
Copyrights 2



Anti-Circumvention

- “No person shall circumvent a technological measure that effectively controls access to a work protected under this title.” (17 USC 1201(a)(1)(A))
- “No person shall manufacture, import, offer to the public, provide, or otherwise traffic in any technology, product, service, device, component, or part thereof, that is primarily designed or produced for the purpose of circumventing a technological measure” (17 USC 1201(a)(2)(A))
- Lots of trouble...

Rights Taken Away

- The anticircumvention measure bars devices for making copies that are legal as fair use
- The “analog hole”
- Block new technologies before they even exist
- Discourages security analysis
- “Hardware makes policy”

Purpose of Copyright

“The primary objective of copyright is not to reward the labor of authors, but [t]o promote the Progress of Science and useful Arts. To this end, copyright assures authors the right to their original expression, but encourages others to build freely upon the ideas and information conveyed by a work. This result is neither unfair nor unfortunate. It is the means by which copyright advances the progress of science and art.”

Feist Publication, Inc. v. Rural Telephone Service Co., 499 U.S. 340, 349-50 (1991)

Taken from the *Internet Law Treatise*, <http://ilt.eff.org/index.php/Copyright>

The Trouble with the DMCA

- The DMCA has tilted too far towards protecting copyright owners
- The balance of rights is being ignored
- Technology is being impeded

DMCA Abuses

- The DMCA bars technology intended to circumvent controls that protect copyrighted material. It's been abused...
- Lexmark: embedded a chip in its ink cartridges to block third-party cartridge manufacturers; sued a company that worked around the chip
- Chamberlain Group sued a rival maker of garage door openers; the court called the suit an "attempt to leverage its sales into aftermarket monopolies"
- TI sent lawyer letters to individuals who cracked the RSA signing key for TI-83 firmware
- Many more...

Lexmark vs. SCC

“We should make clear that in the future companies like Lexmark cannot use the DMCA in conjunction with copyright law to create monopolies of manufactured goods for themselves just by tweaking the facts of this case. . . . The crucial point is that the DMCA forbids anyone from trafficking in any technology that “is primarily designed or produced for the purpose of circumventing a technological measure that effectively controls access to a [protected] work.” 17 U.S.C. §1201(2)(A) (emphasis added). The key question is the “purpose” of the circumvention technology. The microchip in SCCs toner cartridges is intended not to reap any benefit from the Toner Loading Program—SCCs microchip is not designed to measure toner levels—but only for the purpose of making SCCs competing toner cartridges work with printers manufactured by Lexmark.”

Concurring opinion, 387 F.3d 522 (2004)

Abusing the Anti-Circumvention Provisions

- Many companies are (ab)using the anti-circumvention provisions, especially to stymie competition
- General approach: have some copyrighted code that has some form of access control *to the product as a whole*; sue anyone who wants to enhance or compete with the product
- The competition does not try to *copy* the copyrighted material, but needs to deal with it to work around the anti-competition features
- Note that the DMCA explicitly permits reverse-engineering

Built-in Abuse

- The anti-circumvention provisions create new rights for content owners
- Yes, illegal copying is prevented
- Permissible copying—fair use—is also prevented

What About Security?

- What if I suspect that some DMCA-protected software contains a security hole?
- The DMCA prohibits (some forms) of analysis by outsiders
- In 2015, the Librarian of Congress granted a partial DCMA exemption for security research, including on cars
- It doesn't permit all security research, and it expires in a couple of years

Copyrighting Hyperlinks

- Can a hyperlink infringe copyright? Generally not.
- Can a hyperlink to someone else's copyrighted material infringe? Perhaps—it's more of an issue in the EU
- What if the linked-to material is embedded in a web page, via an IMG tag or a frame?

Copyrighting APIs

- Google reimplemented some Java APIs (Application Program Interface) to create Android
- ☞ These APIs are necessary for standard library routines
- Oracle (which acquired the rights to Java when it bought Sun Microsystems) claimed this infringed their copyright on the Java source code and in 2010 sued Google
- It got complicated...

What's an API?

Here's part of an API definition from Java.

```
public class SecureRandom
  extends Random
```

...

```
public void setSeed(byte[] seed)
public void setSeed(long seed)
public void nextBytes(byte[] bytes)
```

...

(Does this slide infringe Oracle's copyright? Almost certainly not—fair use)

Many Trials

2012 A judge rules that APIs cannot be copyrighted

2014 The Court of Appeals thinks otherwise

2016 A jury rules that Google's reimplementation of these copyrighted APIs is fair use

2018 The Court of Appeals says otherwise

The future... Google will almost certainly appeal

Alternatives to Copyright

- Not everyone wants to restrict access to their work
- Academics, for example, generally don't profit and hence want maximum distribution
- Open Access publishing
- Creative Commons

Open Access


- Many scientific papers are published by commercial firms like Springer and Elsevier
- Others are published by professional organizations like ACM and IEEE
- Most of these publishers charge for access, to make a profit or to support their work
- But—the authors do not receive royalties, and the peer review—the quality control on scientific work—is provided free by other scientists
- The research is generally government- (i.e., taxpayer-) funded
- Should these papers be freely available? More and more academics say “yes”

Sci-Hub

- Alexandra Elbakyan, a Kazakh bioengineer now living in Russia has created a web site for free access to paywalled journals
- Her code finds open library proxies at universities with site licenses—and possibly passwords shared with her; she won't say
- The publisher has accused her of stealing logins
- “I started the website because it was a great demand for such service in research community.”

Creative Commons

- Creative Commons is a way to use copyright law to stipulate one of several pre-written licenses
- Attributes selectable include “no commercial use”, “attribution required”, right to share changed versions, etc.

- My slides:  (attribution, no commercial use)
- This is a legally-binding license, imposed by the copyright owner

The GNU General Public License (GPL)

- Encourage (one view of) desirable open source (or, to some, “free”) software
- Uses *copyleft*—an actual, legally enforceable copyright with a pre-attached license
- This license imposes certain restrictions, such as mandatory source code availability
- Note: there are many other open source licenses; see <https://opensource.org/>)

File-Sharing

- Individuals obtain a digital copy of some work and distribute it
- The copyright owner is not compensated
- Does this reduce the incentives for creation?
- Or do the pirated copies represent revenue that would never have been realized in any event?
- (Often, there are unauthorized versions of works for which there is no legal version.)
- It violates copyright law as currently written.
- That is not to say that current law is correct

From the Library of Congress Web Site

“Uploading or downloading works protected by copyright without the authority of the copyright owner is an infringement of the copyright owner’s exclusive rights of reproduction and/or distribution. . .

“Whether or not a particular work is being made available under the authority of the copyright owner is a question of fact. But since any original work of authorship fixed in a tangible medium (including a computer file) is protected by federal copyright law upon creation, in the absence of clear information to the contrary, most works may be assumed to be protected by federal copyright law.

“Since the files distributed over peer-to-peer networks are primarily copyrighted works, there is a risk of liability for downloading material from these networks.”

Cost Issues

- Many different components go into the retail cost of a copyrighted item: royalties, performance (for music), editing (for books), acquisition by the publisher, marketing, physical production, distribution, retailer overhead, and more
- Digital distribution affects physical production *only*
- Electronic distribution costs much less, but servers, data centers, Internet connectivity, etc., are not free
- What has changed is the ratio between fixed costs and per-unit costs

The Underlying Issue

<i>Era</i>	<i>Creation Cost</i>	<i>Reproduction Cost</i>
Manuscripts	High	High
Gutenberg	High	Medium
1900	Medium-high	Medium-low
1995	Medium	Low
Now	Medium	Zero

The cost of creating a work has dropped somewhat, because of things like word processors, cheap high-quality sound equipment, etc. The cost of editing, mixing, has probably gone up. But—the cost of reproduction is close to zero. How can the fixed costs be covered?

Related Issue: Open Access Publishing

- Most academics do not profit (or expect to profit) from their writings
- Can professors post their own papers on their web pages?
- Some publishers require you to sign over copyright to them and bar postings
- But some universities (Harvard, MIT, some others) have policies requiring that articles be posted
- But—how will academic publishing houses be supported? Do they add value?

How Peer-to-Peer Works

- Napster: centralized index, but the actual file transfer did not go through the central server complex
- Gnutella and many later systems create *overlay networks*; queries are flooded over the overlay, while file transfers go directly over the Internet
- This latter is far less subject to *subpoena attacks*

BitTorrent

- Files are divided into chunks
- A *tracker* can tell you which nodes have which chunks
- Different pieces of the file are downloaded from different sites
- Once a node obtains a file, it can offer it for upload
- Download speed is related to upload speed offered—prevent “leeching”

Protecting Copyright

- One approach: suing file-sharers
- But—expensive and unpopular
- New crime: criminal copyright infringement without a profit motive
- “3 strikes” laws—make ISPs responsible for disconnecting repeat infringers

The Problem with ISP Enforcement

- No due process
- People rarely have a choice of ISP
- There's a difference between downloading copyrighted material and downloading the same file without proper permission—but that doesn't show up on the wire

Felony Interference with a Business Model?

- The current structure cannot survive; it was based on technological assumptions that are no longer correct
- (You wouldn't design today's book publishing industry for a pre-Gutenberg era.)
- But—there are still fixed, medium-independent costs that need to be covered
- The challenge: devising a sustainable business model *and* overcoming vested corporate commitments to today's structure

How Should We Protect Software?

- For external distribution, copyright plus a license agreement seems to be the standard
- Patents can sometimes be useful (albeit controversial), but only if there's a clear case for novelty and non-obviousness
- 👉 Note that you need some probable way of knowing if infringement is taking place
- Internal software is always copyrighted. It *may* be a trade secret, but that might hurt internal access to source code
- Requiring employees to sign NDAs is a good idea regardless
- Check with your lawyer!