosts.

### Gnutella Is Filesharing

Okay, so you've got [Napster](#), and you've got [SpinFrenzy](#), and you've got [CuteMX](#). And you've got FTP sites, web pages, and all kinds of other stuff. And you still can't find what you want.

Enter Gnutella. Gnutella is the answer to your prayers. Searching for that recipe for strawberry-rhubarb pie? Can't find the latest version of Linux on a T3 or better link? It's probably out there on the GnutellaNet.

What's great about Gnutella is that it isn't focused on trading MPEG music the way the other guys are. There is all kinds of stuff on the GnutellaNet, and when you get a search hit, it's virtually guaranteed to be there. No stale links. No irrelevant hits. And if you don't want to download your recipes from someone in Belize with a 2400 bps link, you just set that in your query.

The other half of Gnutella is giving back. Almost everyone on GnutellaNet *shares* their stuff. Every client on the GnutellaNet is also a server, so you not only can find stuff, but you can also make things available for the benefit of others. So if you've got a good recipe for blueberry cobbler, you could answer someone's prayers by sharing it with the rest of the GnutellaNet!

### Gnutella Is Anonymous

One of the problems with Napster and others like it is that they are centralized. A centralized place for government agencies to

impinge upon your freedom to search the net. All those commercial realtime search engines probably keep logs so they can target ads at you. At least they keep logs so they know how many searches they get per day so they can tell it to their investors. And they probably run some data mining to figure out how many people searched for MP3's, how many people searched for recipes, etc. All that so they can figure out *exactly* what their customer is like.

Gnutella puts a stop to all those shenanigans. When you send a query to the GnutellaNet, there is not much in it that can link that query to you. I'm not saying it's totally impossible to figure out who's searching for what, but it's pretty unlikely, and each time your query is passed, the possibility of discovering who originated that query is reduced exponentially. More on that in the next section.

In short, there is no safer way to search without being watched.

A big however, however. To speed things up, downloads are not anonymous. Well, we have to make compromises. But again, nobody's keeping logs, and nobody's trying to profile you.

### **Gnutella Is The Game : Telephone**

Remember the game telephone? Yeah, you know...someone whispers something to you, and you're supposed to whisper that to someone else, and so on and so on? And the guy at the end of the chain got a whisper that sounded nothing like the original whisper. Well, Gnutella is similar in many ways.

When you say to GnutellaNet, "Hey, find strawberry-rhubarb pie recipes.", you are actually saying, "Hey, my close friends, could you tell me if you've seen any recipes for strawberry-rhubarb pie? And while you're at it, ask your close friends too. And ask them to ask their friends." It's obvious that after just a few rounds of this, you've got a lot of friends working on finding that recipe! And, it's pretty much impossible for any one person to know who asked the question in the first place. Two beautiful things about Gnutella.

So suppose some guy, 6 degrees from you (your friend's friend's friend's friend's friend's friend), has the world's best recipe for strawberry-rhubarb pies. He tells the guy who asked him. That guy tells the guy who asked him... And ultimately the answer gets back to you. But only one person in the whole world knows that you're the original person who asked. And guess what? In GnutellaNet, we even fix that. The guy you asked originally doesn't even know that you're the person who's really asking the question. Err...searching for that strawberry-rhubarb pie recipe. So you get your answer, and you don't have to admit to anyone that you're a pantywaist.

Could it get any better?

### **Gnutella Is Designed to Survive Nuclear War**

Gnutella is designed to survive nuclear war. It's true. Maybe it's a munition. Who knows. What we do know is that GnutellaNet cannot be defeated by something so lame and simple as an ICMP flood. It's not going to leave you stranded like Yahoo! did when it was pummeled by Smurfs.

The GnutellaNet concept is not to have one massive Gnutella service provider that can go down and bring the whole world to a screeching halt. You don't have to stand around in your kitchen for the next three hours waiting for some geek to switch the DNS from GlobalCenter to Exodus. You just issue your query, and some guy in Texas jumps up and down and waves his Gnutella hands in the air and says, "Pardner, I've got a recipe for strawberry-rhubarb pie that'll have you salivating like a dog in heat."

### **Gnutella Can Withstand A Band of Hungry Lawyers**

Gnutella can withstand a band of hungry lawyers. How many realtime search technologies can claim that? Not Napster, that's for sure. Just to emphasize how revolutionary this is: hungry lawyers are probably more destructive than nuclear weapons.

There are a few things that will prevent Gnutella from being stopped by lawyers, FBI, etc. First, Gnutella is nothing but a protocol. It's just freely-accessible information. There is no company to sue. No one entity is really responsible for Gnutella.

Second, Gnutella is not there to promote the piracy of music. It's a *technology*, not a music-piracy tool.

The important thing is that Gnutella will be here tomorrow. It's reliable, it's sharing terabytes of data, and it is absolutely unstoppable.

**Have more questions? Post them in our [forums](#), and we'll try our best to answer them.**

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## Free Riding on Gnutella

by Eytan Adar and  
Bernardo A. Huberman

*An extensive analysis of user traffic on Gnutella shows a significant amount of free riding in the system. By sampling messages on the Gnutella network over a 24-hour period, we established that almost 70% of Gnutella users share no files, and nearly 50% of all responses are returned by the top 1% of sharing hosts. Furthermore, we found out that free riding is distributed evenly between domains, so that no one group contributes significantly more than others, and that peers that volunteer to share files are not necessarily those who have desirable ones. We argue that free riding leads to degradation of the system performance and adds vulnerability to the system. If this trend continues copyright issues might become moot compared to the possible collapse of such systems.*

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## Introduction

The sudden appearance of new forms of network applications such as Gnutella [Gn00a] and FreeNet [Fr00], holds promise for the emergence of fully distributed information sharing systems. These systems, inspired by Napster [Na00], will allow users worldwide access and provision of information while enjoying a level of privacy not possible in the present client-server architecture of the Web.

While a lot of attention has been focused on the issue of free access to music and the violation of copyright laws through these systems, there remains an additional problem of securing enough cooperation in such large and anonymous systems so they become truly useful. Since users are not monitored as to who makes their files available to the rest of the network (produce) or downloads remote files (consume), nor are statistics maintained, the possibility exist that as the user community in such networks gets large, users will stop producing and only consume. This free riding behavior is the result of a social dilemma that all users of such systems confront, even though they may not be aware of its existence.

In a general social dilemma, a group of people attempts to utilize a common good in the absence of central authority. In the case of a system like Gnutella, one common good is the provision of a very large library of files, music and other documents to the user community. Another might be the shared bandwidth in the system. The dilemma for each individual is then to either contribute to the common good, or to shirk and free ride on the work of others.

Since files on Gnutella are treated like a public good and the users are not charged in proportion to their use, it appears rational for people to download music files without contributing by making their own files

accessible to other users. Because every individual can reason this way and free ride on the efforts of others, the whole system's performance can degrade considerably, which makes everyone worse off - the tragedy of the *digital commons* [Ha68].

The second problem caused by free riding is to create vulnerabilities for a system in which there is risk to individuals. If only a few individuals contribute to the public good, these few peers effectively act as centralized servers. Users in such an environment thus become vulnerable to lawsuits, denial of service attacks, and potential loss of privacy. This is relevant in light of the fact that systems such as Gnutella, Napster, and FreeNet are depicted as a means for individuals to rally around certain community goals and to "hide" among others with the same goals. These may include providing a forum for free speech, changing copyright laws, and providing privacy to individuals.

Given these concerns we decided to conduct a set of experiments to determine the amount of free riding present in the Gnutella system. As we show below, a large proportion of the user population, upwards of 70%, enjoy the benefits of the system without contributing to its content.

In what follows we describe the basic architecture of Gnutella and the experiments that we performed. We then provide an analysis of the data and show ways in which such rampant free riding can impact distributed systems. Finally we propose some mechanisms that can counter free riding.

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## Gnutella

People who wish to use the Gnutella network will download [Gn00a] or develop [Gn00b] an application that adheres to the Gnutella protocol. This application acts as either a *client* (a consumer of information) or a *server* (a supplier of information), as well as a high-level *network*, connecting and routing information between clients and servers. Each instance of an application is called a *peer*. We will use peer interchangeably with *host* in the following discussion.

Gnutella boasts a number of features that make it attractive to certain users. For example, Gnutella provides for anonymity by masking the identity of the peer that generated a query. Additionally, Gnutella provides the mechanism by which ad-hoc networks can be formed without central control.

Since there are no central servers in the Gnutella network, in order to join the system a user initially connects to one of several known hosts that are almost always available (although these generally do not provide shared files). These hosts then forward the IP and port address information to other Gnutella peers.

Once attached to the network, peers interact with each other by means of messages. Peers will create and initiate a broadcast of messages as well as re- *broadcasting* others (receiving and transmitting to neighbors). The messages allowed in the network are:

- *Ping Messages* - Essentially, an "are you there?" message directed at a host.
- *Pong Messages* - A reply to a ping ("yes, I'm here"). The pong message contains information about the peer such as their IP address and port as well as the number of files shared and the total size of those files. Peers forward this kind of message to their neighbors so that it is possible to later find other peers. This is needed in case there is a disconnect in the network.
- *Query Messages* - These are messages stating, "I am looking for x" and can get forwarded throughout the entire network (at least theoretically). Query messages are uniquely identified, but their source is unknown.
- *Query Response Messages* - These are replies to query messages, and they include the information necessary to download the file (IP, port, and other location information). Responses also contain a unique client ID associated with the replying peer. These messages are propagated backwards along the path that the query message originally took. Since these messages are not broadcast it becomes impossible to trace all query responses in the system.
- *Get/Push Messages* - Get messages are simply a request for a file returned by a query. The requesting peer connects to the serving peer directly and requests the file. Certain hosts, usually located behind a firewall, are unable to directly respond to requests for files. For this reason the Gnutella protocol

includes push messages. Push messages request the serving client to initiate the connection to the requesting peer and upload the file. However, if both peers are located behind a firewall a connection between the two will be impossible.

Several features of Gnutella's protocol prevent messages from being re-broadcast indefinitely through the network. One such feature includes a short memory of messages that have been routed through a peer (thus preventing re-broadcasting). Additionally, messages are flagged with a time-to-live (TTL) field. At each hop (re-broadcast) the TTL is decremented. As soon as a peer sees a message with a TTL of zero, the message is dropped (i.e. it is not re-broadcast).

## Free riding in Gnutella

In our analysis we consider two types of free riding. In the first type, peers that free ride on Gnutella are those that only download files for themselves without ever providing files for download by others. The second definition of free riding considers not only the amount of downloadable content a producer has, but how much of that content is actually desirable content. This is essentially a quantity versus quality argument that also poses a social dilemma when there is a cost to the provider to make desirable files available to others. In the "old days" of the modem-based bulletin board services (BBS), users were required to upload files to the bulletin board before they were able to download. In response to this requirement users would upload their own bad artwork or randomly generated text files and would be able to download high quality content generated by others. In the experiments described below we address both kinds of free riding.



## Experiments

In the following section we describe the experiments used to test the following three hypotheses:

- Hypothesis 1: A significant portion of Gnutella peers are free riders.
- Hypothesis 2: Free riders are distributed evenly across different domains (and by speed of their network connections).
- Hypothesis 3: Peers that provide files for download are not necessarily those from which files are downloaded.

## Measuring downloads

One of the features that attract users to Gnutella is the difficulty in associating queries to any particular peer/user. Given a query message it is virtually impossible (unless some large percentage of peers collude) to find the peer that originated the query. The unfortunate side effect of this property is to make it impossible to experimentally measure the number of queries and files downloaded by each client. This forces us to make assumptions about downloads in order to measure them.

One possible assumption is that users that share a high number of files had to have downloaded them, so those that share more also download more. In this case, there is no free riding. The other possible assumption is that users who have no files are those that will try to access them. Therefore the fewer files a user has the more likely he is to download them, resulting in rampant free riding.

Since we unfortunately have no way of knowing which of these two extremes is closest to reality, we assume that the truth is somewhere in between.

## Experimental Setup

In order to perform monitoring experiments on the Gnutella network it was necessary to modify a Gnutella client to log messages flowing through the system. We elected to use the Java based Furi client [Fu00] which was a full featured implementation, with numerous hooks for logging.

The Furi client was then executed for a 24-hour period over a weekend in August of 2000 (Saturday 1pm to Sunday 1pm) [1]. During this time period we collected both pong and query response messages from normal Gnutella users. A shorter trace during a weekday shows results consistent with the weekend findings. In the 24-hour period we observed 35,352 hosts issuing ping messages, which shared a total of 3,304,046 files.

One of the difficulties in measuring Network Address Translation (NAT) [Nat00] based peers is that it is possible that multiple machines will report the same address. In our study we witnessed 2,017 peers (or about 5% of the total) reporting a NAT address in ping messages. In analyzing query response which also utilize a unique client identifier (in addition to an IP address) we saw 937 out of 5,699 hosts (16% of the total) using NAT addresses.

While the possible range of 5% to 16% seems high, we find that the characteristics (in terms of files shared) of NAT based hosts is in line with non- NAT hosts and thus it is safe to remove them from the sample[2]. This leaves with a final count of 33,335 hosts sharing 3,100,464 files.

Although we could not capture all query response messages it was nonetheless possible to sample a wide selection by shifting locations (i.e., by reattaching to different hosts) within the Gnutella network. Over the 24-hour period, we were thus able to capture 87,668 query response messages.

## Results

Figure 1 illustrates the number of files shared by each of the 33,335 peers we counted in our measurement. The sites are rank ordered (i.e. sorted by the number of files they offer) from left to right. These results indicate that 22,084, or approximately 66%, of the peers share no files, and that 24,347 or 73% share ten or less files.

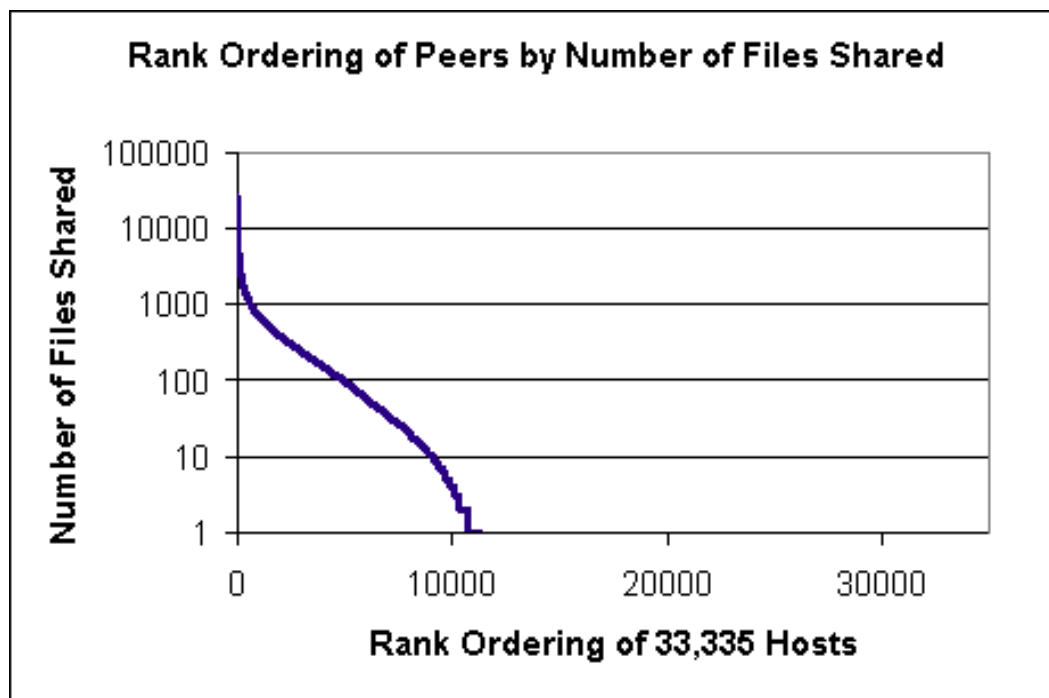


Figure 1

Although NAT allows firewalled hosts to share files, if both the sharing host and downloading host have NAT addresses the transaction cannot be completed. Thus, as the number of NAT based hosts on the network increases the number of completed transactions decreases. With 5% of hosts using NAT, this is a trivial .25%. However, as we approach 16% this turns into over 2% of transactions. While this is not "intentional" free riding, it is nonetheless important to consider. These probabilities push the zero share statistics up to 69%.

The data also shows that the top 1 percent (333 hosts) represent approximately 37 percent of the total files shared. This quickly escalates to the top 20 percent (6,667 hosts) sharing 98% of the files. Table 1 shows the values of the in-between data points.

The top	Share	As percent of the whole
333 hosts (1%)	1,142,645	37%
1,667 hosts (5%)	2,182,087	70%
3,334 hosts (10%)	2,692,082	87%
5,000 hosts (15%)	2,928,905	94%
6,667 hosts (20%)	3,037,232	98%
8,333 hosts (25%)	3,082,572	99%

Table 1

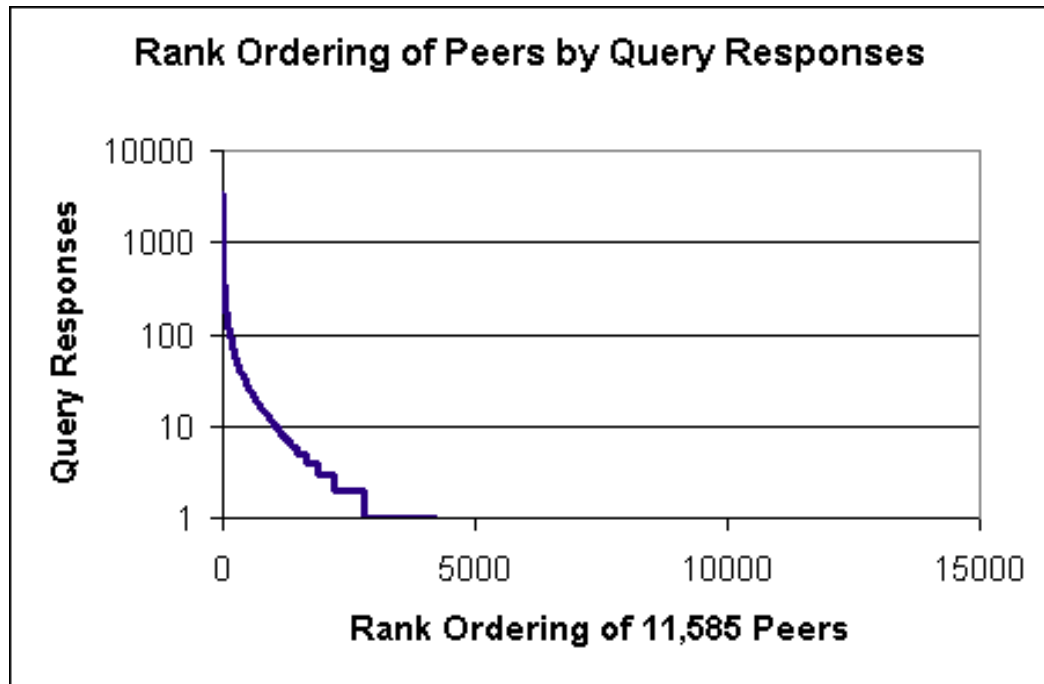


Figure 2

As per our second definition of free riding we determined which hosts provide files and which hosts provide files that are actually downloaded. We attempted to capture this by analyzing the query response traffic. The difficulty with analyzing this data is that it is unclear for how long each peer was actually connected to the network. However, we can assume again that due to the large sample, network connectivity averages out to some degree. As we show below, bandwidth appears not to have a significant effect on free riding. Using the lower bound estimate of NAT based hosts of 5% we find that after eliminating hosts that provide no downloadable files we were left with a set of 11,585 hosts.

Again, we measured a considerable amount of free riding on the Gnutella network. Out of the sample set, 7,349 peers, or approximately 63%, never provided a query response. These were hosts that in theory had files to share but never responded to queries (most likely because they didn't provide "desirable" files).

Figure 2 illustrates the data by depicting the rank ordering of these sites versus the number of query responses each host provided. We again see a rapid decline in the responses as a function of the rank, indicating that very few sites do the bulk of the work. Of the 11,585 sharing hosts the top 1 percent of sites provides nearly 47% of all answers, and the top 25 percent provide 98%.

## Who Shares Files?

In our second experiment we verified the hypothesis that files and query responses (and therefore free riders) are shared equally across different domains. The implication is that hosts based in domain *a* do not contribute more than hosts in domain *b* in terms of the ratio of peers on the network to files and responses offered. This does not imply that certain domains contribute more or less *total* hosts to the network, but simply that free riders are distributed equally. Additionally, domains can function as a proxy for bandwidth (for example aol.com hosts tend to operate on modems, and rr.com on cable modem connections). Therefore, if our hypothesis holds, the speed of a peer's internet connection will not influence the likelihood to free ride.

In order to do this analysis we filtered our initial test set to 26,014 peers. These were hosts with IP addresses that were readily converted to host names. We then counted the number of hosts in each *domain* (mit.edu, home.com, etc.) as well as the number of hosts in each *top-level domain*, or TLD (.edu, .com, .net, etc.).

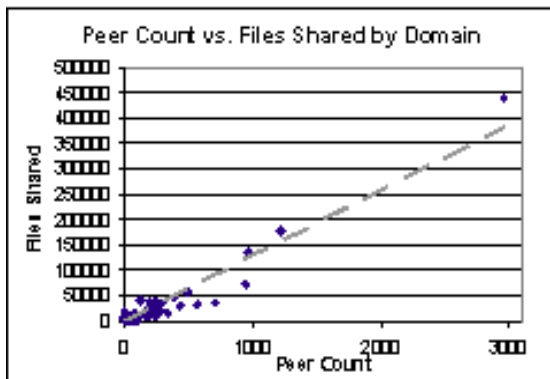


Figure 3a

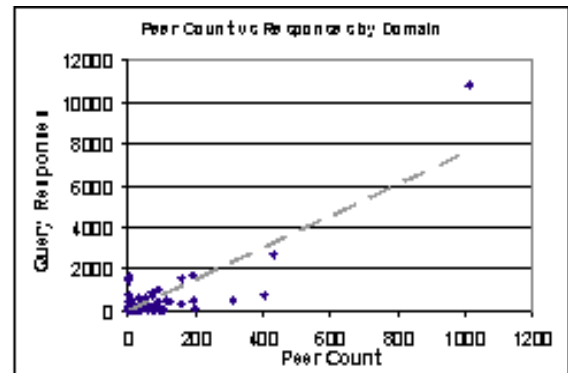


Figure 3b

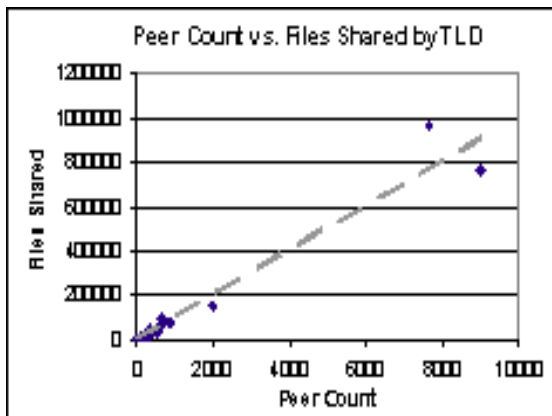


Figure 4a

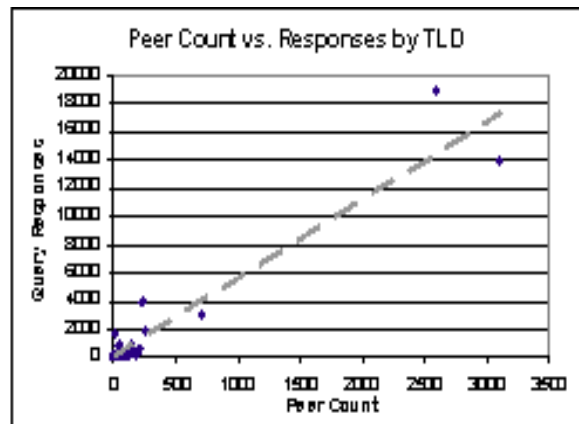


Figure 4b

In our set of hostnames there were 2,538 unique domains. The range of peers in each ranged from 1 to a maximum of 2,951. Figure 3a above illustrates this data. Each of the points in the figure represents a domain in terms of the number of peers (the x-axis) and the total number of files shared (the y-axis). The dashed line is the trend line for this data. A regression of the two dimensions yields an r-squared value of 0.927, indicating that peer count is linearly related to the number of files shared independent of the domain.

Figure 3b depicts the relationship between query responses and peer count. Again, a regression on this sample of 1,276 domains reveals a fairly linear relationship between the two dimensions (with an r-squared of 0.922). We consider this evidence of an even distribution of free riders [3].

Figures 4a and 4b display the equivalent data sets for TLDs (edu, net, org, etc.). Figure 4a represents the 77 top-level domains in terms of peer count to the number of files shared. Figure 4b represents 61 top-level domains in terms of peer count to query responses. Again, there appears to be a linear relationship in both figures with the regression fitting with an r-squared of 0.953 and 0.958 for figures 4a and 4b respectively.

## Quality vs. Quantity

In the final experiment we tested our hypothesis that the number of queries answered is not necessarily proportional to the number of files offered. This provides a test of the "quality" vs. quantity argument. The intuition is that the kinds of queries that are issued by the bulk of Gnutella users are very concentrated on particular topics. The files that are returned for these queries are therefore more desirable, which defines their quality. Therefore, only a small number of peers will actually share anything that is considered to be high "quality."

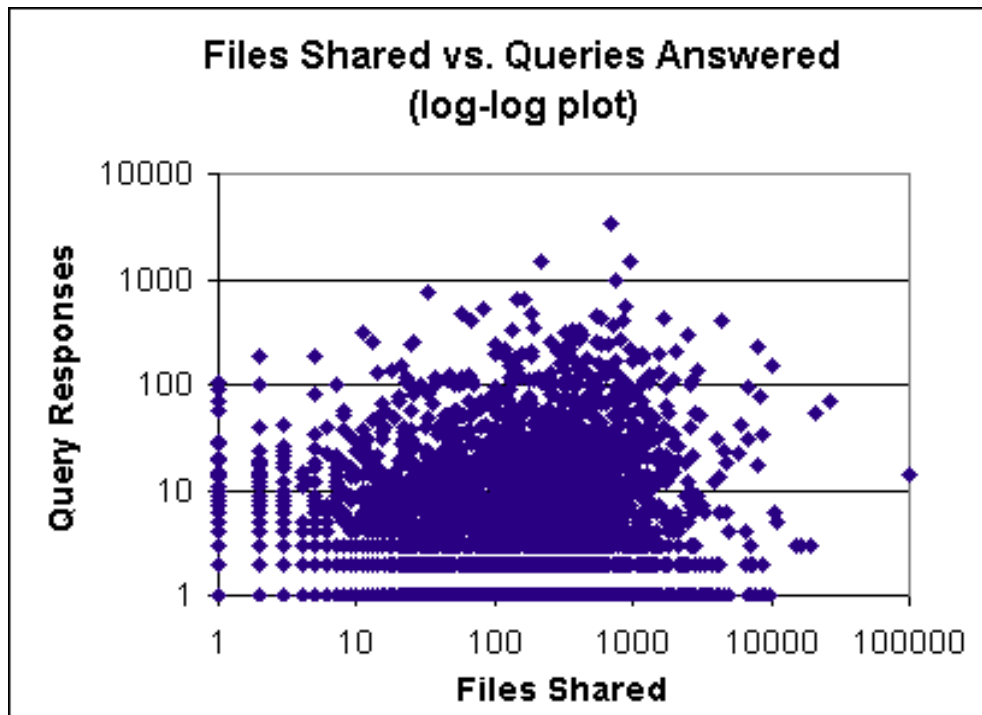


Figure 5

We found the degree to which queries are concentrated through a separate set of experiments in which we recorded a set of 202,509 Gnutella queries. The top 1 percent of those queries accounted for 37% of the total queries on the Gnutella network. The top 25 percent account for over 75% of the total queries. In reality these values are even higher due to the equivalence of queries ("britney spears" vs. "spears britney").

The predicted behavior is present to some extent. For example, the top responding host only hosted 695 files, but responded to 3,436 queries. The next most responsive peer hosted 956 files and responded to 1,474 queries.

Figure 5 illustrates the relationship between files hosts (the x-axis) and query responses (the y-axis) for 10,510 peers. As is apparent from the plot there is very little evidence of a relationship between quantity and quality in the Gnutella network. A regression analysis yields a very low r-squared value of 0.00105 for this data.



## Discussion

Studies of social dilemmas [Gl94] [Hu96] [Hu97] have shown that it is hard to generate spontaneous cooperation in large anonymous groups. As we have shown in this paper, Gnutella is no exception to this finding, and an experimental study of its user patterns shows indeed that free riding is the norm rather than the exception.

If distributed systems such as Gnutella rely on voluntary cooperation, rampant free riding may eventually render them useless, as few individuals will contribute anything that is new and high quality. Thus, the current debate over copyright might become a non-issue when compared to the possible collapse of such systems. This

collapse can happen because of two factors, the tragedy of the digital commons, and increased system vulnerability, which we now discuss.

## The Tragedy of the Digital Commons

An ideal analysis of free riding would allow us to calculate the contribution provided by individuals in exchange for consumption (either in proportion or some fixed cost). There are two ways in which individuals on Gnutella can contribute. The first is simply by uploading files. The second is the active participation in the protocol of the network, thus providing the "glue" that holds the network together. It may be then that all peers on the network contribute even if they provide no downloadable files. However, there is a point at which peers that act only as glue provide diminishing returns to the system leading to at least two ways in which the quality of the service degrades.

First, peers that provide files are set to only handle some limited number of connections for file download. This limit can essentially be considered a bandwidth limitation of the hosts. Now imagine that there are only a few hosts that provide responses to most file requests (as was illustrated in the results section). As the connections to these peers is limited they will rapidly become saturated and remain so, thus preventing the bulk of the population from retrieving content from them.

A second way in which quality of service degrades is through the impact of additional hosts on the *search horizon*. The search horizon is the farthest set of hosts reachable by a search request. For example, with a time-to-live of five, search messages will reach at most peers that are five hops away. Any host that is six hops away is unreachable and therefore outside the horizon. As the number of peers in Gnutella increases more and more hosts are pushed outside the search horizon and files held by those hosts become beyond reach.

## Vulnerability

One argument that has appeared in the popular press regarding systems such as Gnutella [Or00] is that there is a diminished risk of the system being shut down by either lawsuit or attack. It will be impossible, users argue, for the Recording Industry Association of America (RIAA) to sue all of them. This belief, which was spread by the press, allowed users to believe that they were safe among others. Unfortunately, in light of the evidence provided above, Gnutella provides a false sense of security.

As we have seen in the experiments, there is a small collection of peers that provide the bulk of the shared files and answered queries. These few providers act as a rather centralized server consisting of several peers and thus the RIAA need not sue all users or even the bulk of users. They simply need to target the top-serving peers (of which there are very few that serve very many).

## Overcoming free riding

There are many ways of patching Gnutella so that it can accommodate the same privacy rules but scale more effectively.[5] It is interesting therefore to establish how different file-sharing applications rely on technological features to induce users to share. FreeNet, for example, forces caching of downloaded files in various hosts. This allows for replication of data in the network forcing those who are on the network to provide shared files. Unfortunately, such a system is prone to replication of "bad" or illegal data and "tainting" hosts.[6] The second cost of the automatic replication as implemented in FreeNet is the unique identifiers for files that forces users to know exactly what they are looking for.

Napster, by default, downloads all files into a shared upload directory. In this way when a user downloads a file it is automatically shared. In some ways this feature addresses the FreeNet problem because users will only keep "good" files on their computers. However, users can easily circumvent this shared upload/download directory and frequently do. We have also witnessed Napster users misrepresenting the speed of their network connections (saying they are on a modem when they are on a high speed connection) in order to discourage other users from connecting to them. Both system provide their own set of solutions to the free riding but at the cost of introducing other problems to their systems.

Another possible solution to this problem is the transformation of what is effectively a public good into a

private one. This can be accomplished by setting up a market-based architecture that allows peers to buy and sell computer processing resources, very much in the spirit in which Spawn was created [Wa92]. In this context we should stress that the utility to users does not necessarily have to be monetary. For instance, issues of prestige or status drive participation in open source systems like Linux [Lo00] and the same can be said of SETI@Home[Se00], where obviously to be the owner the PC that detects the first intelligent signal from outer space would constitute great utility.


Another alternative for eliminating free riding is to reduce the cost. For example the Usenet system, while allowing some degree of anonymity, provided a great advantage to individual users as their messages were distributed by an infrastructure that offloaded the bandwidth requirements for individuals. That is, the only cost to the user was the initial posting; afterwards the message was propagated by the system.

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## Conclusions

In this paper we analyzed user traffic in Gnutella and concluded that there is a significant amount of free riding in the system. Specifically, we found that nearly 70% of Gnutella users share no files, and nearly 50% of all responses are returned by the top 1% of sharing hosts. Furthermore, we found that free riding is distributed evenly between domains, so that no one group contributes significantly more than others, and that peers that volunteer to share files are not necessarily those who have desirable ones.

These findings have serious implications for the future development of Gnutella and its many variants. In order for distributed systems with no central monitoring to succeed, a large amount of voluntary cooperation is required, a requirement that is very hard to fulfill in systems with large user populations that remain anonymous.

Sometimes, the logic behind the decision to cooperate or not changes when the interaction is ongoing, since future expected utility gains will join present ones in influencing the rational individual's decision. In particular, individual expectations concerning the future evolution of the social dilemma can play a significant role in each member's decisions [Hu96]. An interesting continuation of these experiments may lead to an understanding of how free riding changes over time. 

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## Notes

1. A much smaller experiment during a weekday revealed that in a sample of over 300 hosts 72% of share no files, a result consistent with our extended study.
2. NAT hosts shared no files 68.7% of the time, and ten or less files 74.5% of the time. The top 1% of NAT hosts shared 37.8% of the total files, and the top 25% shared 99.4% of the total files.
3. Of tangential interest may be the top number of hosts sharing files. The top 5 domains are (from most to least) home.com, rr.com, aol.com, t-dialin.net, and mediaone.net. The top hosts in query responses are home.com, rr.com, mediaone.net, ks.us, and pacbell.net.
4. The top five domains for queries in the first-level domain in terms of files shared are: net, de, nl, edu, and ca. For queries answered they are: com, net, edu, de, and nl.

5. Hint: Mix one part mailing list, one part anonymous bulletin board (see for example [Ch85]), and one part anonymous re-mailer (add more re-mailers depending on taste for paranoia).

6. If a user requests a bad file (say a bomb or Trojan [St00]), this file is replicated between all computers from the host uploading to the host downloading.

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## Editorial history

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**'No limits' browser planned**



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The music industry, the film industry, the police and repressive governments have a new nightmare.

A group of hackers are developing a web browser that it claims will make it easier for people to circumvent censorship and avoid the attentions of law enforcers.

The software, which is due to be unveiled in July, uses a combination of encryption and a Gnutella-like network to avoid any of the limits corporations and governments are trying to place on anyone using the web.

The inventors of the new browser said they were developing it for people living under restrictive regimes who wanted to see information they were otherwise denied.

Many governments, including those of China, Malaysia and Singapore and many Arabic countries, restrict what their citizens can look at on the web, fearing that access to subversive, pornographic or political information will cause social unrest.

**Shoddy security**

Later this year, the hacking collective known as the Cult of the Dead Cow (cDc) is planning to release a web browser called Peekabooty that it claims will make it almost impossible to restrict what information people look at on the web.

Peekabooty will work like the Gnutella peer-to-peer network that has no central server and instead uses all the machines in the system to hold data.

Members of the Peekabooty network can ask for particular documents or files to be put on to the network. When the files appear, the Peekabooty

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system will package them up, encrypt them, and then ship them back to the machine requesting them.

The Cult of the Dead Cow styles itself as a group of "ethical" hackers that use technology creatively to defeat attempts to restrict the spread of information or embarrass companies with shoddy security.

If Peekabooty is used by large numbers of people its use of encryption could make a mockery of any police attempts to monitor electronic communications.

### **Microsoft target**

In the UK, the controversial Regulation of Investigatory Powers Act calls for the placing of "black boxes" inside Britain's internet connection companies, so law enforcement agencies can easily dip into and tap data streams.

Civil and cyber-liberty groups, such as the Foundation for Information Policy Research, have drawn attention to the shortcomings of this approach, and shown how easy it is to circumvent this tapping.

In the past, the cDc has won notoriety for its development of the Back Orifice and Back Orifice 2000 software tools. The programs were designed to show the security failings of Microsoft products, and can be used to remotely hijack a computer.

The Peekabooty software is due to be unveiled at this years DefCon hacker conference being held in Las Vegas in July.

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## IAAL\* : Peer-to-Peer File Sharing and Copyright Law after Napster

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### What this is, and who should read it.

As the Napster saga illustrates, the future of peer-to-peer file-sharing is entwined, for better or worse, with copyright law. The legal fight has already broken out, with copyright owners targeting not only the makers of file-sharing clients like Napster and Scour, but also companies that provide products that rely on or add value to public P2P networks, such as MP3Board.com, which provides a web-based search interface for the Gnutella network.

The fight has only just begun. If these early skirmishes yield any lesson for future P2P developers, it's that a legal strategy needs to be in place early, preferably at the beginning of development, rather than bolted on at the end. As a result, if you are interested in peer-to-peer file sharing, whether as a developer, investor, or provider of ancillary services (such as search services, platform tools, or security), it's time to bone up on some copyright law basics.

This piece is meant as a general explanation of the U.S. copyright law principles most relevant to P2P file-sharing technologies. It is aimed primarily at:

- Developers of core P2P file-sharing technology, such as the underlying protocols, platform tools, and specific client implementations;
- Developers of ancillary services that depend upon or add value to P2P file-sharing networks, such as providers of search, security, metadata aggregation, and other services;
- Investors seeking to evaluate the potential copyright risks associated with the various ventures listed above.

The following discussion is meant as a general introduction, and thus occasionally glosses over some of copyright law's more subtle nuances. At the most basic level, it is aimed not at giving you all the answers, but rather at allowing you to recognize the right questions to ask your lawyers.

**What this is not:** The following discussion focuses only on U.S. copyright law, and does not address any issues that may arise under non-U.S. law. While non-copyright principles may also be mentioned, this discussion does not attempt to examine other legal principles that might apply to P2P file-sharing, including patent, trademark, trade secret, or unfair competition. Nothing contained herein constitutes legal advice—please discuss your individual situation with your own attorney.

### Copyright Basics and the Intersection with P2P Filesharing

Copyright law applies to virtually every form of expression that can be captured (or, to use the copyright term of art, "fixed") in a tangible medium, such as on paper, film, magnetic tape, hard drive, optical media, or even merely in RAM. Songs, books, photographs, software, and movies are all familiar examples of copyrighted works. Copyright protection begins from the moment that the expression is fixed, and continues for the lifetime of the author, plus 70

years.

During this period, copyright law reserves certain rights exclusively to the owner of the work, including the right to reproduce, distribute, and publicly perform the work. So, for example, if you wrote a song and recorded it on your computer, you would own the resulting copyrighted work and only you would have the right to make copies of the file, distribute it to the public, or sing the song in your local concert hall. If anyone else did any of these things without your permission, she would be infringing your copyright (unless the activity qualified as a "fair use" or fell into one of the other statutory exceptions to a copyright owner's exclusive rights).

The nature of digital file-sharing technology inevitably implicates copyright law. First, since every digital file is "fixed" for purposes of copyright law (whether on a hard drive, CD, or merely in RAM), the files being shared generally qualify as copyrighted works. Second, the transmission of a file from one person to another results in a reproduction, a distribution, and possibly a public performance (in the world of copyright law, "public performance" includes the act of transmitting a copyrighted work to the public). To a copyright lawyer, every reproduction, distribution, and public performance requires an explanation, and thus file-sharing systems seem suspicious from the outset.

## The end-users: "direct" infringement.

For the individuals who are sharing files, the question becomes whether all of these reproductions, distributions, and public performances are authorized by the copyright owner or otherwise permitted under copyright law (as "fair use," for example). So, if the files you are sharing with your friends are videos of your vacation, you are the copyright owner and have presumably authorized the reproduction, distribution, and performance of the videos. However, if you are sharing MP3's of Metallica's greatest hits, or disc images of the latest Microsoft Office 2000 installation CD, the issue becomes more complicated. In that case, assuming that the copyright owner has not authorized the activity, the question of copyright infringement will depend whether you can qualify for any of the limited exceptions to the copyright owner's exclusive rights. If not, you're what copyright lawyers call a "direct infringer"—you have directly violated one or more of the copyright owner's exclusive rights.

## The P2P tool maker: "contributory" and "vicarious" infringement.

But what does this have to do with those who develop and distribute peer-to-peer file-sharing tools? After all, in a pure peer-to-peer file-sharing system, the vendor of the file-sharing tool has no involvement in the copying or transmission of the files being shared. These activities are handled directly between end-users. Copyright law, however, can sometimes reach beyond the direct infringer to those who were only indirectly involved in the infringing activity. As in many other areas of the law (think of the "wheel man" in a stick up, or supplying a gun to someone you know is going to commit a crime), copyright law will sometimes hold one individual accountable for the actions of another. So, for example, if a swapmeet owner rents space to a vendor with the knowledge that the vendor sells counterfeit CDs, the swapmeet owner can be held liable for infringement alongside the vendor.

Under copyright law, this indirect, or "secondary," liability can take two distinct forms: **contributory infringement** and **vicarious infringement**. In order to prevail under either theory, the copyright owner must first show that some underlying direct infringement has taken place. In other words, there must be a direct infringer before anyone will be "indirectly" liable. In a widely-used public peer-to-peer file-sharing environment, however, it is a virtual certainty that at least some end-users are engaged in infringing activity (unless specific technical measures are taken to prevent this, like permitting only the sharing of files that have been cryptographically marked as "authorized"). When the major record labels and music publishers decided to sue Napster, for example, it was not difficult for them to locate a large number of Napster users who were sharing copyrighted music without authorization.

## Contributory Infringement

Contributory infringement is similar to "aiding and abetting" liability: one who knowingly contributes to another's infringement may be held accountable. Or, as the courts have put it, "one who, with knowledge of the infringing activity, induces, causes, or materially contributes to the infringing conduct of another, may be held liable as a contributory infringer." So, in order to prevail on a contributory infringement theory, a copyright owner must prove each of the following elements:

- **Direct Infringement:** There has been a direct infringement by someone.
- **Knowledge:** The accused contributory infringer knew of the underlying direct infringement. This element can be satisfied by showing either that the contributory infringer *actually* knew about the infringing activity, or that he reasonably *should have known* given all the facts and circumstances. At a minimum, however, the contributory infringer must have some specific information about infringing activity—the mere fact that the

system is capable of being used for infringement, by itself, is not enough.

- **Material Contribution:** The accused contributory infringer induced, caused, or materially contributed to the underlying direct infringement. Merely providing the “site and facilities” that make the direct infringement possible can be enough.

## Vicarious Infringement

Vicarious infringement is derived from the same legal principle that holds an employer responsible for the actions of its employees. A person will be liable for vicarious infringement if he has the right and ability to supervise the infringing activity and also has a direct financial interest in such activities. Thus, in order to prevail on a vicarious infringement theory, a copyright owner must prove each of the following:

- **Direct Infringement:** There has been a direct infringement by someone.
- **Right and Ability to Control:** The accused vicarious infringer had the right and ability to control or supervise the underlying direct infringement. This element does not set a high hurdle. For example, the Napster court found that the ability to terminate user accounts or block user access to the system was enough to constitute “control.”
- **Direct Financial Benefit:** The accused vicarious infringer derived a “direct financial benefit” from the underlying direct infringement. In applying this rule, however, the courts have not insisted that the benefit be especially “direct” or “financial”—almost any benefit seems to be enough. For example, the Napster court found that “financial benefit exists where the availability of infringing material acts as a draw for customers” and the growing user base, in turn, makes the company more attractive to investors.

It should be noted that the nature of vicarious infringement liability creates a strong incentive to monitor the conduct of your users. This stems from the fact that knowledge is not required for vicarious infringement liability; a person can be a vicarious infringer even if they are completely unaware of infringing activity. As a result, if you exercise control over your users and derive a benefit from their activities, you remain ignorant of their conduct at your own risk. In the words of the Napster court, “the right to police must be exercised to the fullest extent. Turning a blind eye to detectable acts of infringement for the sake of profit gives rise to liability.”

## Indirect Liability and P2P Systems: the Napster Case

The Napster case represents the first application of these indirect liability theories to a peer-to-peer file-sharing service. In that case, the plaintiffs admitted that Napster did not, itself, make or distribute any of their copyrighted works. Instead, they argued that Napster is liable for contributory and vicarious infringement. In its February 12, 2001 opinion, the Ninth Circuit agreed, rejecting each of Napster’s proposed defenses.

Turning first to contributory infringement, the Ninth Circuit upheld the lower court’s findings:

- **Direct Infringement:** At least some Napster users are direct infringers, because they distributed and reproduced copyrighted music without authorization.
- **Knowledge:** Napster had actual knowledge of infringing activity, based on internal company emails and the list of 12,000 infringing files provided by the RIAA. Moreover, Napster should have known of the infringing activity, based on the recording industry experience and downloading habits of its executives and the appearance of well-known song titles in certain promotional screen shots used by Napster.
- **Material Contribution:** Napster provided the “site and facilities” for the directly infringing conduct of its users.

The Ninth Circuit also endorsed the lower court’s vicarious infringement analysis:

- **Direct Infringement:** At least some Napster users are direct infringers, because they distributed and reproduced copyrighted music without authorization.
- **Right and Ability to Control:** Napster has the ability to control the infringing activity of its users because it retains the right to block a user’s ability to access its system.
- **Financial Benefit:** Napster derived a financial benefit from the infringing activities of its users because this activity acted as a “draw” for customers, and a portion of Napster’s value is derived from the size of its user base.

The Ninth Circuit concluded, however, that the lower court had not adequately considered the technological limits of the Napster system when crafting the preliminary injunction. In ordering the district court to revise its injunction, the Ninth Circuit spelled out

some guiding principles. First, in order to prevent contributory infringement, after receiving notice from a copyright owner that a work is being shared on its system without authorization, Napster will have to take reasonable steps to prevent further distribution of the work. Although the particulars will be up to the lower court, this almost certainly will require that Napster implement file-name filtering to its central index. It may also require that Napster implement more sophisticated filtering based on MP3 ID tags, MD5 hashes, acoustic fingerprints, or other meta-data.

Second, in order to prevent vicarious infringement, the Ninth Circuit declared that "Napster...bears the burden of policing its system within the limits of the system." Again, the particulars of this command will be determined by the lower court. Nevertheless, this will almost certainly require some pro-active monitoring activity by Napster. Since, in the court's view, Napster "controls" its users, Napster will likely be required to take reasonable measures to keep tabs on what those users are up to, within the bounds of its system architecture. At a minimum, this will require that Napster pro-actively monitor its central index to weed out any songs that it knows are not authorized for sharing. It will also require that Napster continue to terminate users who share copyrighted works without authorization.

## **Potential Defenses Against Contributory and Vicarious Liability**

### **No Direct Infringer: "All of My Users are Innocent Fair Users"**

As discussed above, if there is no direct infringement, there can be no indirect liability. Consequently, if a peer-to-peer developer can plausibly claim that no users in the network are sharing copyrighted works without authorization, this would be a complete defense to any contributory or vicarious infringement claims. Unfortunately, this may be extremely difficult to demonstrate, given the decentralized nature of most P2P networks and the wide variety of uses to which they may be put. Even if file sharing by some users is privileged under the "fair use" doctrine or another statutory exception to copyright, it will be very difficult to show that every user falls within such an exception. Nevertheless, in certain specialized networks that permit the sharing of only secure, authorized file types, this may be a viable defense.

### **"Capable of substantial noninfringing uses"**

Although contributory and vicarious infringement can sweep broadly, catching even those only indirectly involved in the copyright infringement of others, the Supreme Court has defined an outer limit to this reach. In a case involving the Sony Betamax VCR, the Supreme Court found that contributory infringement liability could not reach the manufacturer of a device that is "capable of substantial noninfringing use."

Universal City Studios and Disney were on one side of this case, arguing that the Sony Betamax VCR was a tool of copyright infringement. On the other side were Sony, its advertising agent, several of its retail distributors, and one individual VCR user. The case ultimately made its way to the Supreme Court, which ultimately issued a 5-4 decision that proceeded in two parts. First, the Court held that there could be no contributory liability, even if some VCR users were engaged in copyright infringement, so long as the device was "capable of a substantial noninfringing use." In the second part of its opinion, the Court found that the VCR was capable of several such noninfringing uses, including the time-shifting of television broadcasts by home viewers.

Unfortunately, the recent Ninth Circuit decision in the Napster case has dramatically reduced the scope of the "Betamax defense." First, the Napster court found that this defense does not apply to vicarious infringement liability. Accordingly, if you have control over, and derive a financial benefit from, direct infringement, the existence of "substantial noninfringing uses" for your service is irrelevant. Second, the court concluded that the Betamax defense only applies until specific information identifying infringing activity has been received. At that point, a failure to act to prevent the infringing activity will give rise to liability, and the existence of "substantial noninfringing uses" becomes irrelevant.

The Ninth Circuit's interpretation of the Betamax defense has at least two important implications for P2P developers. First, it underscores the threat of vicarious infringement liability—at least in the Ninth Circuit, a court will not be interested in hearing about your "substantial noninfringing uses" if you are accused of vicarious infringement. Accordingly, "control" and "direct financial benefit," as described above, should be given a wide berth. This will likely reduce the attractiveness of business models built on an on-going "service" or "community-building" model, to the extent that these models allow the provider to control user activity (i.e., terminate or block users) and create value by attracting a large user base. At the same time, it may increase the attractiveness of selling completely decentralized file-sharing software, insofar as this might minimize the vendor's "control" over, and continuing "direct financial benefit" from, infringing uses.

Second, with respect to contributory infringement, the Ninth Circuit's interpretation of the Betamax defense makes it risky to ignore "cease and desist" letters from copyright

owners, which in turn may limit a developer's freedom to define the architecture of her product or service. Once you have received notice of specific infringing activity, your "substantial noninfringing uses" may no longer serve as a shield to contributory liability. Of course, even the Ninth Circuit recognized that the ability to respond to these notices may be limited by the technology behind the challenged service or product. Nevertheless, when a court is required to determine the limits of what is technically reasonable, the results can be uncertain. The Napster decision certainly suggests that copyright owners, once they make out a case of contributory or vicarious infringement liability, are in a position to demand that a developer of P2P tools take steps to reduce the likelihood that it will be used for infringing activity. What these steps might entail is difficult to predict, but may include, in some cases, modification of the architecture and capabilities of the tool, service or system.

## **The DMCA Section 512 "safe harbors"**

In 1998, responding in part to the concerns of ISPs regarding their potential liability for the copyright infringement of their users, Congress enacted a number of narrow "safe harbors" for copyright liability. These safe harbors appear in section 512 of the Copyright Act, which in turn appears in title 17 of the U.S. Code (17 U.S.C. 512). These safe harbors apply only to "online service providers," and only to the extent that the infringement involves four functions: transitory network transmissions, caching, storage of materials on behalf of users (e.g., web hosting, remote file storage), and the provision of information location tools (e.g., providing links, directories, search engines).

Each of these functions, however, is narrowly defined by the statute (e.g., they don't cover what you'd think) and reflects the state of the art in 1998. For example, the automated web page caching conducted by AOL in 1998 falls within the caching safe harbor, while the more sophisticated efforts of Akamai today may not. Because Congress did not anticipate peer-to-peer file sharing when it enacted the safe harbors, many P2P products may not fit within the four enumerated functions. For example, according to an early ruling by the district court in the Napster case, an OSP cannot use the "transitory network transmission" safe harbor unless the traffic in question passes through its own private network. Many P2P products will, by their very nature, flunk this requirement, just as Napster did.

In addition to being limited to certain narrowly-circumscribed functions, the safe harbors are only available to entities that comply with a number of complex, interlocking statutory requirements:

- The online service provider ("OSP") must (1) adopt, reasonably implement, and notify its users of a policy of terminating the accounts of subscribers who are repeat infringers; and (2) accommodate and not interfere with "standard technical measures" that have been widely adopted on the basis of industry-wide consensus (e.g., the use of robot.txt exclusion headers to block spiders).
- The OSP must designate a "copyright agent" to receive notices of alleged copyright infringement, register the agent with the Copyright Office, and place relevant contact information for the agent on its web site.
- The OSP must, upon receiving a notification of infringement from a copyright owner, expeditiously remove or disable access to the infringing material ("notice and takedown").
- The OSP must not have known about the infringement, or been aware of facts from which such activity was apparent (i.e., if you take a "head in the sand" approach, you lose the safe harbor).
- The OSP must not receive a direct financial benefit from infringing activity, in a situation where the OSP controls such activity (i.e., if you're liable for vicarious liability, the safe harbor may not protect you).

In the final analysis, qualifying for any of the DMCA safe harbors requires careful advance attention to the legal and technical requirements and obligations that the statute imposes. As a result, any P2P developer who intends to rely on them should seek competent legal counsel at an early stage of the development process—an after-the-fact, "bolt on" effort to comply is likely to fail (as it did for Napster). For more detailed information regarding the limits and requirements of the safe harbors, you might consult the overview located at <http://www.richmond.edu/jolt/v6i4/article1.html>.

## **The DMCA ban on circumvention technologies**

One recent addition to the copyright landscape deserves special attention. Section 1201 of the Copyright Act, enacted as part of the DMCA, makes it unlawful to "circumvent" any technology aimed at protecting a copyrighted work. In addition, the development, distribution or use of circumvention technology or devices is, with only narrow exceptions, also unlawful. For example, if a copyright owner uses a digital rights management ("DRM") solution to protect a song, it would be unlawful for anyone to crack the encrypted file without the

copyright owner's permission, or to build or distribute a software tool designed to crack the file. The litigation involving DeCSS software, which is capable of decrypting video DVDs, represents one of the first cases testing these "anti-circumvention" provisions of the DMCA.

Of course, circumvention technology is not a necessary part of a peer-to-peer file-sharing network. Today's P2P protocols, such as Gnutella, simply facilitate file transfers, leaving the file itself, whether encrypted or not, unaltered. Nevertheless, as copyright owners begin to deploy DRM and watermarking systems, there may be interest in integrating circumvention tools with file-sharing tools. In light of the DMCA's broad ban on circumvention technology, however, any such integration may substantially increase the risk of liability.

## **Lessons and Guidelines for P2P Developers**

A few general guidelines for P2P developers can be derived from the discussion above. These are steps you can take that may: (1) reduce the chance that your project will be an easy, inviting target for copyright owners; (2) placate your investors when they ask you whether you are likely to spend their money on litigation rather than products; and (3) minimize the chances that your case will become the next legal precedent that content owners can use to threaten future innovators.

Of course, because the relevant legal principles are still in flux, these guidelines represent merely one, general analysis of the legal landscape—please consult with an attorney regarding your precise plans.

### **1) Your two options: total control or total anarchy.**

In the wake of the Napster decision, it appears that copyright law has foisted a binary choice on P2P developers: either build a system that allows for thorough monitoring and control over user activities, or build one that makes such monitoring and control completely impossible. This conclusion stems from the Ninth Circuit's analysis of contributory and vicarious liability in the Napster case.

As discussed above, contributory infringement requires that you have "knowledge" of, and "materially contribute" to, someone else's infringing activity. In most cases, it will be difficult to avoid "material contribution"—after all, if your system adds any value to the user experience, you probably have "materially contributed" to any infringing user activities. So the chief battleground on contributory infringement will likely be on the "knowledge" issue. The Napster court's analysis suggests that once you receive notice that your system is being used for infringing activity (e.g., a cease and desist letter from a copyright owner), you have a duty to "do something" to stop it. What might that "something" be? Well, it will be limited by the architecture of your system, but may ultimately be decided by a court. So, in order to avoid the unpleasant surprise of a court telling you to re-engineer your technology to stop your infringing users (as happened to Napster), you can either include mechanisms that enable monitoring and control of user activities (and use them to stop allegedly infringing activity when you receive complaints), or choose an architecture that will convince a judge that such monitoring and control is impossible.

The Napster court's vicarious liability analysis also counsels for either a total control or total anarchy approach. Vicarious liability requires that you "control," and receive "benefit" from, someone else's infringing activity. The "benefit" element will be difficult to resist in many P2P cases—so long as the system permits or enables the sharing of infringing materials, this will serve as a "draw" for users, which can be enough "benefit" to result in liability. So the fight will likely center on the "control" element. The Napster court found that the right to block a user's access to the service was enough to constitute "control." The court also found that Napster had a duty to monitor the activities of its users "to the fullest extent" possible. Accordingly, in order to avoid vicarious liability, a P2P developer would be wise to either incorporate mechanisms that make it easy to monitor and block infringing users, or choose an architecture that will convince a judge that monitoring and blocking is impossible.

### **2) Better to sell stand-alone software products than on-going services.**

As discussed above, vicarious liability is perhaps the most serious risk facing P2P developers. Having the power to terminate or block users constitutes enough "control" to justify imposing vicarious liability. Add "financial benefit" in the form of a business model that depends on a large user base, and you're well on your way to joining Napster as a vicarious infringer. This is true even if you are completely unaware of what your users are up to—the pairing of control and financial benefit are enough. Of course, most "service" business models fit this "control" and "benefit" paradigm. What this means is that, after the Napster decision, if you offer a "service," you may have to monitor your users if you want to escape liability. If you want to avoid monitoring obligations, you'll have to give up on "control." It's time to set aside all the lessons you've learned about the importance of "relationships" in the New Economy. If your system may be used for infringement, and this capability is a "draw" for users, you've already crossed the "benefit" threshold. In order to avoid vicarious liability for those infringing uses, you will need to give up any "control" over users.

Vendors of stand-alone software products may be in a better position to resist monitoring obligations and vicarious infringement liability. After Sony sells a VCR, it has no control over what the end-user does with it. Neither do the makers of photocopiers, optical scanners, or audio cassette recorders. Having built a device with many uses, only some of which may infringe copyrights, the typical electronics manufacturer has no way to “terminate” end-users or “block” their ability to use the device (but look out for those shrinkwrap software license terms permitting unilateral vendor termination). Not coincidentally, these manufacturers also typically don’t get sued (at least not yet) by copyright owners. The key here is to let go of any control you may have over your users—no remote kill switch, contractual termination rights, or other similar mechanisms.

### **3) Can you plausibly deny knowing what your end-users are up to?**

Assuming that you have escaped vicarious infringement by eliminating “control” or “financial benefit,” there is still the danger of contributory infringement. To avoid liability here, you will need to address whether you knew, or should have known, of the infringing activity of your users. Have you built a level of “plausible deniability” into your product architecture and business model? If you promote, endorse, or facilitate the use of your product for infringing activity, you’re asking for trouble. Similarly, software that sends back usage reports may lead to more knowledge than you want. Instead, talk up all the great legitimate capabilities, sell it (or give it away), and then leave the users alone. Again, the choices are total control, or total anarchy (see #1 above).

There are other good reasons for designing deniability into your product or system. First, it protects your users and, depending on your architecture, hosts or nodes as well. If you’re not collecting information about what they’re doing, no one can get that information from you. That’s important for reasons that have little to do with copyright infringement. By not collecting user information, peer-to-peer networks can promote free speech and privacy. Remember the FBI’s “Library Awareness Program”? Don’t make yourself a target for subpoenas if you don’t have to.

### **4) What are your substantial noninfringing uses?**

If your product is intended to work solely as a mechanism for copyright piracy, you’re asking for legal trouble. More importantly, you’re thinking too small. Almost all peer-to-peer systems can be used for many different purposes, some of which the creators themselves fail to appreciate. So create a platform that lends itself to many uses, or, to paraphrase William Gibson, let the street find its own uses for things. For example, if you’re developing a file-sharing system or distributed search engine, support all file types, not just MP3 or Divx files. Actively, sincerely, and enthusiastically promote the noninfringing uses of your product. And don’t promote any infringing uses.

The existence of real, substantial noninfringing uses will increase the chances that you can invoke the “Betamax defense” if challenged in court. As discussed above, however, it is worth noting that this defense will only help you until the copyright owner delivers a “cease and desist” letter notifying you of specific infringing activity. At that point, the “Betamax defense” may evaporate, and may leave you with an obligation to make a reasonable effort to stop the infringement. What this means will depend on the architecture of your system and the whims of the court.

### **5) Disaggregate functions.**

Separate different functions and concentrate your efforts on a discrete area. In order to be successful, peer-to-peer networks will require products to address numerous functional needs—search (e.g., OpenCOLA), security (e.g., Intel’s security toolkit), dynamic file redistribution (e.g., Freenet), to take a few examples. There’s no reason why one entity should try to do all of these things. In fact, the creation of an open set of protocols, combined with a competitive mix of interoperable, but distinct, applications is probably a good idea, from a product-engineering point of view.

This approach may also have legal advantages. If Sony had not only manufactured VCRs, but also sold all the blank video tape, distributed all the TV Guides, and sponsored clubs and swap meets for VCR users, the Betamax case might have turned out differently. Part of Napster’s downfall was its combination of indexing, searching, and file sharing in a single piece of software. If each activity is handled by a different product and vendor, on the other hand, each entity may have a better legal defense to a charge of infringement.

A disaggregated model, moreover, may limit what a court can order you to do to stop infringing activity by your users. For example, if a search engine that trawls the P2P network space were to be held contributorily or vicariously liable for facilitating access to copyrighted works, the search engine company would not be able make any changes to an anonymized, secure file-sharing product that was developed by a different company. As the Napster court recognized, you can only be ordered to police your own “premises”—the smaller it is, the less you can be required to do.

Finally, certain functions may be entitled to special protections under the “safe harbor”

provisions of the Digital Millennium Copyright Act ("DMCA"). Search engines, for example, enjoy special DMCA protections. Thus, the combination of a P2P file sharing application with a third party search engine might be easier to defend in court than Napster's integrated solution.

#### **6) Don't make your money from the infringing activities of your users.**

Avoid business models that rely on revenue streams that can be directly traced to infringing activities. For example, if you are developing a peer-to-peer auction system, do not take a percentage cut on transactions completed through the system. To take another example, a peer-to-peer file sharing system that includes a payment mechanism might pose similar problems, if the system vendor takes a percentage cut of all payments, including payments generated from sales of bootleg Divx movie files.

Of course, in the wake of the Napster decision, the mere fact that infringing material may act as a "draw," thus increasing your user base, might be enough to trigger vicarious liability. Nevertheless, there is nothing to be gained by building your business on a "financial benefit" even more directly linked to infringing activity by users—you'll only be making it that much easier for copyright owners to shut you down.

#### **7) Be open source.**

In addition to the usual litany of arguments favoring the open-source model, the open source approach may offer special advantages in the peer-to-peer realm. It may be more difficult for a copyright owner to demonstrate "control" or "financial benefit" with respect to an open source product. After all, anyone can download and compile open source code, and no one has the ability to "terminate" or "block access" or otherwise control the use of the resulting applications. "Financial benefit" may also be a problematic concept where the developers do not directly realize any financial gains from the code (as noted above, however, the Napster court has embraced a very broad notion of "financial benefit," so this may not be enough to save you). Finally, by making the most legally dangerous elements of the P2P network open source (or relying on the open source projects of others), you can build your business out of more legally defensible ancillary services (such as search services, bandwidth enhancement, file storage, file meta-data services, etc.).

#### **8) Do not be a direct infringer: make and store no copies.**

This one may be obvious, but remember that if you make or distribute any copies (even if only in RAM) of copyrighted works, you may be held liable as a direct infringer. In that case, many of the defenses discussed here will not be available to you. The court will not be interested in "control" or "knowledge" or "financial benefit" or "material contribution." If you made copies, you're probably liable for infringement. Of course, this shouldn't be a problem for most P2P developers, since the great insight of peer-to-peer architectures is that the actual resources being shared need not pass through any central server. Nevertheless, be careful where caching or similar activities are concerned.

#### **9) Do not build any "circumvention devices" into your product.**

Avoid incorporating into your product any technology designed to circumvent a protection measure meant to protect the rights of copyright owners. For example, do not incorporate any code into your product that is intended to crack the CSS encryption system used on DVDs, bypass the protection scheme used on Sony Playstation video games, or strip the "no copy" flags out of streaming RealAudio files. Whatever you may think about the merits of this work, leave it to others. You'll have enough worries without adding circumvention liability to the list.

#### **10) Don't use someone else's trademark in your name.**

This tip does not relate to copyright, but rather trademark law. It's also good common sense. Many early peer-to-peer products are attempting to capitalize on the notoriety of Napster by incorporating portions of the Napster name into their products—Napigator, OpenNap, and AIMster, to name a few. Napster has shown itself to be a strong defender of its trademark rights, having threatened legal action against a variety of unauthorized Napster merchandise vendors. Gnutella may also be a dangerous name to appropriate, as it is not clear who owns it (AOL?), and whether the owners of the Nutella trademark may at some point assert their own trademark rights. And remember that AppleSoup, for example, was forced to change its name to FlyCode after receiving pressure from Apple Computer.

Good luck, and change the world!

\* \* \*

**About the Author:** Fred von Lohmann is an attorney working as a visiting researcher with the Berkeley Center for Law & Technology, a research center associated with the Boalt Hall School of Law at UC Berkeley. His current research is focused on the impact of peer-to-peer technologies on the future of copyright. He also continues to maintain a relationship with Morrison & Foerster LLP ([www.mofo.com](http://www.mofo.com)), where prior to joining the Center he was an associate with a practice concentrated on transactions and counseling involving copyright, the Internet, and information technology. His primary legal interests lie at the intersection of copyright law and the Internet, including issues relating to online music distribution and the application of the Digital Millennium Copyright Act ("DMCA") to Internet businesses. He has worked with a variety of Internet clients, including Yahoo!, Verio, Myplay, Riffage, Voquette, iUniverse.com, SpikeRadio and NBCi.

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Footnote

\* Acronym for "I am a lawyer," to distinguish from the common "IANAL" ("I am not a lawyer") that appears on Slashdot and other online forums.

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(If you have general interest questions contact:

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## No one likes waiting in the queue

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## It's all in the delivery

August 29

*This article is from the August 15, 2001, issue of Red Herring magazine.*

In last year's issue devoted to digital media, *Red Herring* lamented the distress caused by ferocious technological change, going so far as to pen a cover story, "[The Sorry State of Digital Hollywood](#)." There was a dearth of sustainable business models for online video, free music services, and interactive television. We found that technology -- no matter how innovative -- held little sway over the entertainment industry's dominant forces: overpaid talent and institutionalized means of distribution. Now, however, things are beginning to change -- perhaps for the better.

Though technology will never develop satisfactory replacements for movie stars or pop idols, it is enabling new players to challenge the established distribution order. A year ago, nobody had heard of [Lime Wire](#) or [Audiogalaxy](#). This year these online music services are all the rage on campus. And some of the players have been around a long time. Take [Microsoft](#) (Nasdaq: [MSFT](#)): for the first time, the company seems to have a coherent strategy for transforming itself into a media company -- or at least a company that might control the distribution of digital media in the same way that Windows dominates personal computing. Then there's Hollywood: after seeing the music industry fumble through the Internet revolution, Sony Pictures Digital Entertainment and [Warner Bros.](#) have taken things into their own hands, planning to sell movie downloads through a service called [Moviefly](#), with help from [Metro-Goldwyn-Mayer](#) (NYSE: [MGM](#)) and [Universal Studios](#). And [Disney](#) (NYSE: [DIS](#)) and the Viacom Entertainment Group have a budding venture of their own, called [Movies.com](#).

It seems Hollywood's executive ranks, who are generally Luddites, may actually be learning a little bit about computing technology. Many who flocked to the Internet and other technology ventures are returning chastened but wiser. But there remains another force in entertainment that technology cannot corral -- consumer behavior. Determining what new forms of entertainment, if any, consumers will be willing to pay for remains the greatest story yet untold. Until companies figure this out, startups will fail, giants will stumble, and billions will be spent. But hope springs eternal.

*On Wednesday: Even with free broadband, college students won't pay for online content. So who will?*

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## New habits die hard

August 30

*This article is from the August 15, 2001, issue of Red Herring magazine.*

*Editor's note: In a series of stories appearing online this week, Red Herring is examining the state of digital entertainment. On Tuesday, Robert La Franco wrote about the [new players](#) challenging the established distribution order in Hollywood. Today, we look at how, even with free broadband access, the Web's supposed prime demographic isn't inclined to pay for digital content.*

College campuses should be the dream marketplace for online entertainment. Robust computing power, high network bandwidth, and fast processing speeds abound. Even interactive content is common. Today's college students have a veritable digital revolution in their dorm rooms. But ask companies like [Icebox](#), [Nibblebox](#), [Heavy.com](#), and [The Romp](#), which targeted the one demographic in the United States with the requisite high-speed Internet connections and desktop computing power to enjoy online entertainment, and they'll say otherwise. All of these companies are now either out of business or they're struggling to stay afloat.

No wonder. When asked about sites like [Nibblebox](#) or [Heavy.com](#), University of Texas at Austin junior Jim Dang and his roommate Jeff Thompson respond with blank stares. Yet Mr. Dang and Mr. Thompson are exactly the target audience that edgy broadband sites need. They are ravenous Internet users, spending hours online every day, and like many of their friends, they fill their hard drives with MP3 files of well-known bands and DivX-compressed downloads of teen movies like *American Pie* and *Road Trip*. But they and their friends eschew the broadband sites tailored to college students. "I don't buy CDs anymore," says UT Austin student Lester Sampson. "They can shut down [Napster](#), but we will still get free music."

Simply put, college students have gotten too accustomed to getting their online entertainment for free (or next to nothing). They don't expect to pay for it. The entertainment industry's worst nightmare is that this has turned out to be a habit that's hard to break.

Every dorm room at UT Austin has a high-speed, always-on Internet port for each student. Such Internet access is fairly standard these days, and colleges and universities without them often find it more difficult to attract applicants. UT Austin charges a modest \$6 a month for access, something that typical DSL users paying \$50 for service (when they can get it) would envy. When UT Austin initiated high-speed access in 1996, it was an unlimited, all-you-could-download service. At the time, placing limits on the amount of bandwidth available didn't seem necessary. That all changed in 1999 with the advent of the music file-sharing service [Napster](#). Suddenly, the university's bandwidth demand soared. Like many other institutions, UT Austin blocked access to the [Napster](#) site until it could find a solution to the skyrocketing bandwidth needs.

The solution was to put a 3.5-GB limit on the amount of data each of its 7,000 dorm residents could download per week. This may seem like a lot to some and criminal to others, but according to William Green, UT Austin's manager of computing services, only about 2 percent of users actually max out their allotment in any given week. "Everybody thinks that bandwidth is infinite and has zero cost, but it's not," says Mr. Green. "You have to meter this stuff."

UT Austin is one of the first universities to institute a bandwidth allotment, but it probably

won't be the last. At the University of California at Berkeley, bandwidth costs more than doubled last year, from less than \$250,000 to \$600,000. Cliff Frost, manager of network services at UC Berkeley, concedes that ultimately some sort of pay-as-you-go system will have to be instituted.

### THE BIG WEBOWSKI

Just a few short years ago, the Internet promised to make the film studios and television networks obsolete. Startups like the Digital Entertainment Network, Pseudo.com, Pop.com, and Quokka Sports all tried to capitalize on what they thought would be a mass migration to the Web for so-called televisual entertainment. Each of these companies has since failed, saying that not enough people have access to the high-speed Internet connections needed for streaming, full-motion video over the Web.

The bandwidth excuse made perfect sense -- but it was wrong, as Icebox and Nibblebox learned. The problem is that when high-speed connections are ubiquitous, the rules of the game change in unexpected ways that no one truly understands (see "[Korea's entertainment conundrum](#)"). The promise of Internet-connected set-top boxes, interactive TVs, and merged media has had entertainment executives running in circles for more than a decade. They have yet to find what works, even as they blather on about the glories of convergence and the importance of protecting copyrighted materials.

Napster's court-ordered filtering of many popular artists may help the entertainment industry in the short term, but it is having an unintended effect that may prove disastrous for them in the long term. The sanctions against Napster are diverting students from the music-only Napster network toward whole new worlds of unlicensed content found on alternative services, like [Audiogalaxy](#), [BearShare](#), [Lime Wire](#), [Toadnode.com](#), and [iMesh](#). With these services, it is easy to find and download pirated copies of movies, television shows, music, and video games -- free of charge.

To counteract these services, entertainment companies are hoping to attract students to streaming-media sites, where content is available on a single-use basis. But these hopes are fraught with problems. Besides the cost of producing original content, the entertainment companies will have to shoulder burdensome distribution costs.

For example, [Akamai Technologies](#) (Nasdaq: [AKAM](#)), which specializes in Web-content delivery, charges about one or two cents per megabyte for streaming. Multiply that by 500 MB for a high-quality streamed film, times 100,000 users, and suddenly the costs are prohibitive, even for the biggest studio. Costs can easily add up to more than \$1 million for a single Webcast. With ad rates in the gutter and sinking lower, there is practically no way to make money from advertising alone. And subscriptions are proving to be only slightly more reliable, especially for an audience unaccustomed to paying for online entertainment. Moreover, unlike TV or radio broadcasting, where the cost of adding an additional user is essentially zero, streaming requires costly additional bandwidth, especially to maintain high quality. Free file-sharing services like Gnutella work because they "steal" content and then pass off the bandwidth costs to ISPs. Nobody makes money, which might be part of the appeal for broke college students.

At UT Austin, the bandwidth cap is another reason for students to avoid streaming-media sites. Instead, they go where they can get the most bang for their 3.5 GB. Streaming content makes no sense when there are limits on bandwidth usage. For students, it's a poor use of their allotment, particularly if they ever want to watch or listen to something more than once. More importantly, off-campus is soon to follow. Many DSL providers offer different levels of connection speeds already. Tiered usage fees are inevitable for high-speed cable modem users, according to Mike Luftman, a spokesperson for Time Warner Cable, especially with the pending adoption of DOCSIS 1.1, a delivery standard for cable modems that allows providers to offer a range of service plans. Users who want to get the premium bandwidth can pay up while the cost-conscious will get the herky-jerky version.

### THE GRADUATES

As Hollywood and its media cousins pray that low-cost high-speed Internet access will lead to new revenue, they would be wise to look closely at the typical college dorm room. Powerful computers are more prevalent than TVs and there is no shortage of interactive content being displayed on desktop monitors. As for bandwidth, that is equally plentiful. Yet, no form of online entertainment has transformed this blend of capable infrastructure and ready consumers into a market. And that is an ominous sign.

Still, such a ripe market needs to be harvested. That's why college campuses will be the first line of attack for studio executives at Sony Pictures Digital Entertainment and [Warner Bros.](#) when they roll out their direct-to-consumer pay entertainment service, [Moviefly](#), later this year. When it comes to fresh content, both companies are focusing on games rather than the animated shows the failing startups focused on (see "[Game theory](#)"). And like cable programmers before them, the studios will soon be offering subscription-based

channels that, like games, go after small, niche audiences, rather than mass markets. No more messing with failed portals like Entertaindom, Pop, or Go.

But the UT Austin students represent a generation that has become accustomed to getting their entertainment for free. So when The Romp, a site cofounded by Eric Eisner, the son of Disney chairman Michael Eisner, switched from a free to a pay model -- \$35 per year -- they signed up only about 2 percent of the site's visitors, of which the company claims college students were an overwhelming majority. Another Web site targeted at college students, Nibblebox, was unable to attract enough of an audience for its collection of college student-made short films to become profitable. After burning through \$5.5 million in venture funding, the site merged with a similar site, [Hypnotic](#), in June. The outlook of all such content sites, regardless of recent life-saving mergers, is no better than it was last fall when they all started crumbling (see "[The sorry state of digital Hollywood](#).")

An excess of free entertainment combined with high bandwidth costs and a disintegrating ad market brought down many a startup and has made the entertainment industry reluctant to take further risks. Reflecting on his own company's demise, Steve Stanford, former CEO of Icebox, says it might be a long time before the situation changes: "The big entertainment companies aren't willing to get into original Web content ventures. It'd be different if you could point to one successful venture, but everyone is going out of business or changing what they're doing. Any new efforts will be very cautious and not heavily funded."

For now, the entertainment industry's best hope is that once students leave school and get real jobs, they will find it easier to buy than to steal. The question of what exactly they will buy remains unanswered.

*On Thursday: Web-weary executives, having taken their best shot at the Internet, are slinking back to Hollywood. Also, our list of the ten companies that could disrupt the entertainment markets.*

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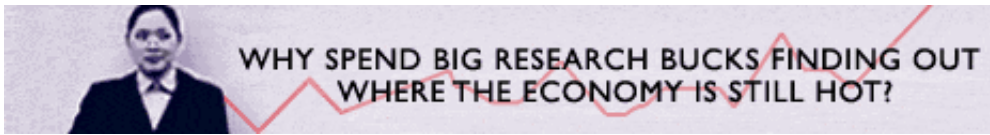
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## Apocalypse Net

August 31

*This article is from the August 15, 2001, issue of Red Herring magazine.*

*Editor's note: In a series of stories appearing online this week, Red Herring is examining the state of digital entertainment. On Wednesday, Peter Rojas wrote about how college students, the Web's supposed prime audience, are showing reluctance to pay for digital content. Today, we look at how Web-weary executives, having taken their best shot at the Internet, are slinking back to Hollywood.*

For Rob Kenneally, the recruiter's call came at just the right time. Mr. Kenneally was a president of television at Rysher Entertainment, an independent production company based in Los Angeles. In his five years there, he had helped develop HBO's *Oz* and CBS's *Nash Bridges*. He had supervised production of *Sex and the City* and other television series. He packaged programs, developed scripts, hung out with talent, and, more deliciously, was pulling in a seven-figure income in salary and bonuses. But when control of Rysher was taken over by Viacom's (NYSE: VIA) Paramount Studios in May 1999, Mr. Kenneally's job vanished.

"At some point, you need to know your endgame," Mr. Kenneally reflects. And 1999's endgame -- replacing Hollywood's sometimes arduous route to financial independence with the instant wealth of the Internet business -- was alluring for many executives.

Mr. Kenneally's first move: become president of Iz.com, an affinity marketing startup that produced cable TV and Web content for the college crowd. When Iz.com was sold to sports affinity startup PopMail.com (OTC: POPM) in January 2000, Mr. Kenneally was courted by ReplayTV. Three months later he joined the Mountain View, California, startup as the executive in charge of original content. Initially, ReplayTV was hoping to get consumers to buy \$800 set-top boxes that would allow them to control live TV, store it for future viewing, and decide just which commercials they saw -- if any. "We were threatening a delicate ecosystem," Mr. Kenneally recalls of the potential disruption to television's ad-based business model.

But as Mr. Kenneally and other media executives would soon find out, it was too good to be true. Maybe they should have known better. Mr. Kenneally and his peers were actually part of a second wave of Hollywood types to be seduced by technology. In the mid-'90s, an earlier group flocked to CD-ROM startups, created online units at the studios, or launched independent entertainment sites like Scott Zakarin's short-lived TheSpot.com. TheSpot, an early Web fascination, became the foundation of American Cybercast, a planned media empire that burned through \$6 million of venture funding between January 1996 and January 1997, taking TheSpot and its sister efforts down with it. Most of the first-wave Web efforts failed just as miserably -- and instantly.

### NOTHING VENTURED, NOTHING GAINED

Now the dreams of the second wave of executives have fizzled, too, and many of them are returning to traditional media and Hollywood -- all of them older, but few of them wiser. "These people didn't operate in a capacity where they could extend their skills," one recruited executive fumes. "What did we learn? Nothing."

Media executives like Mr. Kenneally joined startups expecting to perform the same work they'd done in their traditional jobs -- creating original content and orchestrating packaging deals. But they got more than they bargained for. Mr. Kenneally's days

became 18-hour grinds of early morning shuttle flights to Silicon Valley, long engineering meetings at ReplayTV's headquarters, and living out of a suitcase.

And when their companies floundered, the Hollywood executives got caught in the mad scramble for workable business models. ReplayTV's business model assumed its set-top boxes would be sold through retail outlets. But when sales failed to grow as quickly as expected, Mr. Kenneally had to rejigger his plans. Establishing revenue splits with the studios on what was primarily ad-supported programming was impossible to pin down. Exactly who would produce and pay for specialized advertising content on the platform changed constantly. "I felt like I was belly-punched every day," Mr. Kenneally recalls.

ReplayTV lost money on every box it sold -- more than \$1,000 per unit, taking all costs into account. To broaden distribution, ReplayTV tried to piggyback its technology on satellite and cable set-top boxes, offering those services' operators "unique services" like remote access, targeted advertising, and asset management -- to little effect. "Our piece of the pie kept getting smaller and smaller," Mr. Kenneally says of the company's bids for new revenue. "Replay was simply not run like a business," adds a former insider. Between August 1997 and December 1999, according to its IPO registration, ReplayTV spent \$41 million, sold only 6,000 boxes, and produced just \$932,000 in income, all from interest on cash.

In April 2000, the Nasdaq slide caused ReplayTV's IPO to be delayed -- indefinitely as it turned out. At a time when the previous wave of online entertainment pioneers like Mr. Zakarin were busy managing their millions of dollars of equity, Mr. Kenneally and his cohorts at companies like [Space.com](#), [Icebox](#), and Digital Entertainment Network watched their hefty options packages turn to dust. In November 2000, Mr. Kenneally, along with other top executives and about half of ReplayTV's 260 employees, were laid off. The company, which had burned through \$160 million in cash and had \$50 million in debt, has since been acquired by device manufacturer [SonicBlue](#) (Nasdaq: [SBLU](#)) for \$120 million, including \$47 million of debt.

#### **WAR STORIES**

With nowhere else to turn, these fallen executives are scurrying back to Hollywood (see "[The career hunters](#)"). Some have had an easy landing. Just days before Icebox folded, Gary Levine bailed as president of the company to become executive vice president of original programming at [Showtime Networks](#). Lou Dobbs left Space.com and returned to [CNN](#), his previous employer. Others have yet to regain their footing. Former Disney TV president David Neuman, who was CEO of online entertainment poster child Digital Entertainment Network, is working at a hazily defined digital cinema venture. Former Z.com CEO Joe DiNunzio only recently returned from a trek through Bhutan. David Wertheimer left Paramount Digital Entertainment two years ago to start [WireBreak Entertainment](#), a Web destination site. The company is now moribund, reduced to just six staffers, and Mr. Wertheimer, who once said the Internet was "Hollywood's Vietnam," is fulfilling his own prophecy. When he founded WireBreak, Mr. Wertheimer told a gathering of industry executives: "All these people are going to be rushing into new media not knowing why they are there. There'll be bloodshed everywhere."

Fortunately, many will find a way back. "Hollywood is a very forgiving town," says Lynda Keeler, former general manager of Columbia-TriStar Interactive who is now chief marketing officer and managing director of the Redleaf Group, a VC firm. "You're allowed one big mistake. Maybe a few small ones."

Of course, there are always costs associated with mistakes. Mr. Kenneally says he lost money during his new-media stint -- a result of a lower salary and evaporating stock options. And when his job at ReplayTV ended, he was passed over for a couple of Hollywood jobs because he was labeled a "tech guy." In May, Mr. Kenneally joined the Creative Artists Agency as a senior agent. He has broad responsibility for television, cable, off-network packaging, and marketing, but unlike his days in new media, he no longer owns a stake in the ventures he puts together. Also, after being out of the loop for two years, Mr. Kenneally says he now scrambles to keep up with "young people who have been in the business every day since I've been gone."

But for someone who didn't have a PC in his office during his years at Rysher, Mr. Kenneally has gained a valuable understanding of the connections among content, hardware, and software. Moreover, it's likely that returning executives will infuse Hollywood with tech savvy -- and caution. He says he has a better idea of what a "200-to-300-channel universe will look like for advertisers." And in the end, Mr. Kenneally has no regrets about his experience. "It toughened me."

*Also today: Check out our list of [Digital Disrupters](#), the ten companies that hope to unsettle the entertainment empire. And on Friday: [Microsoft stakes its claim in Hollywood](#) -- and your living room.*

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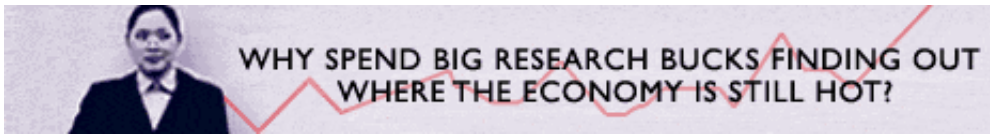
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## The digital disrupters

August 31

*This article is from the August 15, 2001, issue of Red Herring magazine.*

*Editor's note: In a series of stories appearing online this week, Red Herring is examining the state of digital entertainment. In addition to [today's feature](#) by John Geirland on the veteran Hollywood executives who ventured unsuccessfully into new-media companies, we also include our list of Digital Disrupters -- the top ten companies whose ideas or technology could unsettle the entertainment empire.*

### 1. Advertising -- Anonymous Content

Los Angeles-based Anonymous Content has developed a bright Web-content idea. Guess what. It's advertising. The film production company, along with the Fallon ad agency, produced a [film series](#) that blends art and commerce, using Hollywood stars and directors, including Madonna and her director/husband Guy Ritchie. The five shorts feature BMW cars as much as they do stars. Founded by Steve Golin, Anonymous has a business model that breaks new programming ground and off-loads the cost of content at the same time -- to the client.

### 2. Television -- News Corporation (NYSE: NWS)

Rupert Murdoch has a history of disrupting business. He launched the Fox network, a challenger to the big-three TV networks in the United States. He also built the satellite broadcaster BSkyB, which is changing television in the United Kingdom. Now Mr. Murdoch hopes to acquire [General Motors's](#) (NYSE: GM) [DirectTV](#), a U.S.-based satellite TV broadcaster. DirectTV offers set-top boxes with personal-video-recorder technology, giving it an edge over cable TV companies. The only thing that may stop News Corporation is GM's asking price for DirectTV -- a reported \$5 billion.

### 3. Radio -- Clear Channel (NYSE: CCU)

Satellite radio looks like it's still in the dream stages. Internet-only radio stations appear moribund, and thanks to a recent U.S. Federal Communications Commission ruling and a fight with the actors guild, simulcasting terrestrial radio over the Web is suddenly much more expensive. Clear Channel is thriving in this environment, aiming to take advantage of the impending consolidation. Its revenue of \$1.6 billion for the first quarter of this year beat lead competitor [Infinity Broadcasting's](#) \$1 billion for the same period.

### 4. Streaming Media -- RealNetworks (Nasdaq: RNWK)

Though its flagship product, RealPlayer, is losing market share to Microsoft's Windows Media Player, RealNetworks is fighting back. The company has forged content deals with the National Basketball Association and Major League Baseball to broadcast their games. It also offers a music subscription service called MusicNet, a joint venture with the media giant [AOL Time Warner](#) (NYSE: AOL) and the record labels [Bertelsmann](#) and [EMI](#). In addition, RealNetworks's player requires less hard-disk space than Microsoft's, 500 Kb vs. 750 Kb, giving it a potential edge for portable devices.

### 5. Gaming -- Microsoft (Nasdaq: MSFT)

Microsoft's [Xbox](#) will be a winner. The game console, which the company promises to release this fall, offers several times the graphics power of any other console on the market, including [Sony's](#) (NYSE: SNE) PlayStation 2. Game developers, whose blockbuster games are the unit's lifeblood, are thrilled with the platform. While Xbox won't necessarily be the market share winner, its technology and developer support are good enough to put Microsoft in a lead position in this global industry, pegged at \$6 billion for the United

States alone.

#### **6. E-Publishing -- Adobe Systems (Nasdaq: ADBE)**

Adobe aims to establish its software as the publishing standard for the emerging electronic-book market. It's betting that the first generation of e-books will be read on laptops, not separate electronic tablets -- a business Microsoft and [Gemstar](#) (Nasdaq: [GMST](#)), with its eBooks, are both chasing. Adobe's software is designed to replicate the look and feel of a book, keeping the familiar pagination and page-turning functionality. In years to come, all e-books may require a separate device with a higher-definition screen, but for now, Adobe's strategy lets customers use the devices they already own.

#### **7. Wireless -- NTT DoCoMo**

NTT DoCoMo, [NTT](#)'s (NYSE: [NTT](#)) wireless subsidiary, has conquered Japan and may disrupt almost every other national market. The company says the number of Japanese who have subscribed to its i-Mode wireless Web service has topped 24 million, after launching only two years ago. In November, the company bought a stake in [AT&T Wireless](#) (NYSE: [AWE](#)) and announced that the [AT&T](#) (NYSE: [T](#)) spin-off would be the exclusive U.S. platform for DoCoMo's i-Mode service, which in early 2002 will compete with other carriers' wireless application protocol services.

#### **8. Film -- Nothing Real**

Hollywood films are rarely made without software-generated special effects. While [Discreet](#)'s Inferno is the major player in effects compositing, Nothing Real's new suite of products comes at a cost per seat of only \$75,000, compared with Inferno's \$600,000. Nothing Real introduced its Shake image-manipulation software in 1997. Shake has been used to create effects for the upcoming *Matrix: Reload* and *Lord of the Rings*. The software is coded to port easily to other platforms -- including Linux, which is gaining ground in shops like [Digital Domain](#), [Industrial Light & Magic](#), and [DreamWorks](#).

#### **9. Digital-Rights Management -- Loudeye Technologies (Nasdaq: LOUD)**

The Seattle-based audio-digital-rights specialist Loudeye recently agreed to license its digital-fingerprinting technology to [Napster](#). Loudeye's technology identifies a song by examining the audio file's wavelengths, then matching the pattern to a catalog of songs. It has deals with the five major music labels to digitally encode and store music samples, which it then packages for customers like online CD retailers. Loudeye boasts similar deals with MSN and AOL Time Warner.

#### **10. Music -- Audiogalaxy**

Which music service will be heir to the original, illegal version of Napster? Audiogalaxy looks to be it. The company, based in Austin, Texas, logs 1 million visitors each month, its numbers increasing as Napster begins filtering out illegal music files. Audiogalaxy's application, Satellite, searches its own filtered network for legal MP3s, but if needed, it can also search beyond the company's network to find any song available and download it. If Audiogalaxy can avoid running afoul of the law, it may become as popular as the old Napster.

*On Friday: Microsoft stakes its claim in Hollywood -- and your living room.*

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## The giant that would be king

September 4

*This article is from the August 15, 2001, issue of Red Herring magazine.*

*Editor's note: In a series of stories appearing online this week, Red Herring is examining the state of digital entertainment. On Thursday, John Geirland wrote about veteran Hollywood executives who **ventured unsuccessfully** into new-media companies, and Jon Maples presented a list of the top companies whose ideas or technology could **upend the entertainment markets**. Today, in the final part of our series, Microsoft stakes its claim in Hollywood -- and your living room.*

On June 7, **Microsoft** (Nasdaq: **MSFT**) president and CEO Steve Ballmer was in Lisbon, Portugal, basking in the glory of a small victory. TV Cabo, a broadband television service, had successfully tested Microsoft TV, the company's interactive TV middleware. It will soon begin offering its 2 million subscribers interactive content and online shopping. Six thousand miles away, Microsoft TV's senior vice president, Jon DeVaan, was meeting with investors and technology executives in Silicon Valley, hoping to win another battle: the so-far elusive industry support for its middleware in the United States.

Meanwhile, Will Poole, vice president of Microsoft's Windows Digital Media division, has been giving Hollywood a hard sell of his own. Just days after **Viacom Entertainment Group** (NYSE: **VIA**) confirmed it had joined **Disney** (NYSE: **DIS**) in a video-on-demand partnership, he called on Hollywood's most notorious technophobe, Jonathan Dolgen, chairman of the Viacom Entertainment Group, to push Microsoft's newest media codec and rights-management software. These days, Microsoft executives are obtrusive fixtures at the Sundance Film Festival, the E3 gaming exposition, and all of the cable TV trade shows.

"They are insidious," says Chris Lutz, cofounder, president, and CEO of **Mediachase**, a broadband content developer in Los Angeles. "From my perspective, they are 100 percent on it. They are not coming at the studios saying they will be competing with them with content of their own. They are helping us find partners rather than just getting us to buy their software and development kits. They want people to perceive them as entertainment savvy."

Actually, Microsoft wants to be seen as more than just entertainment savvy. Microsoft's executives want the entertainment industry to view it as indispensable. And buoyed by its recent successful antitrust appeal, the company's aspirations are now in the open: Microsoft doesn't plan to be a typical media company. It intends to become a media company by supplying the software that will deliver all forms of entertainment to any playback device.

If successful, Microsoft will be the software platform that executives use to view digital dailies of movies they're funding, that directors use to encode demo reels, and that consumers use to watch video on demand or to listen to downloaded music.

### BLANK SCREENS

Microsoft did not have an easy time getting to its current position. The company's previous media strategies were incoherent and haphazard. Five years ago, Microsoft tried to look like a studio. It invested in special effects makers, movie studios, and digital archives, often with lousy results. It started a television network, an online magazine, and a city directory. Nathan Myhrvold, the company's chief technology officer, wrote lengthy missives about the importance of editorial brands. *Wired* featured a cover story in June

1996 titled "[Microsoft morphs into a media company](#)." At the time, the magazine couldn't have been more wrong.

Now the time is right for Microsoft's new media plans. Convergence is creeping up on us. The Internet as a commercial medium is paving the way for interactive entertainment. High-speed bandwidth is in the ground, satellites are in the sky, and computing power is cheap enough to make living room devices more accessible to consumers. In 1993, [Silicon Graphics](#) (NYSE: SGI) and Time Warner launched an interactive TV trial with set-top boxes that cost \$4,000. Today, Internet-ready set-top boxes and video game consoles cost a good deal less than \$1,000. Web media players are used by 68 million PC owners. Shrewdly, and perhaps by necessity, Microsoft is prepared for this. It has all but ceased production of entertainment content, yielding the opportunity to its newest bitter enemies, companies like [AOL Time Warner](#) (NYSE: AOL). Instead, Microsoft aims to control the delivery of digital media -- from how it's encoded to how it's played.

It won't be easy. Last year, Microsoft failed to sell its interactive TV middleware to cable operator [AT&T](#) (NYSE: T), opening the door for competitor [Liberate Technologies](#) (Nasdaq: LBRT). It didn't matter that Microsoft had invested \$5 billion to help AT&T install broadband networks throughout the United States. AT&T still selected Liberate -- only to later kill its interactive TV project altogether. In total, Microsoft has spent \$11 billion on similar deals, with just a few interactive TV victories so far in relatively minor markets like Mexico, Israel, Canada, and Portugal.

Microsoft must also overcome problems at the local level -- the living room. Its [UltimateTV](#), with one of the most powerful set-top boxes on the market, is rife with problems. In April, consumers discovered a bug that mysteriously shrunk its hard drive, decreasing the amount of space available to record programs and deleting previously saved shows.

Making it worse, in the battle for control of media delivered by IP (the likely platform for on-demand and high-end interactive programming), Microsoft still lags market leader [RealNetworks](#) (Nasdaq: RNWK). Last year, usage of Microsoft's Windows Media Player rose 32 percent to 21 million users, vs. a 48 percent increase to 26 million for RealNetworks's RealPlayer, according to Jupiter Media Metrix, a research firm. In December, [Philips Electronics](#) (NYSE: PHG), [Cisco Systems](#) (Nasdaq: CSCO), [Sun Microsystems](#) (Nasdaq: SUNW), [Apple Computer](#) (Nasdaq: AAPL), [IBM](#) (NYSE: IBM), and [Kasenna](#) formed an alliance to push an open-standard application called MPEG-4, seriously threatening the proprietary dreams of both Microsoft and RealNetworks (see "[Playing for keeps](#)").

## WINDOWS ON THE WORLD

But Microsoft is relentlessly executing its plan for the media business. Due to be released in late October, the Windows XP operating system is intended to be nothing short of an OS that can control every digital device that a consumer might be tempted to install or carry.

Windows XP will advance the company's "Windows everywhere" campaign. The Windows OS is the core software powering the Xbox game console, also due out this fall. UltimateTV is also powered by Windows. The Pocket PC runs on Windows CE, a scaled-down version of the Windows OS. Then there's the Windows Media Player, which, thanks to its Windows platform dominance, boasts distribution in 250 million PCs. With this player platform, Microsoft also claims the world's most widely used digital-rights-management tool. And the company's .Net initiative aims to unite it all under one tidy, connected roof. "Nobody really thinks about this the way that we do," puffs Jim Allchin, vice president of Microsoft's platforms products group and one of its senior media warriors. "This is big, big, big numbers."

And though the market numbers have yet to be seen, early displays of engineering prowess are visible. Windows Media Player's latest codec and the user interface included with the new XP OS that Mr. Poole has demonstrated to industry insiders are impressive. Playing at an encoded 500 Kbps, a particularly data-rich clip from *Gladiator* looks clean and sounds great -- even on Mr. Poole's portable system. The same clip played on the current RealPlayer looks fuzzy and primitive by comparison. With the Media Player's new codec, audio clips consuming 96 Kb of disk or streaming resources sound as good as 128-Kb MP3 clips -- a major concern for portable devices with limited processing power. "And," adds Mr. Poole, "they are secured by our rights-management tool."

These technical superiorities are cost-effective. [Intertainer](#), a streaming media service that offers Web-delivered video on demand for cable operators, cut its bandwidth usage by 33 percent with the upgraded codec, reducing its per-movie stream size from 750 Kbps to 500 Kbps. Microsoft wants to leverage that technological expertise to complete ownership of the distribution chain. Look at the streaming business. If a company wants to use Microsoft's encoding software, it also has to use the company's proprietary

streaming protocol, MMS, which, of course, works with the Windows NT OS. RealNetworks and Apple, whose QuickTime player is a minor competitor with a modest 9 percent market share, use the real-time protocol, or RTP.

Though there are others, like [SightSound](#) and [CinemaNow](#), Intertainer is the perfect model of a Microsoft media client. The startup, in Culver City, California, boasts Microsoft as a lead investor and uses Windows NT servers and Windows Digital Media rights-management software to collect payments from consumers, each of whom watches the programming, which is delivered over proprietary cable networks, with the Windows Media Player running on set-top boxes. "We want to be in the day-to-day activities of the entertainment business," says Mr. Poole.

One major obstacle, though, is open-source OS Linux, which is making inroads in the entertainment industry, initially in the hardscrabble special effects business. When founded in 1993, [Digital Domain](#), one of the largest special effects houses in Hollywood, ran entirely on a Unix-based OS. Not anymore. Offering faster, stronger, and cheaper machines, Windows NT moved in quickly, handling half of the computing workload last year, says Doug Roble, Digital Domain's director of software. This year, however, Digital Domain is adding Linux-based effects to the mix. Linux runs the same inexpensive software as NT, but interfaces much more easily with Unix. Linux now handles 10 percent of Digital Domain's workload, while NT has slipped to 40 percent. [DreamWorks](#) and [Industrial Light & Magic](#) are also testing Linux systems, says Mr. Roble, their first break from Unix.

Of course, the own-it-all strategy may pose legal trouble as well. The company's grand plans for bundling Windows Media Player with XP are similar to the earlier bundling of Internet Explorer with the Windows OS, an effort that landed Microsoft in antitrust hot water in 1998 (see "[Microsoft fights new battles in the same war](#)").

And the rest of Hollywood is responding coolly to Microsoft's ambition. Viacom's Mr. Dolgen has given the Windows Media Player technology nothing more than a lukewarm embrace. The same goes for Yair Landau, president of Sony Pictures Digital Entertainment, and Kevin Tsujihara, executive vice president of new media at [Warner Bros.](#), who are building their own Internet video-on-demand business called [Moviefly](#).

At some point Microsoft would likely collect a transaction fee, not just for the delivery of entertainment files, but also for managing the associated digital rights. But when speaking to a group of students at the Stanford University Graduate School of Business in April, Disney chairman and CEO Michael Eisner boomed: "Why should I pay 5 percent of the revenue on my movies to a company just because it has come up with a way simply to deliver my content safely? That's just too much." Adds Mr. Landau: "People are worried about depending on one company."

For now, Microsoft is following a distribution strategy similar to what it did with Internet Explorer: give away the software, hook users, and bilk them later. And Microsoft may just be able to pull it off. Microsoft does, after all, generate monthly revenue of \$1 billion and has \$30 billion cash in the bank -- \$30 billion buys a lot of market share. That's why Mr. Ballmer, in addition to trips to Portugal, has been chumming it up with media baron Rupert Murdoch. And why Mr. Poole has been courting executives like [Vivendi Universal](#) (NYSE: V) chairman Jean-Marie Messier and [EMI Recorded Music](#) senior vice president of new media Jay Samit. "Microsoft is looking at this from so many angles," says Mr. Samit. "You need software for all these devices to talk to each other, and software is what they do best."

#### **HOLLYWOOD BILLS**

The software opportunity in media distribution is indeed sweet. While [InterTrust](#) (Nasdaq: ITRU), a rights-management company, charges content owners less than 1 percent of the gross transaction value for use of its protection scheme, [Liquid Audio](#) (Nasdaq: LQID), an online music distributor, gets 15 to 25 percent of the transaction for encoding, storing, distributing, protecting, and monitoring that same content. According to PricewaterhouseCoopers, in the United States, music is a \$15 billion business, home video \$23 billion, and pay-per-view \$2.2 billion. Even a 5 percent cut of those businesses would yield \$2 billion a year in revenue. Non-U.S. revenue could triple that figure. RealNetworks, which last year generated \$242 million in revenue by distributing digital media, has gross margins of 84 percent. Half of that business, the licensing of media distribution software, has 90 percent gross margins. Sounds an awful lot like the financial performance of Microsoft.

But a victory for Microsoft is far from assured -- on several fronts. The company plans to spend more than \$4 billion during the next four years to pit its Xbox game platform against [Sony's](#) (NYSE: SNE) PlayStation2 and [Nintendo's](#) GameCube. It has already spent an estimated \$1 billion on WebTV, the core of its struggling Ultimate TV service. And, in

addition to the \$11 billion it has invested in cable and telephone companies, Microsoft is offering \$3 billion of [News Corporation's](#) (NYSE: [NWS](#)) bid to unite its global satellite assets with U.S.-based [DirecTV](#) in a \$50 billion merger.

Elsewhere, Microsoft is desperately seeding the market. It is giving away its rights-management tool, player technology, streaming services, and digital storage space to record labels, online music distributors, and movie studios. In some cases, say media executives, it even pays customers to use its technology.

Then there are upstart competitors. Jordan Greenhall, cofounder and CEO of compression scheme company [DivXNetworks](#), is hoping to have his software imbedded in chips, one-upping Microsoft's OS strategy. The only encryption stronger than one that sits on the OS -- as Microsoft's does -- is one embedded in the chip. Steve Perlman, the cofounder of WebTV Networks who now runs entertainment technology company Rearden Steel Technologies, is building a living room device with backing from AOL Time Warner, Cisco, and satellite provider EchoStar Communications. [Hewlett-Packard](#) (NYSE: [HWP](#)) and AOL Time Warner have equally grand designs for controlling the living room. As yet, there is no Intel of the living room device market.

And if the threat of Linux isn't enough, there are established companies with their fingers deep in the pie. According to Stephen McKenna, Sun Microsystems's director of media and entertainment industry sales, his company's entertainment server business has grown from \$120 million in 1995 to more than \$1 billion today. Sun's Java was recently selected as the European standard for digital broadcast video. "I don't think a large company like Sony wants to see a Microsoft system running across all of its devices," says Mr. McKenna.

Neither does any other media giant, especially AOL Time Warner. Though Moviefly executives deny it, sources close to Microsoft say that in June, AOL Time Warner issued a mandate to the service that its films be encoded for RealPlayer, not just Windows Media Player. One reason: having an in-house version of Microsoft-funded Intertainer was too close for comfort. Another: when AOL bundled RealPlayer into its version 6.0 software last year, the company's user base increased by almost 3 million. It's no surprise that the Warner Music Group partnered with RealNetworks to form [MusicNet](#), an online distribution venture in which RealNetworks has a 40 percent stake.

Despite the many challenges they face, Microsoft executives remain defiant. Ask Mr. DeVaan about the many skirmishes in which Microsoft is engaged across myriad entertainment categories, and he just shrugs. He may know something we don't: he was one of the executives who used Microsoft's Exchange software to defeat Lotus Notes, IBM's once market-leading office communications software. According to Mr. DeVaan, "It's not important to win any particular battle. It is important only that you win the war."

Write to [robert.lafranco@redherring.com](mailto:robert.lafranco@redherring.com).

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# [INSIDE]

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## Wary of a Video Napster, Hollywood Plots a TV Crackdown

Beth Pinsker  
1/3/2001 17:17

In the final version of Hollywood's proposal to prevent the **Napsterization** of TV, there's a surprise mention of something politely referred to as an "obliteration" application.

Aimed at heading off the digital theft of TV shows and movies, the obliteration computer code would sit in the guts of your digital TV or set-top box and would essentially eat up any bit of programming deemed off limits.

Spooked by what has happened to the music industry, movie and TV executives have vowed an aggressive campaign to prevent a repeat on their turf. And they appear to have won the latest round, despite a pitched battle from consumer electronics companies and retailers, who fear that curbs on what people can watch will hurt sales of digital TVs.

This fall, the **FCC** blessed the idea for a device to regulate what people watch and copy, and last month an industry trade group submitted its final proposal on the specs of the new system.

The results aren't pretty: Now, when people switch over to digital TVs, if they ever do, it's not just that they won't be able to create infinite perfect copies of movies and television shows to bootleg or trade for free on the Internet. Under the new rules, they will not be able to make a copy on the den TV and then play it in the bedroom or take the tape over to a friend's house.

The middleman, **CableLabs**, submitted its final proposal to the FCC in December, which was supposed to be a formality signaling that the deal was done. But now the **Consumer Electronics Association**, which represents manufacturers, says it's asking the FCC to make the license document available for public comment and proceed from there to make changes in it. The trade group has a list of complaints about as long as the 34-page license itself. The biggest beef is that consumers, who already are wary of buying expensive new TVs, will be less inclined if they think they won't have any control over what they can record.

How realistic is the worry that people might feel constrained? This is how the copy protection module will affect viewing:

- If an incoming signal doesn't hit a copy protection device, you'll get static.
- If you have a device in your TV, but you try to tape a show to a machine that doesn't, it won't compute.
- If a show is designated as "copy never" and you try to tape it on any kind of device, it won't go there.
- If you record a "copy once" program to your TiVo and then want to transfer it to a VCR, it won't go.
- If you want to send a signal to a device with a CD burner in it, it won't go.
- If you want to copy a digital recording onto the Internet or your computer, it won't happen.
- If you want to watch a high definition TV program on an analog TV set, the signal will be downgraded so it's not HDTV-quality anymore.
- If you make a copy on one machine and want to play it on another, it won't play.

Left unresolved in all of this is the critical issue of who decides what shows get obliterated, which ones can never be copied and which ones can be copied as many times as people want. CableLabs says those issues are beyond its purview. The entertainment companies, through the **Motion Picture Association of America**, say that they are entitled to copyright protection for their programs and don't really have to consult with anyone about it.

But the consumer electronics industry disagrees, and has said it is willing to go to court to get that decided. On its side it has **Supreme Court** precedent: The **1984 Sony Betamax case** gave home recorders the right under fair use rules to tape what they wanted for their personal use.

While this control wasn't a prime issue months ago because the entertainment companies had pledged that the only things that would be designated "copy never" would be pay-per-view or video-on-demand movies, the bar has since moved. The entertainment industry now wants "copy once" designation on all cable programming. And at least two companies would like it on over-the-air programming, too, if they can get it.

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ARE YOU LOOKING AT ME?

the ONION

# Kid Rock Starves To Death

## MP3 Piracy Blamed

LOS ANGELES—MP3 piracy of copyrighted music claimed another victim Monday, when the emaciated body of rock-rap superstar Kid Rock was found on the median of La Cienega Boulevard.



Above: A malnourished Kid Rock at his last public appearance April 22.

"How many more artists must die of starvation before we put a stop to this MP3 madness?" asked Hilary Rosen, president of the Recording Industry Association of America (RIAA). "MP3s of Kid Rock's music were so widely traded and downloaded by Napster users that he was driven back to the mean streets from whence he came, dying bankrupt and penniless in the gutter."

When found by police, the 28-year-old Kid Rock, born Bob Ritchie in Detroit, was still clutching the cardboard "Devil Without A Place To Sleep Or Anything To Eat" sign that had been his trademark ever since the rise of Napster's MP3-sharing software bankrupted him in January.

Rosen said the RIAA would prosecute the music-piracy firms that are responsible "to the fullest extent of the law."

"Napster killed Kid Rock, there's no doubt about it," Rosen said. "As soon as that web site went up last October, people stopped buying his music. It's not surprising, either: Why would anyone in their right mind pay \$12.99 for a CD with artwork when they could simply spend seven hours downloading the compressed MP3 files of all the album's songs onto their home computer's desktop, decompress it into an AIFF sound file, and then burn the data onto a blank CD?"

"If we don't do something, this technology is going to destroy the record industry," said Nathan Davis, vice-president of Atlantic Records, Kid Rock's label. "Just imagine if the oil-change industry allowed the public to have direct access to oil and oil filters, enabling them to change their car's oil themselves without going through Jiffy Lube or Kwik Lube. People would stop going to oil-change shops, and the entire industry would collapse. We can't let that happen to us."

According to post-autopsy analysis of Kid Rock's stomach contents by the L.A. County coroner's office, his last meal consisted of newspapers, cigar butts, old CD liner notes, and the partial remains of sidekick Joe C., who had been missing since May 15.

Thus far, relief efforts on behalf of afflicted artists have met with little success. In January, Metallica, System Of A Down, and Powerman 5000 teamed up for a concert tour known as "Us Aid," but the rockers were forced to cancel when concertgoers at the kickoff show in Tempe, AZ, showed up with MP3 recording equipment. An all-star fundraiser CD featuring Kid Rock, Limp Bizkit, and Korn was similarly scrapped when an individual known only by the user name PimpKracker69@aol.com acquired a promotional copy and made it available to millions of fans over the Internet.



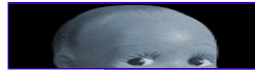
"This is exactly the kind of thing we've been warning our fans about," James Hetfield, the lone surviving member of Metallica, told reporters during a press conference at Hollywood's Grace Church Homeless Shelter. "First, they found Madonna dead of a crack overdose in the alley behind Liquid. Then my best friend and bandmate Lars is killed by cops during a botched hold-up of a liquor store. Now, Kid Rock dies of starvation like a filthy dog in the street. My God, people, didn't we learn the lesson of Elton John?"

John, the British rock star who went bankrupt in 1976 before private ownership of music-pirating cassette decks was made illegal, died of exposure on a Welsh moor that year after creditors repossessed his clothing.



**Above: The home page of the web site Napster, which has cost numerous rock stars their lives.**

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OPINION: LAWRENCE LESSIG

## Just Compensation

**Congress should help artists get paid without delivering the Internet into the hands of the big labels.**

Apr 09 2001 12:00 AM PDT

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Just as the record labels smell victory in their judicial battle to control how content gets distributed on the Net, an interesting scuffle is beginning to erupt within the halls of Congress. It may well be that the laws as written give the labels the right to veto innovation in the distribution of content, but some in Congress, from both sides of the aisle, are beginning to wonder whether these laws make sense. We didn't deliver control over **FedEx (FDX)** into the hands of the Post Office; should we deliver control over Internet distribution into the hands of the labels?

As Congress knows, but as the recording industry wants us to forget, the struggle over **Napster (dossier)** is nothing new to copyright law. The past 100 years have been filled with Napsters - new technologies that "steal" content. But in every previous Napster-like case, Congress has struck a very different balance from the one that the courts are now establishing with the labels. Every time a major new technology for distributing content was born, Congress has assured compensation without guaranteeing control.

Take cable TV. Like Napster, cable was born as a commercial enterprise devoted to making tons of money by "stealing" other people's content. Twice the broadcasters took this "theft" of their freely broadcast content to the Supreme Court; twice the Supreme Court said it was a matter for Congress. It wasn't until 1976 that Congress finally resolved this "theft" by passing legislation designed to strike a balance between broadcasters and cable.

In finding that balance, Congress kept separate two questions the labels want you to confuse. One question was whether broadcasters should be paid for their content. Answer: Yes. The second question was whether broadcasters should have the power to control innovation in cable TV by deciding whether cable could run broadcasters' content. Answer: Absolutely not. While broadcasters and copyright holders were entitled to compensation for their content, the right to compensation did not have to mean the broadcaster's right to control. Cable providers had to pay for what they "stole," but they had, under Congress' law, a fundamental right to steal.

The wisdom in this balance is not hard to see. Artists should be paid for their art. But there are many ways to ensure this, and not all of them give labels a veto over innovation. The law could ensure that artists get paid by establishing some compulsory rate, or by requiring a license. This, in turn, would give innovators the freedom to build new distribution technologies. The content would be free - not in the sense of free beer, as **Richard Stallman** of the Free Software Foundation puts it, but in the sense of free speech. This is how it has always been. Every major new technology has enjoyed freedom from control by the old, from piano rolls to satellite TV, and Congress has been balanced and creative about it. So what makes the Net so different? Why is Congress sitting back as the buggy manufacturers get to decide how best to deploy the automobile?

The labels say congressional action is premature. Let them, they say, strike deals with these upstarts. The market works fine, they assure us. Government (as in Congress) should stay away as soon as government (as in the courts) has killed off any innovator that the RIAA doesn't own.

But what works for the RIAA does not necessarily work for innovation. Congress knows that truth in its heart, even if it pays to forget it. And, interestingly and importantly, some in Congress - from Rep. Rick Boucher (D-Va.) to Sen. Orrin Hatch (R-Utah) - are beginning to act on what they know.

Dinosaurs should die. A truly free market would let them die, and Congress could help this evolution along by passing laws to make sure artists get paid without delivering the Internet into the hands of the labels. Compensation, in other words, without control.

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*Lawrence Lessig is a professor of law at Stanford Law School.*

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## HIS NAPSTER'S VOICE

David G. Post<sup>1</sup>

May, 2001

Everybody, by now, knows the Napster story; news travels quickly these days. Napster is a clever little Internet application, invented by a 19 year old college dropout right out of Central Casting. It's very simple. You download a piece of software from Napster's web site. The software scans your hard disk and compiles a directory of the music files it finds there. It then sends that directory—not the files themselves, just the list of files —back to Napster's computer, where it is placed into a database, along with the directories of all of the other Napster users who have gone through the same process (68 million or so by last count).

Then, when you find yourself desperate to hear, say, Bob Dylan's version of the Stanley Brothers' classic "Rank Stranger," you log into the Napster database to see if anyone, from among those 68 million people, both (a) has a copy of this song on his or her hard disk and (b) is currently logged on to the Internet. If there is someone who fulfills both criteria, the software conveniently connects you directly to them, and the file in question is then transmitted directly to your machine.

Napster's the fastest-growing software application in the (relatively short) history of personal computers, and using it is an intoxicating experience. It gives you a glimpse of the extraordinary power of the global network, and of the power of the notion that if information exists anywhere on the planet, you can find it and you can use it. When people began talking, back in 1995 or thereabouts, about the coming of the "celestial jukebox," the instantly downloadable library of songs that would be available at the touch of a button, most people (myself included) assumed that it would come from Time/Warner, or Sony Music, or EMI, or BMG, that there really would be some box, housed in the basement of an office building in L.A., with a zillion songs stored on it, and that we would all be able to dial in and access it over the net.

But it didn't happen like that. *The network is the jukebox*. A string of code --

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<sup>1</sup> Professor of Law, Temple University Law School. Postd@erols.com. A version of this paper was delivered as an address to the Philadelphia Federalist Society Speakers' Series (March 27, 2001) and at the Cardozo Law School Symposium on "Copyright and Communications Laws" (April 2, 2001).

relatively simple and straightforward code, I'm told – does the trick, turning the whole world into your personal, searchable hard drive. You agree to share a portion of your hard drive with others, in return for their reciprocal agreement to share a portion of theirs with you.

As everybody also knows by now, Napster raises some hard questions about copyright law. Are Napster users infringing if they are only downloading files for “personal use”? Is their use covered by the Audio Home Recording Act? Does, or should, the fair use doctrine cover these activities? If its subscribers are indeed infringing when using Napster's software and services, should Napster be liable for that infringing conduct? Does the “staple article of commerce doctrine” apply to Napster? Who has the responsibility for identifying those files available on the Napster service that are, and those that are not, infringing? What happens if a Napster-like service opens up offshore – whose copyright law applies then?

I could go on and on – anyone who thinks about these issues (not to mention anyone who has tried to *teach* this body of law) could go on and on. It's no trick, at least in the cyberlaw business, coming up with the hard questions; the trick is coming up with the easy questions. That's not quite as silly as it sounds; teasing apart this thicket of questions into those on which we might agree and those on which we don't is the only way we'll be able to focus on the latter and figure out what to do about them.

Talking about Napster sometimes seems a bit like old news, like last year's headlines. Napster exploded on the scene, had its fifteen minutes of fame (including a *Time* magazine cover story), the lawsuits followed, the courts have spoken (at least, in the United States), Napster's been enjoined, and that's that. Time to move on.

But one of a law professor's jobs, on occasion, is to slow things down – a job that seems particularly important these days. Napster's not old news – at least, we shouldn't treat it as such. The Napster litigation represents one small step through a very deep and very dark forest. It's very important that we think hard about how we got here and where we should be going, that we not conclude too early that we're through with this and onto the next problem. Napster poses some critical issues for the development of law of the global network, issues that are going to be with us for a long, long time.

The IS.

To start thinking about these issues, we need to distinguish the ‘is’ from the ‘ought,’ the question whether the Ninth Circuit was correct in its recent decision (holding that Napster is liable for violating the Copyright Act) from the question whether copyright law should, or should not, impose liability on Napster. [Not that “is” and “ought” questions are unrelated to each other; I’m not sure if the meek inherit the earth, but the next generation always does, and in a democratic society, the “ought” can become the “is” because processes exist whereby people can always bring what the law “is” into closer conformity to what they believe it should be.]

Is Napster infringing? Even assuming that millions of people use Napster to make unlawful copies of copyrighted works – there is a contrary argument, based on either the “fair use doctrine” or other provisions of the Copyright Act, that users’ ‘personal use’ of downloaded files does not constitute infringement, but we can ignore that for now – is Napster, which after all does not actually “copy” any files, liable for that copying?

The answer, we all know, is “yes.” The headlines told us: *NAPSTER LOSES*. Just last month, the Ninth Circuit Court of Appeals affirmed the entry of an injunction against the continued operation of the Napster service on the ground that Napster is responsible for these infringing uses.

But the headlines conceal some interesting nuance – that’s one problem with moving too quickly through these issues. The Ninth Circuit actually did some interesting things here. For instance: Napster based part of its defense on the important 1984 Supreme Court case of *Sony v. Universal Studios*.<sup>2</sup> In *Sony*, the entertainment industry challenged a new copying technology – the VCR – which, they claimed, was about to destroy their business; tumbleweed would be blowing through the streets of Hollywood, they cried, if the VCR were not brought under control. The Court ruled, however, that the VCR manufacturers were not liable for the copyright infringements of VCR users; because the VCR had “substantial non-infringing uses” – because it could be used for perfectly lawful copying as well as unlawful copying -- Sony (and the other VCR manufacturers) could continue to distribute VCRs without permission from (or payment

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<sup>2</sup> *Sony v. Universal Studios*, 464 U.S. 417 (1984), available at <http://supct.law.cornell.edu/supct/cases/464us417.htm>.

to) the copyright holders.

[It is, perhaps, interesting that the entertainment industry plaintiffs in the *Sony* case were, in fact, wrong; the VCR did have, in fact, substantial non-infringing uses, and the industry learned how to live with that technology quite comfortably. And notice, too, the nice twist: Sony, Inc. is pitching a 2-0 shutout thus far – having won as one of the copyright defendants in *Sony v. Universal* and as one of the copyright plaintiffs in *A&M Records et al. v. Napster*.]

“We’re just like the VCR manufacturers,” Napster claimed; the Napster service has “substantial non-infringing uses” and should be allowed to continue because of that.<sup>3</sup> There is a great deal of original music being written out there in which the authors do not assert their rights to prohibit copying and distribution, but in fact encourage it; go to MP3.com if you don’t believe that. Sharing those files is not infringement of copyright. A substantial amount of traffic through the Napster system involves transmission of those files. QED.

The district court had disagreed: the non-infringing uses of Napster, that court ruled, are insubstantial, trivial, in comparison to the infringing uses. Some of us thought that was plain wrong, and the Ninth Circuit agreed with us. It held that Napster *does* have “substantial non-infringing uses”; indeed, it reversed the district court on just this point. But, the Ninth Circuit went on, although Napster (like the VCR) has substantial non-infringing uses, Napster is not in the same position as Sony or the other VCR manufacturers, because it (unlike Sony) has “actual knowledge that specific infringing material is available using its system” as well as the ability to “block access to [its] system by the suppliers of the infringing material.” (The emphasis is in the original.) The record companies had given Napster “actual notice” of the names of “more than 12,000 infringing files” that appeared in Napster’s database. For this reason, the court said, the *Sony* doctrine does not shield Napster from liability.

That’s a critical component of the court’s decision that many reports have overlooked. Napster is liable only when it has actual knowledge of the specific infringing files appearing in its database. How can it obtain that knowledge? The burden is on the

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<sup>3</sup> The briefs and court opinions in the *A&M v. Napster* litigation are helpfully collected together by Prof. Stuart Biegel at <http://www.gseis.ucla.edu/iclp/napster.htm>.

record companies; they must deliver the list of infringing files that are being shared over the Napster system, the names of the recording artists involved, and a “certification that [they] own or control the rights allegedly infringed” before Napster has the obligation to remove the files.

That’s not quite the victory for the record companies that many news reports suggested it was. At least as I write this (in May, 2001), Napster’s still out there, still going strong by the look of it. It ain’t over, like the man says, till it’s over.

### **THE OUGHT**

What should copyright law say about Napster?

Let’s try to unpack that question into its difficult, and its not-so-difficult, components. Here’s the easy – at least, easier than it appears – part. Suppose we were trying to come up with a copyright law applicable *only* to information created and distributed on the global network; what would that law look like? Imagine, in other words, an impenetrable boundary between the world of atoms – “Here” – and the world of bits – “There.” Information *cannot move* across the border. Information can appear There only if created There. What copyright law would we think best for There, for that side of the border?

I understand, believe me, that this is fantasy. There is no such boundary, information moves easily back and forth from analog to digital to analog, from cyberspace to realspace and back. That is, indisputably, reality. But true knowledge, Kierkegaard said, consists of “translating the real into the probable.”<sup>4</sup> Let’s indulge in this thought experiment and put the real aside for the moment – there will be plenty of time to re-introduce reality later. If we were to pretend that there is such a boundary, what kind of copyright law would we think best over There, over on the other side?

An easy question? I think it is – at least if we look at copyright not as a “natural” right but as something we impose on the world for a very specific purpose, namely to increase the overall stock of creative works. This “instrumentalist” view of copyright law

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<sup>4</sup> See W.H. Auden (ed.), *The Living Thoughts of Kierkegaard* (1952) at 113 (“The only reality that exists for an existing individual is his own ethical reality. To every other reality he stands in a cognitive relation; but true knowledge consists in translating the real into the probable.”).

is familiar<sup>5</sup> (though it is by no means universal) as the view that, by and large, underlies U.S. copyright law. This is Copyright 101: we give legal protection to creative expression in order to induce creative activity, to give creators an incentive to produce new works of authorship by promising them the opportunity to profit from their labors via a market in their works; we tolerate the “monopoly” that we grant to these creative artists because, and to the extent that, it is a means to that end.. We seek in our copyright law the right balance, the optimum point, between protection that is “too strong” (*i.e.*, protection that reduces creative output by making it difficult for authors to borrow from pre-existing works) and protection that is not strong enough (*i.e.*, protection that does not

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<sup>5</sup> The most eloquent statement of this view remains Thomas Jefferson’s, in his justly-famous 1813 letter to Isaac MacPherson:

“It has been pretended by some, (and in England especially,) that inventors have a natural and exclusive right to their inventions, and not merely for their own lives, but inheritable to their heirs. But while it is a moot question whether the origin of any kind of property is derived from nature at all, it would be singular to admit a natural . . . right to inventors. It is agreed by those who have seriously considered the subject, that no individual has, of natural right, a separate property in an acre of land, for instance. By an universal law, indeed, whatever, whether fixed or movable, belongs to all men equally and in common, is the property for the moment of him who occupies it; but when he relinquishes the occupation, the property goes with it. Stable ownership is the gift of social law, and is given late in the progress of society.

It would be curious then, if an idea, the fugitive fermentation of an individual brain, could, of natural right, be claimed in exclusive and stable property. *If nature has made any one thing less susceptible than all others of exclusive property, it is the action of the thinking power called an idea, which an individual may exclusively possess as long as he keeps it to himself; but the moment it is divulged, it forces itself into the possession of every one, and the receiver cannot dispossess himself of it. Its peculiar character, too, is that no one possesses the less, because every other possesses the whole of it. He who receives an idea from me, receives instruction himself without lessening mine; as he who lights his taper at mine, receives light without darkening me. That ideas should freely spread from one to another over the globe, for the moral and mutual instruction of man, and improvement of his condition, seems to have been peculiarly and benevolently designed by nature, when she made them, like fire, expansible over all space, without lessening their density in any point, and like the air in which we breathe, move, and have our physical being, incapable of confinement or exclusive appropriation.*

Inventions then cannot, in nature, be a subject of property. *Society may give an exclusive right to the profits arising from them, as an encouragement to men to pursue ideas which may produce utility, but this may or may not be done, according to the will and convenience of the society, without claim or complaint from any body. . . .*

give authors enough of an incentive to invest the time and energy required into producing works of value).

So: how much copyright protection do we need to induce creative activity There, on our hermetically sealed global network?

Fortunately, we have been conducting (inadvertently, to be sure) a little natural experiment over the past decade or so to help us answer this question. We know how much creative activity we'd get if there were little or no copyright protection in cyberspace, because there has in fact been, in effect, little or no copyright protection in cyberspace. Copyright has been, at best, a 'weak force' in cyberspace, routinely flouted (as the Napster plaintiffs and other copyright holders keep reminding us). Copyright "piracy" is rampant There; nobody has been voluntarily making information available on the global network in the expectation that copyright law will protect that information (and any lawyer who has been advising clients otherwise is probably guilty of malpractice).

So we can answer the question "is copyright protection needed to stimulate creative activity in cyberspace?" because we have some idea what cyberspace would look like as a "copyright-free zone" – it would look like cyberspace does today.

And what does that look like? It looks to me like the greatest outpouring of creative activity in a short span of time – the Internet itself, let us not forget, is only a quarter-century or so old, and it has been all of 7 years since the World Wide Web was loosed upon an unsuspecting world – that the world has ever seen. I recognize that I can't prove the truth of that statement (any more than I could prove its opposite, that we would have seen *more* creative activity had there been more legal protection for that activity). All I know is that cyberspace keeps growing and growing; more and more stuff keeps appearing, in new guises and new shapes; there are more and more people trying to give me information to place in my computer than I have room for. Look at my desktop, for goodness sake – real time stock quotes, the weather in five pre-selected cities, news headlines from Reuters and the Associated Press, the complete works of Thomas Jefferson, the latest scores from the English Premier League, maps of the city of my choice, maps of the distribution of information in cyberspace, powerful search tools, etc. I'm one click away from a lot of pretty interesting stuff. All at a marginal cost to me of zero. And all this without any substantial legal protection for that information at all.

It was fortunate that we actually conducted this natural experiment because without it, the conventional wisdom would have assured us that it could never happen. Without any incentive to create provided by strong property rights, we surely would have said, there will be no creative activity, and cyberspace will be a vast wasteland.

But somehow it's not. Perhaps we don't understand everything there is to understand about the need for intellectual property protection. Perhaps the world is trying to tell us something, that this is a new kind of place where things that worked well in the world of atoms don't work so well. Perhaps in these special circumstances – in a medium built upon the ability of machines to copy and to disseminate information at previously-unimaginable speeds with previously-unimaginable efficiency, and at a previously-unattainable low cost – there are other ways that creative activity can be stimulated.

Eben Moglen of Columbia Law School puts it more elegantly (and colorfully) that I:

In the world of digital products that can be copied and moved at no cost, traditional distribution structures [that] depend on the ownership of the content or of the right to distribute, are fatally inefficient. As John Guare's famous play has drummed into all our minds, everyone in society is divided from everyone else by at most six degrees of separation. Let's not concentrate on the precise number, but on the fact it reveals: the most efficient distribution system in the world is to let everyone give music to whomever they know who would like it. When music has passed through six hands under the current distribution system, it hasn't even reached the store. When it has passed through six hands in a system that doesn't require the distributor to buy the right to pass it along, after six exchanges it has reached several million listeners.

This increase in efficiency means that composers, song-writers and performers have everything to gain from making use of the system of unowned or anarchistic distribution . . . Hundreds of potential "business models" remain to be explored once the proprietary distributor has disappeared, no one of which will be perfect for all artistic producers, but all of which will be the subject of experiment in decades to come, once the dinosaurs are gone.

Musicians, though terrified of the possible losses (which the industry is doing everything to overestimate for them) are beginning to discover the enormous potential benefits. No doubt there will be some immediate pain that will be felt by artists rather than the shareholders of music conglomerates. The greatest of celebrity musicians will naturally do fine under any system, while those who are presently waiting tables or driving a cab to support themselves have nothing to lose. For the signed recording artists just barely making it at present, on the other hand, the changes now occurring are of legitimate concern. But musicians as a whole, from the top to the bottom of the current

hierarchy of success, stand to gain far more than they can lose. Their wholesale defection from the existing distribution system is about to begin, leaving the music industry--like manuscript illuminators, piano-roll manufacturers, and letterpress printers--a quaint and diminutive relic of a passé economy.<sup>6</sup>

We can discuss *why* all this is happening (and have an interesting discussion in the course of so doing), but it seems to me very difficult to deny that it *is* happening.

Thinking about cyberspace as a copyright-free zone might not come naturally to most of us in this room, but it sure comes naturally to my kids (and I bet to yours, too). And remember: they get to write the rules, soon. As the plaintiff record companies put it in their brief to the Ninth Circuit: “If the perception of music as a free good becomes pervasive, it may be difficult to reverse.” Indeed.

So if there were a real border between cyberspace and realspace, between There and Here, we might conclude that we don’t need strong property protection for the information There to induce creative activity, and we might be a tad more sympathetic to the millions of people who indulge in the free sharing of information over There. Why, they’re not lawless banditti out there in cyberspace – they’re implementing sound and sensible public policy!

What difference, though, does all of this make? Suppose that a “bordered cyberspace” would flourish without copyright law; so what? There is no such border; what good is it to talk as if there were? Where has this little thought experiment gotten us?

It might, perhaps, cause us to think more about what copyright can continue to work (where its needed) and can disappear (where its not). The “Napster problem” is not that people are using the tools at their disposal in cyberspace for the rapid sharing and re-distribution of information; on the contrary, that’s the *solution* to the age-old problem of finding ways to distribute information to the maximum number of people.

The “problem” consists in the ease with which information can be moved from realspace to cyberspace – “smuggled,” as it were, across a border that is insufficiently impermeable. People can, with ease, transfer information created Here – the songs, say, of Jerry Lieber and Ben Stoller, two of the plaintiffs in the Napster suit (who just happen to be two of America’s greatest songwriters) – and move it There, onto the global

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<sup>6</sup> Eben Moglen, “Liberation Musicology,” <http://www.thenation.com/doc.mhtml?i=20010312&s=moglen>.

network. And once the information is There, it is subject to the customs and practices of the people There – which in this case, involves rapid and efficient sharing and re-distribution.

Lieber and Stoller deserve compensation when that happens; I agree with the Recording Industry Association of America (RIAA) (and many others who look at this problem) that there is something *unfair* here, that we made a bargain with Lieber and Stoller that is now being broken against their wishes. Solving the Napster problem, then, does not mean figuring out ways to impose an unnecessary copyright regime on the information circulating on the global network; it means figuring out ways to reduce the incidence of smuggling, and/or to compensate those whose works are the object of this smuggling activity.

That's not a trivial task, to be sure – but it's not an impossible one, either. Maybe I'm wrong, but I don't think that shutting down Napster gets us much closer to accomplishing it. The RIAA is right: the perception of music as a free good has become pervasive; they will not succeed with a strategy that makes all 70 million Napster users into copyright infringers. Shutting down Napster will only speed up the development of other peer-to-peer sharing technologies -- gnutella, and FreeNet technologies, for example – that will be *\*much\** harder to shut down.

If I were working for the RIAA and trying to solve this problem, I'd focus my attention on better “border construction,” on the development and deployment of tools that would increase the impermeability of the relevant boundaries. One set of such tools are things like the Secure Digital Music Initiative – cryptographically-based protection schemes to prevent the unauthorized movement of information – do just that, creating a boundary between a world of protected information and a world of unprotected information. Unlike many of my colleagues on the academic side of this debate, I think that these tools hold out terrific promise. If Lieber and Stoller or other artists want to “lock up” the information they have created in unbreakable cryptographic envelopes, I say more power to them. We can have, in effect, two alternative worlds, two parallel universes – one consisting of protected information, and one of unprotected information. Then we get to see which one really does stimulate creativity. Perhaps if the RIAA spent

less of its money on lawyers to shut down offending networks, and more on engineers designing a Napster-resistant security system, we'd be a little closer to that goal.

I'd also look to Charles Dickens.<sup>7</sup> Dickens, it turns out, was as angry about border permeability and copyright smuggling as Lieber and Stoller are. Dickens' works, too, were being transferred across a border – in his case, the border between the United Kingdom and the United States – and freely reproduced and distributed on the Other Side. It wasn't truly “smuggling,” because U.S. copyright law, in the nineteenth century, gave absolutely no protection whatsoever to works created on the other side of the U.S. border, so it was perfectly lawful to bring Dickens' works into the U.S. and to reproduce and distribute them to your heart's content. [Sound familiar?]

International copyright relations have always reflected a simple opposition between net copyright exporters (favoring reciprocal recognition of foreign copyrights) and net copyright importers (resisting such recognition). In Professor Paul Goldstein's words, “If Country A imports more literary and artistic works from Country B than it exports to Country B, it will be better off denying protection to works written by Country B's authors even if that means foregoing protection for its own writers in Country B.”<sup>8</sup> The first copyright exporters (like Great Britain and France) were happy to offer to protect the works of foreign authors to countries offering reciprocal protection for their authors. On the other hand, the U.S., in its early days, was primarily an *importer* of copyrighted works, and U.S. copyright policy was designed (largely by America's first Treasury Secretary, Alexander Hamilton) precisely to promote the development of infant copyright industries within the United States; providing copyright protection only for American authors, Hamilton (and others) believed, worked to the advantage of the growing American publishing industry, because American publishers could publish cheaper versions of foreign (especially British) works (since they were not obligated to pay royalties to the [foreign] authors when they did so).

These protectionist provisions of the U.S. Copyright Act were relatively uncontroversial for the first 40 years or so, as the American publishing industry grew (at

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<sup>7</sup> This argument is presented in some more detail in my paper “Some Thoughts on the Political Economy of Intellectual Property: A Brief Look at the International Copyright Relations of the United States,” available at <http://www.temple.edu/lawschool/dpost/Chinapaper.html>.

least partially due to these protections). Dickens and other prominent British authors (most notably Anthony Trollope) did not take kindly to their treatment at the hands of the Americans, and they complained bitterly, and quite publicly, about the injustice of this arrangement. Dickens devoted much of his public tour of the United States in 1841-42 to this subject, as he did on a later tour in 1867, which helped to increase the awareness of the American public of this question. Trollope, in 1868, wrote “The argument . . . is that American readers are the gainers -- that as they can get for nothing the use of certain property, they would be cutting their own throats were they to pass a law debarring themselves from the power of such appropriation. . . . In this argument all idea of honesty is thrown to the winds ... [T]his argument, as far as I have been able to judge, comes not from the people, but from the book-selling leviathans, and from those politicians whom the leviathans are able to attach to their interests.”

As the nineteenth century proceeded, however, domestic voices began to be heard in support of the recognition of foreign copyrights. The first formal proposal to recognize international copyright and to remove the discrimination against foreign authors was made in 1837 by Senator Henry Clay—one of America’s most influential Congressmen and a future Presidential candidate—in the much-publicized “Clay Report.” Clay argued that American interests were harmed, not benefited, by the absence of recognition for foreign copyrights; whatever benefits American *publishers* might be reaping by virtue of the ability to reprint foreign works at low cost, Clay suggested, was offset by the benefits that American *authors* would reap by an extension of copyright to the works of foreigners. Soon thereafter, a number of the most distinguished American authors and artists—including Louisa May Alcott, William Cullen Bryant, George William Curtis, Ralph Waldo Emerson, Horace Greeley, Oliver Wendell Holmes, William Dean Howells, Henry Longfellow, Harriet Beecher Stowe, and J.G. Whittier, among many others – began to speak out on behalf of copyright protection for their foreign counterparts.<sup>9</sup>

It sounds like a paradox: what did American authors have to gain by an extension

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<sup>8</sup> The quote is from Paul Goldstein, *Copyright’s Highway: From Gutenberg to the Celestial Jukebox* (1994), an excellent introduction to the history of U.S. copyright law.

<sup>9</sup> These developments are marvelously described in Thorvald Solberg, “The International Copyright Union,” 36 *Yale Law Journal*, 68 (1926),.

of copyright protection to the works of their counterparts—their competitors—in other countries? The answer is two-fold. First, American authors were finding that their works, though protected by copyright in the United States, were hard-pressed to compete with inexpensive editions of foreign works; why pay a dollar for the work of an American author such as Herman Melville or Nathaniel Hawthorne when you can get the latest Dickens or Trollope for half that price or less?

And second, U.S. authors found that they were being harmed by discriminatory treatment directed against them in foreign markets; other nations were—understandably!—reluctant to give copyright protection to American authors when the United States was denying copyright protection to their authors, and American authors were accordingly frustrated in their attempts to market their works overseas.

This battle was fought where all battles about policy in a democratic society are fought: in the court of public opinion. The American people (and the U.S. Congress) ultimately were persuaded that Dickens' copyrights should be respected over Here. In 1891 – 101 years after enactment of the first U.S. Copyright statute – the U.S. Congress passed the International Copyright Act, granting, for the first time, protection to foreign works.

The moral of the story? Napster users have to be convinced that it is in their interest to grant recognition to the “foreign” copyrights held by Lieber and Stoller. They will, I predict, do so (that's easy for me to say!). We could speed that process up by a policy of non-recognition of cyberspace copyrights here in realspace; if, for example, we denied copyright protection Here for Napster's software, a constituency for reciprocal copyright recognition would develop There among cyberspace's Hawthornes and Melvilles and Emersons.

Border construction is a long and complicated process, unlikely to satisfy those looking for a quick fix. But the Future is (always) just beginning. The border between cyberspace and realspace can be as real as we want it to be; like the border between France and Belgium, we make it up as we go along, if we choose to.

# Digital Music: Problems and Possibilities

William Fisher

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Note on the origin and purposes of this essay

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## I. Introduction

Almost all music is distributed today in digital, rather than analog, form. Until recently, most digital music was sold in containers called compact discs. Developed and refined between 1965 and 1985, **compact-disc technology** swept the consumer market during the late 1980s and early 1990s, displacing almost completely long-play vinyl albums. In the past few years, a new method of distributing digital music has become increasingly popular: transmission of containerless files via the Internet, followed by storage on home computers. Music distributed in this manner typically is replayed either through **stereo systems** attached to the home computers or through **portable devices** analogous to the "walkman."

The technology that has made this new method convenient and popular is **MP3**, an audio compression file format. Musical files compressed using MP3 occupy approximately 1/12 of the disk space occupied by uncompressed files, enabling them to be transmitted faster and stored more easily. Two groups have embraced MP3 technology especially enthusiastically. First, musicians unable to obtain recording contracts with the major record companies have found that, at modest cost, they can record their material in MP3 format and then make it available over the Internet. Second, high-school and college students have discovered that they can obtain on the Internet MP3 copies of most of the songs of their favorite musicians. A high percentage of the MP3 recordings available in this manner were prepared without the permission of the owners of the copyrights in the music.

This essay attempts to sort out the legal issues presented by this new technology. **Section II** catalogues its social advantages and disadvantages. **Section III** analyzes the various legal challenges that have been or might be brought against users of the new technology. **Section IV** suggests some ways in which the legal and business landscape might be reconfigured to handle better the combination of opportunities and dangers presented by the new technology.

## II. Benefits and Costs

Widespread adoption of the technique of distributing digital music via the internet -- either in MP3 format or in some other form -- would give rise to five important social and economic advantages.

1. **Cost savings associated with "disintermediation."** Currently, most of the retail price paid by a consumer for a compact disks goes to the manufacturer of the disc itself, the distributor of the disc, the retail store where she purchased it, or the record company that produced the recording. The composer and the recording artist (often the same person) rarely receive more than 16% of the purchase price. If the music were distributed over the Internet by the artist himself, almost all of costs associated with making and distributing discs could be eliminated. The result: musicians could earn more or consumers could pay less or both.
2. **Elimination of overproduction and underproduction.** Under the current system, the record companies must guess

how many copies of each CD consumers will demand. Distribution of containerless digital files over the Internet would eliminate this problem.

3. **Convenience and precision.** The many annoyances associated with buying music in retail stores (travel time; the disappointments when CDs are out of stock; etc.) would all be eliminated by Internet distribution. The less substantial annoyances associated with mail-order purchases of CDs (waiting for delivery; being forced to purchase an entire CD when one is only interested in a few tracks) would also be eliminated. Consumers would get exactly the music they wanted (and none of the music they didn't want) instantly.
4. **Increase in the number and variety of musicians.** The set of musicians who would like to make their music available to the public and the set that significant numbers of consumers would like to hear are both much larger than the set hired by the recording companies. The opportunities available to new artists and to bands that appeal to "niche" markets would increase rapidly through widespread adoption of the new technology.
5. **Semiotic democracy.** In most modern capitalist countries, the power to make meaning, to shape culture, has been concentrated in relatively few hands. One of the great cultural benefits of the Internet in general lies in its tendency to decentralize this semiotic power. In two respects, Internet distribution of digital music would contribute to that decentralization. The first, already mentioned, consists of the expansion of the set of musicians who can reach wide audiences and the associated diminution of the cultural power of the "big five" record companies. The second consists of the ease with which "consumers" of digital music can manipulate it, recombine pieces of it, blend it with their own material -- in short, can become producers. The next generation of compression formats -- MP4 -- promises to increase radically those opportunities for interaction and iteration.

Regrettably, distribution of digital music via the Internet also has one, very substantial drawback: It undermines the ability of music creators to earn money. Two circumstances, in combination, give rise to this problem. First, MP3 files are unsecured. In other words, nothing prevents a person who has acquired (with or without permission) an MP3 file to make an unlimited number of copies of it. Second, unlike the copies of musical works made using analog technology (such as ordinary cassette tape recorders), the copies made using digital technology are perfect. In other words, each copy is identical to the original. The result: unauthorized, perfect MP3 copies of copyrighted recordings are widely available on the Internet for free.

The proliferation of unauthorized free copies has frightened both the recording industry and **many musicians**. The laments of the recording companies leave many observers unmoved. It is **commonly said** that the major recording companies have been engaged in oligopolistic pricing for years and can stand to forego some profits. Even if that is true, however, the pleas of the musicians merit our attention. A dramatic reduction in their revenues both may deprive them of a **fair return for their labors** and may create precisely the state of affairs that copyright law (according to the dominant theory thereof) was designed to prevent: **socially suboptimal production of musical works because of their nonexclusivity**. In short, Internet distribution of digital music may result, not in an increase in the amount and variety of music available to the public, but in a decrease.

### III. The Inconclusive Legal Campaigns

During the past three years, the **Recording Industry Association of America (RIAA)** and **its cousins in other countries** have tried valiantly to halt the unauthorized distribution or use of digital music. The industry has waged this war on four fronts: against individuals engaged in nonpermissive downloading of copyrighted MP3 files; against the manufacturers of the machines used to play MP3 files; against the operators of "pirate" Web sites; and against the growing group of intermediaries that assist users in locating and obtaining MP3 files. To date, none of these struggles has been decisively resolved. On the first two fronts, the forces embracing the new technology are currently winning; on the third and fourth, the forces seeking to limit uses of the new technology are currently winning. But the outcomes of all four campaigns remain in doubt.

**A. Copyists.** The legal case against a person who, without permission, downloads an MP3 copy of a copyrighted song to her hard drive is very strong. The **current version of the American copyright statute** protects both "musical compositions" and "sound recordings." Thus, both the composer of the song in question and the artist who recorded it -- or (most likely) **the organizations to whom they have assigned their copyrights** -- are in legal positions to challenge the downloading. Have the entitlements of the copyright owners been violated? The answer is clearly yes. The sets of entitlements associated with copyrights in "musical compositions" and "sound recordings" are somewhat different, but both encompass exclusive rights to make verbatim reproductions of the entire song. The copyist has plainly abridged those rights.

Only one colorable legal argument is available to the copyist: the contention that the downloading (like the home recording using a VCR of a copyrighted television program) should be excused as a "fair use" of the copyrighted works. The doctrine upon which this argument rests is notoriously vague and unpredictable, requiring the application, on a case-by-case basis, of an ambiguous, multi-factored test. But the unauthorized downloading of MP3 files is a relatively rare instance in which application of the doctrine can be predicted with confidence. In combination, the facts that (1) the copying involves no "transformation" or parody of the copyrighted works, (2) the entire copyrighted song (not an excerpt thereof) is being duplicated, (3) the material in question is more creative than "factual," and (4) this behavior, if it became widespread, would surely erode the "potential market" for the copyrighted work would doom the copyists' fair-use defense.

To date, however, this powerful set of arguments has been invoked by copyright owners only rarely. **Three circumstances** explain the relative quiet on this front. First, it is difficult to locate the persons who download MP3 files. Second, the recording industry is understandably reluctant to antagonize its principal customers. Third, a prohibitively large number of copyright suits would be necessary to make any material inroads into this increasingly widespread practice.

There are signs, however, that these circumstances may not shield the copyists indefinitely. Many of the most enthusiastic downloaders are students in universities, which, relying on logs of students' online activities, have begun to initiate **disciplinary proceedings** against them. So far those sanctions have been relatively mild (**including writing essays on copyright law**), but more serious penalties may be in the offing.

**B. Equipment Manufacturers.** The second potential target of the recording industry consists of the manufacturers of devices used to download or playback MP3 files. If the industry were able to remove from circulation the machines essential to the trafficking in illicit files, they would not need to bring unpopular suits against individual copyists. So far, however, this strategy has not succeeded.

The most promising lawsuit of this sort was brought by the RIAA against Diamond Multimedia, the manufacturer of a portable MP3 player called **the Rio**. Similar in form and function to a "walkman," a Rio enables its owner to download 60 minutes worth of MP3 files from his hard drive and then listen to them while exercising, commuting, etc. Conceivably, the RIAA might have accused Diamond of engaging in "contributory copyright infringement" -- on the ground that it manufactured and sold a device whose principal use, in practice, was to engage in copyright infringement. However, the defeat of the closely related argument in the 1984 **Sony case** apparently dissuaded them from making such a claim. Instead, they relied upon an obscure provision of the Audio Home Recording Act of 1992 (AHRA), which, as part of **a complex compromise between the proponents and opponents of digital audio tape recorders**, mandates the inclusion in any "digital audio recording device" of a "Serial Copy Management System" designed to prevent the device from making multiple copies from a single copyrighted work. The case, though peculiar, was close -- but in the end the manufacturer prevailed. Last year, **the Court of Appeals for the Ninth Circuit found in favor of the defendant**, ruling that the AHRA did not apply to the Rio device, because the computer hard drive from which the Rio records cannot be considered either a digital audio recording device or a digital music recording within the meaning of the Act. Moreover, according to the court, because MP3 files are not coded with generation status or other copyright information, and because copies cannot be made of the files downloaded to the Rio, the SCMS would serve no useful function.

For the time being, this ruling has halted the efforts of the recording industry to bring to heel the manufacturers of machines that facilitate nonpermissive copying and performance of digital files. However, the doctrine of contributory copyright infringement, bypassed in the Rio litigation, remains available if machines dedicated more exclusively to infringing behavior ever come on the market.

**C. Pirate Sites.** The third of the four targets consists of the operators of so-called "pirate" Web sites -- sites on which unauthorized MP3 files have been "posted," thus making them readily available for downloading. The recording industry has had a good deal more success on this front than on the two just described. The legal arguments that the industry can deploy against the pirates are even stronger than the arguments it might deploy against the individual copyists. Like the copyists, the pirates are making verbatim copies of copyrighted songs, thus infringing both the copyrights in the underlying musical compositions and the copyrights in the recordings. In addition, some (not all) of the pirates are making money from their operations (e.g., through advertising), thereby further weakening their already very weak fair-use defenses. Next, the pirates may well be deemed to have violated the **Digital Performance Right in Sound Recordings Act of 1995**. Finally, some will run afoul of the 1997 No Electronic Theft (NET) Act.

Unlike individual copyists, pirate Web sites can be identified with relative ease. Using the doctrinal weapons described above, the recording industry has moved successfully against several. In the United States, the RIAA has sent "cease-and-

desist" letters to many site operators; almost invariably, the recipients of the letters have shut down their operations. **In other countries, similar tactics by parallel organizations have had similar results.**

In the past year, the recording industry has also been able, at least on occasion, to invoke the aid of governments in pursuing pirates. In November of 1999, the Justice Department secured its **first conviction under the NET Act** of a student operating a pirate site on his university's server. Special criminal statutes and specialized offices within the police departments of Japan and Hong Kong have been deployed against similar miscreants.

***A variation on the theme:*** As suggested above, the legal issues presented by the typical "pirate" site are not especially interesting or difficult. By contrast, one website enabling users to gain access to copyrighted music without the permission of the copyright owners presents much more complex questions. In January of 2000, the pioneering company, **MP3.com**, introduced **two new services**, both of which allowed a customer to assemble on MP3.com's servers a personal database of her favorite music and then to **"stream"** selections from that database to any **MP3 player**. The first system -- the "Instant Listening Service" -- allowed her to purchase a CD from one of MP3.com's ecommerce partners and at the same time to load digital versions of the music contained on those CDs into her personal online account. The second system -- the "Beam-It service" -- enabled her to insert a CD from her home music collection into the CD drive on her home computer, which in turn communicated to MP3.com the contents of the drive. MP3.com then registered the track information and placed a copy of the music contained on the CD into her password-protected database. Thus, in order to access any of the music files stored on the MP3.com server, a customer must either purchase a "hard copy" of the CD from one of MP3.com's partners or prove that she owns the CD (or has access to a copy of it). The benefit of these systems to consumers, argued MP3.com, is that they did not need to fill up scarce storage space on their hard drives with MP3 files, that their music libraries were not vulnerable to computer crashes, and that they could listen to music in their libraries from any computer, not just their home computers.

The record companies **took umbrage** and **brought suit**. They pointed out that, to construct the database of MP3 files from which customers' personal music libraries were assembled, MP3.com had made verbatim copies, without permission, of the copyrighted songs contained on 40,000 compact discs. MP3.com conceded as much but argued that, because each customer was obliged, in one way or another, to pay for a CD before she could obtain access to the MP3 versions of its contents housed on the company's website, neither the recording industry nor the musicians it ostensibly represents had any legitimate grounds for complaint. The record companies responded that, by using borrowed CDs to activate the "Beam-It Service," customers could easily gain access to music they had not purchased.

In the end, the judge who heard the case did not reach the tricky question of whether **the security devices incorporated in the system were effective**. In April of 2000, **Judge Rakoff ruled** that, by copying the CDs without permission, MP3.com had plainly violated section 106 of the Copyright Statute. Rakoff then rejected MP3.com's claim that its actions should nevertheless be excused as a "fair use." In his view, (a) the company's actions were "commercial" and "nontransformative" in character, (b) the material copied was highly creative and thus deserved strong copyright protection, (c) the entirety of the copyrighted works in question had been reproduced, and (c) MP3.com had "usurped" an important secondary market for copyrighted songs. All four of the factors traditionally used to assess fair-use defenses thus disfavored MP3.com. Consequently, he granted a preliminary injunction against the continued operation of the system. In the wake of the decision, MP3.com reached **settlement agreements** with all but one of the record companies that had brought the suit, agreeing to pay them approximately \$80 million in damages and modest royalties whenever copyrighted songs are copied on and then "streamed" from the MP3.com site in the future. The remaining company, UMG Recordings, insisted upon proceeding to trial. In September of 2000, Judge Rakoff found that MP3.com's behavior had constituted "willful" copyright infringement and **ordered the defendant to pay UMG \$25,000 per copied CD**. Total damages under this formula could exceed \$250 million. MP3.com has promised to appeal. Will this judgment, assuming it stands, put the company out of business? Perhaps not -- although **its stock price has dropped precipitously**. But the ruling will surely act as a deterrent to other firms considering innovative ways of distributing digital music.

**D. Intermediaries.** The final target of the recording industry's efforts consists of Internet intermediaries that help Web surfers locate free MP3 files for downloading. The importance of these intermediaries is plain: unless the copyists can find copies of songs in which they are interested, they will not be able to "steal" them -- and may thus be induced to buy them instead. Sensing this, the recording industry early **brought pressure to bear on the popular search engine Lycos**, arguing that, by providing users an indexed list of MP3 files available on the Internet, Lycos had run afoul of the Digital Millennium Copyright Act. Lycos backed down, and its MP3 index has since been reduced to little more than a collection of dead links.

But success on this front proved short-lived. Far more serious than the threat posed by Lycos is the danger to the recording industry presented by the emergence of a new type of intermediary: peer-to-peer copying systems. By far the most famous

of these is [Napster.com](http://Napster.com). Napster is not a traditional search engine, but a protocol that **enables individual computer users to share information** concerning the contents of their hard drives. Specifically, it enables a user interested in obtaining an MP3 copy of a particular song to search the drives of other Napster participants for the song in question -- and then, after locating a copy, to download it to his or her own drive. The service has proven extraordinarily popular, especially among college students. A high percentage of the **traffic on many university networks** now consists of Napster searches and downloads.

Aware that its system facilitates the nonpermissive reproduction of copyrighted material, Napster has employed various tactics to minimize its exposure to liability: it **neither stores nor caches** any digital music (infringing or otherwise) on its servers; it trumpets a "**Copyright Policy**" in which it disclaims responsibility for the activities of its subscribers and insists that they promise not to violate the law; and it has promises to "respond expeditiously to claims of copyright infringement committed using [its] service." Unimpressed, **the RIAA filed suit**, accusing Napster of both contributory and vicarious copyright infringement.

In its defense, Napster has made three legal arguments. First, it has invoked the protection of sections **512(a) and 512(d)** of the Digital Millennium Copyright Act (DMCA), which provides to the operators of "transitory digital network connections" and "Information Location Tools" "safe harbors" against liability for copyright infringement. Second, Napster argues that peer-to-peer copying of digital files using its system constitutes "the noncommercial use by a consumer" of "a digital audio recording device," which, pursuant to **section 1008 of the Audio Home Recording Act**, cannot constitute copyright infringement. Because its members are not engaged in copyright infringement, Napster argues, it plainly cannot be liable for contributory copyright infringement. Finally, Napster insists that **a significant percentage of the uses of its system** involves lawful copying of musical files -- either because the owners of the copyrights in the songs in question do not object to (indeed, encourage) the duplication of their works or because the character of the copying is such as to make it a "fair use." Consequently, Napster argues, its system is manifestly "capable of substantial noninfringing uses," and thus is immunized against liability for contributory copyright infringement by the decision of the Supreme Court in the **Sony** case.

At the trial-court level, Napster's arguments fared badly. In April of 2000, **Judge Marilyn Patel rejected Napster's invocation of DMCA 512(a)**. On August 10, **Judge Patel rejected all of Napster's remaining arguments** and granted a **preliminary injunction against the continued operation of the system**. The Court of Appeals for the Ninth Circuit has been somewhat less hostile. One day after Judge Patel's second ruling, the Court of Appeals stayed the imposition of the injunction pending an appeal. **Oral argument** on the appeal was heard on October 2, 2000. The tenor of the questions asked by the three-judge panel (although surely not a reliable predictor of the judges' votes) suggested they were more receptive than Judge Patel to Napster's position. **A decision should be forthcoming soon**.

A great deal is at stake in this litigation. If Napster prevails, the many victories of the recording industry in its war against pirate sites will be for naught -- because henceforth, pirate sites will be unnecessary. The array of MP3 material available through the Napster system vastly exceeds that available from any individual pirate -- or even from all of the pirates combined. If the RIAA prevails, the traffic in illicit MP3 files will surely slow down -- at least for a while. And the RIAA will be in a much stronger position as it **mounts legal attacks on cousins of Napster**, such as **Scour.com**.

However, even an outright victory by the RIAA in its struggle with Napster will not end peer-to-peer copying. Systems such as **Gnutella** and Freenet, though not as convenient and efficient as Napster, provide comparable services. Because these alternatives do not rely upon a centralized system of servers and search engines, they are **far less invulnerable to legal attack**. In short, Judge Patel was probably correct when, in her second opinion in the Napster case, she analogized the lawsuit to a tort claim brought by a farmer against someone who had burned his field; meanwhile, a wildfire threatened to engulf the entire farm.

#### IV. What to Do?

If the war described in the **preceding section** is allowed to run its course, the public will almost certainly suffer. If the recording industry prevails, it will deprive us of many of the potential **social and cultural benefits** associated with the Internet distribution of digital music. If the recording industry loses, we may be left with **less music** than we would wish.

To avoid these two undesirable outcomes, we must try to think more imaginatively. Specifically, we must try to identify ways of simultaneously (a) allowing digital music to circulate freely and (b) providing composers and musicians adequate financial incentives to continue to produce music. Six possibilities of this sort are now on the horizon. They are arranged below in a sequence from the least attractive to the most attractive. But the principal argument of this essay is that we should not be satisfied with these options -- but should, instead, continue to seek better ones.

**1. Tie internet distribution to sales of containers.** The first option would be to overturn -- either through a ruling by an appellate court or through federal legislation -- Judge Rakoff's controversial ruling in the MP3.com case. **Serious arguments have been made** that the "Instant Listening" and "Beamn-It" services enabled consumers to obtain access to copyrighted music more easily and did not significantly injure the owners of the copyrights in that music. Under those circumstances, the recording companies' insistence that they have the right to control this new mode of music distribution seems hard to defend.

The defenders of MP3.com may well be correct. However, the services in question, though ingenious, represent at best a modest advance in methods for distributing digital music. Assuming that they work the way MP3.com says they do, they will protect the revenues of the music companies and the musicians even in the absence of license agreements. But they will fail to take advantage of most of the potential benefits of the new technology. Specifically:

- They result in no **"disintermediation."** Consumers pay just as much -- and musicians earn just as little -- as before.
- They do not solve the problems of **overproduction and underproduction.**
- They result in some increase in **convenience and precision** -- although not as much as online purchase of individual containerless tracks.
- Because of effect #1, they will not increase the **quantity or variety** of music available to the public.
- They will have little or no impact on **semiotic democracy.**

For real progress, we must look elsewhere.

**2. Tax and Royalty System.** Had they won, the plaintiffs in the **Sony** case likely would have sought the establishment of a system under which each purchaser of a VCR paid a fee, which would then be distributed (in a fashion analogous to the regime employed by ACAP and BMI) to the owners of the copyrights in movies and television programs -- in amounts roughly proportional to the frequency with which each movie and program were taped. In the **controversy over digital audio tape recorders**, the recording industry did better, persuading Congress to create such a system as a part of the Digital Audio Home Recording Act.

One could imagine a similar legislative compromise to the problems presented by the Internet distribution of digital music. Congress could require that all purchasers of things used in the acquisition or performance of containerless digital music pay fees, which would then be distributed to the owners of the copyrights in musical compositions and recordings in rough proportion to the frequency with which they are copied. What sorts of "things" would be likely targets for such a tax? They would include (in order of plausibility): MP3 playback devices (portable, car, and home); access to internet service providers; hard drives; and general-purpose microcomputers. The logistics of distributing the proceeds of such a tax would not be simple, of course, but it's been done in analogous circumstances before and thus presumably could be done again.

Such a system would have the following substantial advantages:

- It would provide musicians (and composers) an alternative source of revenue. If the tax were set at the right level, this revenue could be sufficient to replace altogether the monies now collected in the form of copyright royalties -- thus ensuring **the preservation of incentives for composers and musicians to ply their trades.**
- The foregoing effect would make it plausible for the courts -- or, better yet, Congress -- to reject all four of the campaigns mounted by the recording industry against unauthorized trafficking in MP3 files. That, in turn, would enable society at large to reap all of **the potential social benefits** of the Internet distribution of music.
- Under such a system, downloads of musical files would no longer be illegal. Because consumers (and providers) would no longer have any incentives to conceal their activities, tracking the frequency with which particular materials are copied (for the purpose of allocating fairly the tax revenues) would be easier and more accurate.

The system would, however, have some serious disadvantages:

- Because many of the "things" listed above are used both by consumers of MP3 files and by nonconsumers -- and because even dedicated MP3 devices (like portable players) are used by their purchasers with varying degrees of frequency -- such a system would result in unfair cross-subsidies. Nonusers and light users would, in effect, pay much of the fares of the heavy users.
- Such cross subsidies would, in turn, result in underconsumption of certain forms of technology and overconsumption of others.
- The Internet is a global phenomenon, but Congress' reach is limited. The results: only a portion of the world market in music would be reshaped by this system, and mobile targets of the tax (e.g., ISPs) would likely move "offshore."

In sum, a tax-and-royalty regime would likely be better than what we currently have, but would also have serious flaws.

**3. Secured formats.** As several scholars have observed, the developers of many sorts of new ideas are abandoning intellectual-property law as the principal method for protecting their creations in favor of either contracts or technological shields. The sellers of movies, software, databases, and even genetically altered plants are giving up on copyright and patent protection and turning instead to "private" deals and encryption.

The music industry appears to be following the same trend. Two years ago, sensing the danger posed by unauthorized MP3 trafficking, a group of hardware and software companies and representatives of the recoding industry joined forces in hopes of developing a new compression format that would enable music providers to control in various ways the ability of users to copy or alter the material encoded thereby. The Secure Digital Music Initiative (SDMI), as this venture is called, has not proceeded as quickly as its members had hoped, and knowledgeable observers are now suggesting that it will have more difficulty developing a common, secure platform than was originally anticipated. However, the project is finally beginning to bear fruit. Compact discs bearing SDMI phase I watermarks are now appearing in retail stores (although whether the watermarks degrade the music remains contested). The project is now considering (and has invited hackers to try to break) four candidates for its Phase II encryption system.

The absence of a widely-agreed-upon encryption protocol has not prevented a few enterprising companies from developing their own "secure" MP3 systems and using them to sell containless music:

- Last year, San Francisco-based Mjuice developed such a system and used it to offer subscribers "a robust music catalog of 30,000 licensed tracks from more than 70 major and independent record labels, including Atlantic, Elektra, Bad Boy, Loud, Mammoth, Roadrunner, DreamWorks, Alternative Tentacles, Zomba, Jive and ANTRA." Copy-protected versions of these songs could be downloaded (for fairly steep prices), and then replayed on home sound systems. In March of this year, ArtistDirect acquired Mjuice and will likely use the encryption technology to exploit its association with four of the "big five" recording companies.
- Microsoft has introduced its own secure format to compete with MP3. Windows Media Audio (WMA) was introduced in the summer of 1999. The format features copyright protection and uses a digital certificate to tie each copy of a song to the PC used to create it. The new, popular Media Player 7, which plays WMA files, plays a prominent role in the Windows Millennium Edition. Record companies have already embraced the technology. In July, EMI released more than 300 singles in the WMA format over the Internet to be downloaded for a fee, echoing Sony's smaller offering earlier in the year. A substantial collection of WMA-format music is now available from Musicmaker.com.
- Yet another encryption system, relying upon a combination of hardware and software, was recently announced by Cirrus Lock and Intertrust Technologies. America Online (AOL) has included that system in its newest version of the AOL software. The software permits recording companies to include security information in digital music files. InterTrust's technology also will be included in AOL's Winamp media player.

Once MP4 (which contains an encryption option) becomes widely available, more enterprises of this sort will likely appear.

Would the development and general acceptance throughout the music industry of a secure compression format enable us to escape the dilemma in which we currently find ourselves? Yes and no. It surely will have major potential benefits:

- Most likely, it would overcome the reluctance with which the recording industry has thus far contemplated distributing music online. Already, several "authorized," secure, internet music stores have appeared on the Internet, using one of the proprietary encryption systems. If a common encryption protocol becomes available, that number will surely multiply. That, in turn, would enable us to reap most of the benefits of Internet distribution discussed at the outset of this essay: lower music prices, better compensation for artists, elimination of over- and underproduction, greater precision and convenience in the marketing of music, and (perhaps) a wider array of music available to the public.
- Technological copy protection of musical files, like all forms of encryption, would enhance the ability of music suppliers to engage in price discrimination -- in other words, to divide the world of music consumers into subcategories and then charge the members of each group what they are able and willing to spend. In its current form, copyright law makes implementation of marketing strategies of this sort difficult; encryption would make it easier. This effect has some potential social and economic benefits -- as well as some potential drawbacks.

Widespread distribution of digital music in encrypted form would, however, have two important, related social drawbacks:

- It would enable the producers of music to eliminate or curtail the freedoms currently enjoyed by music consumers under the auspices of the fair-use doctrine in copyright law. By abandoning copyright law in favor of encryption as the mode of shielding their works against nonpermissive copying, alteration, etc., the producers could override the privileges that consumers now enjoy. To the extent those privileges reflect important public interests, this effect would highly unfortunate. Various proposals have been advanced for mitigating that effect. None, however, would be easy to implement -- particularly on a global scale.
- Adoption of this system would seriously reduce the potential of Internet distribution to foster **semiotic democracy**. One of the great advantages of the new medium is the malleability of musical material made available to consumers - a malleability that the newest forms of unsecured compression formats are increasing. The opportunities for creativity made possible by that malleability would be forfeited through adoption of the SDMI strategy.

Again, it seems that this approach, though better than the current arrangement, leaves much to be desired.

**4. Subscriptions.** In a forthcoming article, Jonathan Zittrain sketches a world in which consumers no longer buy copies of musical works, but instead pay the music distributors each time they wish to listen to particular songs:

Songs are not “sold” in even the colloquial sense of the word; rather, they are “licensed”—both from a legal and technical standpoint. Compact discs have joined 8-tracks, cassettes, and phonograph records in the dustbin; their replacements are small, generic “jukeboxes” linked by the Net to a central repository of songs managed by a publisher.

An individual authenticates herself to a jukebox—perhaps with a fingerprint or carefully scrawled signature on its back with a stylus—and then may access specific songs that fall under her monthly payment plan. She will be granted access to the music archive only after parting with personal information about herself, including name, age, address, and phone number. . . .

As she selects songs, her tastes are noted, allowing offers for “special” songs not included in her monthly plan to be specifically targeted to her tastes and sent to her across all media. The songs she asks for are “streamed” to her player as she listens, and do not remain there any more than a song stays inside a radio after it is over.

An inaudible signal is embedded in the music; if she holds a microphone to her headphones and thereby makes an imperfect, analog copy to an old-fashioned cassette, her name and a unique identifier will be “in” it, permitting prosecution for copyright infringement if the copy is found. Her user license agreement provides an alternative path for the music owner to pursue fast-track damages, including the sending of a signal to her jukebox that permanently disables anyone from using it until the matter is settled.

In the unlikely event that she were to abuse her access to the system by hooking up her jukebox to an amplifier and playing the music at a backyard party outside her California apartment, a cheap listening post on the beach’s lifeguard chair could be monitored by ASCAP, which would use a watermark decoder to know instantly that she was behind the cacophony—and that the particular performance had only been paid for at the “portable personal use” rate rather than the “noncommercial party” rate. . . .

A more likely event is that she will fall behind in her monthly payments, in which case her access to any music—except that which is heard over old-fashioned analog “public” radios—will be cut off automatically. (This may soon happen; her monthly rate just doubled since her graduation from college and corresponding loss of student discount status.)

Several of the social advantages associated with the SDMI initiative would also be secured in a world of this sort:

- **lower music prices and (perhaps) better compensation for musicians;**
- **elimination of the over- and underproduction of music containers;**
- **greater precision and convenience** in the marketing of music;
- **a wider array of music** available to the public; and
- myriad opportunities (suggested in Zittrain's last paragraph) for **price discrimination**.

Many people, however, find this image unattractive. Like the SDMI initiative, it would impose severe constraints on people's ability to manipulate in creative ways the music they "consume." Fair-use privileges would disappear. Finally, as Zittrain's evocative account makes plain, it would both depend upon and help to foster a society vastly less protective than our own of privacy and anonymity -- in which the **tracking of people's behavior and preferences** is **routine** and surveillance is common.

5. **Advertising.** Many internet businesses (**browsers, search engines, portals, and websites**) make money, not by charging users directly, but instead by providing services to the public for free, thereby attracting lots of visitors, and then selling advertising to ecommerce and "real-world" enterprises that hope, in turn, to sell products or services to those visitors. This model was, of course, pioneered by network television and radio, and has simply been adapted for use in the new environment.

Music distributors are beginning to explore applications of the same marketing strategy:

- **Mjuice**, for example, employs a "download wizard," which displays advertisements on subscribers screens while they are downloading Mjuice's (secure) MP3 files.
- **Internet Underground Music Archive** uses a similar method of embedding advertising banners into streaming audio tracks.
- **EverAd** has gone further. Its "PlayJ" system embeds advertisements in MP3 files. Users download the files to their hard drives in the usual fashion. Then, each time they play the tracks, banner ads appear on their computer monitors. In July of 2000, EverAd announced its partnership with **Launch.com**, an established website offering digital music for downloading. EverAd's business plan calls for an even split of the ad revenues between it and music distributors. In turn, artists get a piece of the distributor's share.
- In September of 2000, **MP3.com** announced an **agreement with Adergy**, a retail and grocery store advertising company that will enable MP3.com to offer customizable audio advertisements. In June, MP3.com signed a partnership with an ad tech company AdAce that will allow MP3.com's musicians to create and buy ads on the site.

This strategy, still in its infancy, shares the substantial social and economic advantages of the two strategies just discussed. In other respects, it seems superior to any of the systems we have examined thus far:

- Unlike SDMI, it would facilitate (although not require) the distribution of music "for free" -- which, in turn, would dramatically increase its accessibility.
- Unlike the "subscription" system, it would not depend upon or promote systems of surveillance.

The advertising strategy does, however, have two features that limit its attractiveness. First, it would likely (although not inevitably) be associated in practice with some form of **encryption**. Otherwise, the recipients of the music would quickly strip away the embedded advertisements and listen to the music unadorned. The copy restrictions necessary to prevent this behavior would, in turn, give rise to the same problems that afflict the two previous strategies: curtailment of fair-use privileges; and threats to semiotic democracy.

Second, many musicians -- and many listeners -- would most likely regard the intertwining of music and advertisements as **corrupting**. Commercials already adorn most forms of contemporary culture -- from **sailboats** to buses to **movies**. Do we really want them permanently affixed to our music as well?

6. **Doing well by doing good.** It certainly would be nice if musicians were willing to release their creations to the public in uncontaminated, unsecured form. We would be able, thereby, to reap all of the advantages -- and avoid all of the disadvantages -- of the systems considered thus far. But, for the reasons reviewed at the outset of this essay, we cannot expect musicians to do so if they would forfeit, thereby, the ability to earn any money. Is there any way in which we can obtain music in the forms most valuable to us, while still preserving the monetary rewards and incentives for creativity? Three closely related options are imaginable. None is perfect, but (especially in combination) they are promising.

a. **Join the Club.** The first option is suggested by **David Bowie's innovative website**. Visitors to the site are invited to become "members" of the Bowie "community." Persons who sign up are provided information about the artist and encouraged to participate in chat rooms with other fans. In addition, they are offered a wide variety of products and services, loosely related to Bowie's artistry. **DavidBowieStore.com** is a fairly traditional ecommerce outlet, featuring Bowie-related T-shirts, posters, videos, sheet music, mousepads, etc. **BowieNet** is an ISP, offering Internet access, unlimited email addresses, and 20 megabytes of personal webspace. **Bowieart.com** offers (for quite substantial prices) Bowie's own paintings, prints, and sculpture. Finally, **BowieBanc**, in partnership with **USABancShares.com**, offers checking and savings accounts, Mastercards, CDs (i.e., 6.65% 12-month "certificates of deposit," not compact disks), and loans. Some of these products are unavailable elsewhere, but others (e.g., ISP access and checking accounts) can be obtained more cheaply from other sites. Why, then, would visitors buy them from Bowie? Presumably, because **they enjoy participating in the group** and wish to lend their support to the artist. Each time they present their credit cards at check-out counters, they see Bowie's smiling face -- and take satisfaction from it. The profits that this scheme provides Bowie would enable him, if he wished, to offer his music in downloadable form for free. At present, he is not doing so --

but rather directs visitors interested in his CDs to a **traditional online retailer**. But he could. And other established artists could do the same.

**b. Tip Jars.** Many museums, historical sites, theatres, **public radio stations**, and churches survive financially, not by charging visitors, but by requesting donations. Radio stations and religious organizations typically ask listeners and parishioners to contribute "what they can"; other organization "suggest" a specific amount. Musicians could operate websites on the same basis.

Suppose you wanted to obtain a copy of the most recent release from **Joshua Redman**. You type his name into **your favorite search engine**, and the first entry that appears on your screen is his "official" website. When you click on the entry, you are presented with a complete list of his recordings (including the most recent release) in unsecured, compressed, downloadable form, accompanied by the following notice:

If you wish, you may download my music for free. However, I will be able to continue offering it in this form only if you are willing to make a modest donation for access. I suggest 50 cents per song, or \$3 for 10.

If people paid, the resultant stream of revenue would equal the stream that Redman currently obtains from the sales of compact disks. (Recall that less than 16% of the retail price of CDs reaches the pockets of the musicians.)

Would people pay? The anarchic culture of the Internet, combined with the anonymity of downloading (the absence of the embarrassment one feels walking by the museum guard without depositing anything in the basket), suggest no. Gratitude toward the musician, respect for the modesty of the fee, and a recognition of the benefits of keeping such a system alive suggest yes. These conflicting hypotheses just beginning to be tested. Four websites -- **Paypal**, **TipJar**, **E-gold**, and **FairTunes** -- now offer **various systems** that assist consumers in making "tips" and assist musicians in collecting them. As yet, only a few thousand dollars have moved through these channels. Whether this model is viable thus remains to be seen.

**c. Mailing Lists.** Consumers might be more willing to pay modest amounts for access to unsecured music if they were able thereby to obtain ancillary benefits. Like what? News about the artist, opportunities to participate in discussion groups, and notices of new releases are all options. But best of all would be advance concert tickets. Suppose, for example, that when "donating" a fee to Joshua Redman, you submitted (along with your credit card number) both your email address and your "real" address. The next time Redman scheduled a concert in your vicinity, you would then receive via email an announcement of the performance and an offer to purchase up to four advance tickets. A significant percentage (perhaps a third) of the seats in the concert hall would be reserved for people like yourself -- i.e., people who previously had paid for the rights to download Redman's recordings. Would arrangements of this sort increase consumers' willingness to make donations? It seems likely.

**Looking Forward.** The six options sketched above are not incompatible. For the foreseeable future, it is likely that each one will have a following among some musicians and recording companies. Nor, we hope, is this list exhaustive. Innovative musicians and agents will likely soon imagine others.

For the reasons we have outlined, some of the options are better -- from the standpoint of society at large -- than others. In particular, the last of the six, though untested and vulnerable, holds out the greatest promise for reconciling musicians' legitimate interest in preserving their incomes with the public's interest in obtaining inexpensive unsecured containerless digital copies of musical works. Our hope is that a strategy of this general sort -- or some other system not yet within our field of view -- will eventually displace the systems that currently dominate the industry.