

CPSC156a: The Internet Co-Evolution of Technology and Society

Lecture 13: October 23, 2003

The roles of technical-protection systems
and business models in online music
distribution

Revolution in Content-Related Technology

- Computers and digital documents radically change content creation.
- WWW radically changes content publication.
- Internet radically changes content distribution.

Three Major “Enforcers” Support a Content-Distribution Business

- Copyright law
- Technical Protection System (TPS)
- Business Model

Technical-Protection System Components

- Encryption
 - Symmetric Key
 - Public Key
- Signature
- PKI
- Rights-Management Language
- Time stamping
- Secure Containers

Product- or Service- Developer's Goal

- Choose the right ingredients and weave them together into an effective end-to-end technical protection system (TPS).
- Ingredients must be "right" w.r.t. business model and legal and social content as well as technical context.

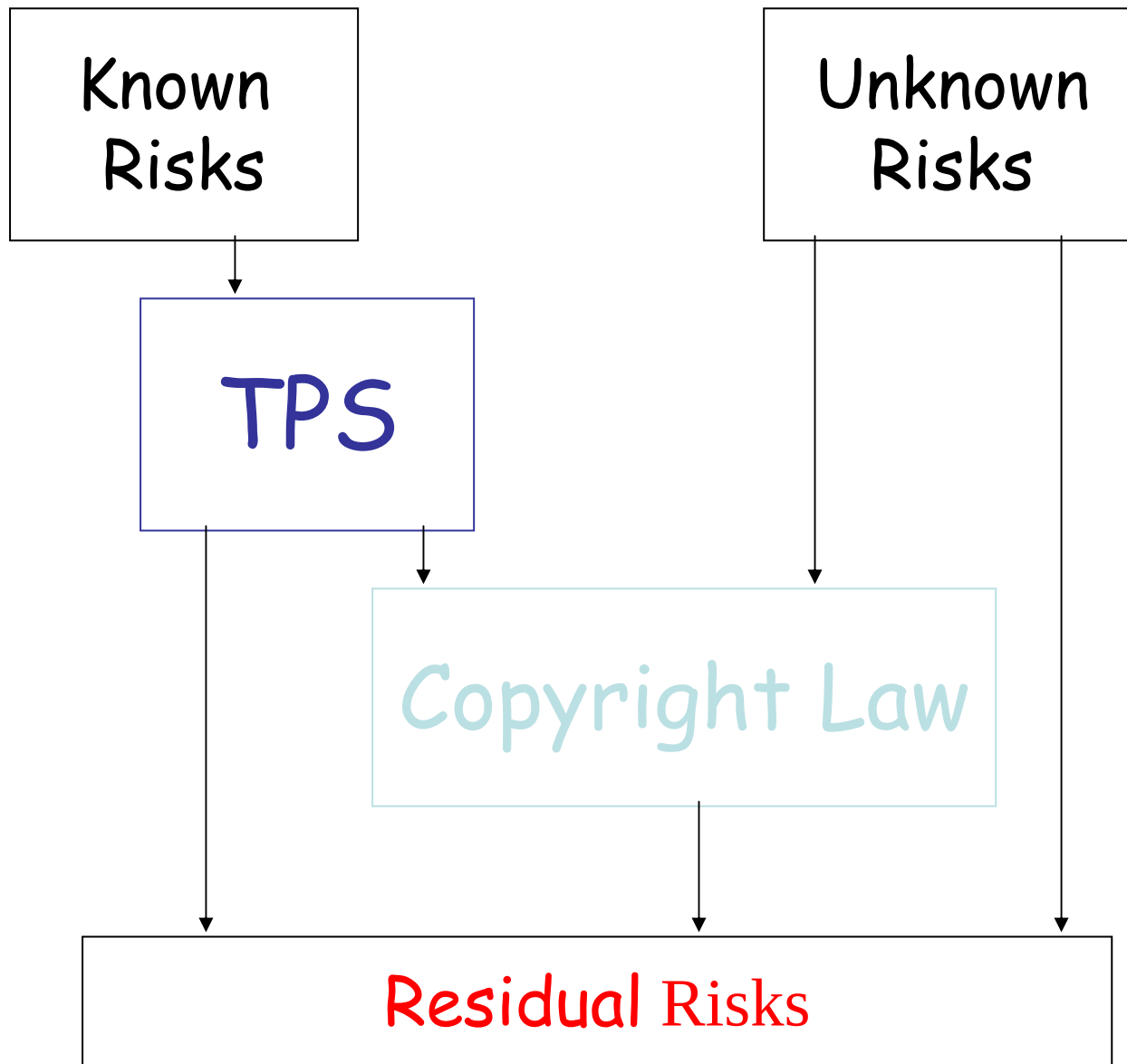
Notoriously Difficult!

General Points about TPSs

- TPS is a means, not an end. Cannot answer legal, social, or economic questions about ownership of or rights over digital documents.
- No TPS is perfect.
- Continued improvement in TPS requires ongoing R&D, including "circumvention."
- TPS easier to design for special purpose devices and systems (*e.g.*, cable television) than for the Internet.
- TPS should serve customers' needs, *e.g.*, assured provenance, as well as rightsholders' needs.

TPS Design Principles

- Know the \$\$ value of content
- Following rules: Convenient
- Breaking rules: Inconvenient
- Breaking rules: Conscious
- Renewable/Improvable Security
- Don't let Pirates use your distribution channel
- Provide value that pirates don't



Best TPS is a Great Business Model

"The first line of defense against pirates is a sensible business model that combines pricing, ease of use, and legal prohibition in a way that minimizes the incentives for consumers to deal with pirates."

Lacy et al., IEEE Symposium on Industrial Electronics, 1997.

Holy Grail: A Great Business Model for Internet Music Distribution

Hal Varian (quoted in C. Mann's 2000 "Heavenly Jukebox" article): "Maybe Coke will find a way to integrate itself directly into the shows. Or they'll release the music free on the Internet, except that it will be wrapped in a commercial." What's the difference if the Spice Girls are marketed by Coca-Cola or by Virgin Records, soon to be a subdivision of AOL-Time Warner?

2000 Sales by RIAA members: \$15B

2000 Coca-Cola Net Operating Income: \$20.5B

Origin of the “Internet Problem” for Music Distributors

- Music is sold **unencrypted** in digital form on CDs.
- Music CDs are **readable** by PCs.
- Digital content read off music CDs is easily convertible to the **compact** MP3 format.
- MP3 files are **easy to distribute** using standard Internet protocols.

Some imaginative
content-distribution
models

"Street Performer" Model

Novelist gives chapter 1 to publisher and promises rest of book after she is paid $\$X$.

Publisher posts chapter 1, collects payments, issues signed receipts to customers ("donors"?).

If publisher collects $\$X+Y$, he gets rest of book from novelist, posts it, gives $\$X$ to novelist, and keeps $\$Y$.

If he collects less than $\$X+Y$, he sends refunds to customers. Also, if novelist doesn't deliver rest of book, she gets bad publicity and customers get refunds.

"Street Performer" Model (Cont.)

Many variations:

- New author gives first book away.
- Non-anonymous big donors
- Some publishers "edit" and choose, and some don't.
- Famous authors don't have to deliver chapter 1 in advance.

"Hum A Few Bars" Model

(K. McCurley, Financial Crypto '00)

"I listen to music in the living room, in the office, in the car, in the shower, and while jogging. I want the music companies, consumer-electronic companies, and data-networking companies to wire these environments so that I can hum a few bars and get the song I've hummed looked up, retrieved from their databases, and piped into my speakers. I'd expect to pay one monthly fee, as I do for cable TV."

JF Note: Can be "all streaming"; no need to clutter your living room floor or your computer disk with a "CD collection." Music will be purely a service, not a product.

MIT Analog-Broadcast Model

(NY Times 10/27/03)

- University runs a radio or tv station.
- Buys licenses from ASCAP/BMI/SESAS for unlimited analog broadcasting and buys recordings of all music covered by these licenses.
- Provides software that allows students, faculty, and staff to sign up for 80-minute broadcasting slots and program them remotely using their computers and Internet connections.
- **No copying** of digital music files is involved!
This analog transmission is legal and licensed.