Short Overview for Document/Content protection

Paolo Nesi
DISIT-DSI, Distributed Systems and Internet Technology Lab
Department of Systems and Informatics, University of Florence
nesi@dsi.unifi.it, paolo.nesi@unifi.it

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Aim of Digital Rights Management

- To prevent the non-authorized rights exploitation by who has not acquired the rights
- To allow accessing at the digital content functionalities in a controlled manner
  ♦ To who has been authenticated/certified
  ♦ To do what (are the rights) is defined in a License
  ♦ Verifying/Control/Supervise if the above conditions and others are respected
  ♦ By using technologies to protect content (e.g., encryption, fingerprint, watermark, etc.)
- To Verifying/Control if the allowed rights are respected

- There are some Cons, since the user is constrained:
  ♦ Registration of users
  ♦ Authentication of users and/or tools/terminal/devices
  ♦ Control of users

- It has to be supported by a set of additional technical solutions
AXMEDIS Content Elements

- **Digital Resources:**
  - Any digital information: images, docs, txt, video, game, application, xml files, audio, animation, etc.
  - Hierarchy of digital resources, nesting levels
  - Internal and external links: e.g., HTML navigation, SMIL references, MPEG-4 paths.

- **Protection Information:**
  - What has to be done to access (unprotect) a given information/resource
  - Protection Tools used, their parameters, etc.

- **License:**
  - Which rights are provided, who is the recipient, what are the conditions, etc.

AXMEDIS Object Model

- **AxObject**
- **AxOID**
- **AxMetadata**
- **AxContent**
- **AxInfo**
- **AxDublinCore**
- **AxResource**
- **AxReferred Object**

**MPEG21 Digital Item**

- Resource embedding
- Hierarchical composition
- External content referencing
AXMEDIS Digital Rights Management

- To allow accessing at the digital content functionalities in a controlled manner
  - To who has been registered the first time and continuously: **authenticated and certified**
  - To do what is defined in a **license** (to allow exploiting the rights)
  - By using technologies to **protect content** (e.g., encryption, fingerprint, watermark, etc.)
  - **Verifying/Control/Supervise** if the above conditions and others are respected

Managing License and Protection Information

- Once obtained the content a license is needed to exploit the right you have acquired,
  - or at least you need a server that verify that you are authorized to exploit some right and provide you the Authorization
- Once you are Authorized to exploit the rights you may get a reference to
  - the Protection Information to Unprotect the specific object segment and/or digital resources
- **License and Protection Information** are typically located in external and remotely located Servers
  - but may be cached on the terminal device if allowed by the license issuer
- During all these phases the AXMEDIS Certifier and Supervisor verify integrity and certificate
An example of REL statement

- Rosy can Play 3 times the Ocean Wilds in November 2003.

Managing License Chain, B2B and B2C

- Alice states: “Bob has the right to issue a license to anyone to print the book in Italy”
- Bob states: “Carl has the right to print the book in Italy”
- To solve the SubSubLicense for Carl all the connected Licenses are needed
- Licenses have to be accessible on Processing Engine
- Alice can revoke the license to Bob
AXMEDIS The Protection and Control Process

- AXMEDIS Protection Tool
- AXMEDIS Certification and Supervisor
- AXMEDIS Protection Manager
- AXMEDIS Compliant Players

Tracking and monitoring Exploitation of Rights

- Different reports and statistics for different roles
  - Reports on licensing and on the consumption/exploitation of rights
- REL and Composition enforce flexibility in business and transaction models, multiple models for the same channel
  - Pay per play, all you can eat, subscription, etc.

Collecting Societies

Content Provider

Content Integrator

Content Distributor

Final users
### Market solutions viz AXMEDIS

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Models</td>
<td>Larger number of Business Models</td>
</tr>
<tr>
<td>Proprietary / Standard DRM and model</td>
<td>Standard DRM: MPEG-21, OMA, etc.</td>
</tr>
<tr>
<td>Non interopable DRM</td>
<td>Allowed Interoperable DRM: MPEG-21, OMA, etc.</td>
</tr>
<tr>
<td>Fixed/Flexible Protection Model</td>
<td>Any Protection Model, key, algorithms, etc.</td>
</tr>
<tr>
<td>Separation among Content and license</td>
<td>Separation among Content and license</td>
</tr>
<tr>
<td>Signed Content Header</td>
<td>Signed Content AXINFO, any Metadata</td>
</tr>
<tr>
<td>Channel distribution</td>
<td>Multichannel with the same license</td>
</tr>
<tr>
<td>Players and Devices</td>
<td>Players and Devices: PC MS-Windows, PDA Windows Mobile, STB, Linux OS, Apple MAC, Mobiles</td>
</tr>
<tr>
<td>License Proprietary: number of rights</td>
<td>Licenses MPEG-21 REL: Expandable dictionary, Any type of rights, License OMA</td>
</tr>
<tr>
<td>Authentication of Player</td>
<td>Authentication of device, user, domain, etc.</td>
</tr>
<tr>
<td>Revocation per Player</td>
<td>Revocation per device, user, etc.</td>
</tr>
<tr>
<td>Revocation per license</td>
<td>Revocation per license</td>
</tr>
<tr>
<td>digital resources that can be included and protected</td>
<td>Any digital format, any type</td>
</tr>
<tr>
<td>Media content</td>
<td>Single audio, video, image, doc, and Cross media: SMIL, HTML, SVG, MPEG-4,...</td>
</tr>
<tr>
<td>Customizable Tools</td>
<td>Customizable Tools: servers and player clients</td>
</tr>
</tbody>
</table>

### AXMEDIS Cross Media Content

**Any content inside a package:**
- Video, Audio, Documents, Images, games, animations, WEB pages, tools, etc.
- compliant and extend MPEG-21

**AXMEDIS content that can**
- create content for other devices, etc.
- satisfy social activity, user annotations, user content production, etc.
- be digitally streamed on TV (DVB-T/DVB-S/DVB-H with the same level of interactivity
- be protected with the needed flexibility
- be distributed on different terminals/devices and via different channels.
- be customized for culture and language
Interoperability among devices

The user likes interoperability among devices, e.g., getting:

- a video for the TV and reproducing it on mobiles, PC, etc.
- an MP3 audio track and using as ringtone in the phone, reproducing it on the car stereo, or in the living room, passing to a friend.
- a guide in a museum for his mobile, using there, and passing and playing it at home on the TV set
- Etc......

AXMEDIS interoperability satisfies these demands among a large set of devices:

- PC, STB/PVR/HDR, PDA, Mobiles, etc.
- You can buy once to use on all devices.

Interoperable Players

- PC players with full functionalities:
  - Stand Alone Player for Windows
  - Version with Replaceable skins
  - Active X Player for Windows, for:
    - Integrating player in Html pages
    - Microsoft Internet Explorer Browser
  - Macromedia tools Authorware
  - Realising customised AXMEDIS Players based on .NET
  - Plug in for Mozilla Internet Browser
  - Integrating player in Html pages
  - Two different skins

- PDA player:
  - MPEG-4, SMIL, HTML

- STB player:
  - for IPTV
  - for DVB-S
  - MPEG-2, MPEG-4

- Mobile player:
  - A pure Java player will be ready for Feb 2008
  - SMIL support with Audio Visual, MMAPi of Java
AXMEDIS Content Processing GRID

AXMEDIS Content Processing capabilities

- In AXCP Scripts you can manipulate, produce, adapt, extract, manage and process:
  - Any type of resource in any format
  - AXMEDIS/MPEG-21 Objects, IMS, SCORM, OMA objects, and features
  - Digital resources in any format
  - Production of new objects: composition, etc.
  - Formatting, automatically producing/selecting: SMIL, XSLT, etc.
  - Digital resource adaptation, transcoding, ...
  - Extraction of descriptors and fingerprints
  - Synchronization of media, etc.
  - Metadata processing, adaptation, and mapping
  - Production and posting of licenses/PAR in OMA and MPEG-21
  - Verification of Licenses against them and PAR
  - Protection Information, OMA and MPEG-21 IPMP
  - Profiling for devices and network capabilities,
  - Reasoning on device capabilities and user preferences
  - User Profile and preferences
  - Etc.

- Open to any other module with plug-in technology:
  - Burning
  - Etc.
Contact Information

- If you like to know more about the AXMEDIS framework and other AXMEDIS technologies and functionalities please do not hesitate to contact the project coordinator.

- Prof. Paolo Nesi, Ph.D.
  DISIT-DSI, Department of Systems and Informatics
  Distributed Systems and Internet Technology Lab
  University of Florence
  Via S. Marta 3, 50139 Firenze, Italy
  Email: nesi@dsi.unifi.it
  Web: http://www.AXMEDIS.org