Introduction

• Digital content – in particular music, movies and books – is pirated and distributed illegally

• Major forces driving digital content piracy:
  – Bandwidth increase.
  – Compression technology.
  – Decentralised networks.

Presentation Outline

• Introduction
• DRM and the issue of interoperability
• DRM “as” Open Source Software
• A few OSS DRM initiatives:
  – Media-S
  – OpenIPMP
  – DReaM
  – OpenSDRM
• DRM, OSS and interoperability
• Conclusions

Copy Protection & Digital Rights Management

• Copy Protection
  – content encryption, scrambling, watermarking
• DRM
  – business and content usage rules, managed by an infrastructure
• Compromise Rights owners / Users
The issue

• When implementing CP & DRM ‡
  Risk of lack of compatibility, mobility, …
• i.e., ONE of the biggest problems DRM has to solve is
  INTEROPERABILITY
• End-users want to enjoy digital content, according to the rights they acquire, anywhere, anytime.
• One fact is unquestionable – DRM is here to stay – but it will have to evolve and adapt to customer (and providers) new needs.

Interoperability approaches

• DRM Interoperability based on Standards:
  – Full-format interoperability: all protection and DRM mechanisms conform to some global standards;
  – Connected interoperability: translation third parties are used to translate operations from one DRM regime to another;
  – Configuration driven interoperability: by downloading adequate tools any DRM system can get the ability to process protected content on end users devices.

DRM problems

• DRM today
  – Vertical (one-to-one) NON-INTEROPERABLE solutions
  – Worst case for every solution: One copy-protected content type, one DRM platform, one content rendering application and a single device type

• DRM in the future
  – Horizontal (many-to-many) INTEROPERABLE solutions
  – Ideal case: Many copy-protected content types, many DRM platforms, many content rendering applications and many device types

Open Source Software (OSS) development process
**DRM “as” OSS**

- One of the most important and controversial issues in open source is Security:
  - “A cryptosystem should be secure even if everything about the system, except the key, is public knowledge”.
  - “Any security software design that doesn’t assume the enemy possesses the source code is already untrustworthy”.
- Security through obscurity does not work.
- Therefore it is untrue that OSS is less secure than COTS.

**OSS DRM initiatives**

- A sample non-exhaustive list of OSS DRM initiatives:
  - Media-S
  - openIPMP
  - DReaM
  - OpenSDRM
  - ...

**Media-S**

- It supports only a specific audio codec
- Three components:
  - Packager
  - Client
  - License Server
- Based on XML for licenses and OpenSSL for security
- Lacks a unique identity mechanism – it is easy to fake the license
- It is possible to confuse the DRM client
- It doesn’t use a standard REL
- The project is currently inactive (GPL License)
- Has little interoperability potential

**Media-S architecture**

[Diagram showing Media-S architecture]
openIPMP

- Based on open standards (MPEG-4, MPEG-21 content identification schemes)
- Includes the MPEG-4 IPMP implementation
- REL expression using ODRL and MPEG-21 REL
- Recently released version 2 adding support for OMA, ISMACrypt and MPEG-2
- Active open-source project (GPL- GNU Public License)
- Due to its distributed architecture, potential to interoperate with other DRM solutions.

DReaM

- Initiative from Sun Microsystems (based on OPERA)
- DRM solution focusing on open-standards
- Aims to provide interoperability with proprietary solution through openness
- SOA methodology
- Two disintermediation elements:
  - Separation of RM from CP systems
  - Separation of identity and authentication services from individual hardware devices
- Active project – starting to release code (CDDL – Common Development and Distribution License)

openIPMP architecture

DReaM architecture
OpenSDRM

- Separates rights management from content protection features
- Agnostic to any content protection technology or content format
- Distributed platform that provides a set of DRM functionalities:
  - User and components registration and authentication, content registration and management, content commerce and delivery, payment, license production and management

OpenSDRM

- Takes advantage from the SOA and web-services paradigm
- Interoperability approach based on public and standardized WSDL interfaces, license templates (currently supporting ODRL and MPEG-REL), and iDRMAgent (client side DRM agent)
- Active OSS project (LGPL – Lesser GNU Public License)
- Developers NEEDED!

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### DRM, OSS and Interoperability

**Two dimensions for the Interoperability problem:**

1. **DRM complexity:**
   - Protection (encryption, decryption, watermarking, key distribution, etc.);
   - Authorisation based on licenses (rights expressions, verification, license distribution, etc.);
   - Metadata;
   - Enforcement;
   - Governance;
   - Authorities;
   - and others.

2. **How we try to get interoperability**
   - Definition of different DRM interoperability levels:
     - Proprietary systems: Forcing to use a unique system.
     - Standards and architectures: Which one?
     - Software framework based: Open specs & available tools (use of standards).
     - Open Source Software.

### DRM, OSS and Interoperability

**Barriers to DRM OSS development:**

- Open-source ISN’T Free
- Patents!!!
  - Big problem for OSS developers – even 100% free and open source code may be infringing patents
- GPLv3
  - Recently, the GNU Public License has been upgraded (v2 ➔ v3).
  - GPLv3 intrinsically disfavours technical attempts to restrict users' freedom to copy, modify, and share copyrighted works
- Lack of support from the industry.

### Conclusions

- Interoperability: Key to defeat growing “anti-DRM” feeling.
- Open-specifications and/or open-source DRM solutions needed to achieve DRM-interoperability.
- OSS can play an important role in DRM interoperability.
- Traditional proprietary solutions will have to adapt to a World where governed digital content should have no barriers and its usage should be done without any technical restriction.
- Patents are however a serious problem for OSS DRM implementations.