axmedis

Automating Production of Cross Media Content for Multi-channel Distribution

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AXMEDIS Framework

The AXMEDIS Framework is an open solution which builds on technologies and tools to:

- reduce costs and increase efficiency for content repurposing, processing, management, production, protection, and distribution;
- offer effective automation for:
  - integrating Content Management Systems (CMSs) with distribution systems by automating the repurposing, communication and maintenance of content and information;
  - managing content gathering and ingestion processes from local / remote CMSs as well as file systems;
  - managing workflow processes at content-factory level and between content-factories with the support of OpenFlow and BizTalk;
  - processing and adaptation supporting parallel processing, GRID technology, and optimisation techniques;
  - allowing content production on demand, VOD and IPTV;
- allow the convergence of several media and interoperability of content to enable multi-channel distribution. In more details the framework supports content distribution:
  - on different channels such as satellite data broadcast, Internet, cellular/mobile network, wireless and traditional media support such as CDs and DVDs;
  - via different communication technologies, particularly with controlled Peer-to-Peer (P2P) for both B2B (Business-to-Business) and B2C (Business-to-Consumer) levels;
  - to different devices such as PC, PDA, interactive TV (i-TV), set-top box (STB), mobiles, etc.;
  - with different transaction models on the same channel and for the same kind of content (pay per play, subscription, with a large set of conditions, etc.);
  - using new methods and tools for flexible and interoperable Digital Rights Management (DRM) in order to facilitate a smooth transition from paper contracts to digital licenses;
  - exploiting MPEG-21 REL (Rights Expression Language) with specific extensions and enhancements;
  - supporting different business and transaction models and their integration;
  - integrating different DRM models such as MPEG-21 REL and ODRL OMA (Open Mobile Alliance).
- support the whole value chain, including composition, repurposing, packaging, integration, aggregation, synchronisation, formatting, adaptation, transcoding, and indexing. Additional features include the integration of both protected and non-protected components within an object, definition of relationships with other resources, metadata integration and remapping/transcoding, protection, license production and verification;
- harmonise B2B and B2C areas for DRM, bringing DRM models into the B2B area, supporting production and protection models across the whole value chain;
- integrate B2B, DRM and content production and distribution with P2P at both business and consumer levels.
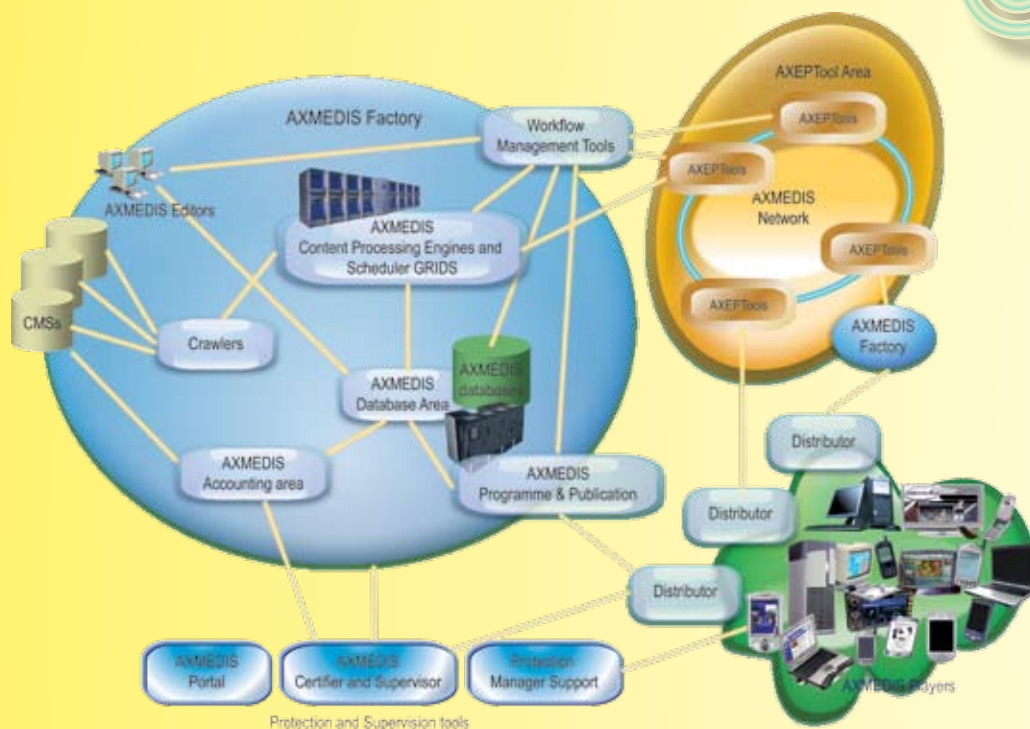

AXMEDIS Architecture

AXMEDIS Content Model

AXMEDIS content model is designed to support all types of cross-media content; from simple media files such as video, audio, images to complex groups such as SMIL and HTML presentations with images, video, documents, text, games, etc. It can be used for a large set of applications, from leisure, education, entertainment, infotainment to the management of protected content for government, healthcare, business, etc. The AXMEDIS model allows enforcing a high level of interactivity into your content by integrating SMIL and HTML technologies with scripting capabilities. AXMEDIS content and players may work with the full set of content formats and with the full set of content processing capabilities.

AXMEDIS is an open format capable of integrating any kind of metadata from the native Dublin Core to other custom metadata for identification, classification, categorisation, indexing, description, annotations, and protection aspects. The AXMEDIS format allows the combination of content components and their secure distribution in respect of intellectual property rights, supporting a large variety of DRM rules and models according to concepts of interoperability among DRM models (mainly, but not only, based on MPEG-21 and OMA, with both binary and XML formats). AXMEDIS is open to all DRM models and solutions.

applications in the factory and among geographically distributed factories, etc. The AXMEDIS Factory is scalable and can satisfy the needs of small and large content producers, integrators, and distributors. The factory is fully supported by tools for automating the production process as well as performing manual editing;

- AXMEDIS P2P and distribution tools, AXP2P: for automating the content publication and acquisition in the business area allowing the interconnection of AXMEDIS Factories by means of the secure and legal P2P tools, AXEPTool, based on BitTorrent technology and AXMEDIS. The tools in this area also allow scheduling of content distribution and publication towards multiple channels and P2P;

- AXMEDIS Players for several different platforms (PC, PDA, mobiles, Mozilla Plug in to insert into WEB pages, Active X to insert in IE web pages and other tools, STB, PVR, HDR, for IPTV, DVB-T, DVB-S). They can be customised in terms of GUI and look and feel for distributing and sharing AXMEDIS and non AXMEDIS content among final users with the support of DRM and P2P tool; Players include the capabilities of playing more than 200 formats of video, audio, images, documents and SMIL, HTML, FLASH, MPEG-4. They can also include scripting capabilities;
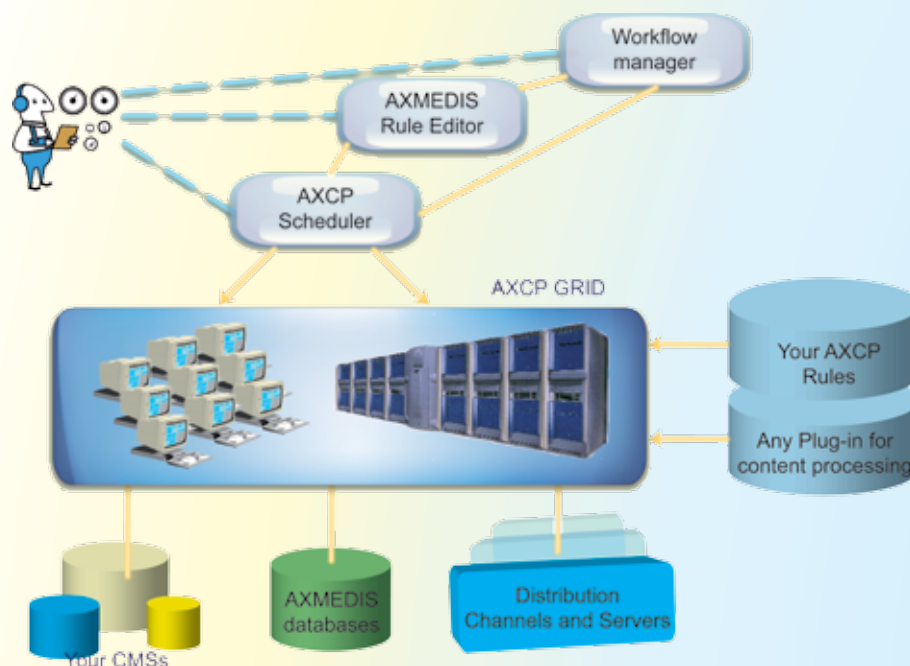
Key Components

- AXMEDIS Content Production tools, AXCP: for automatically producing and repurposing any content and cross media content. Exploiting legacy CMSs, programming and scheduling the production processes in extended AXMEDIS JS language, processing metadata, composing and formatting content, producing licenses to harmonise the production with workflow

- AXMEDIS DRM tools: to enforce DRM on content distribution. It has supports for user and tools registration, certification, authentication and supervising, attack detection, monitoring all the activities performed on the AXMEDIS content on AXMEDIS players and tools, processing licenses, managing black lists, and collecting and reporting the information about content usage and rights exploitation, etc., for business purposes and/or for statistical reasons.

Content Processing

AXMEDIS framework and the AXMEDIS Content Processing (AXCP) based on GRID technology offer automated features and functionalities, supporting convenient scripting interface and integrated development tools to automate integrated activities of:

- Content Ingestion and Gathering;
- Content Storage and Retrieval;
- Content Processing, repurposing, adaptation, transcoding for text, docs, images, audio, video, multimedia, XML, SMIL, HTML, styles, MXF, NewsML, MPEG-4, etc.;

- Metadata repurposing, adaptation, transcoding;
- Content composition, formatting, layout, styling;
- Communication with databases, P2P and distribution servers via several protocols;
- Content packaging: MPEG-21, MXF, OMA, newsML, ATOM, ZIP, etc.;
- Content Protection via several algorithms;
- Content DRM with MPEG-21 and OMA, with tracking and reporting rights exploitation;
- Content Licensing;
- Content Publication and Distribution toward multiple channels;
- Workflow management integration with BizTalk and OpenFlow.
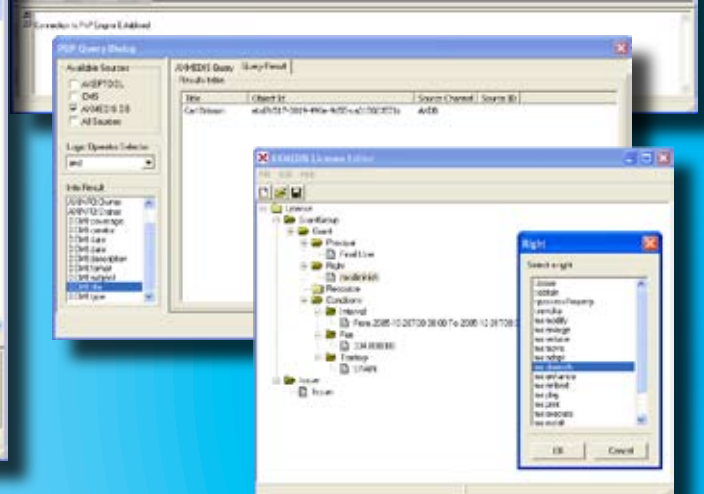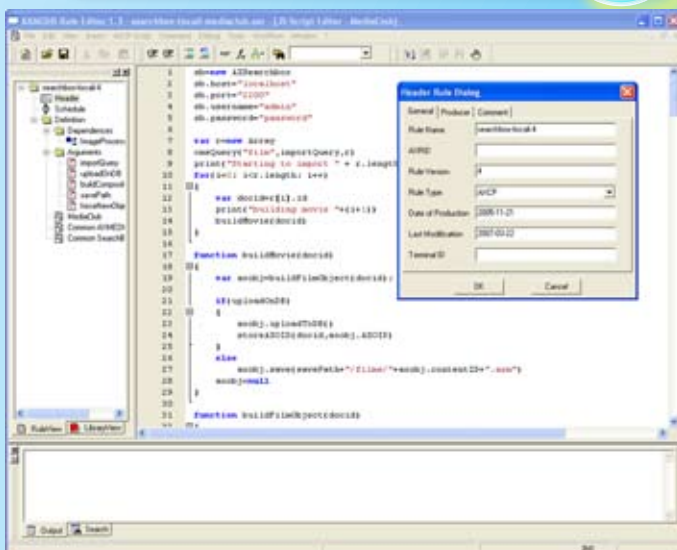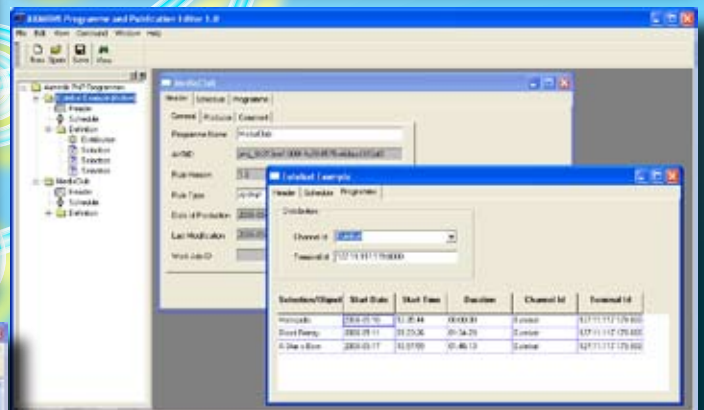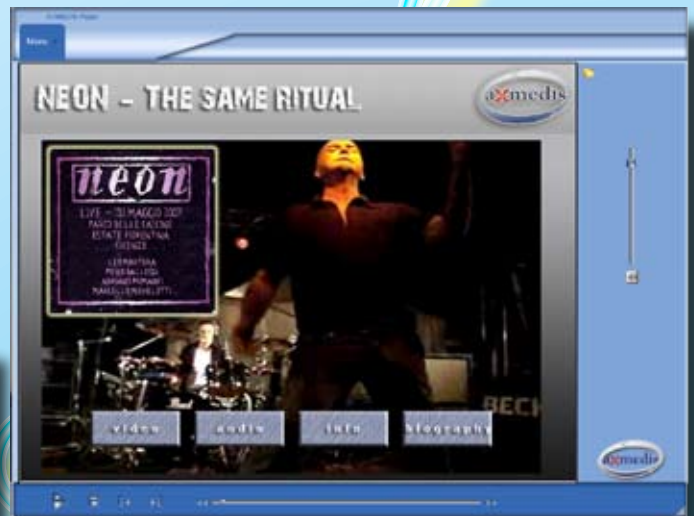
Access to the AXMEDIS Framework

The AXMEDIS Framework consists of a set of tools, libraries, manuals, specification, test cases, server tools, reports, technical notes and promotional material. All of these, along with their source code, are accessible to Affiliated Partners.

You can use it to setup and build simple as well as complete applications and services in the area of content re-purposing, production, protection and distribution. With the flexibility of AXMEDIS dynamic plug-in technology, you can customise your applications and processes according to your needs. The same plug in can be used on authoring, production tools and players.

AXMEDIS Framework is open:
- AXMEDIS focuses on interoperability and openness of content model and interoperability of DRM models, including multi-channel distribution;
- AXMEDIS specification is public and accessible from AXMEDIS portal. Its use is royalty free;
- source code of the AXMEDIS Framework is accessible via the AXMEDIS Affiliation programme. The affiliation fee is affordable for all. Alternatively affiliation can also be offered in return for contributions to improve and/or extend the AXMEDIS Framework;
- AXMEDIS plug-in technology is public. The specification and the source code for creating new plug-ins are public and accessible without the need to be affiliated. Any tool can be integrated into the AXMEDIS Content Processing GRID with this technology;
- AXMEDIS partners are open to your needs that may be useful to improve the capabilities of the AXMEDIS framework.

To take advantage of the AXMEDIS framework and technologies, you are invited to apply for the AXMEDIS Affiliation. Affiliation is free of charge for non profit institutions.

AXMEDIS Affiliation

With the AXMEDIS Affiliation, industrial participants can:
- access the AXMEDIS Framework which can be used to set up and enhance production, protection and distribution facilities/platforms in a simple and cheap manner;
- adopt standard models (e.g. MPEG-21) for content and licenses modelling and hence adding DRM in your content business;
- establish contacts with other business partners interested in exploiting similar technology;
- obtain greater control on the content usage;
- create customised AXMEDIS players for PC, PDA, mobiles and STB;
- exploit and trial innovative business models that can be enforced on a distribution channel with management of rights and obtain reports on exploited rights of the multimedia content distributed.

With the AXMEDIS Affiliation, research institutions can:
- access the AXMEDIS Framework to build different solutions and applications to cover the needs of the value chain actors and tested with low effort;
- improve visibility, promote and produce algorithms and tools that can be used for content processing and modelling, and can be integrated into the framework;
- add new content models and new DRM models, make them interoperable with MPEG-21 and others already in place on the AXMEDIS Framework;
- test algorithms and tools with respect to the state of the art solutions, with ease;
- collaborate with other relevant research institutions and companies within the sector.
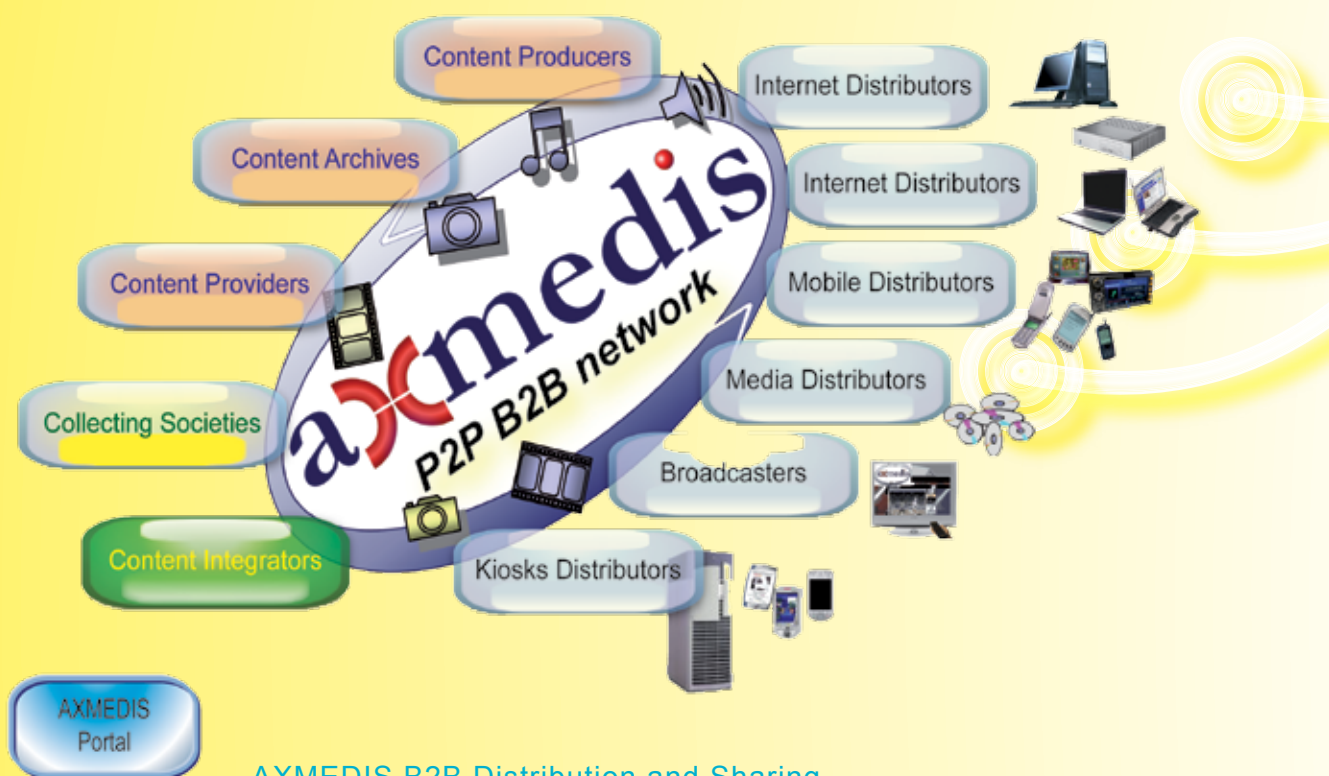
AXMEDIS B2B Distribution and Sharing

For latest information, developments, events and announcements, please visit the AXMEDIS web portal at **http://www.axmedis.org**.
If you have any queries or comments, please email **axmedisinfo@axmedis.org**.

AXMEDIS Partners include:

- Accademia Nazionale di Santa Cecilia Fondazione, Italy
- Advance Concepts for Interactive Technology GmbH, Germany
- AFI, Associazione dei Fonografici Italiani, Italy
- AI2, Italy
- Albeniz Foundation, Spain

- APT, Associazione Produttori Televisivi, Italy
- BBC, British Broadcasting Corporation, UK
- AIV, DigiChannel.net, Italy
- DSI, Department of Systems and Informatics, University of Florence, Italy
- Dipartimento di Italianistica, University of Florence, Italy
- EPFL, Ecole Polytechnique Federale de Lousanne, Switzerland
- ETRI, Electronics and Telecommunications Research Institute, Korea
- Elion Enterprises Ltd., Estonia
- EUTELSAT S.A., France
- EXITECH S.r.l., Italy
- Focuseek, Italy
- FHGIGD, Fraunhofer Institute for Computer Graphics, Germany
- GIUNTI Interactive Labs S.r.l., Italy
- Grupo Gesfor, Spain
- HP, Hewlett Packard Italy S.r.l., Italy
- Hexaglobe, France
- Kaunas University of Technology, Lithuani

- Maat-G, Italy
- MBI S.r.l., Italy
- Peking University, China
- Pentex, Italy
- Rigel Engeneering, Italy
- SEJER, Bordas and Nathan, France
- SDAE, Sociedad Digital de Autores y Editores, Spain
- SIAE, Società Italiana degli Autori ed Editori, Italy
- Strategica S.r.l., Italy
- Telecom Italia, Italy
- Telsey, Italy
- TEO LT, Lithuania
- TISCALI Services, Italy
- UPC, Universitat Politècnica de Catalunya, Spain
- University of Leeds Interdisciplinary Centre for Scientific Research in Music, UK
- University of Reading Informatics Research Centre, UK
- VRS Grupé, Lithuania
- XIM Ltd., UK

For the full list, please see the AXMEDIS portal.

AXMEDIS Contacts:

Prof. Paolo Nesi (Coordinator)
DISIT-DSI
Distributed Systems and Internet Technology Lab,
Dipartimento di Sistemi e Informatica,
Università degli Studi di Firenze,
Via S. Marta, 3, 50139 Firenze, Italy
Email: nesi@dsi.unifi.it
Tel: +39-055-4796567, +39-055-4796523
Fax: +39-055-4796363

Dr. Kia Ng (User Group Chair)
ICSRiM - University of Leeds,
School of Computing & School of Music,
Leeds LS2 9JT, UK
Email: kia@kcng.org, kia@comp.leeds.ac.uk
Tel: +44-(0)113-3432583, +44-(0)113-3432572
Fax: +44-(0)113-3432586

Image courtesy of NASA and the Visible Earth, http://visibleearth.nasa.gov
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