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AXMEDIS Overview and Content Distribution

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This AXMEDIS tutorial and the others for the 2006

- This tutorials is belongs to a series:
  - **Content Production**: manual production of content, AXMEDIS model, MPEG-21 Model, object authoring, the packages, the metadata editor, the license editor, the protection editor, the players (PC, PDA, Mobile, STB/PVR), etc., Any kind of digital format content into the AXMEDIS format.
  - **Content Processing**, automated content production and processing tools, automating the backoffice, AXMEDIS GRID tools, estimation of descriptors, estimation of fingerprint, content protection, crawling of legacy databases and content management systems, content formatting, usage of Scripts, etc.
  - **Workflow tool usage with AXMEDIS tools**, integration of workflow systems with AXMEDIS, control of AXMEDIS tools, monitoring, etc.
  - **Content Distribution**, multichannel content distribution, example of for interned distribution with TISCALI, example of mobile distribution with ILABS, example of Kiosk distribution towards PDAs with ILABS, example of satellite distribution with EUTELSAT, content sharing, etc.
  - **In some occasions they are proposed in compressed and/or aggregated forms**

Purpose of this Tutorial

- This tutorial aims to provide you an overview of the AXMEDIS technologies, solutions and architecture.
- It gives you answers to the following questions
  - What is AXMEDIS ?
  - Which is the State of the Art of the sector ?
  - Which are the innovations/advantages of AXMEDIS ?
  - What can I do with AXMEDIS ?
  - Why I should use AXMEDIS ?
  - Which are the major tools of AXMEDIS ?
  - How can I use AXMEDIS for my business ?
  - Which implications I have in using AXMEDIS ?
  - Who can help me in knowing more ?
  - Any other wish ?
  - ...
- Please do not hesitate to make questions !!
Schema of the Tutorial and Purpose

- **Duration**: 3.5-4 hours
- **Which could be the Attendees of this Tutorial:**
  - Who is interested to get a general overview of AXMEDIS aims, technologies, solutions and tools
  - **Business Managers and decision makers** interested in understanding if AXMEDIS is suitable for their business or not, if it is an advantage or not, etc.
  - **Technical Managers** interested to have a first overview
    - How to exploit AXMEDIS technology in their solutions
    - Technical innovation of AXMEDIS with respect to the state of the art
  - **Research Managers** interested to get on overview of the whole architecture and assessing the advantages for Using AXMEDIS framework for:
    - Testing and developing new solutions, new algorithms, etc., reducing costs of infrastructure creation
    - Promoting and disseminating their new solutions on a large audience
    - Making business with AXMEDIS, exploiting the framework

Table of Content

- **Preface**
- **What is AXMEDIS**
- Short Market Analysis and Opportunities
- State of the Art, Limitations, Needs
- AXMEDIS Content Packaging
- AXMEDIS Content Protection and Tracking
- AXMEDIS Content Production and Processing
- AXMEDIS Application Scenarios
- Conclusions and references
What is AXMEDIS?

- AXMEDIS is a consortium/project of the European Commission proposed by companies and institutions to solve a set of problems in the area of e-commerce of digital content
  - approved by the EC for reaching specific objectives, among them the creation of an Open Platform for the digital content production, protection and distribution.
  - partially funded by the EC and partially from the Companies and Institutions involved

- Start: 1st September 2004
- Cost: about 14 Meuro, >8 Meuro of Funding
- About 200 people are working on AXMEDIS every day
- More than 35 partners (contractors and affiliated)

Partners
**Growing and numbers**

- **AXMEDIS started in Sept 2004 with fewer partners**
  - GIUNTI, TISCALI, EUTELSAT, HP, AFI, SEJER, etc.
  - Univ. Florence, Univ. Leeds, FHG, Univ. Politecnica Catalonla, Univ. Reading, etc.
- **Added 10 more partners in the December 2006:**
  - BBC, TEO, ELION, TI, SDAE
  - MBI, VRS, KTU, ETRI, PKU
- **Added Affiliated partners:**
  - SIAE, PENTEX, GESFOR, MAAT-G, FIA, RIGEL, HEXAGLOBE, Focuseek
- **Now**
  - >700 AXMEDIS technical documents/tools have been downloaded
  - >1.2 Millions of accesses

**Objectives**

- **reduction of costs for content production, management and distribution considering activities of B2B and B2C**
- **exploiting new models, methods and tools for content production, protection and distribution**
  - Content more
    - interactive: …..cross media, multimedia
    - interoperable: ….device, DRM, formats
- **Supporting massive processing for content production and distribution (on demand)**
- **Harmonize B2B and B2C**
  - Enforcing flexibility in business and transaction models
  - Integration of B2B and B2C areas
  - Modeling secure/legal P2P content sharing for both B2B and B2C
- **Create the AXMEDIS Framework for all**
### Applications and Customers

- **Applicative areas of AXMEDIS automation**
  - Entertainment, edutainment, infotainment, educational, etc.
  - Real-time and non-real-time content production, distribution and sharing
  - Internet, P2P, broadcast, IPTV, mobiles, DVB-T, DVB-S, DVB-H, etc.
  - And also:
    - banking, governmental, military and healthcare

- **AXMEDIS Customers**
  - content management, production, protection and distribution
  - Broadcasters, satellite, terrestrial, etc.
  - Telecom operators, multichannel operators
  - Content producers, editors, publishers
  - Collecting societies
  - Multimedia and cross media archives and WEB Portals
  - Etc.

### Technical Applications

- General content management and processing
- Multi-channel production and distribution: broadcasting, IP/Internet, WEB sites, P2P, mobile, PDA, IPTV, interactive TV and channels, etc.
- Multi-channel experience for customers
- Video on Demand (VOD), and production on demand solutions
- Control of P2P content sharing and distribution, involving your customers in distribution (super-distribution)
- Involve customers and final users in content production and social networking
- Interoperable DRM (MPEG-21, OMA, etc.)
- Different business models and/or transactions on the same distribution channels: pay per play, monthly rate, preview, renting, advertising, etc.
Activities & relations

Technical Objectives

- Enhance the interactivity and content forms
  - cross media and simple resources
- Enabling interoperability among different
  - distribution channels (TV, PDA, mobile, kiosks, broadcasting,..)
  - DRMs (digital rights management) models (e.g., MPEG-21, OMA, Windows DRM, etc.),
    make possible translations among license formats
- Harmonize B2B and B2C
  - Enforce flexibility in business and transaction models
  - Facilitate the passage from Contract to Digital Licenses and vice versa
  - Insertion of DRM domain management for Business and final users
- Enabling the production and processing
  - at low costs and in a scalable manner with GRID technology
- Enabling secure/legal P2P content sharing for both
  - B2B and B2C
- Reuse and improve standards, remaining open and expansible
  - Adoption and extension of MPEG-21 and OMA
**AXMEDIS Framework**

- A unified European platform for content production and distribution, AXFW
  - Improve standards
  - Development of the AXFW
  - Make the AXFW open, expandable and accessible to all
  - Open the Affiliation Programm to access at the AXFW
  - Set up of trials and demonstrators

**AXMEDIS Technical Architecture**

User Interaction and/or Automated Control via WSs

AXMEDIS (CP) Content Processing
- Script Editor and Debug
- AXCP GRID Scheduler

AXMEDIS Authoring Tools
- Metadata Resources
- X & Multimedia Styles
- DRM Licenses Protection information

AXMEDIS manual and autom, content sharing and Distribution Tools
- AXEPTool B2B P2P
- AXMEDIA B2C P2P Programme and Pub

AXMEDIS Model Supports and Plug-ins
- including support for XML, XSLT, WSDL, OS, etc.

- Plug in Manager
- DRM Support
- Protection Support
- Content Processing
- Content Formatting
- Database Support
- Workflow Support
- Content Descriptors

AXMEDIS, AXMEDIS

- Administrative Tools
- DRM Servers
- Reporting Tools
- Monitoring Player & Plugins

AXMEDIS MPEG-21

- Multidev. Player & Plugins
- Traditional and P2P Distribution Channels and servers

WS, https, FTP, Webdav, etc.

CMSs
AXMEDIS Training slides, http://www.axmedis.org

AXMEDIS Framework for all

- Content Distributors
- Content Providers
- Content Integrator, editors
- IT Companies
- Telecom Operators
- Broadcasters
- Collecting societies
- Associations
- Research institutions
- Cultural Institutions
- Etc.

Partners

trials, and channels

AXMEDIS Based solutions

How to

- Accessing to the AXMEDIS Framework
- Exploiting AXMEDIS tools
  - Installing and using AXMEDIS tools to set up a new business and solution
  - Customizing AXMEDIS tools and solution for your purpose
  - Integrating them in your solution
- Integrating AXMEDIS tools in your devices and STB
- Integrating AXMEDIS P2P in your distribution model
- Integrating AXMEDIS cross media model to provide more interactivity on your content and tools
- Etc.
Affiliation to the AXMEDIS

- You can become affiliated with AXMEDIS. The affiliation provides access to
  - a large amount of information and knowledge
  - full source code of the AXMEDIS Framework
- The benefits of the affiliation include the possibility of using the AXMEDIS technology and tools (customize them from source code), for your business without limitations
- The affiliation can be formalized via the affiliation agreement, you can find information on the flyers and on the DVD and on the portal.
- The affiliation has a convenient annual fee that can be covered in money or value by offering in change contributions to the AXMEDIS Framework itself for the community.
- For additional information please contact Paolo Nesi nesi@dsi.unifi.it
Exploitation: Online content revenues

- Forecast of increasing revenues coming from online content
- Changes in user demand are forcing content owners, aggregators and distributors in making content available towards different distribution channels
  - Need to reduce costs for authoring and re-authoring
  - Need for a single content format suitable for multiple platforms

Total online content revenue by type of content in Western Europe (Meuro)

* Source EITO 2005

Grow AVG, Mill. Download files per year, EU 25, P2P
Needs and the cure

- **Lower costs for**
  - production (packaging, protection, management, advertising, etc.), distribution and advertising
  - contract management, licensing, accounting, reporting, etc.
  - P2P distribution

- **Automation is THE cure/solution to**
  - reduce the costs
  - make the long tail access possible and convenient for all
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- Short Market Analysis and Opportunities
- State of the Art, Limitations, Needs
- AXMEDIS Content Packaging
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- AXMEDIS Content Production and Processing
- AXMEDIS Application Scenarios
- Conclusions and references

Contingency

- Trend of the market for digital content:
  - Audio and Video distribution growing
  - Issues regarding the market loss for piracy (60-80%)
  - Issues regarding the P2P as primary source of piracy
  - High costs of content production and distribution
  - High business risks
- High demands on
  - content interactivity
  - interoperability of content and devices
  - tools for cultural valorization of content
- Issues on DRM
  - Legal and technical capabilities
  - Lack of interoperability, openness
  - Flexibility in the business and transaction models
- Massive processing in content production and distribution, and in license processing and event tracking
  - These are a real challenge for many industries that are discovering the complexity of managing large digital content factories and distribution chains.
User’s Trends

- Users are gradually abandoning the traditional TV
- We can see that they
  - Spend more time on PC/games console
  - Spend more money and time on i-TV
    - Cultural programme
    - Thematic information
  - Are more attracted by new content models and usages
  - Are more attracted by new devices,
  - Are interested in personal content publishing and sharing
    - YouTube, Video Google, etc.,
  - Are interested in Personal TV, personal realities,
  - Are more interested in individuality and personal needs,
  - Are interested in interactive and interoperable content
  - Are interested in home media centers and content management,
  - Etc,
Present Needs for Accessing New Markets

- **Reduction of costs to access at the Fatter “Tail”**
- Needs of Interoperable Content that may Migrate from
  - one terminal/device to another
  - one user to another
  - one channel to another
  - Licenses assigned to users, devices or domains
  - etc.
- **Transcoding/Adaptation problems**
  - Content is packaged
  - Content is protected, adaptation of protected content is needed
  - Content contains several types of information: digital resources, metadata, glue, etc.
  - On the servers and/or on the client terminals
- **DRM Architecture has to support Migration and Adaptation**
  - see in the following

The Media Usage at home

Source EITO2005
Not enough interactivity and interoperability

- Cross Media Content examples are:
  - Interactive training material
  - Documents with hyperlinks
  - Interactive content in which the user may navigate
- DVDs, WEB pages, eBooks, etc.
  - Mainly audio visual or textual
  - Allow the inclusions of Simple Games (only DVD)
  - Mainly for physical distribution (e.g., DVD)
  - eBooks and WEB pages are only digital distribution
  - Low or absent interoperability among devices and distribution channels

AXMEDIS Innovations
- More interactivity and interoperability among devices/players
  - Content moving among devices and player
  - The same content on different devices
  - Different media inside
- Flexibility in creating content packages
- …

Simplified Traditional value chain

Production Area
- Production
- Authoring

Processing Area
- Processing (adapt, fp, etc.)

Packaging Area
- Packaging (integration, etc.)

Protection Area
- Protection

Distribution Area
- Distribution

Supervision and Collecting Area
- Collecting
- Control
- Supervision
- Collecting

Usage
- Pay
- Pay
Traditional value chain Issues, state of the art

- The protection is performed just before distribution
  - By the distributor or
  - By a specialized third party company as a service

- The B2B areas are (production, integration, etc.):
  - Considered trusted
  - Based on paper contracts
  - Contracts are produced on the basis of a limited and not standard terminology, so that they are not easy interpreted and transported on other media, or channels, etc.

- Producers and integrators have no control about what is done on the content in the last phase of distribution:
  - authors and producers cannot verify, they may ask
  - integrators cannot verify, they may ask at the business partners
  - Etc.

- The distributors:
  - control the selling of content, mainly with conditional access systems
  - do not control/verify the exploitation of each single rights

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
Simple protection with Key sending

Production and distribution

Player device

License Production

Content Packaging, Protection

Distribution Server

License distribution and player/device verification and supervision

Selling Server

Ask for the License

Content deprotection and rights exploitation

Technologies and standards

- Technologies for content protection
  - Microsoft Windows Media, DRM
  - Apple I-Tune
  - Media Commerce Suite of Real Network
  - Intertrust
  - Liquid Audio
  - DMD secure
  - Adobe
  - And also the Conditional Access Systems: Nagravision, Irdeto, etc...

- Standards on DRM
  - OMA, Open Mobile Association
  - MPEG-21, DI, DID, IPMP, REL, etc.
  - XrML, Content Guard, related to MPEG-21
## Market solutions

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<td>Authentication of Player</td>
<td>Authentication of device, user, domain, etc.</td>
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<td>Revocation per device, user, etc.</td>
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<td>Revocation per license</td>
<td>Revocation per license</td>
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<tr>
<td>digital resources that can be included and protected</td>
<td>Any digital format, of any type</td>
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<tr>
<td>Media content</td>
<td>Single audio, video, image, doc, and Cross media: SMIL, HTML, SVG, MPEG-4,….</td>
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<tr>
<td>Customizable Tools</td>
<td>Customizable Tools: servers and player clients</td>
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## Limitations of Present DRM solutions

- **DRM is typically added only in the Integration or distribution phases**
  - DRM is seen mainly for B2C
    - Added by distributors
    - Owners demand to producers
    - Producers demand to integrators or distributors
    - Some Distributors demand to carriers
  - DRM is tuned for a specific distribution channel and media
    - Windows Media DRM for PC/internet, etc.
    - OMA DRM for Mobile
    - Etc.
  - **No convergence**
    - no interoperability of content
    - No possibility of assigning a License to a Domain
    - Partially solved producing content in several formats for several channels and terminals, very complex and expensive
- **Large Limitations for the final users**
- **Limitations for the business and markets**
Business Rules, a way to formalize allowed rights

- **Exploitation Models** (contracts from the consumers to the provider are aligned to the exploitation model):
  - Subscription to a collection or service
  - All you can eat
  - Pay per renting
  - Pay per use, pay per play, pay per print, etc.
  - Pay per stream, per download, etc...
  - Pay per minute all you can eat
  - Pay per burning the CD
  - Pay per copy the object
  - Pay per moving the object
  - Pay per passing the object to a different device
  - Pay per building a collection
  - Preview without paying
  - Try and buy
- Etc.

B2B Rights Management

- **Advantages of B2B DRM**
  - Automation of contract-based deals
  - Assessing the Usage in the B2B
  - Reducing costs of B2B promotion
  - Allowing integration and composition of protected content
  - Allowing content production on demand, no contracts signatures, immediate DRM processing
  - Try and buy, try and use for business
  - Free try for Business users
  - Increasing the control, decreasing the risk

- **P2P distribution**
  - sharing of content
  - lower costs to access content
  - Lower costs to promote/distribute content
  - Increment of accessible content
Summary of Major Needs

- Convergence of content distribution and usage
  - Multichannel solution
  - create/buy one to use on many devices
  - Interoperable Content and Devices
  - Interoperable DRM, Licenses

- Content management in the home
  - the domain management
  - Interoperability of content in the home, interoperability of the devices, the Home Media Server
  - Multimedia Middleware among devices
  - Integration with domotic applications and tools

Summary of Major Challenges

- Reduction of production, protection and distribution costs
- Content production/protection on demand
- Automating the B2B area, DRM and distribution
  - Production, protection and distribution phases
  - Expanding DRM to B2B
  - Reducing costs of B2B distribution
- Real Time content Processing
  - Reducing production and distribution costs
  - Flexible Content Distribution
  - Content production, protection, distribution on demand
  - Adaptation and transcoding
  - Accelerating B2B processing
- Increasing security: rights usage and control on
  - Harmonization of B2B and B2C
  - Increasing security and interoperability
  - Increasing control of rights exploitation
  - Allowing the set up of a large number of business models

- Any other question/issue ??
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  - Content Models vs DRM models
  - Content Model and hierarchy
- AXMEDIS Content Protection and Tracking
- AXMEDIS Content Production and Processing
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- Conclusions and references

AXMEDIS Content Elements

- Content Packaging for protection and distribution
  - Streaming (so called real-time) and/or downloading
  - Sharing on P2P, etc.
  - portable on physical supports, etc. (scalable)
  - binary and/or XML, etc.
- Real Cross Media
  - Multimedia hierarchies of digital resources such as models based on:
    - HTML, SMIL, SCORM/IMS, WDELMUSIC, MPEG-4, etc.
    - With internal and external links and relationships: for example one HTML page may be build by using several images and audio files.
  - Integration of docs, audio, video, images, via spatial rendering and synchronization, providing interactivity
- The Content Package in the hands of the final user to be used may need of the following information
  - Metadata
  - Digital Resources
  - Protection Information
  - License
AXMEDIS Metadata

- **Metadata:**
  - Identification of information,
    - unique ID (AXOID), UUID,
    - distributor ID, UUID,
    - other codes such as: ISRC, ISBN, etc.
  - Producer ID and Information, etc.
  - Author Information, etc.
  - Classification information also for indexing:
    - Dublin core, etc.
  - PAR: Potentially Available Rights
  - Descriptors: for indexing, MPEG-7, technical and conceptual, etc.
  - References to Owner, to Distributor, etc.
  - Fingerprint
  - Historical and versioning aspects
  - Etc.

- **Some of them are grouped in AXMEDIS format in the so called AXMEDIS Information, AXINFO**

- **One Metadata set for each resource or group, ITEM**

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.
Packaging and Protection, AXMEDIS model

Integrated and classical DRM Models
The Cross Media Content Model

- Based on MPEG21 Digital Items, but not limited to
- Overcoming limitations in content modeling and DRM:
  - Cross media:
    - any kind of metadata and any kind IDs
    - presentation and glue (e.g., HTML, SMIL), plus
    - digital resource images, documents, video, audio, games, MPEG-4, etc.
  - Content components: composition and reuse;
  - DRM interoperability: MPEG-21 and OMA
  - DRM Chain of licenses: B2B and B2C integration;
  - Integration of semantics and behavior into the content.
- DRM, Digital Rights Management
  - Modeling licenses for the B2B-B2C areas
  - Algorithms and tools for processing licenses, chains and relationships
- Supporting legal/secure P2P for B2B and B2C/C2C
- Supporting B2B-B2C content production and transactions,
  - for protected and non protected objects

AXMEDIOS Object Model

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

MPEG21 Digital Item

unique identification

content description

special B2B metadata

mandatory

resource embedding

hierarchical composition

external content referencing
AXMEDIS Training slides, http://www.axmedis.org

AXMEDIS hierarchical objects

Nesting levels of Objects

References to external Objects

AXMEDIS Editor: some examples

See links in the last page to download the videos
**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.

The Protection and Control Process

1. Registration for Authentication
2. Installation
3. Tool Certification
4. Business Transaction
5. Content Access
6. Usage

AXMEDIS or Distributor Registration Site
Any Distributor front end Server
Transaction front end Server
AXMEDIS Protection Manager
AXMEDIS Certifier and Supervisor
AXMEDIS Compliant Players
License Definition and Processing

- **License:**
  - digital version of the contract
  - contains the list of acquired rights
  - may be signed by clicking
  - supported by a way to demonstrate its authenticity
  - can be stored in the digital object or not
    - If not, may in the terminal or remotely located
  - may refer to other licenses, creating a chain of licenses for the evaluation of each given grant associated to a right
  - formalized in some language
    - Refer to some dictionary for terms that define the semantics of the expressions of the language
  - may be revoked
  - Etc.

AXMEDIS License formal language

- **AXMEDIS License**
  - Derived from MPEG-21 REL
  - Support for RDD: Rights Data Dictionary
- **MPEG-21 REL: Rights Expression Language**
  - Derived from XrML
- **XrML 2.0: eXtensible rights Markup Language**
  - At the basis of the MPEG-21 REL
  - ContentGuard, Nov. 2001, Microsoft
  - At the basis of the Windows Media
  - Derived from DPRL
- **OMA ODRL: Open Digital Rights Management**
  - Expression language for mobiles
  - Simpler than MPEG REL
  - Under certain restriction is compatible with AXMEDIS license
AXMEDIS DRM Aspects

- **Formal definition of Licenses as MPEG-21 REL**
  - Facilitate the passage from Contract to Digital Licenses and viceversa

- **Support and make easier the B2B market of digital content, and cross media content**
  - Content composition and DRM management
  - Tracking and monitoring the exploitation of rights
  - Reduction of costs for B2B trading of content
  - Enforce flexibility in business and transaction models
  - Harmonize and automating B2B and B2C
  - Management of domains

- **Enable interoperability among different**
  - distribution channels and devices with their DRM
  - TV, PDA, mobile, kiosks, broadcasting...
  - DRMs models: MPEG-21 and OMA, other can be added

- **Enabling**
  - Content production on the consumer side
  - secure/legal P2P content sharing for both B2B and B2C

### MPEG-21 REL data model

- REL grant consists of
  - principal to whom grant is issued
  - rights the grant specifies
  - resource to which right in grant applies
  - condition to be met before grant can be exercised
An example of REL statement

Condition = November 2003.

Resource = Ocean Wilds

Right = Play

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

Possible values for terms

- Principal
  - AllPrincipals and KeyHolder

- Rights
  - Issue, Obtain, PossesProperty and Revoke

- Resources
  - DigitalResource, Revocable and ServiceReference

- Conditions
  - AllConditions, ExerciseMechanism, ExistsRight, Fullfiller, PrerequisiteRight, RevocationFreshness, ValidityInterval
  - CallForCondition
  - ExerciseLimit
  - FeeFlat
  - FeeMetered
  - FeePerInterval
  - FeePerUse
  - FeePerUsePrePay
  - SeekApproval

- Examples of Rights
  - Adapt
  - Delete
  - Diminish
  - Embed
  - Enhance
  - Enlarge
  - Execute
  - Install
  - Modify
  - Move/Migrate
  - Play
  - Print
  - Reduce
  - Uninstall
  - Burn
  - ...

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

Cross media content and composition

- AXMEDIS objects can be used as components for creating other added values AXMEDIS objects
  - Allowing the production for composition of protected content, creation of added value objects,
  - Allowing the Rights Management Of Composition, RMOC, in the digital world similarly at what is performed in the physical world
  - The shares along the value chain are de facto formalized
  - Who is composing can add its own protection and licensing
Make easier the B2B market of digital content

- REL and Composition enforce flexibility and openness in business transactions
- PAR: Potentially Available Rights into AXMEDIS objects
  - PARs based content trading
    - Customers may know directly which rights they could buy and by who
    - Querying can be performed on DBs and P2P
  - PARs may be used to harmonize and automate B2B and B2C

---

Managing License Chain and Protection Information

- Protection Info
- Protection Manager Support
- Action log database
- License Server, DRM Processor
- Content provider
- Content Integrator
- Content Distributor
Managing License Chain and Protection Information

Content provider
Content provider

Integrated Digital Protected Content

Protection Info

Action log database

License Server, DRM Processor

Right Auth.

Digital Protected

Produce License

Produce License

Store Key

Produce License

Produce License

AXMEDIS The Protection and Control Process

A Distributor

AXMEDIS Protection Tool

New Protected Object: Post ProtInfo (WS)

do license (WS)

AXMEDIS Compliant Players
AXMEDIS License Production

A Distributor
Requesting license Production (WS):
- Distributor ID
- Object ID
- User ID
- Rights

Protected Object: Post Profile (WS)

AXMEDIS License Editor
AXMEDIS Protection Tool
AXMEDIS Compliant Players

Protected Object: Post Profile (WS)

AXMEDIS Protection Manager
AXMEDIS Certifier and Supervisor

Need of Massive Production: one License X each user X each resource

DRM and Domain Management

- Users are strongly interested in acquiring a content to be used in their domain in which they have their
  - Home devices, cars, mobiles, etc.
- Media Centers and/or Home Servers are going to manage content and licenses for the whole domain
  - One license for all devices and people

ADSL
Domain Server
**AXMEDIS Control and Supervision**

- Performed by the: AXCS and AXMEDIS PMS
- Continuously verify and certify the trusting level of the Tool/Device/Terminal and of the User
- Collect Action Logs (event logs) related to rights exploitation and thus to License usage
- Allow the implementation of black lists for Users, Tools, Devices/Terminals, Licenses

**Tracking and monitoring 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. etc.
- Different reports and statistics for different roles
  - Reports on licensing and on the consumption/exploitation of rights
Event reporting

- Single traces, events, etc.
- Statistical data for reporting and analysis

List of Events/Actions on rights Exploitation

- Collecting Events and Actions
  - Further reporting
  - Further verification of consistency
  - provide the evidence about the exploitation of rights to: content owners, producers, collecting societies, distributors, etc.
  - provide the billing information to the final user
  - provide the statistical information
- Counting the usage, exploitation of rights
  - how many times a music piece has been played, how many print out have been produced, etc.
  - Dynamic definition of price for example…
- Extending MPEG-21 Event Reporting
  - Specifies how to express ER-Request and Event Report and how they are represented as digital item
DRM Interoperable ..........

- DRM, Digital Rights Management
  - Digital management of rights
- Proprietary DRM solutions are
  - based on proprietary formats for content and licenses, protection information, control messages, and reporting, etc.
- DRM Interoperable (e.g., DMP, OMA)
  - based on a UNIQUE Standard format for content and licenses, protection information, control messages, and reporting, etc.
  - Extensions are not accepted if not decided by the standard body
  - Standards are becoming obsolete in short time, patent pending is blocking the market
- DRM Interoperable “a la AXMEDIS”
  - based on SEVERAL standard formats (now MPEG-21 e OMA) e/o proprietary for content and licenses, protection information, control messages, and reporting, etc.
  - Interoperable on the B2B and B2C areas
  - It can be extended to accept other solutions for example MS Windows DRM, i-Tune, or more, etc.

Considerations

- AXMEDIS License:
  - Formalized in MPEG-21 REL
  - Can be used for formalising both B2B and B2C
  - Can be interoperable with OMA licenses
  - Can addresses single users, devices or domains
  - Can be produced
    - Manually with AXMEDIS DRM Editor
    - Remotely by using a WEB service
    - Massively and remotely by using AXMEDIS content processing tools
  - Processed in the chain of licenses
    - by the AXMEDIS Protection Manager Support as License Server/DRM Processor
  - Can be included into AXMEDIS objects or can be provided independently
  - Can be cached or not on the client terminal
  - Can formalize a large set of business models
  - Etc.

- Any other question/issue ??
Considerations

- AXMEDIS DRM integrated solution:
  - Allows usage of DRM on new object types such as Cross Media content: SMIL, HTML, etc.
  - Allows the control on multichannel distribution
  - Support multiple business models in the same and on different channels
  - Support with a unified DRM both B2B and B2C areas
  - Continuously Controls user terminals
  - Collects Actions Logs of any kind of event
    - Allows to bring back easily the Action Log on your Administration
    - Provides the evidence of the exploited rights
    - Provides statistical data on the rights exploitation
  - Manages black lists of several Entities
    - Allows the definition of policies for putting user, device, license, objects, etc. into the black lists
  - Etc.

- Any other question/issue ??

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  - Automated AXMEDIS Content Processing and Production
  - Multichannel Back-Office Management
  - Production of Content on Demand
- AXMEDIS Application Scenarios
- Conclusions and references
Major Tools

- **Players for cross media content:**
  - PC, PDA, STB, mobiles, etc.

- **DRM and protection support**

- **Content Production tools**
  - Authoring tools for cross media content: AXMEDIS Editor
  - for content, protection and licenses
  - Automated production tools for content, protection packages and licenses: AXCP, Workflow
  - CMS: search and retrieval, automated connection with your own and/or third parties CMSs

- **Content Distribution**
  - P2P tools for B2B and C2C in a controlled and safe/legal manner: AXEPTool, AXMEDIA
  - User and tool Registration portals
  - Certification authority, AXCA
  - License Server and Certifier and Verificator, PMS/AXCS
  - Scheduling: Program and publication, Workflow, etc.
  - Distribution Portal
  - Content acquisition portal for end user production

AXMEDIS Architecture
AXMEDIS Cross Media Content

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

Packing 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
AXMEDIS Authoring Editor

- The AXMEDIS Editor is an application allowing:
  - manual production of AXMEDIS objects
  - inspection of automatically produced objects
  - finishing AXMEDIS objects pre-produced automatically

- It integrates many Editors & Viewers to handle all the aspects of the AXMEDIS Objects production:
  - Resource
  - OBJ Composition
  - Metadata
  - DRM/Licenses
  - Protection
  - Presentation
  - Behavior
  - Etc....

AXMEDIS Client Tools

- AXMEDIS/MPEG-21 Model plus a set of players:
  - Audio and video players: almost any format
  - Document viewers: PDF, HTML, etc.
  - Image viewers: any format
  - Cross media: MPEG-4, SMIL player, HTML, etc...
  - Etc.

- AXMEDIS Metadata support:
  - AXInfo, Dublin Core, etc.
  - Any descriptors, etc.

- Possible integration AXMEDIS AXOM core module in any player:
  - The access to the AXMEDIS Framework allows you to create in short time your customized AXMEDIS compatible player in many platforms based on AXOM:
    - Windows
    - Linux
    - PDA, Windows Mobile 5
    - Etc.
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 October 2007
  - SMIL support with Audio Visual
  - MAPI of Java

- **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 October 2007
  - SMIL support with Audio Visual
  - MAPI of Java
Cross media Player as Active X, for MS IE and .NET applications

AXMEDIS Players: videos, SMIL, HTML, ....
AXMEDIS Player for PDA with SMIL/MPEG-4

HTML, SMIL and/or MPEG-4 PDA player

PDA player

see links in the last page to download the videos
 AXMEDIS Player for STB, PVR, Decoders, etc.

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Content Processing, AXCP

AXMEDIS Factory
- AXMEDIS Editors
- AXMEDIS Control Processing Engines and Scheduler GRIDs
- AXMEDIS databases
- AXMEDIS Workflow Management tools
- Programme and Publication
- Distribution Servers

AXMEDIS Editors
- Crawlers
- CMSs

AXMEDIS Content Processing Applications

- Automating back office content production/protection and distribution
  - Open and secure architecture for content production, processing, protection and enrichment, based on a scalable GRID model
  - Maximum flexibility with
    - AXMEDIS content processing GRID Language
    - Uses plugins for content adaptation/transcoding for multi-channel production, fingerprinting, processing profiles, etc.
    - Algorithms for automated formatting of content: SMIL, style, Genetic Algorithms

- Automating massive processing applications
  - For solving the on-demand problem:
    - Production
    - Adaptation, transcoding, processing, ...
    - Advertisement insertion
    - Managing profiling (user device, network, etc.), etc.
  - Multi-channel distribution:
    - multiple interoperable DRMs, license chain processing/reasoning
  - Content recognition for monitoring
    - broadcast and networks,
    - P2P, Web sites, etc.
Content Processing

AXMEDIS Content Processing Platform

- AXCP GRID solution allows automated management of:
  - content, metadata and licensing information, etc.,
  - operations of
    - ingestion, crawling, database management, indexing, processing, adaptation, transcoding, encoding, decoding, descriptor extractor, recognition, filtering, production, archiving, storing, packaging, preview, extracting fingerprint, licensing, DRM, profiling, protection, encryption, accounting, enrichment, network management, etc.

- AXCP tools can be integrated and controlled by your applications and/or workflow management systems.

- AXMEDIS allows you to reduce costs and increase efficiency of your content management.
AXMEDIS supports the whole value chain and makes real and simple the convergence of media,
- media transcoding,
- interoperability of content enabling multi-channel distribution (e.g., mobile, satellite, kiosk, iTV, web, P2P, interactivity, etc.),
- provides a flexible and interoperable DRM, for both B2B and B2C across traditional and P2P distribution platforms.

**AXCP solution is based**
- AXCP Rules formalized in JavaScript and XML to define jobs, processes and their features (deadlines, needs, etc.).

**The AXCP tools are based on a Service Oriented Architecture (SOA):**
- fully documented APIs for all the JavaScript functionalities, and WEB Services for accessing and controlling tools, and for distributing produced content towards your front-end distribution servers.

---

**AXMEDIS Content Processing GRID**

AXCP GRID

- Workflow manager
- AXMEDIS Rule Editor
- Your AXCP Rules
- Any Plug-in for content processing
- AXCP Scheduler
- AXCP nodes

- Distribution Channels and servers
- AXMEDIS Database
- WS, FTP, etc.
- Your CMSs
Enabling massive content production and processing

- AXMEDIS GRID language and tools for
  - Automated Content Ingestion and Gathering
  - Automated Content Query and Retrieval
  - Automated Content Load and Storage: databases and files
  - Automated Content and Metadata Processing, enrichment
  - Automated Content and Data processing
  - Automated Content Filtering and Repurposing
  - Automated Content Composition, Formatting
  - Automated Content Protection and Licensing
  - Automated Content Publication/Download on/from:
    - Any channel including P2P Network
  - Automated Content Distribution
  - Automated Profiles management and processing
  - Automated Production of Content on Demand

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.
AXMEDIS CP GRID tools

- AXCP Rules can be:
  - activated for content processing on any AXCP Node as well as on a single computer
  - used/parameterized to produce content on demand or to be integrated in your content factory
  - activated from your Workflow Management System or from any other application
  - activated by changes in remote objects and queries in the local database and on the P2P network.

- AXCP Nodes allow to be controlled by an AXCP Scheduler. The stand alone version of the AXCP Node can be used for executing AXCP Rules for ad-hoc processing and activation without demanding their allocation and scheduling to the AXCP Scheduler.

- AXCP Scheduler to allocate and manage AXCP Rules on Nodes:
  - scheduling and balancing jobs/processes on AXCP Nodes
  - activating jobs as sporadic and periodic tasks
  - monitoring progress of production processes and their status, etc.

- AXCP Rule Editor allows you to produce, debug, test and validate AXCP Rules to execute them on AXCP Nodes

- AXCP Quick Start allows you to activate Rules in simple manner by passing them parameters;

AXMEDIS Considerations

- AXMEDIS Content Processing allows you to automate any kind of content processing:
  - Massive or small scale processing
  - Locally performed or Workflow controlled
  - On any kind of Digital Resource not only AXMEDIS objects

- AXCP Applications for massive processing as
  - Production/packaging platform for producers and integrators
    - Digital files, metadata, etc.
  - Protection of objects, and protection information processing
  - Transcoding/adaptation platform for distributors
  - License Production, or as License Sever/processor
  - etc.

- Any other question/issue ??
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  - Application Scenarios
  - Content Sharing and/or Distribution
  - AXMEDIS Trials and Demonstrators
- Conclusions and references

Applicative Areas

- Multi-channel production and distribution: broadcasting, IP/Internet, WEB sites, P2P, mobile, PDA, IPTV, interactive TV and channels, etc.
- Multi-channel experience for customers
- Video on Demand (VOD), and production on demand solutions
- Control of P2P content sharing and distribution, involving your customers in distribution (super-distribution)
- Involve customers and final users in content production and social networking
- Interoperable DRM (MPEG-21, OMA, etc.)
- Different business models and/or transactions on the same distribution channels: pay per play, monthly rate, preview, renting, advertising, etc.
- Interactivity with cross media models
- Advertising (customized and/or real time personalized advertising)
- Production and distribution of content with unprotected preview and the rest protected
- Etc.
**Addressed value chains**

- **Production**
  - Author
  - Producer / Aggregator / Distributor / Facilitator
  - AXEPTool
  - AXEMedia

- **Distribution**
  - AXEditors
  - AXMEDIS Players
  - AXOP

- **Usage**
  - Author
  - B2B

**Applications and scenarios**

- **In most of the cases there is:**
  - Usage of the AXMEDIS Editors and Players
  - Massive usage of the AXCP GRID for managing back office issues, defining specific scripts for:
    - Automated content production and adaptation (MPEG-21, OMA, etc.)
    - Automated creation of licenses (MPEG-21, OMA, etc.)
    - Automated regeneration of new versions of the objects
    - Automated object acquisition and posting on DataBases
  - Support of the AXMEDIS PMS and AXCS for the DRM aspects
  - Support of the CAMART and AII for collecting reporting data
  - Usage of the AXMEDIS Editors and Players
  - Front ends for selling and distributing of the Distributors involved so that to maintain their plate and relationships with their customers

- **In some cases there is the usage of:**
  - The P2P tools, for B2B and B2C2C
  - Some specific tools for content posting on the databases
  - Some specific player tools for final users
  - Some specific tools for Home and Factory Domain Management
  - Workflow support
**Enabling secure/legal P2P**

- P2P network set up for content distribution
  - BitTorrent Technology with Query and Catalogue
  - Protected content, legal P2P set up
  - P2P Client Tools
  - Automated B2B content distribution/publication via P2P, fast seeding,
  - Automated and efficient control of P2P networks
  - CONSUMER content distribution and sharing

- Content Sharing among, producers, integrators, archives and libraries, etc.

**Controlled P2P Network**

- Control of P2P Distribution
- AXMEDIS Content Processing Engines and Scheduler GRIDs
- Accelerated Seeding Controlled P2P network
AXMEDIS P2P Tools

- AXMEDIS P2P tools for content sharing respecting IPR
  - Content Distribution and P2P file sharing based on BitTorrent
  - DRM support, supervision and control
  - Certified metadata, etc.

- AXEPTool
  - Only for B2B
  - Technical queries and information:
    - Features, descriptors, duration, formats, license information, distribution model, etc.
  - Automated loading and publication via the AXCP tools
  - Control and certification of metadata

- AXMEDIA tool:
  - Only for C2C and B2C
  - Simple queries on simple user focussed metadata
  - Simple management of files on the file system
  - Control and certification of metadata
Content Sharing among Content Archives

- Archive A
- Archive B
- Archive Z
- Library C
- Mediateque C
- Content Provider
- Mobile Distributor
- Internet Distributor

Networking:
- Wireless LAN
**AXMEDIS Multichannel Distribution**

- **PCs via Internet + P2P, AXMEDIS P2P and PC player:** TISCALI Media Club, DSI
- **PCs via Internet, AXMEDIS PC player:**
  - ELION, VRS
- **PCs via Satellite data broadcast, AXMEDIS PC player:**
  - EUTELSAT, UNIVLEEDS
- **PDA via Kiosks, AXMEDIS PDA player:**
  - ILABS + ANSC Kiosks, TISCALI, DSI
- **STBs and PVRs:**
  - AXMEDIS STB: IPTV, Internet VOD: TEO, VRS
  - AXMEDIS STB/PVRs via Satellite data broadcast: EUTELSAT, MBI
- **Mobiles:**
  - AXMEDIS mobile player: ILABS, TISCALI, DSI
  - OMA player: Telecom Italia (TI), DSI
- **PCs via Internet + P2P, AXMEDIS P2P and PC player:**
  - free air DVB-T + home domains/media center
  - BBC, SDAE, ETRI, UPC

**AXMEDIS Certifier & Supervisor Server**

**AXMEDIS Portal**

**AXMEDIS P2P TOOL (AXEPTool)**

**AXMEDIS Multichannel Content Distribution**
TISCALI Media Club Distribution on Internet

TISCALI Media Club, Distribution Portal
TISCALI Distribution with AXMEDIS Technology

- **B2C distribution**
- **AXMEDIS objects with**
  - Video and Audio Files, with MD, images and also MPEG-4
- **The AXMEDIS Objects may be**
  - Downloaded from the TISCALI media club or P2P AXMEDIA
  - shared among consumers with AXMEDIA Tool a P2P tool
  - Visualized and played on AXMEDIS players free accessible
- **The users**
  - have to perform the registration on TISCALI
  - by a license to use the content
  - may use any AXMEDIS player
  - Mainly on PCs and Media Centers. PVRs
- **License allows**
  - Content sharing on AXMEDIA
  - Content play
  - Content Adaptation...
  - Content Migration on other P2P channels...
  - Content Migration on any other AXMEDIS terminal

TISCALI Media Club, Distribution Portal
EUTELSAT Distribution with AXMEDIS Technology

AXMEDIS Service on ATLANTIC BIRD™ 1:
- 12.5° West, covering Europe and Americas
- Frequency: 11.428GHz
- Symbol rate: 30000KSym/s
- Polarization: Horizontal

http://www.eutelsat.com/satellites/125e.html
AXMEDIS Programme and Publication

- AXMEDIS AXMEDIS P&P Editor
  - Users create and edit programmes for the multi-channel publication of AXMEDIS objects

- Distribution Servers/Channels
  - P&P Programme
  - On-Demand
    - Request to play/view and AXMEDIS object

- Programme and Publication Engine

- AXMEDIS AXMEDIS Database Manager
  - AXMEDIS databases

AXMEDIS AXMEDIS Programme and Publication

- AXMEDIS AXCP (Content Adaptation)

- AXMEDIS Database Manager
  - AXMEDIS databases

- Video on EUTELSAT distribution

- Video
  - See links in the last page to download the videos

www.axmedis.org

www.AXMEDIS.org, Paolo Nesi, November 2007
EUTELSAT Distribution with AXMEDIS technology

- B2B and B2C distribution
- AXMEDIS objects with
  - Any kind of content,…
  - Video, images, document, audio, animations, etc.
- The AXMEDIS Objects may be
  - Visualized and played on AXMEDIS players free downloaded
- The users have to perform the registration of
  - themselves on an AXMEDIS portal or via the STB ID/PIN
  - any AXMEDIS player tool they would use
  - Mainly on PC for TV and/or STB and/or Kiosks
- License allows
  - Content play
  - Content Adaptation…
  - Content Migration on any other AXMEDIS terminal, in some cases

ILABS Distribution with AXMEDIS technology

- B2B and B2C distribution
- AXMEDIS objects with
  - Educational and cultural content,…
  - Video, images, document, audio, animations, etc.
- The AXMEDIS Objects may be
  - Produced on demand on the basis of phone profile, POD
  - Visualized and played on AXMEDIS players free downloaded
- The users have to perform the registration of
  - themselves on ILABS portal and/or an AXMEDIS portal
  - any AXMEDIS player tool they would use
  - Mainly on PC-Kiosks, PDA and/or mobiles
- License allows
  - Content play
  - Content Adaptation…
  - Content Migration on any other AXMEDIS terminal, in some cases
**Mobile & kiosk scenario as 2 channels, POD**

- **AXMEDIS Network**: Content delivery to user, content delivery to distributor, content sharing via AXEPTool.
- **Kiosk (n)**:
  - **WiFi**: Content delivery to user
  - **GPRS**: Content delivery to distributor
  - **Content sharing via AXEPTool**

**AXMEDIS Protection Manager**

**Certifier and Supervisor**

**Content Factory**

**Distributor front end Server**

**Content Databases**

**Personalized Content on Demand**

- **Content**: Search, Selection, Acquisition, Production, Adaptation, Transcoding, Formatting, Packaging, Protection, Publication and Licensing on Demand

**AXMEDIS CS**

**AXMEDIS PMS**

**AXMEDIS Scheduler**

**AXMEDIS Rule Editor**

**Few Ready to use rules**

**Activate Rule**

**Add info**

**User and Device profile**

**AXCP GRID**

**Players**

**AXCP for profiling and Production On Demand**
**ILABS Content Distribution to Kiosks and PDA**

**AXMEDIS**

**KIOSK FACTORY**

Catalogue Creation Workflow management Content Item Link

**Catalogue Creation**

Fields marked by * are mandatory:

- **Name:**
- **Identifier:**
- **Description:**
- **Category:**
- **Capacity:**

**AXMEDIS**

**Content Distribution on IPTV, VOD on STB**

**AXMEDIS**

**TEO Video on Demand Front End Server**

**Audio and Video**

**Distributor**

**VOD access service**

**Issue license**

**Accounting and reporting**

**AXMEDIS Certifier and Supervisor**

**AXMEDIS Protection Manager**

**AXMEDIS DRM**

**MPEG-21**

**Cross media Content, from video, audio to complex content**
**VIDEO on TEO VOD channel**

See links in the last page to download the videos.

AXMEDIS distribution via Internet, VOD on PC

Cross media
Content, from video, audio to complex content

Distributor
Sale Manager

Accounting and reporting

do license

AXMEDIS Certifier and Supervisor

AXMEDIS Protection Manager

AXMEDIS DRM

MPEG-21
VIDEO on ELION VOD channel

Content Production on the Consumer Side

Cross media Content, from video, audio to complex content

BBC Broadcasting DVB-T

TV free on air

Recording, added value Content Package on site production and domain management

Free on air transmission

Added value content via ADSL

Accounting and reporting

Grant authoriz...
VIDEO on BBC content production

VIDEO see links in the last page to download the videos

Interoperability among channels

Channels are the distribution methods for content:
- Streaming, e.g., DVB-T, S, H
- Downloading, WEB

Channels are grounded on different communication standards,
- MPEG, HTTP, RTSP, DVB, etc.
- Content and devices are strongly related to the supported input channel

AXMEDIS content is independent on the communication channel
- Content can be automatically produced for multiple channels at the same time
- Content received from one channel can be passed to a different one

DVBT
P2P
Internet
UMTS
GPRS
DVBS
Download
Streaming
VOD
P2P
Mobile distribution, OMA and MPEG-21

<table>
<thead>
<tr>
<th>Distribution &amp; Distribution back-office</th>
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<tbody>
<tr>
<td>AX_CPS GRID Scheduler</td>
</tr>
<tr>
<td>AX_RuleG(.,.)</td>
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<tr>
<td>DimProfileProcessing([UID,DP])</td>
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<tr>
<td>AX_RuleL(.,.)</td>
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<tr>
<td>AX_CPDPackage(UID,DP)</td>
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<tr>
<td>AX_RuleProduction(.,.)</td>
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<tr>
<td>AX_RulePosting(.,.)</td>
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<tr>
<td>M.Rel_to_OMA drmConversion([L,D])</td>
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<tr>
<td>M.ODRLPosting(.,.)</td>
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<tr>
<th>Collection of Actions Logs Records</th>
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<tr>
<td>AXMEDIS License Server</td>
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<tr>
<td>AX_Dist Service</td>
</tr>
<tr>
<td>OMA Content Issuer</td>
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<tr>
<td>Rights server</td>
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<tr>
<td>Content Acquisition &amp; usage</td>
</tr>
<tr>
<td>Rights acquisition &amp; exploitation</td>
</tr>
<tr>
<td>Promotion Portal</td>
</tr>
<tr>
<td>Selling Portal</td>
</tr>
<tr>
<td>[UID, OID, DID, Const]</td>
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<tr>
<td>Telecom Italia, OMA &amp; MPEG-21 distribution</td>
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<tr>
<td>&quot;Choose an option:&quot;</td>
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<td>&quot;File list of Axmedis contexts&quot;</td>
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<td>&quot;Display an item&quot;</td>
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<td>&quot;Display another item&quot;</td>
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<tr>
<td>&quot;Display another item&quot;</td>
</tr>
</tbody>
</table>
**USERs production and distribution**

- Content production tools for final users, SIAE trial

- Set up a service for final users’, producers
  - content acquisition and collection from the final user would,
    - Definition of the DRM rules from the final users
  - automated content production, protection and adaptation
  - automated license creation
  - License production on demand, different models
  - Content distribution via distribution portal with/without DRM

**AXMEDIS Content Posting Portal, SIAE**

Engage FINAL USERS to provide their content
Fase 1: file upload with COPOP client

See links in the last page to download the videos.
Content Enrichment with final users

- Content Enrichment with AXMEDIS
- VARIAZIONI - ContentPlus
- www.variazioni.org
- Content
  - enrichment, several forms
  - produced and reproduced on demand at each enrichment
  - production with DRM
  - distribution from VARIAZIONI portal and from AXMEDIS P2P
- > than 10 partners + communities
  - Partners from Spain, Lithuania, Belgium, Portugal, Italy, Finland, Portugal

Content Enrichment and social network

- audiovisual
  - Master classes of famous magisters (Harmos)
  - Concerts
  - Conferences
  - Special Events...
- audio
  - Concerts
  - Lessons
  - Rehearsals of concerts
  - Popular Songs...
- historic documents
  - Programs of concerts
  - Letters
  - Scores
  - Images
  - Articles
  - Pedagogical Material
Table of Content

- Preface
- What is AXMEDIS
- Market Analysis and Opportunities
- State of the Art, Limitations, Needs
- AXMEDIS Content Protection and Tracking
- AXMEDIS Content Production and Packaging
- Examples of AXMEDIS Applications
- Conclusions and references

AXMEDIS Framework for all

- Content Distributors
- Content Providers
- Content Integrator, editors
- IT Companies
- Telecom Operators
- Broadcasters
- Collecting societies
- Associations
- Research institutions
- Cultural Institutions
- Etc.
### Mapping Main AXTools on Life-Cycle

- **Pre-Production**
  - AXEditor
  - AXCP GRID
  - AX-DRM

- **Production**
  - AXEditor
  - AXCP GRID

- **Distribution**
  - AXEPTool P2P

- **Consumption**
  - AX-DRM

- **Satellite**
  - GRID solutions
  - P2P sharing
  - processing

- **Internet**
  - workflow
  - flexibility

- **Terrestrial**
  - plug-ins
  - tools

- **Mobile**
  - databases

- **P2P sharing**
  - webservices

- **Terrestrial**
  - standards

- **Internet**
  - optimisation

- **Post-production**
  - customizations
  - languages

### Can be a very important solution to

- **support the distribution of Cross media content**
  - More interactivity and capabilities for the consumers
  - Interoperability among devices/content for the consumers
  - Interoperability among DRM for the consumers and along the value chain

- **make easier the B2B market of digital content, and of cross media content**
  - Composition and DRM management
  - Tracking and monitoring the exploitation of rights
  - Simpler B2B Content Trading, costs reduction
  - High flexibility in business and transaction models

- **make easier for SMEs to access/survive in the digital content market**
  - Proposed and getting content
  - Set up distribution and other business solutions for content
AUTOMATING the BACKOFFICE

- Lower costs of and enabling
  - content gathering, transcoding/monitoring platform, production of content on demand with AXCP
  - integrate cross media content and automatically managing rights for complex multimedia products
  - production, B2B distribution, promotion via P2P B2B

- New forms of content and unexploited content:
  - Making business with cross media content, integrating HTML, SMIL, document, video, etc., no possible up to now
  - Exploiting the content “long tail”

- Interoperability, convergence of media
  - interoperability of content and DRM, Multi-channel distribution
  - access to the same content on several platforms, devices and locations
  - greater level of security, control of content usage in all channels B2B2C

- DRM, creation new business models
  - different business models on the same channel may be used
  - adapting the distribution channel to the users needs and would
  - Access to detailed reporting on the exploited rights

- Distribute content with
  - Any B2C: Internet, STB, broadcasting, Mobile, kiosks, pda, etc.
  - P2P to Consumers with the support of DRM

A unique framework for all

- Cross Media Content and tools
- Backoffice Automation
- Standards
- Open platforms
- Interoperability on content
- Interoperability on devices/players
- Interoperability on DRM

The added value to your business!
Affiliation to the AXMEDIS

- The benefits of the affiliation include the possibility of using the AXMEDIS technology and tools (customize them from source code), for your business without limitations.
- You can become affiliated with AXMEDIS.
  - The affiliation provides access to:
    - a large amount of information and knowledge
    - full source code AXMEDIS Framework TOOLS
    - AXMEDIS tools ready to be used
    - Technical reports and documentation
    - Mailing and discussion lists, wiki portal
    - Training reports and tutorials, videos, slides and docs
    - Access to the AXMEDIS workshops and training
- The affiliation can be performed via the affiliation agreement
  - Information can be recovered from the DVD and on the portal
- The affiliation has a small annual fee that:
  - Can be covered in money or by value, offering contributions to the AXMEDIS Framework for the community.
  - Is free of charge for no profit institutions.

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.
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  - 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
Click here to download the video of the Tutorial

- slide 62: editor-new5b.wmv
- slide 77: mn1.wmv
- slide 96: play5-N.wmv
- slide 98: play5-VIDEO-nesi.wmv
- slide 100: pda-short.mpg
- slide 132: part2-sat-client-nesi.wmv
- slide 139: AXELTEO-TEO-STB-demo.mpg
- slide 141: ELION-enduser-nesi.wmv
- slide 143: bbc-user3.mpg