



# Copyright, Code and Creativity

## A Note of Caution About DRM in JPEG

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## Outline

### **Problems with DRM**

- Technical and Security Problems
- Legal and Social Problems

### **Alternatives to DRM**

- Technical and Security Alternatives
- Legal and Social Alternatives



## Introduction

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- This would *not* be effective at protecting intellectual property rights in images and would have unwanted side-effects
- Most other objectives of the JPEG Privacy & Security activity can be achieved without resorting to DRM



## Problems with DRM

## Alternatives to DRM



## Cryptographers Don't Believe That DRM Works

**"Digital files cannot be made uncopyable, any more than water can be made not wet."**

— Bruce Schneier

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- It only ever takes time for the key to be extracted!



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- It only ever takes time for the key to be extracted!
- At worst, the analog hole can always be used





# Cryptographers Don't Believe That DRM Works





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- Allows anti-competitive conduct like region coding
- Even archives often (wrongly) claim copyright-like rights in public domain images





## DRM Doesn't Achieve Standardization Goals

DRM does *not* actually protect media, but it does:

- Restrict media from being used with free and open source tools.
- Make interoperability more difficult to engineer.
- Expose coders and researchers to additional legal risk.
- Extend a bad precedent for the extension of DRM to other forms of digital content.



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### EME standardization at W3C


EME has not produced a reliable solution – it's a support/implementation nightmare that members can't make sense of.

# DRM Reduces the Value of Content

Apple TV 2, with lower specs than Apple TV 3, sells for three times as much

**ebay** Shop by category Search... All C

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### Apple TV (2nd Gen) second generation Apple TV II

**1** viewed per hour ★★★★★ 324 ratings

Item condition: **Used**  
"Apple TV with power cord and remote are included only."

Price: **US \$124.99** [Buy It Now](#)

[Add to cart](#)

SquareTrade 2 yr warranty \$29.99

Best Offer: [Make Offer](#)

2 watching [Add to watch list](#)  
[Add to collection](#)

**Experienced seller** 30-day returns Free shipping

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## Apple TV 3rd Generation A1469 Digital HD Media Streamer

7 viewed per hour 342 ratings

Item condition: **Used**Quantity:  7 availableTrending at: **\$49.99**Price: **US \$42.99**[Buy It Now](#)[Add to cart](#) SquareTrade 2 yr warranty \$13.49

3 watching

[Add to watch list](#)[Add to collection](#)**Free shipping**

Hassle-free returns

Located in United  
States





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- The end-result: long-lived critical vulnerabilities that are never reported for fear of prosecution



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- Dmitry Sklyarov prosecution
  - A Russian programmer was charged with violating the DMCA for speaking at DEF CON about breaking e-book encryption (*even though this was legal in Russia!*)





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### The bottom line:

DRM is considered antithetical to the public interest





Problems with DRM

**Alternatives to DRM**



## Cryptography

- Many use cases for JPEG Privacy & Security only require *signing* not *encrypting* metadata
  - Integrity of an original version of the image
  - Tracking of modifications
  - Integrity of the metadata (date, copyright)
- For encryption of the entire image file to prevent access, common container formats for this exist already
- For encryption of plain text metadata only, this can be done without locking the whole image



## Rights Management Information

- Even without technical protection for metadata, the law *already limits* removal of rights information
  - InfoSoc Directive Article 7(1)(1), DMCA Section 1202
- This does not only apply to user-visible marks, therefore likely includes IPTC, Exif and XMP metadata



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- Watermarking
- Stegonography



## Licensing

- Good (if unsurprising) news  
— *licenses are enforceable*
- All active Creative Commons  
image licenses include an  
Attribution condition





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- 1 Online platforms should be encouraged to preserve image metadata (the law may even require this)
- 2 Those concerned with attribution should utilize an appropriate license that allows reuse with attribution
- 3 JPEG Privacy & Security group should work on extensions to allow signing of image metadata
- 4 JPEG Privacy & Security group should *not* create a DRM-protected image format that inhibits access



## Summary

JPEG Privacy & Security has some worthwhile aims

- Validating (not preserving) image and metadata integrity
- Encrypting plain text metadata for protection of privacy

It also has some which are probably *not* achievable

- Protecting intellectual property rights
- Preserving the economic value of protected images

For those that are not achievable, alternatives exist

- Existing protection of copyright law and license terms
- For preventing copying, encrypt the image in a container



Questions?

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