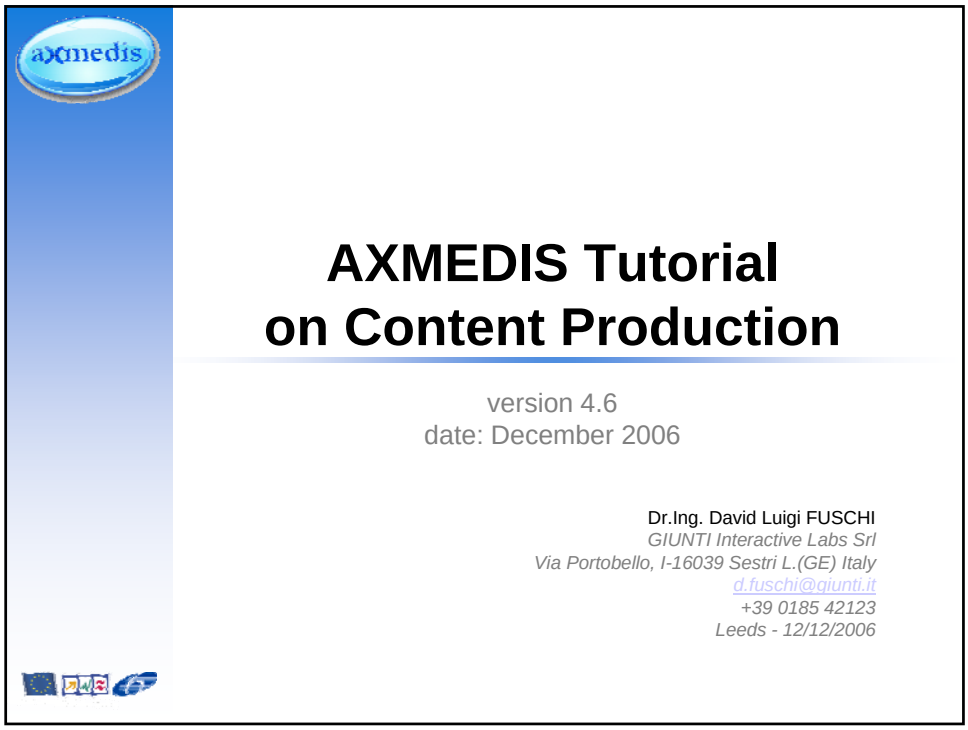
axmedis
AXMEDIS Tutorial
on Content Production
version 4.6
date: December 2006
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Leeds - 12/12/2006

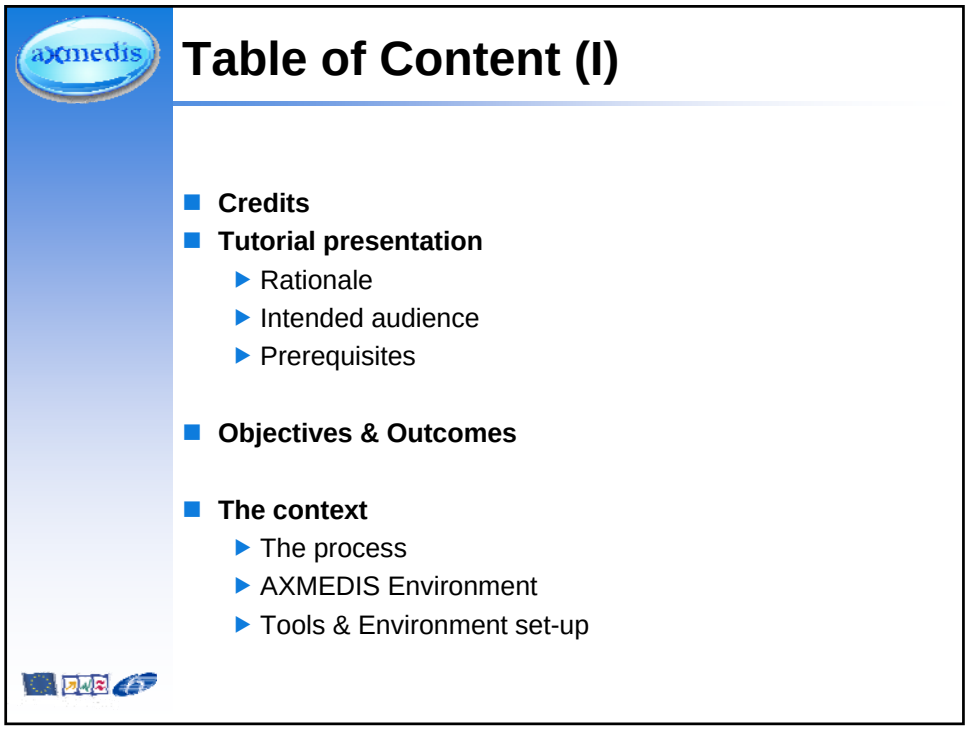
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Table of Content (I)
Credits
Tutorial presentation
Rationale
Intended audience
Prerequisites
Objectives & Outcomes
The context
The process
AXMEDIS Environment
Tools & Environment set-up

Credits

- **Narrator**
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    l.sutton@santacecila.it

Table of Content (II)

- **Content production – Intro**
- **Content production – Detail**
  - AXMEDIS Model
  - AXMEDIS Editor
  - AXMEDIS Database access
  - AXMEDIS Content crawling
  - AXMEDIS Content Processing
  - AXMEDIS Content Protection Tools
  - AXMEDIS Publishing Tools
- **References, Info & Contacts**

Tutorial presentation (I)

- **Rationale**
  - Open to all and based on AXMEDIS 2005 Content production tutorial
  - Adopts examples selected to explain both the process modifications and related benefits
  - Limits & constraints are pointed out to keep a fair and concrete perspective.

Tutorial presentation (II)

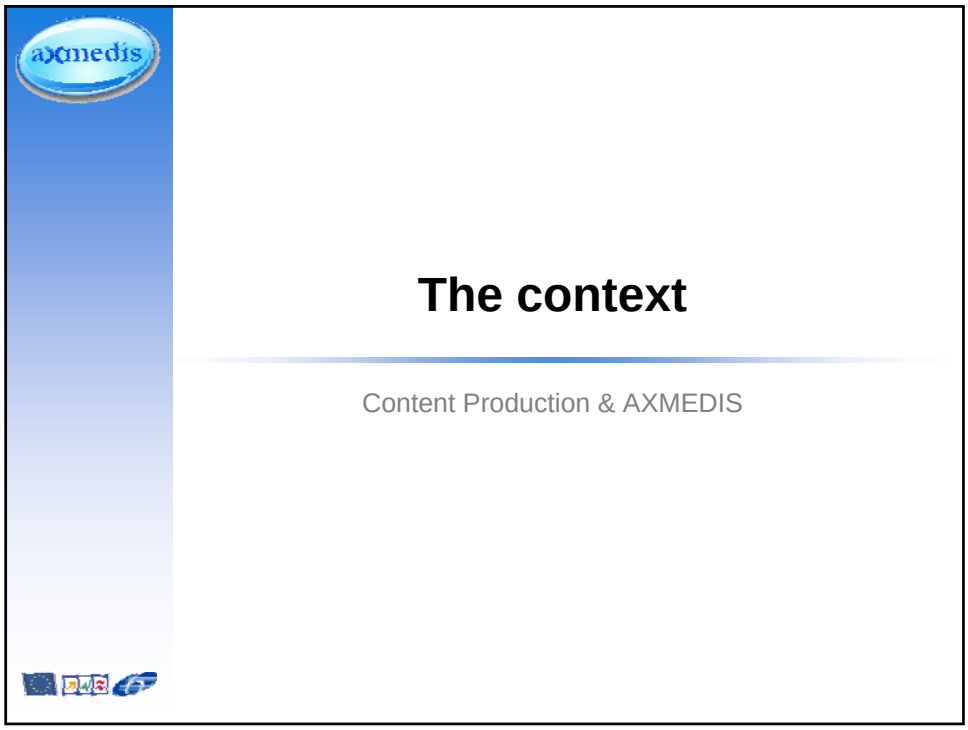
- **Intended audience**
  - Decision makers
  - Technical managers
- **Prerequisites**
  - Basic knowledge of Production cycle & tools
  - Basic knowledge of Protection tools

Objectives & Outcomes (I)

- **Objectives**
  - Recall overall content production process
  - New tools location in the process
  - Hints & suggestions on environment set-up
  - AXMEDIS content production framework usage know-how

Objectives & Outcomes (II)

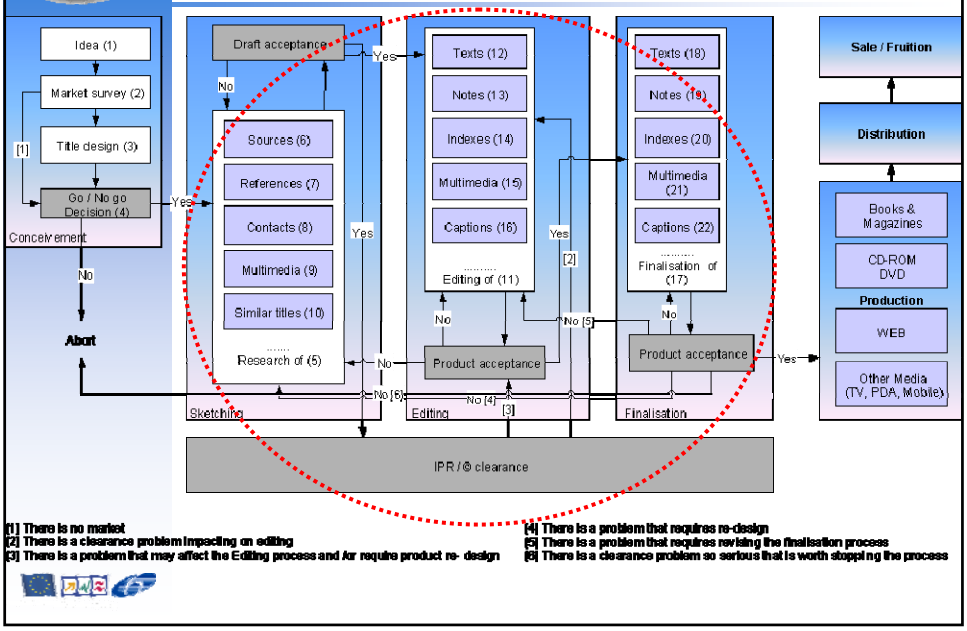
- **Outcomes**
  - AXMEDIS & MPEG-21 models know-how
  - AXMEDIS & MPEG-21 license know-how
  - AXMEDIS content production know-how
  - SMIL editing know-how
  - Content descriptors/fingerprint & metadata usage know-how



The context

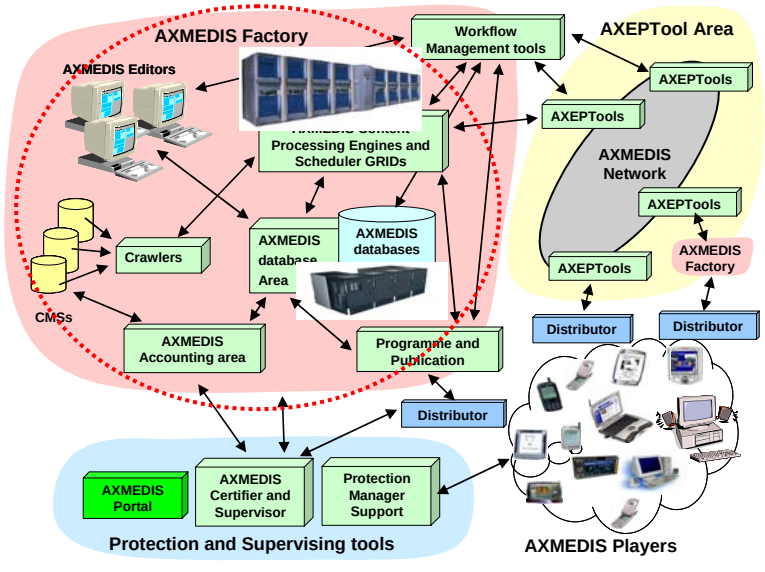
- **Objectives**
  - Recall overall content production process
  - New tools location in the process
  - Hints & suggestions on environment set-up
- **Outcomes**
  - AXMEDIS relation to standard content production context know-how

The process



[1] There is no market
[2] There is a clearance problem impacting on editing
[3] There is a problem that may affect the Editing process and /or require product re- design
[4] There is a problem that requires re-design
[5] There is a problem that requires revising the finalisation process
[6] There is a clearance problem so serious that is worth stopping the process

AXMEDIS Environment



Environment set-up (I)

- **Preliminary actions**
  - Retrieve install requirements & documentation
  - Organise work environment following requirements (HW/SW)
  - Organise needed space and infrastructure
- **Select and download tools**
  - Identify needed tools and related install pack
  - Download the install pack

Environment set-up (II)

- **Install tools**
  - Follow install pack instructions (automatic configuration recommended)
- **Configure tools**
  - Insert required data for custom configurations or wherever needed
- **Get acquainted with user interface & commands**
  - Read available documentation, suggestions, tips and FAQs
  - Look at provided examples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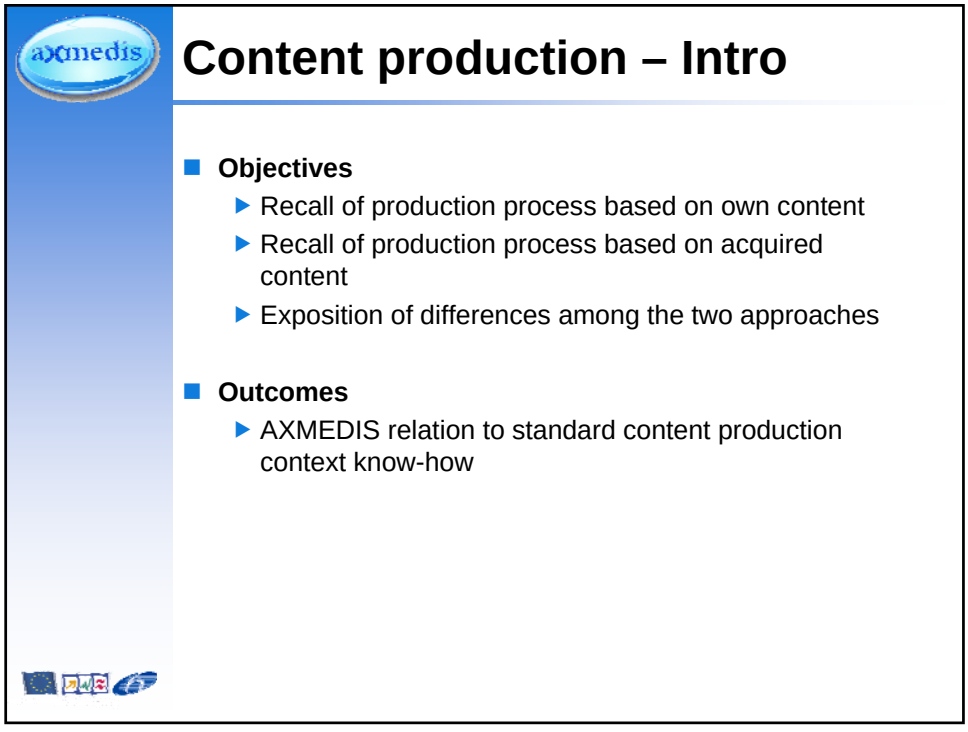
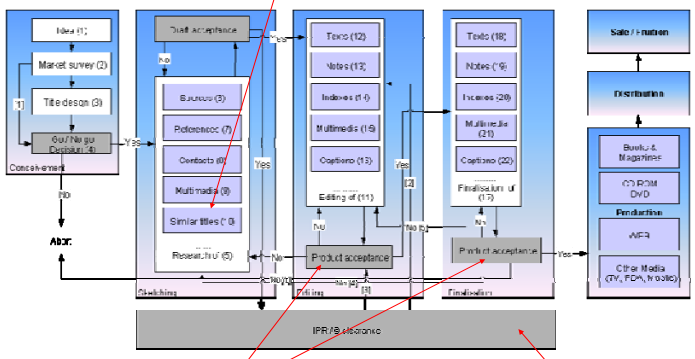
Content production – Intro
Starting from Own or Acquired Content


axmedis
Content production – Intro
Objectives
Recall of production process based on own content
Recall of production process based on acquired content
Exposition of differences among the two approaches
Outcomes
AXMEDIS relation to standard content production context know-how

Production from own content

The search for similar titles/products is aimed to prevent IPR infringement and allow proper IPR protection, licensing and enforcement

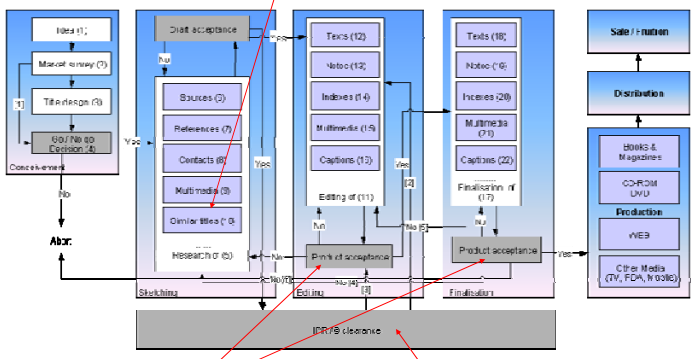


Each stage of product acceptance represents the start for a new IPR management step, from copyrighting to licensing and enforcement

IPR is internal therefore focus is not on clearance but on protection. Licensing and enforcement

Production from acquired content

As in previous case the search for similar titles/products is aimed to prevent IPR infringement and allow proper IPR protection, licensing and enforcement



Each stage of product acceptance represents the start for a new IPR management step, from copyrighting to licensing and enforcement

IPR is external therefore focus is on clearance as lack of it may cause great damage (including product abort), yet protection of work done has to be taken carefully into account. Copyrighting, Licensing and enforcement are still possible

Content production – Detail

From models to tools usage

Content production – Detail

- **Objectives**
  - Recall of basic & AXMEDIS principles
  - New tools presentation & location in the process
  - Hints & suggestions on AXMEDIS content production framework usage
- **Outcomes**
  - AXMEDIS & MPEG-21 models know-how
  - AXMEDIS content production know-how
  - SMIL editing know-how
  - Content descriptors/fingerprint & metadata usage know-how

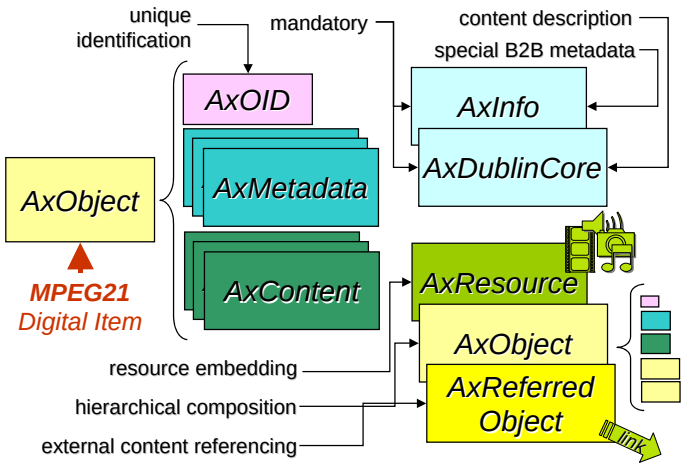
AXMEDIS Model – Definitions

- **AXMEDIS Objects**
  - MPEG21 Digital Item with a specific structure
  - Can be protected
  - Has several kinds of metadata
  - Can embed or refer resources and other AXMEDIS objects
- **AXMEDIS Objects Kinds**
  - Basic – with resources and the related metadata
  - Composite – containing / referencing other Basic or Composite AXMEDIS Objects

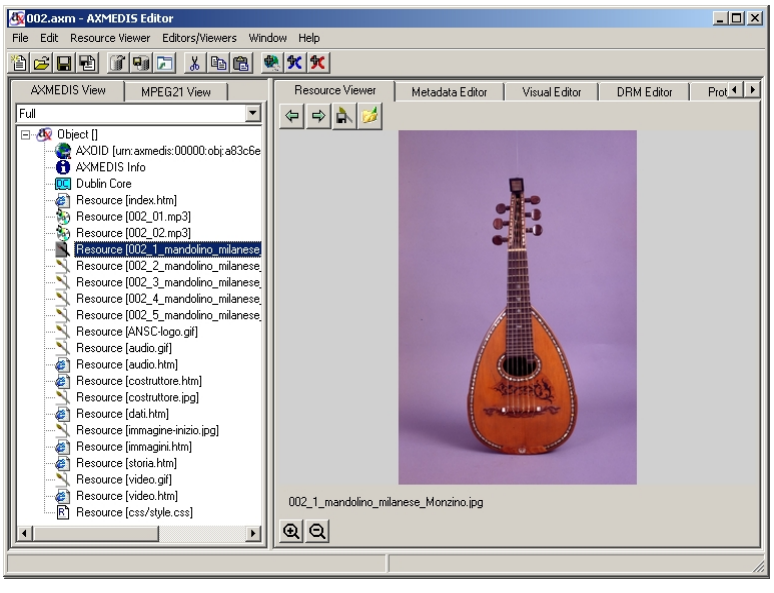
AXMEDIS Model – Singularities

- **Structure**
  - Hierarchical with one level for resources
  - Hierarchical with more levels for embedded AXMEDIS objects
- **Protection**
  - Only AXMEDIS Objects can be protected
- **Metadata**
  - Only AXMEDIS Objects have metadata not their components
  - AXMEDIS Objects metadata are always accessible

AXMEDIS Object structure



AXMEDIS Object example



Metadata – AxInfo (I)

- **The AxInfo part of the metadata contains B2B and AXMEDIS specific information like:**
  - ObjectCreators (ID, Name, Company, Nationality, etc.)
  - Owner (ID, Company etc.)
  - Distributor (ID, Name, Company, etc.)
  - Object version & revision
  - ObjectStatus, ObjectType
  - IsPromoOf (AXOIDs)
  - History of object production

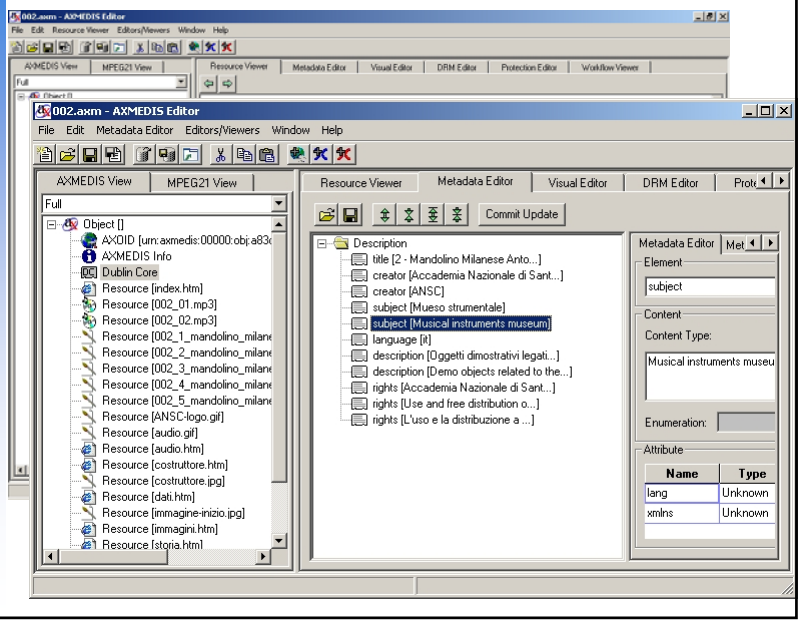
Metadata – AxInfo (II)

- **Furthermor AxInfo contains specific information like:**
  - Workflow information
  - Fingerprints algorithms used
  - Internal Potential Available Rights (the rights owned)
  - Potential Available Rights (the rights on sell)
  - Metadata certification and status

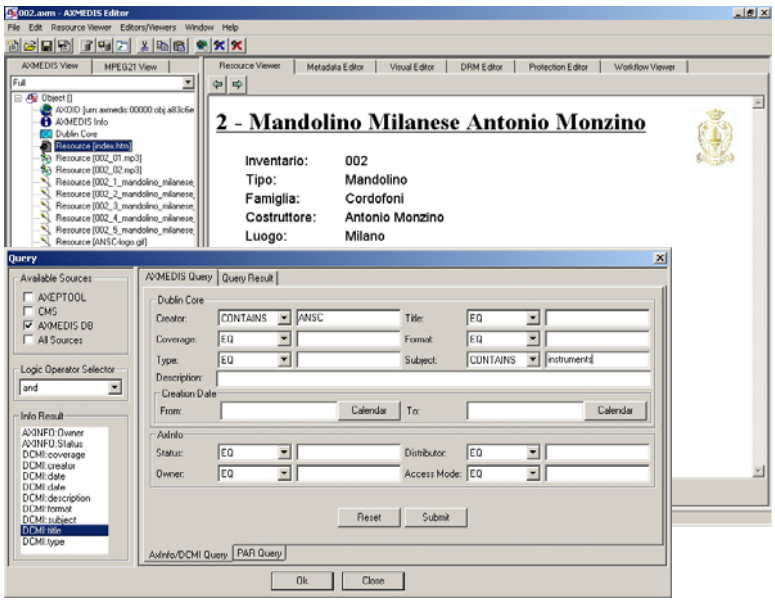
Metadata – Dublin Core (I)

- **Dublin Core Metadata are a standard set of metadata usable for multimedia cataloguing, comprising 15 basic elements:**
  - title
  - creator
  - contributor
  - description
  - coverage
  - format
  - date
  - Identifier
  - language
  - publisher
  - rights
  - source
  - subject
  - type
  - relation
- **Dublin Core Metadata comprises also other and derived elements :**
  - abstract
  - audience
  - available
  - conformsTo
  - dateAccepted, …

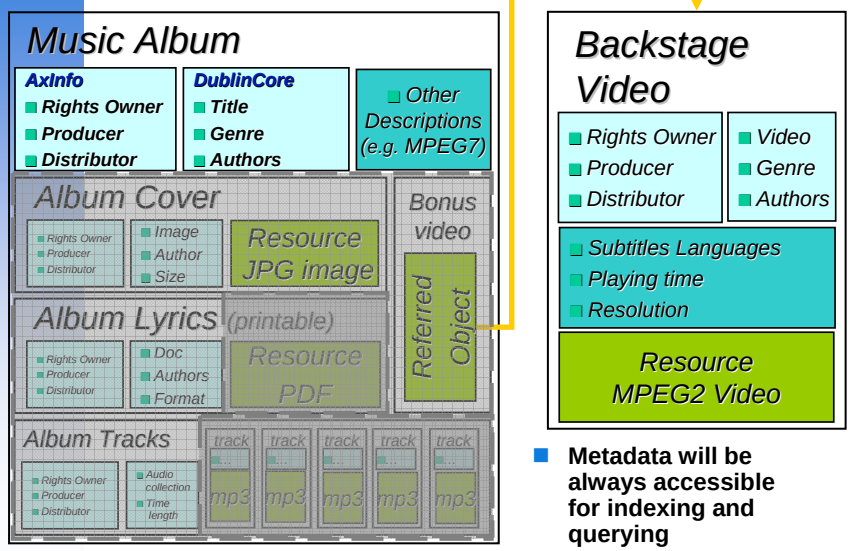
Metadata Example (DC)



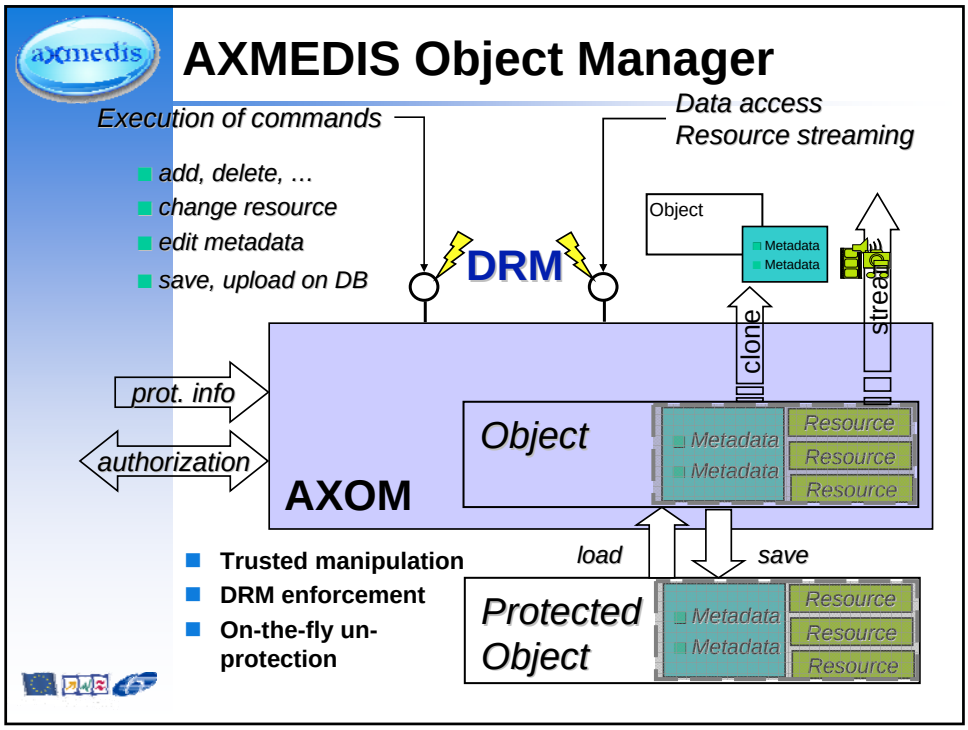
Metadata & object querying

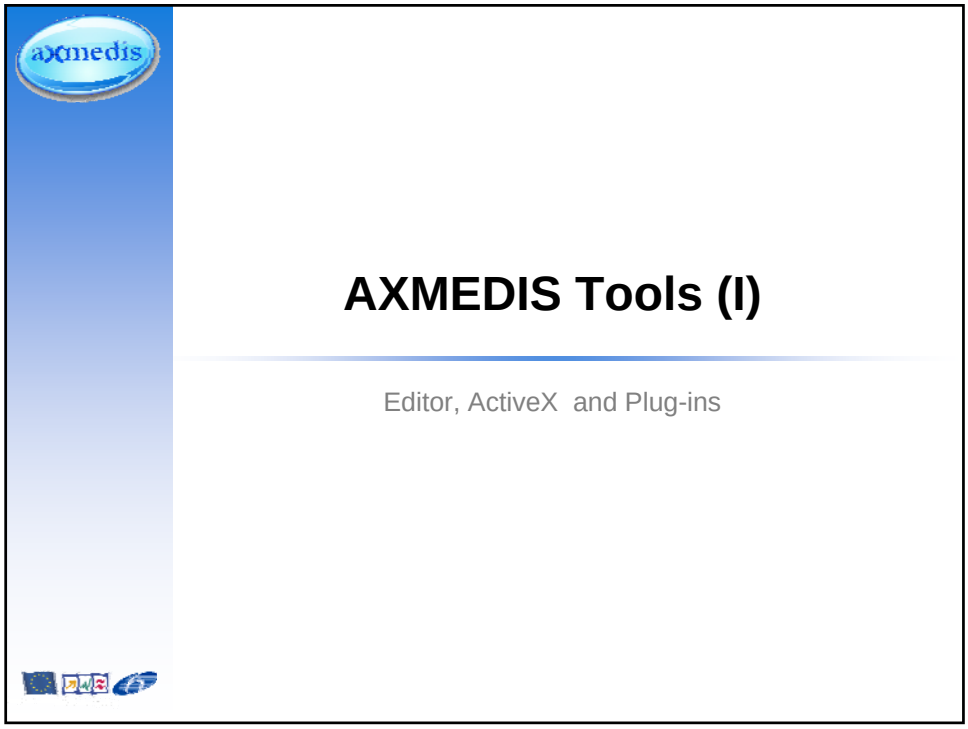


AXMEDIS Object: an example



- **Metadata will be always accessible for indexing and querying**

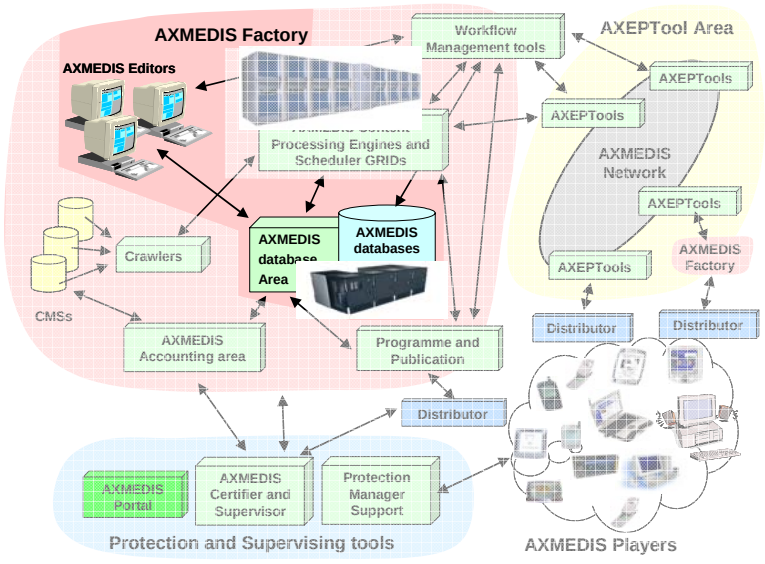

AXMEDIS Object Manager
Execution of commands
add, delete, …
change resource
edit metadata
save, upload on DB
Data access
Resource streaming
DRM
Object
Metadata
Metadata
stream
clone
prot. info
authorization
AXOM
Object
Metadata
Metadata
Resource
Resource
Resource
Trusted manipulation
DRM enforcement
On-the-fly un-protection
load
save
Protected Object
Metadata
Metadata
Resource
Resource
Resource


AXMEDIS Tools (I)
Editor, ActiveX and Plug-ins

AXMEDIS Editor

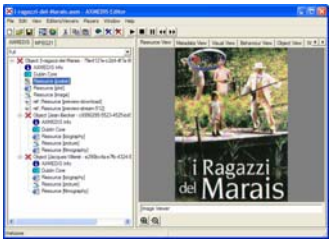
- **Objectives**
  - Definition of AXMEDIS Editing suite
  - New tools presentation & location in the process
- **Outcomes**
  - Understanding of AXMEDIS Editor
  - Usage of AXMEDIS Editor
  - Embedding Digital Resources know-how
  - Integration and composition know-how of
    - SMIL
    - HTML
    - MPEG-4….

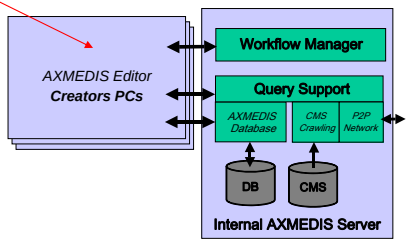
AXMEDIS Editor



AXMEDIS Editor – Definition

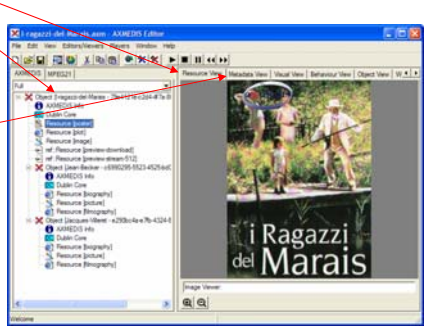
- **The AXMEDIS Editor is an application allowing**
  - manual production of AXMEDIS objects
  - inspection of automatically produced objects
  - finishing AXMEDIS objects pre-produced automatically





AXMEDIS Editor – Functionalities

- **It integrates many Editors & Viewers to handle all the aspects of the AXMEDIS Objects production**
  - Resource
  - DRM
  - Protection
  - Presentation
  - Annotation
  - Metadata
  - …
  - Workflow



AXMEDIS ActiveX / plug-in(s)

AXMEDIS Player Mozilla plug-in

Content Processing usages

- **AXMEDIS objects creation/processing/adaptation**
  - For audio/video
  - For multimedia
- **Content and Metadata adaptation/processing**
- **Estimation of descriptors/fingerprinting**
- **Content protection and governance**
- **A combination of all this thanks to integration with**
  - Workflow
  - Crawler

Adaptation of audio content

- **Functionalities supported**
  - Down-sampling
  - Channel-mixing
  - MPEG-21Digital Item adaptation
  - Adaptation to terminal output capabilities
  - Selection of a precisely specified file portions
  - Adaptation to specific user's presentation / rendering preferences
- **Supported formats & codecs**
  - mp3, wav, aiff, wma…

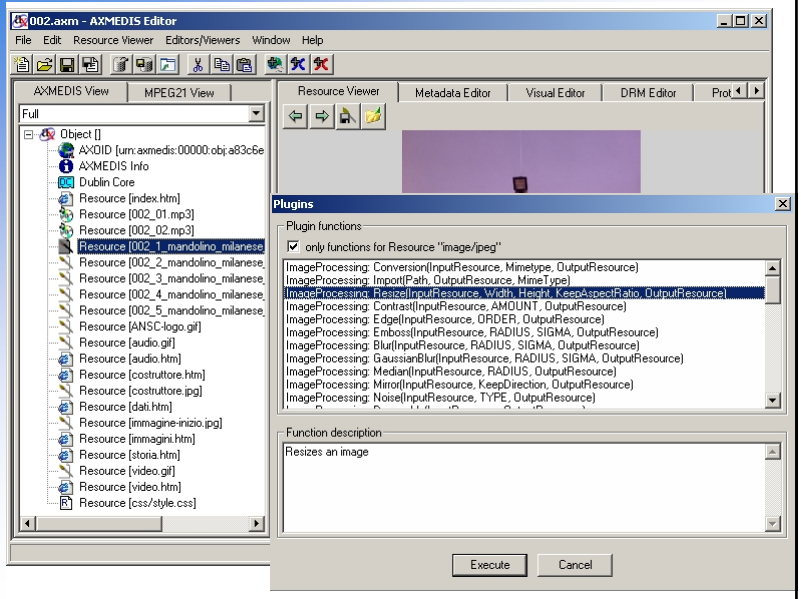
Multimedia content adaptation

- **Functionalities supported**
  - Add, remove and delay Media tracks
  - Extract single track from multimedia files
  - Conversion between different formats
  - Concatenation of multimedia files
  - File splitting by size or time
- **Supported formats**
  - MPEG-4, MPEG-1/2, JPEG, AVI, BT, XMT, SWF, X3D, SMIL, 3GP…
  - SRT subtitles…

Usage of Fingerprint

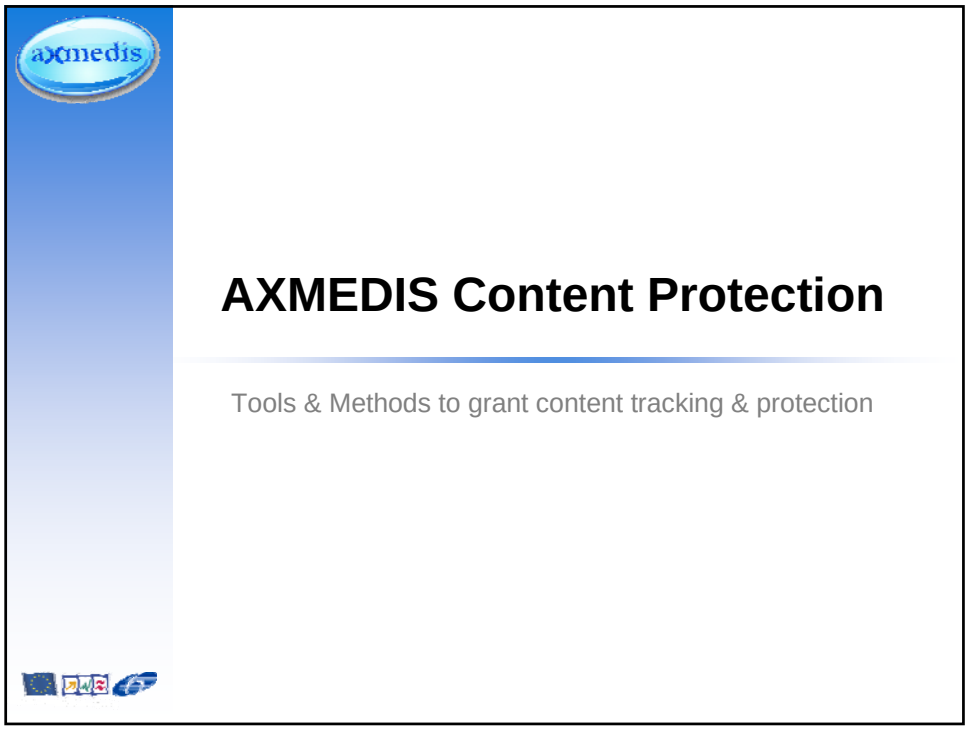
- **To monitor**
  - Distribution channels
  - Published content
  - Acquired content
  - Distributed content
  - Used content
- **To detect usage / passage of content by**
  - Estimating in real time the fingerprint
  - Searching into the database

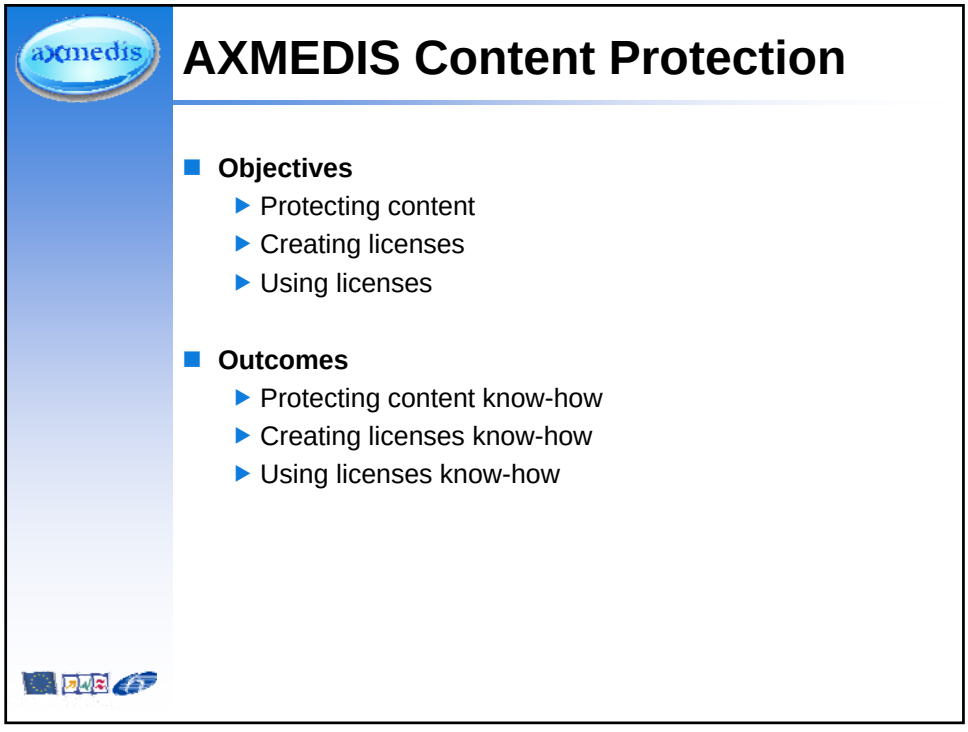
Content Processing plug-ins



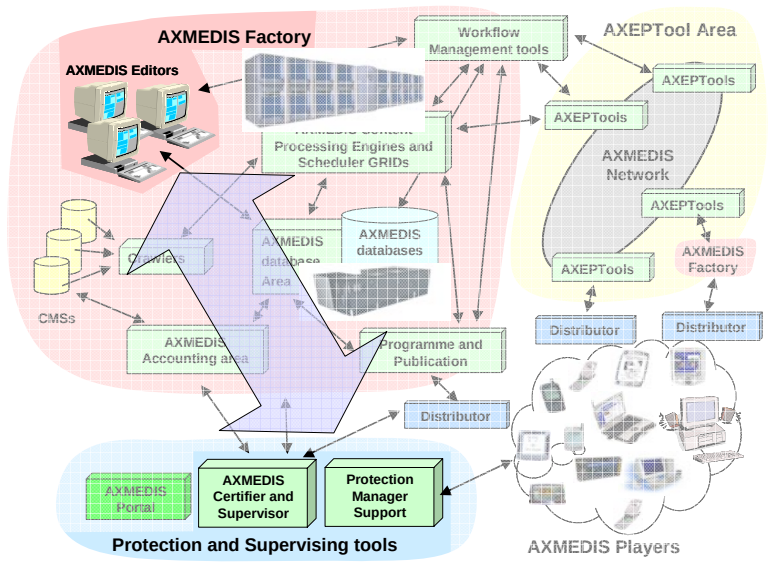
Practice section

- **Examples of operations using**
  - AXMEDIS Editors
  - Metadata editor
  - Plug in for processing content
  - Access to the database
  - Creation of composed objects
    - Digital resources
    - Formats (SMIL, HTML, …MPEG-4)
    - Nesting levels
  - AXMEDIS Players as ActiveX / plug-in(s)

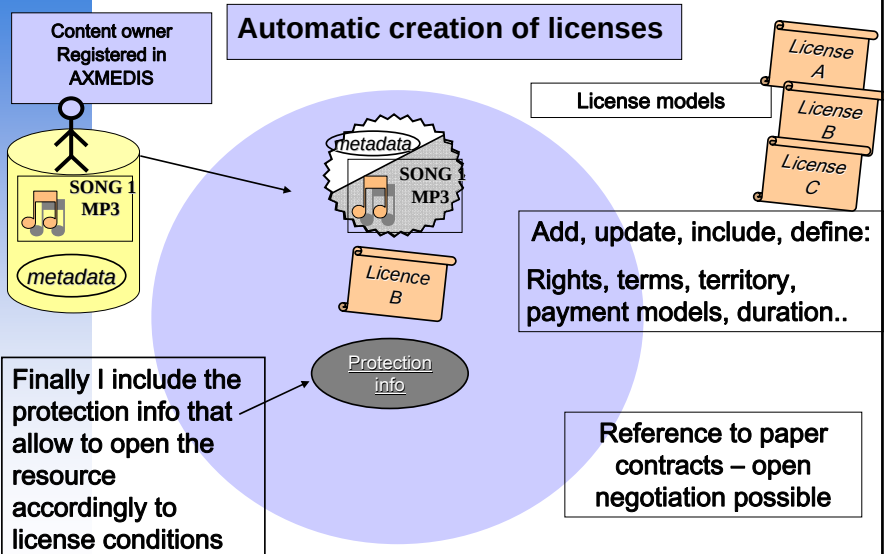

axmedis
AXMEDIS Content Protection
Tools & Methods to grant content tracking & protection


axmedis
AXMEDIS Content Protection
Objectives
Protecting content
Creating licenses
Using licenses
Outcomes
Protecting content know-how
Creating licenses know-how
Using licenses know-how

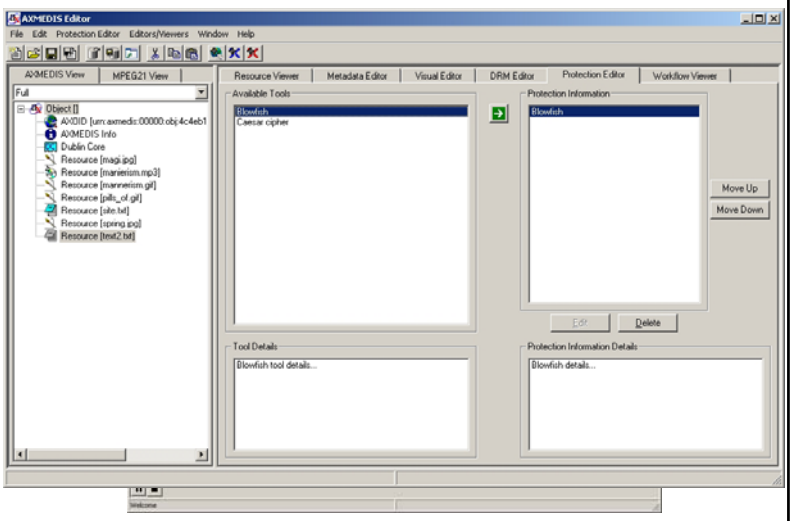
AXMEDIS Content Protection



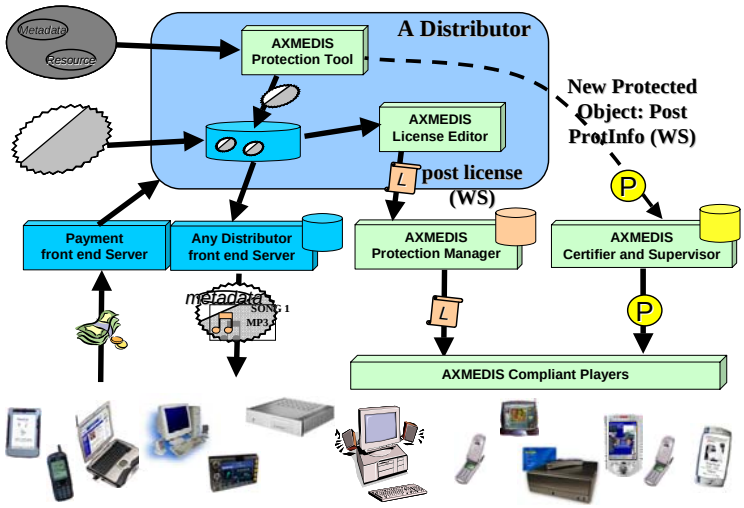
AXMEDIS Production area



Protection Editor



Protection & Control Process



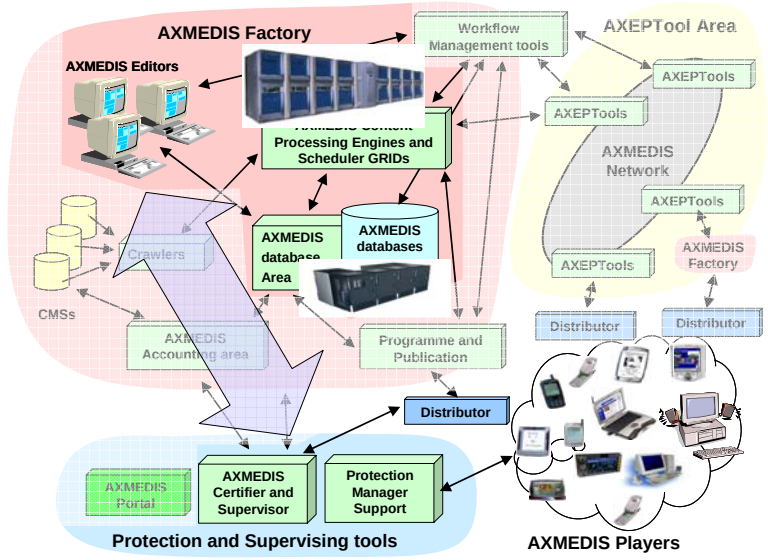
Protection Manager Support

- **Objectives**
  - Provide the licensing functionality to the system
    - Verification, storage, management, authorisation of user actions
  - Connect clients to AXMEDIS Certifier and Supervisor through secure channels
    - Keep track of user actions, even off-line
- **Outcomes**
  - Several levels of control and governance: PMS Client, PMS Domain and PMS Server
  - Allow on-line and off-line operation to the users

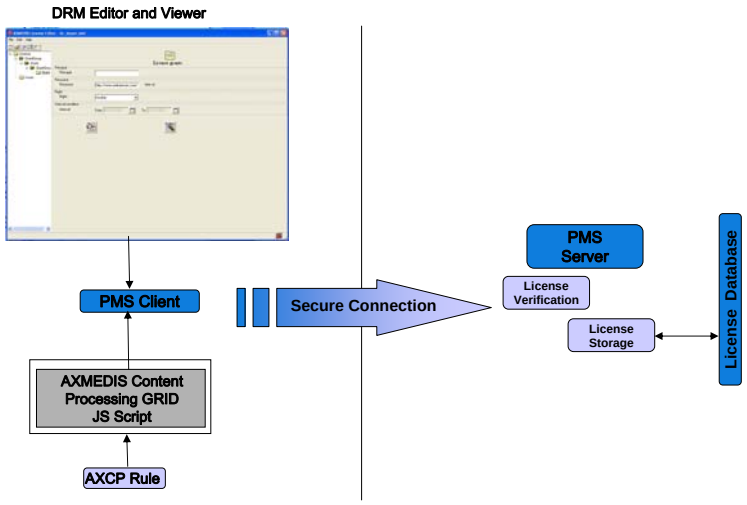
Protection Manager Support

- **PMS Client**
  - Provide licensing functionality on the client side
  - Establish secure connection to the PMS Domain / Server
  - Tracking of user actions for allowing off-line operation
- **PMS Server**
  - Storage of licenses to be able to verify license chain
  - Connection to AXMEDIS Certifier and Supervisor for checking off-line user actions, tools certification and verification , etc
- **PMS Domain**
  - Support for Domains at two levels: Home and Factory

DRM Editor & Viewer and PMS

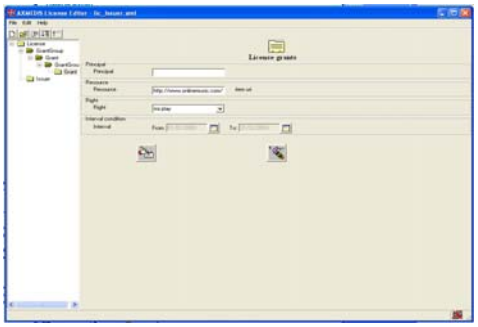


License Production



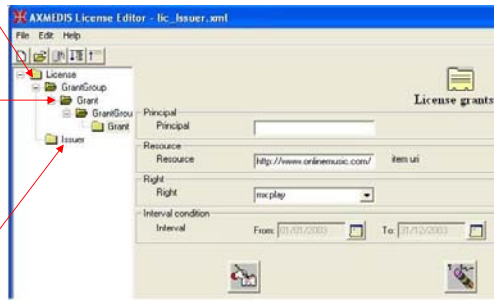
DRM Editor and Viewer

- **Purpose**
  - Edit and display licenses and Potential Available Rights (PAR)
- **Availability**
  - Stand-alone application
  - Integrated into AXMEDIS Editor (PAR Support)



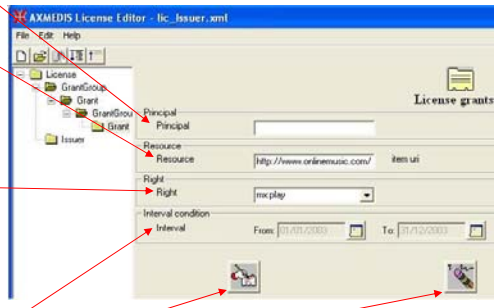
DRM Editor and Viewer

- **License edition**
  - License root element
- **Permissions**
  - Grants in MPEG-21 standard nomenclature
- **Issuer**
  - The one who issues the license (content owner, distributor, etc.)

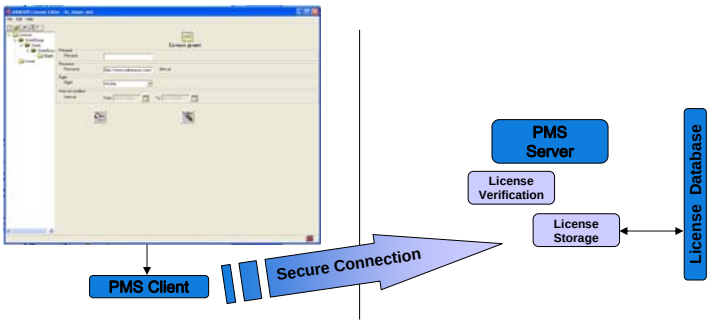


DRM Editor and Viewer

- **Principal**
  - The licensee
- **Resource**
  - Multimedia content
- **Right**
  - The right given to make use of the resource
- **Conditions**
  - Time interval
  - Number of times
  - Territory
  - …



DRM Editor and Viewer and PMS



- **Sending license to Protection Manager Support (PMS) Server from DRM Editor and Viewer**
  - When the license is finished, the PMS Client sends the license through a secure connection to PMS Server
  - The license is verified against parent license(s) or PAR. If it is valid, then it is stored into License Database
  - This process can be automatised using JScript rules

Practice section

- **Examples of operations using**
  - Protection mechanisms
  - DRM Editor and viewer
  - Metadata editor
  - License production and storage
  - Usage of Protected Objects

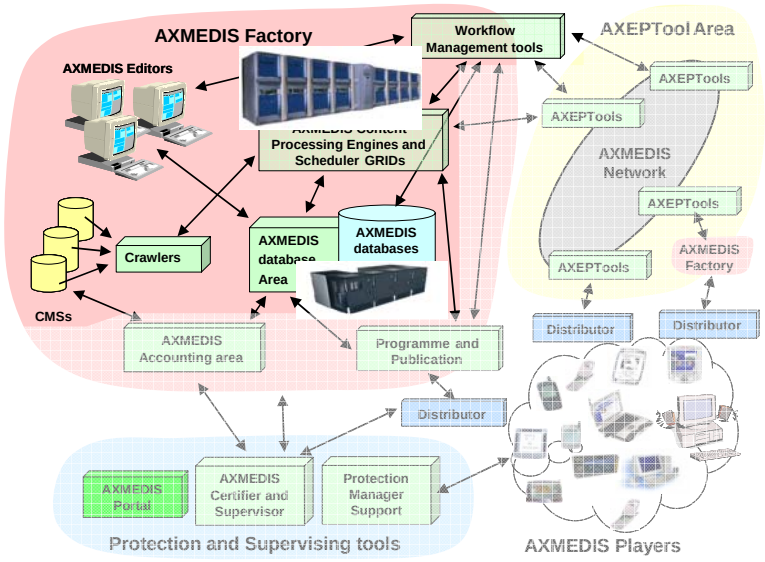
AXMEDIS Tools (II)

Content crawling and Focuseek

AXMEDIS Crawler

- **Objectives**
  - Definition of AXMEDIS Crawler
  - Tool location in the process
- **Outcomes**
  - Understanding of AXMEDIS Crawler
  - Usage of AXMEDIS Crawler know-how

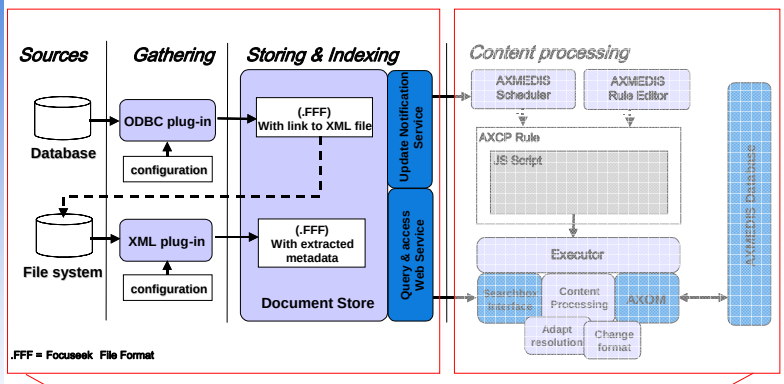
AXMEDIS Crawler



Crawling process

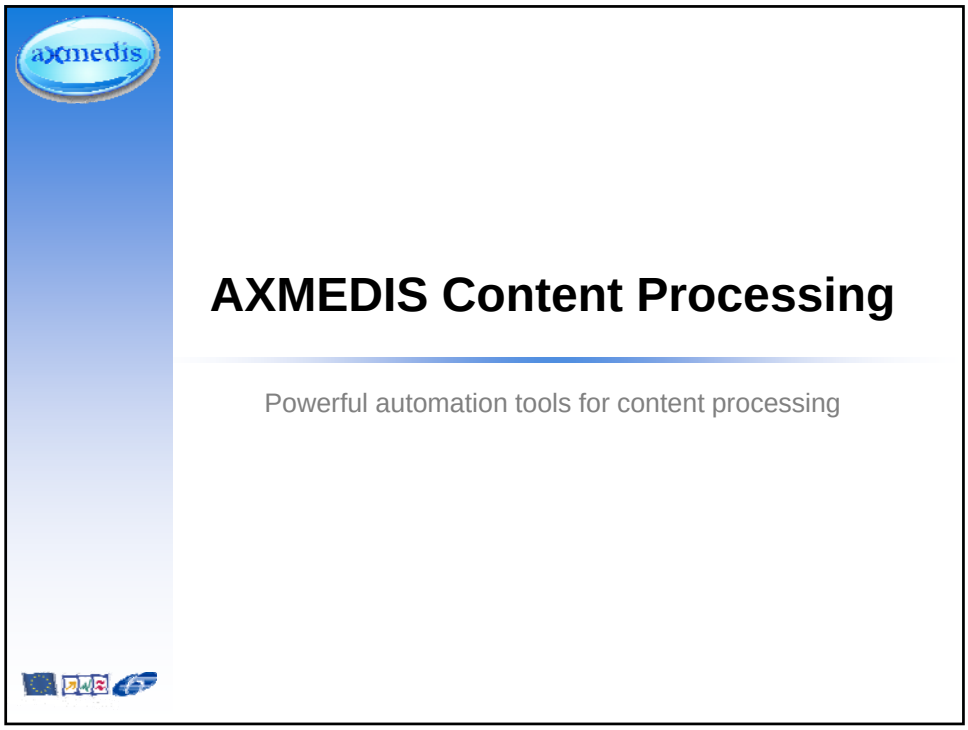
- **Objectives**
  - Ingestion into AXMEDIS Database
- **Input**
  - List of sources
  - Definition of Rules & Timers
  - Supporting scripts
- **Output**
  - Ingestion into AXMEDIS Database
  - Content and Metadata adaptation/processing
  - Estimation of descriptors/fingerprinting

Crawling & Content processing



Crawling is a way to populate AXMEDIS database and can be profitably connected to content processing to maximise benefits

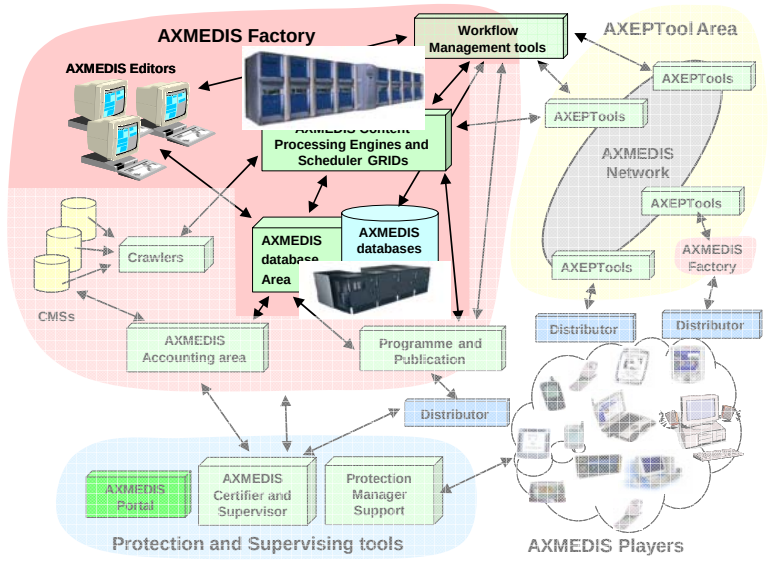
AXMEDIS content processing is a powerful solution to optimise time and resource consumption in relation to repetitive content production operation



AXMEDIS Content Processing

- **Objectives**
  - Definition of AXMEDIS Content Processing
  - Tool location in the process
- **Outcomes**
  - Understanding AXMEDIS Content Processing
  - Usage of AXMEDIS Content Processing know-how

AXMEDIS Content Processing

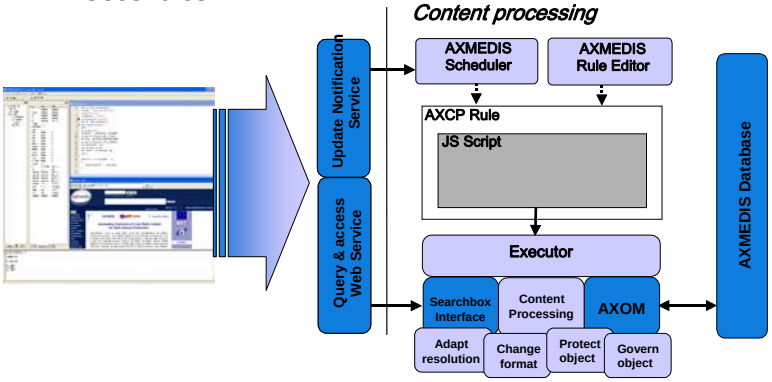


Content Processing

- **Objectives**
  - AXMEDIS objects creation/processing
  - AXMEDIS objects transcoding/adaptation
- **Input**
  - Definition of Rules & Timers
  - Supporting scripts
- **Output**
  - AXMEDIS objects creation/processing/adaptation
  - Estimation of descriptors/fingerprinting
  - Content and Metadata adaptation/processing

Content Processing Definition

- **AXMEDIS Content Processing (AXCP)**
  - A distributed tool based on a GRID
  - Workflow / Crawler connected
  - Uses rules



AXMEDIS Publishing Tools

Powerful tool to enable content delivery

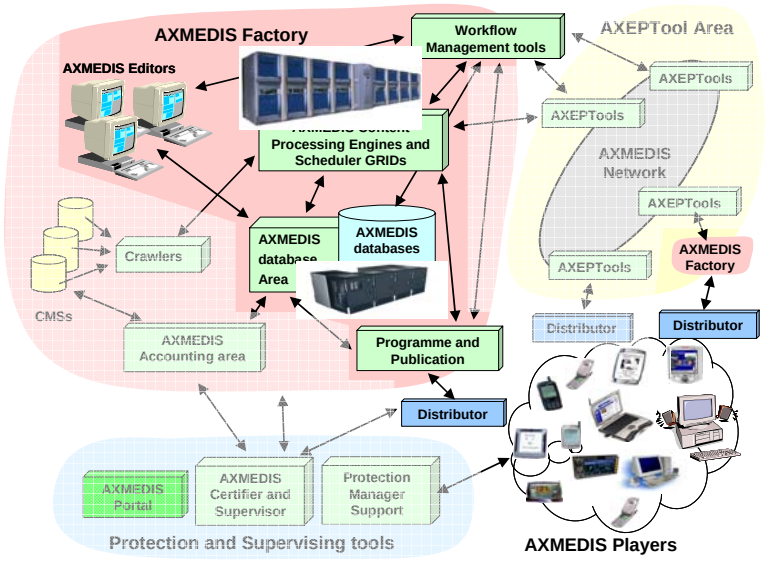
AXMEDIS Publishing Tools

- **Objectives**
  - Introduce AXMEDIS publishing tools
  - Explain their relation with the content production chain
- **Outcomes**
  - Understanding of Programme & Publication (P&P)
  - Understanding of AXMEDIS Query on demand
  - Understanding of AXMEDIS distribution mechanism

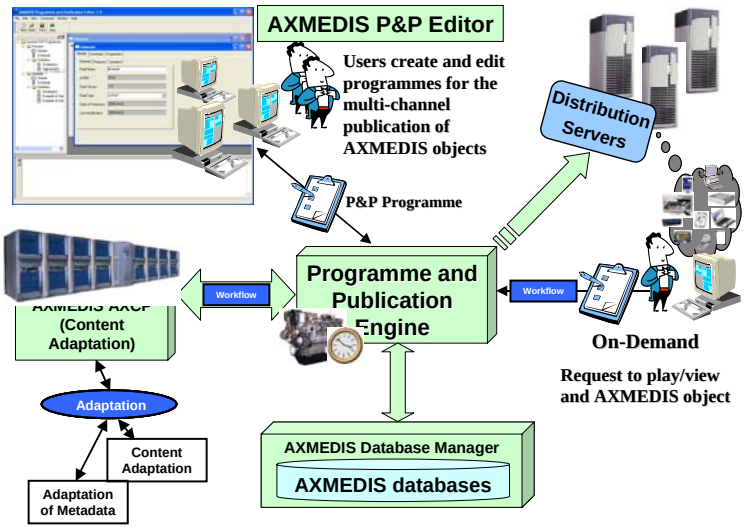
Introduction to P&P

- **Aim**
  - Operations and applications of the P&P area
    - AXMEDIS P&P programmes: create, edit, test, activate
    - multi-channel distributions
- **Overview**
  - P&P Area within the AXMEDIS architecture
  - Tools and functionalities
  - P&P Editor
  - Create and edit a P&P programme
  - “Test”, “Activate” or “Stop” a P&P programme
  - AXMEDIS P&P Engine and P&P Engine Monitor
  - “On-Demand” requests

Programme & Publication

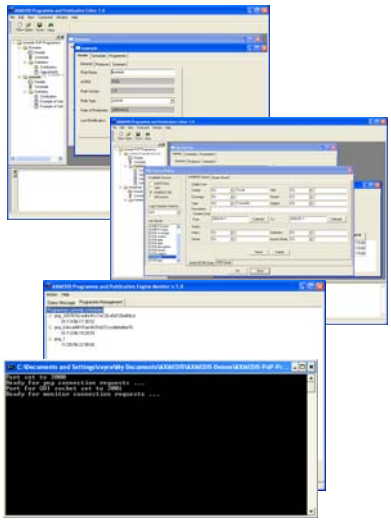


P&P overview

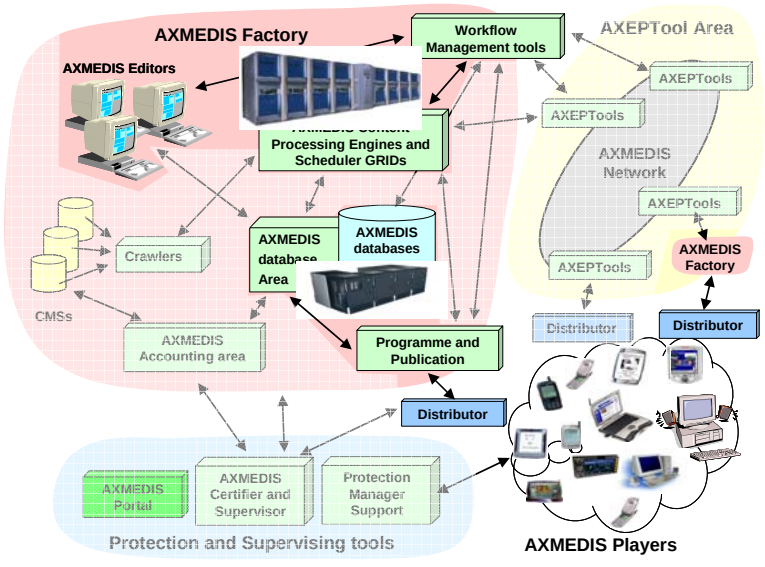


P&P Area Tools

- **AXMEDIS Programme and Publication**
  - P&P Programme Editor (GUI)
    - Editing
    - Search (P2P, AXDB)
    - Testing and Activating
    - Quick test; Full test
  - P&P Engine
    - Links to AXMEDIS Content Processing area
    - Links to the AXMEDIS Distribution Servers
    - GUI monitor
- **On-Demand**



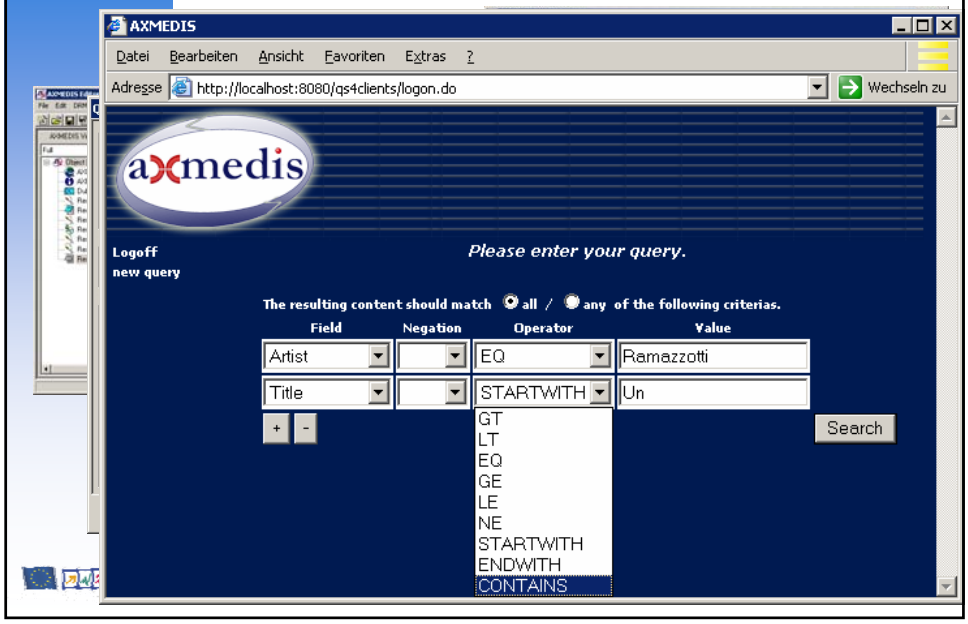
AXMEDIS Query On Demand



Query On Demand

- **The actor wants to select and download specific content according to his wishes, e.g. based on**
  - Artist
  - Title
  - Year of publication
- **AXMEDIS provides a simple search mechanism**
  - Simple queries are enriched using information about the client device and the distribution channel
  - User can select a specific content or refine the query
- **The P&P Engine adapts On-Demand content to fit with the user's device (client profile)**
  - Content is produced on demand based on client and distribution profile
  - Content is downloaded and played on the client device

Querying



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- **ODRL** http://odrl.net/
- **OMA** www.openmobilealliance.org
- **MI3P, Music Industry Integrated Identifier Project** http://www.mi3p-standard.org/

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