Un’architettura per la produzione automatizzata di contenuti crossmediale e la distribuzione multicanale

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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

Content Providers

Internet Distributor

Mobile Distributor

Media Distributor

Broadcasters

i-TVs

STB

Kiosks distribution

VOD

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
AXMEDIS Architecture

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**

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

- **MPEG21 Digital Item**

- **Unique identification**
- **Mandatory**
- **Content description**
- **Special B2B metadata**

- **Resource embedding**
- **Hierarchical composition**
- **External content referencing**

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**Managing License Chain and Protection Information**

- **Protection Manager Support**
- **Certifier and Supervisor**
- **Action log database**
- **License Server, DRM Processor**
- **Rights Auth.**

- **Content provider**
- **Content Integrator**
- **Content Distributor**

- **Store Key**
- ** Produce License**
- **Produce License**
- **Use**
- **Auths to integrate**
- **Auths to distribute**
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 Multichannel Multiformat Management

Augmented License

License distribution and player/device verification and supervision

License distribution and player/device verification and supervision

Distribution Server Front-end

Content deprotection and rights exploitation

License Production

Selling Servers Front-end

Ask for the License

Ask for the License

Get the content

Get the content

Open Licensing Model

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

Documentation and support

Composition and Formatting algorithms

Query support model and tools

Secure communic. protocol

AXMEDIS database

Test Cases

Transcoding and Adaptation algorithms

Query search algorithms

DRM and protection algorithms

Crawling integration

Content for validation

Fingerprint and Descriptor extractors

P2P protocols

Workflow interfaces

AXMEDIS Object Model guidelines

GRID and script execution support

License models

Protection models

Any Proprietary CMS, and Content as files

Any Workflow

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Any Workflow
Use of AXMEDIS Framework

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

AXMEDIS Framework

- Research institutions
- IT Companies
- Content Distributors
- Content Providers,
- Integrator
- Etc.

9 subprojects
9 demonstrators

AXMEDIS Based solutions

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, FOCUS, …

- 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
Thanks for your attention!