axmedis

Automating Production of Cross Media Content for Multi-channel Distribution

www.axmedis.org

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Un'architettura per la produzione automatizzata di contenuti crossmediali e la distribuzione multicanale

P. Bellini, I. Bruno, P. Nesi, D. Rogai, A. Vallotti

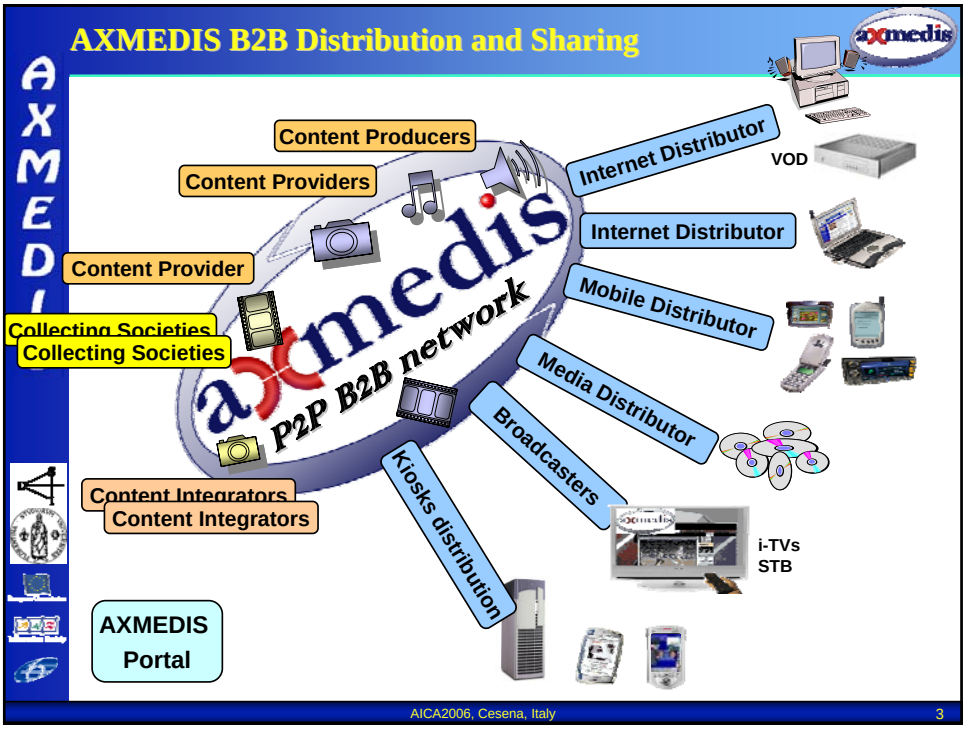
University of Florence, DISIT LAB,
Distributed Systems and Internet Technology
Via S. Marta 3, Florence, Italy
email: nesi@dsi.unifi.it

AXMEDIS

AXMEDIS Objectives

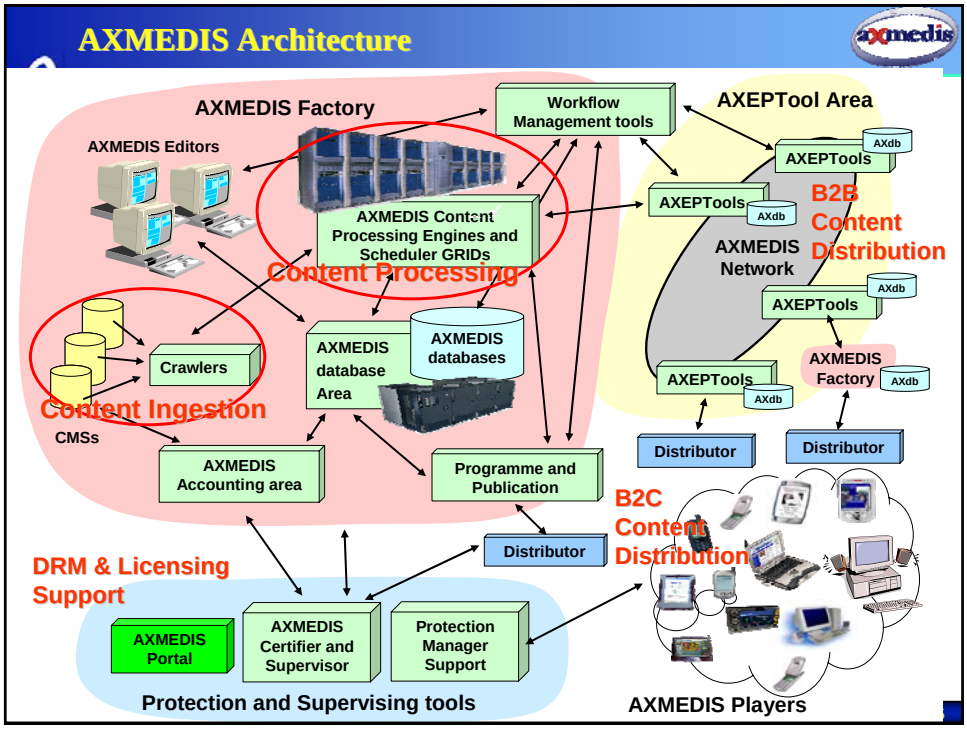
- **AXMEDIS is a R&D IP project of the European Commission**
  - Performing research on enabling technologies to allow
    - reduction of distribution and aggregation costs for content production and management
  - New models, methods and tools for content production, protection and distribution
- **Major needs and technical goals:**
  - Supporting interoperability among different
    - content formats
    - distribution channels (TV, PDA, mobile, kiosks, satellite,..)
    - DRMs (digital rights management model) (e.g., MPEG-21, OMA, etc.)
  - Supporting massive processing for content production and distribution (on demand), license processing, event tracking, protection, tracking and DRM
  - Enforcing flexibility in business and transaction models
  - Integration and Harmonization of DRM in B2B and B2C areas
  - Modeling secure/legal P2P content sharing for both B2B and B2C
  - Expanding MPEG-21 standard

AXMEDIS B2B Distribution and Sharing



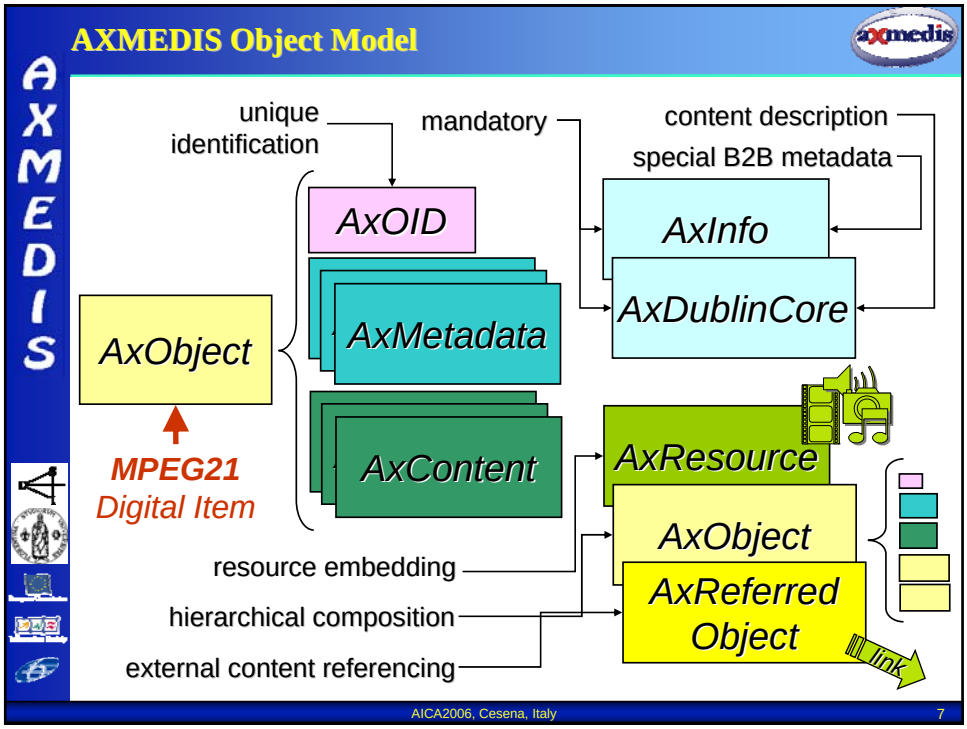
AXMEDIS Applications

- **Applicative areas of automated content production and protection**
  - Entertainment, edutainment, infotainment, educational, etc.
    - Real-time and non-real-time content distribution
    - Internet, P2P, broadcast, IPTV, mobiles, DVB-T, DVB-S, DVB-H, etc.
  - Other relevant applicative areas are:
    - banking, governmental, military and healthcare
- **Technical Applications of AXMEDIS**
  - Massive and scalable production of content on demand
  - Content distribution: single and multi-channel
  - Content protection and DRM
  - Content recognition and monitoring
  - Content management and archive management
  - Content sharing among producers and distributors
  - Content integration and metadata enrichment
  - Etc.
- **AXMEDIS Framework for all**
  - Set up and maintenance of an European Platform for improving the knowledge and tools on e-Commerce of digital goods.
  - Making the AXFW accessible



The Cross Media Content Model

- **AXMEDIS Cross media content model**
  - Model supporting B2B-B2C content production and transactions, for protected and non protected objects
  - Based on MPEG21 Digital Items
  - Overcoming limitations in content modeling and DRM of Windows Media, I-Tune, Adobe, Google, etc.:
    - Cross media: images, documents, video, audio, HTML, SMIL, MPEG-4, etc.;
    - Content components: composition and reuse;
    - DRM Chain of licenses: B2B and B2C integration;
    - Integration of semantics and behavior into the content.
  - Supporting legal P2P for B2B and B2C
- **DRM, Digital Rights Management**
  - Modeling licenses for the B2B-B2C areas
  - Algorithms and tools for processing licenses, chains and relationships


AXMEDIS Object Model
unique identification
mandatory
content description
special B2B metadata
AxOID
AxInfo
AxDublinCore
AxObject
AxMetadata
AxContent
MPEG21 Digital Item
AxResource
AxObject
AxReferred Object
link
resource embedding
hierarchical composition
external content referencing
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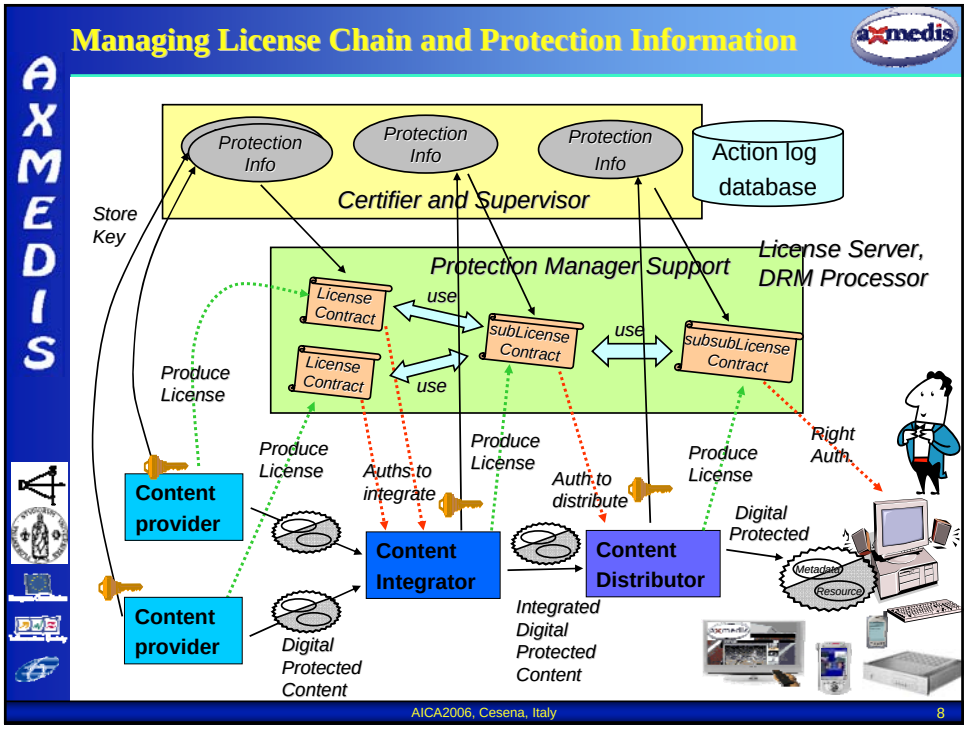
Managing License Chain and Protection Information
Protection Info
Protection Info
Protection Info
Action log database
Certifier and Supervisor
Store Key
Protection Manager Support
License Server, DRM Processor
License Contract
use
subLicense Contract
use
subsubLicense Contract
License Contract
use
Produce License
Produce License
Auths to integrate
Produce License
Auth to distribute
Produce License
Right Auth
Content provider
Content provider
Content Integrator
Content Distributor
Digital Protected
Digital Protected Content
Integrated Digital Protected Content
Metadata
Resource
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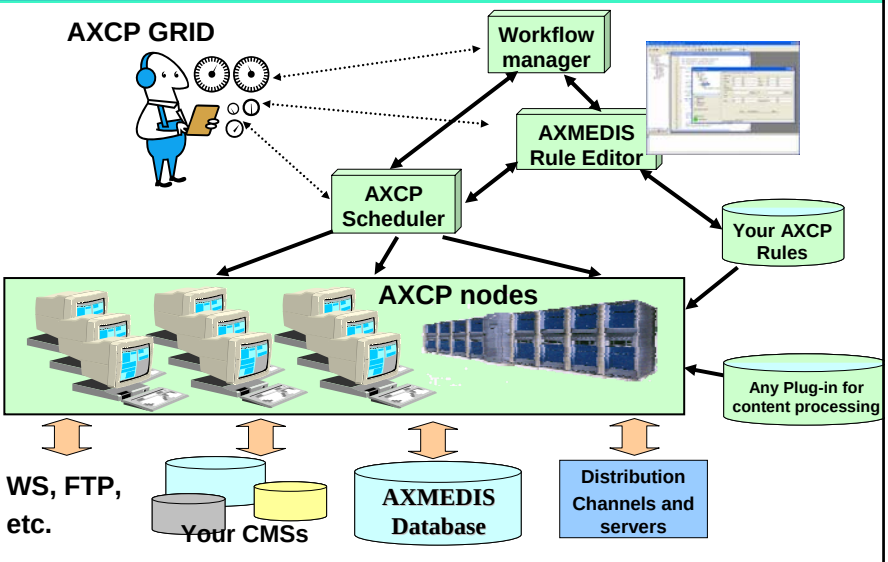
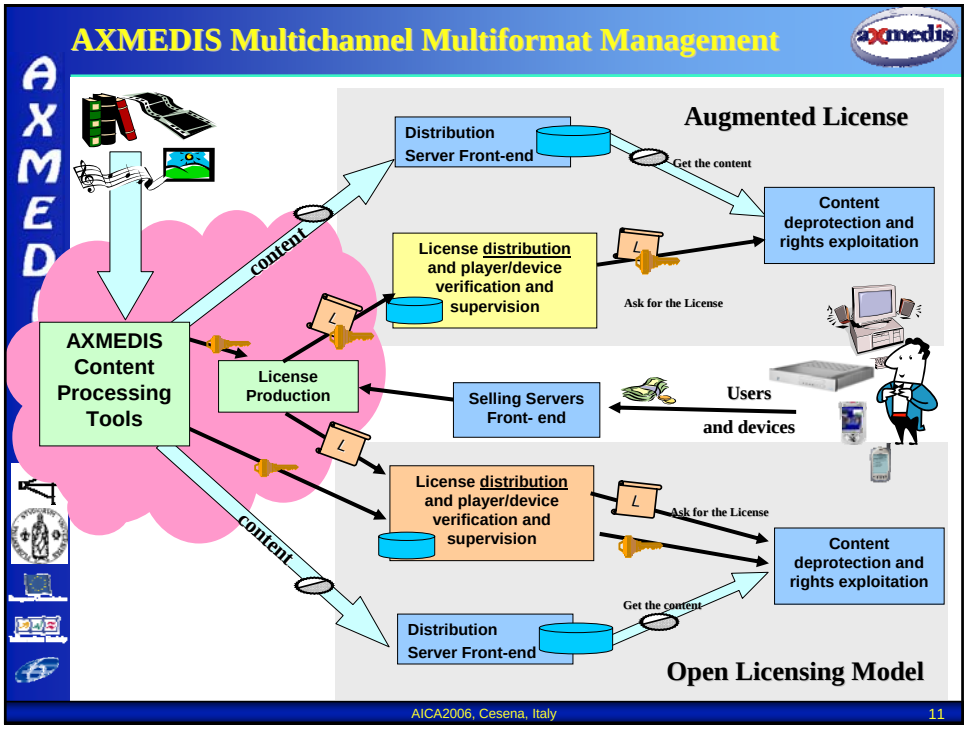
The Content Processing

- **Automating back office content production/protection and distribution**
  - Open, secure and scalable architecture for content processing, GRID
  - Language for content processing and GRID
  - 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 the on-demand problem:
    - 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.

AXMEDIS Content Processing GRID




AXMEDIS Multichannel Multiformat Management
Augmented License
Distribution Server Front-end
Get the content
Content deprotection and rights exploitation
License distribution and player/device verification and supervision
Ask for the License
AXMEDIS Content Processing Tools
content
License Production
Selling Servers Front- end
Users and devices
License distribution and player/device verification and supervision
Ask for the License
Content deprotection and rights exploitation
content
Get the content
Distribution Server Front-end
Open Licensing Model
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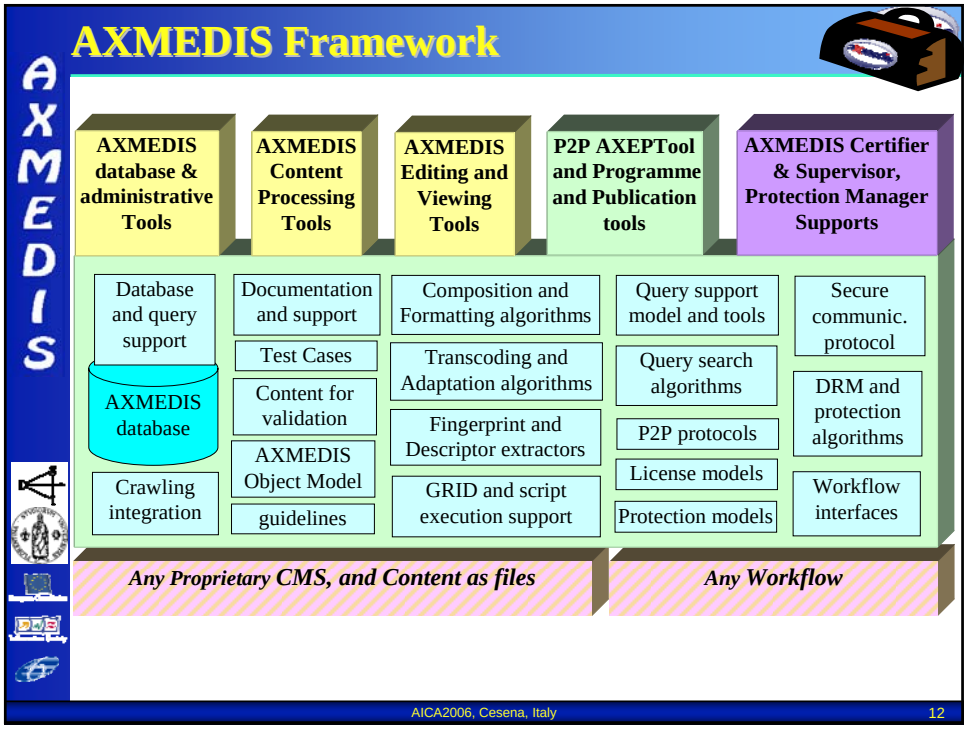
AXMEDIS Framework
AXMEDIS database & administrative Tools
AXMEDIS Content Processing Tools
AXMEDIS Editing and Viewing Tools
P2P AXEPTool and Programme and Publication tools
AXMEDIS Certifier & Supervisor, Protection Manager Supports
Database and query support
AXMEDIS database
Crawling integration
Documentation and support
Test Cases
Content for validation
AXMEDIS Object Model
guidelines
Composition and Formatting algorithms
Transcoding and Adaptation algorithms
Fingerprint and Descriptor extractors
GRID and script execution support
Query support model and tools
Query search algorithms
P2P protocols
License models
Protection models
Secure communic. protocol
DRM and protection algorithms
Workflow interfaces
Any Proprietary CMS, and Content as files
Any Workflow
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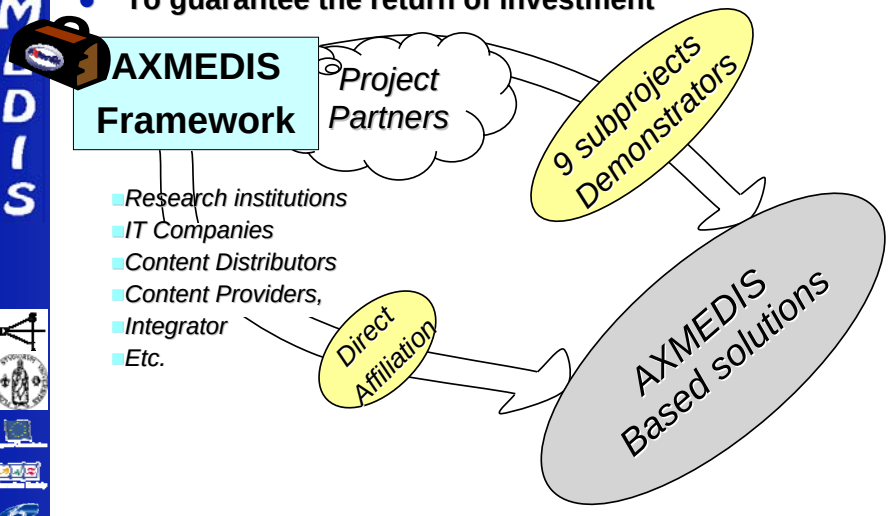
Use of AXMEDIS Framework

- **Exploitation of AXMEDIS research and innovation**
- **To guarantee the return of investment**



Conclusions

- **AXMEDIS is a R&D IP project of the European Commission (DG-INFSO)**
  - 4 years project started Sept. 2004, 8.4 Meuro of funding, for more than 14 Meuro of costs
  - A short overview of AXMEDIS Framework and tools have been given
  - Affiliations are open to access at the AXMEDIS Framework:
    - SIAE, HEXAGLOBE, FOCUSEEK, …
- **Major challenges of AXMEDIS are the:**
  - Defining a formal Cross media model
    - Supporting content interoperability, composition, etc.
    - Integrating DRM and business models
    - Formal verification and security assurance/enforcement
  - Automating content processing along the value chain
    - Language and GRID for content processing and production
  - Supporting
    - DRM models along the value chain (different transactions and business models)
    - Convergence of media
      - different formats, …
      - Multichannel, different distribution, different devices,
- **Future work:**
  - Still one year of research activity
    - Models and tools improvement
    - Integration of optimization algorithms (e.g., Taboo Search, Genetic Algorithm, etc…) to use more efficiently the GRID infrastructure
    - Integration of rational choice of the computational resources processing profiles automatically and taking into account CPU profile for optimization processing.
    - Expansion of the language with the addition of other processing functionalities
  - Support of several demonstrators spread in Europe for the next two years

AXMEDIS

Thanks for your attention!