**Technical Note
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Multichannel WebTV, IPTV VOD with Social Networking in a single tool

Manage and distribute your contents with that of your users

Provide a unique tool to provide access to **cross media content**, selling it and getting **user generated content**, Social Networking.

Video on Demand (VOD), and production on demand solutions

Interactivity with Intelligent cross media models

Integrated interoperable DRM Exploiting different business models and/or transactions on the same distribution channels: pay per play, monthly rate, preview, renting, advertising, etc.

Adopt advertising (customized and/or real time personalised advertising)

Control P2P content sharing and distribution, involving your customers in distribution (superdistribution)

AXMediaTech

XMF: a tool for setting up Cross Media Multichannel WebTV with Social Networking

The market of digital content is rapidly changing. Users are becoming more interested in using interactive and intelligent content. **The Cross Media Finder is a solution which allow you to set up and create your Multichannel distribution, WebTV, content on demand, and Social Networking supporting the Cross Media Content and distributing them on: PC, PDA and Mobile (see http://xmf.axmedis.org).** The solution is based on AXMEDIS technology for the cross media content modeling, for the Digital Rights Management, DRM and business models, for the automated production of content for multichannel, and for the collection and management of the **User Generated Content**.
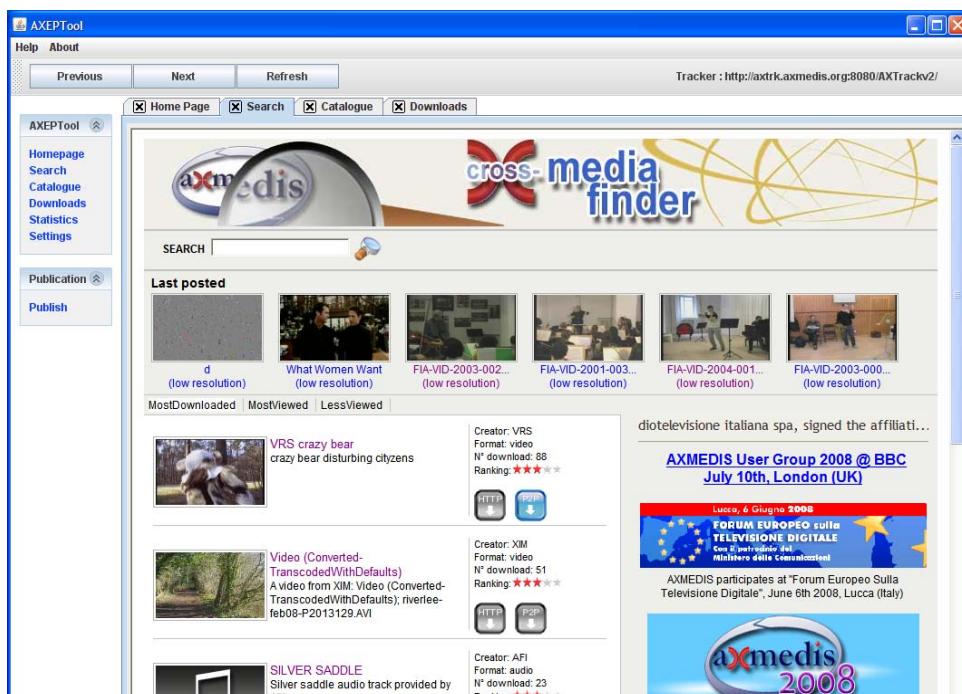
The main innovations mainly consist in the AXMEDIS Cross Media Content that can:

o present in a single digital object more powerful and participative entertainment experiences than present DVDs;

o provide enhanced interactivity such as making queries into the content elements, supporting and storing annotations, navigating and selecting content elements to be played, reacting to user commands and changes, etc.;

o include/describe/package any kinds of media and media collections: audio, video, games, documents, images, etc.;

o be exchanged and distributed among different devices/tools: PC, mobiles, smart-phones, STB/PVR, HDR, PDA, etc.;

o be accessed from several different interoperable distribution channels: Internet, P2P, wireless mobile, satellite and/or terrestrial networks, etc.;

o change/adapt its behavior according to the user profiles and experience, context, device capabilities, connection capabilities, etc.;

o be generated by final users, produced at home and/or shared in the network,
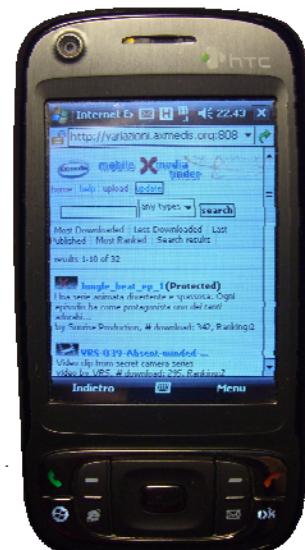
in the respect of the user Intellectual Properties Rights (IPR), that means supported by some open versatile DRM solution;
o present some autonomy of control, being proactive with the users providing and requesting information and data: for example to create touristic guides, to create traveling reports, coking books, brico-work manual, etc., asking to the user to augment the manual for further experiences and/or friends, etc.; See for example the AXMEDIS objects which are wizards for:
  o leaving a message on the Social Network
  o collecting your content and posting large set of content on the Social Network
  o producing your image collections
  o posting and collecting your content making them accessible for your mobiles,
  o protecting your content, making it accessible only for your friends.
  o Etc.
o be protected and managed with AXDRM that supports a large set of business models, for example: renting, pay per play, subscription, advertising, user generated content, etc.;

A trial version of the Cross Media Finder, XMF.AXMEDIS, solution and portal is accessible on http://xmf.axmedis.org for PC, PDA and Mobiles with suitable demonstrative content. It shows all the the presented features and thus how they can be integrated in a portal, WebTV, IPTV for cross media content on demand integrating social networking capabilities obtaining the integrated features reported in this document.

On the Cross Media Finder, XMF
On the Cross Media Finder, the user can directly access to facilities for searching, downloading and publishing/uploading content. Observing and browsing the content already obtained, downloaded in the past. The users can
• access to cross media content as described in the following;
• make queries on cross media content selecting video, audio, documents, images, cross media or any, on the basis of extended metadata, or other categories;
• download the interactive content from the server, client/server direct download;
• play interactive content directly into the WEB page or from the downloaded files;
• browse the list of the most downloaded content;
• browse the list of the less downloaded content;
• browse the list of the most ranked downloaded content;
• see the list of the last recently uploaded content;
• see a preview for each content element with an icon or animated icon;
• see content metadata such as: title, description, format, type, genre, ranks, comments, etc., for each content element in preview or as a result of a query;
• see the extended metadata for each content;
• play and see the content at full screen; In order to play a cross media content, the user has to click on the visible and/or animated icons representing the content. The resulting action is the internal opening of a new web page into the AXEPTool. That page contains the AXMEDIS Active X player with the automatic loading of the selected content.
• upload content and contributions on the Cross Media Finder to see them directly presented in the portal and declined for PC, PDA, STB and Mobile if requested;
• upload content and contribution deciding to protect them, and to make them accessible for some users for example (available with AXMEDIS DRM support only)

Social Networking
Registered users may:
• search for other users on the basis of name, email ,etc.;
• post his/her generated content on the portal to see it automatically transformed into content distributed on the cross media finder portal, and send the content automatically formatted for PC, PDA and Mobile, etc.
• see the list of his/her posted content with details about the ranks and views;
• create a list of friends;

- define the list of friends that may access to the posted content;
- see the preferred content of friends;
- see the posted/uploaded content of friends;
- see the content which is closer to his/her profile;
- see the list of the most played content;
- create the list of their preferred content elements, marking them;
- vote and comment played content, influencing the ranks;
- create play list of content (enhanced versions only);
- access to protected content reserved to them without paying;
- access to pay per play content according to the business models.

Registered users on the portal may fill a form to describe their profile. The profile includes some few personal data and their preferences on the cross media content. On the basis of the user profile and of users' actions on the portal, the portal is capable of:
- suggesting a list of potential friends on the basis of their profile;
- suggesting the list of content closer to their preferences and profile;
- recommending a list of content to be acquired;
- presenting to user specific advertising on the basis of their profile (extended version only).

The Cross Media Finder can be integrated with P2P tools. This can be tested by installing the AXMEDIS P2P client as stated in the help accessible from the first page http://xmf.axmedis.org. In that case, the user starts connecting with the http link of the XMF (webTV) or by means of the AXMEDIS P2P client tool called AXEPTool (as depicted in the figure). The AXEPTool is a P2P client tool of the AXMEDIS P2P controlled Network: http://www.axmedis.org/documenti/view_documenti.php?doc_id=3624. With the support of AXMEDIS P2P (concretized with the AXEPTool client tool) the user may:
- download the interactive content from the P2P network;
- publish files and/or cross media content on the P2P network;
- see statistics about download and upload of the P2P network;
- see the list of content he collect and share on and from his computer;

AXMEDIS Cross Media Content, features and capabilities

AXMEDIS content format supports from simple files to complex collections of multimedia for a large range of applications, from business to business to personal and/or global scale production, protection and distribution, with and without DRM. AXMEDIS format and solution can be used to:

o describe and/or package and may be protect any kind of digital content, with standard, custom and extended metadata;
o valorize and distribute cultural heritage, educational and infotainment content: lessons, coursewares;
o distribute content with different business models as: VOD, PPV, PPP, IPTV, WEBTV, etc. 9with AXMEDIS DRM);
o model and distribute content for PC, PDA, P2P, Kiosks and mobiles with interactive parts;
o distribute and set up business models in which intelligent content is used, having the possibility of defining the internal business model and actions on the content itself, dynamic modeling of content behavior;
o interchange content among different factories and distribution chains. The AXMEDIS format can wrap any kind of files, including SMIL, HTML, FLASH, MXF, newsML, etc., for safer audio/visual sharing, and the number of components in the package and the size of the single element in the package are very very large;
o share content among B2B actors of the value chain, in protected and non protected versions;
o produce and cope with leisure and entertainment content: video, TV, games, etc.;
o distribute and protecting governmental, military, clinical information;
o package, protect and distribute newsML;
o create audio guides for PDA and mobiles;
o produce content with advertising (customized and/or real time personalized advertising inside the package or linked to outside);
o produce and deliver personalized content inside the package or linked to outside;
o manage personally produced content from final users and customers;
o provide multichannel experience and distribution: different content on different channels at the same time for multichannel experience of the user.

The above mentioned scenarios and many others can be realized thanks to AxMediaTech AXMEDIS technology and tools of: AXMEDIS content format, DRM, controlled P2P, and Content Processing, see Technical Notes http://www.axmedis.org/documenti/documenti.php

AXMEDIS Cross Media Content may contain:
o **elements/essences** which are:
  o simple files audio, video, images, documents, animations, games, etc.;
  o any combinations of cross media content with presentations in HTML, SMIL, MPEG-4, XML, FLASH, NewsML, MXF elements, etc., hypermedia with internal and external links;
o **reference** to external files and/or other AXMEDIS objects as URIs and links;
  o menus, collections, lists, interactive elements on animations, etc.
o **metadata and descriptors** associated with single resources and/or collections:
  o metadata, classification information, Dublin Core, and any other XML metadata, ….
  o descriptors such as fingerprint, technical information, MPEG-7, XML, etc.;
  o single and/or multiple identifications: AXOID, UUID, ISBN, ISMN, ISRC, ISAN, …
  o business descriptors such as the AXInfo, PAR (potentially available rights);
  o extended metadata…
o **collections** of content as lists, hierarchy of files, nesting levels, menus, etc., on which users may
  o navigate, make queries on the basis of metadata of single components or files;
  o receive auto play, automated presentation, dynamic advertising, chained videos, special content, packaging audio visual with additional content, etc.;
  o access to content with different presentation algorithms, protected and/or selectively non-protected, with or without previews, and many other models.
  o perform annotations to content elements;
o **narrative and proactive capabilities:** behavior formalization and semantics to make intelligent and interactive the content package, allowing the final users to perform not only interaction, while
  o enrichment (addition of comments and data to object content);

- o transformations (migration of the same object to another device with some adaptation), extraction of ringtones, screens for mobiles, etc.;
- o queries inside the content collection;
- o questionnaires, quiz, exercises inside the content package;
- o recording additional content coming from P2P, Web, etc.;
- o licensing its own content with specific wizard;
- o recording and send a video message, protecting the video message;
- o evolving the content with its own action as above, so has to have at the next usage its own picture collection, brico-reporting experience, traveling experience report, messages for the family, etc.

AxMediaTech AXMEDIS Player into Internet browser

The AXMEDIS player can be in the form of Active X for Internet Explorer or as Firefox Plugin, for PDA direct player for Windows Mobile 5 and 6, and for Mobile the AXMEDIS java player. Most of the AXMEDIS players present the following features, see technical note on player for the feature table:

- play video/audio from HTTP link in progressive download;
    - o stop, pause, restart, go end, go top, go full screen;
    - o seeking position on the video/audio moving cursor;
    - o show full metadata, show structure, show progressive download bar;
- play cross media content in AXMEDIS/MPEG-21 format downloading them via HTTP;
    - o MPEG-21, SMIL, HTML, FLASH, animation, image, audio, video, doc, MPEG-4,
    - o show and navigate into the cross media content structure;
- play content produced for PC, PDA, STB and Mobiles;
- execute intelligent AXMEDIS objects with AXMethods in Javascript;
    - o interactive Support, Content behavior, Internal content query, Collection of user action, Proactive with users, Extraction of resources, User monitoring, licensing, adaptation, ….
- AXMEDIS DRM Support:
    - o off Line DRM function, Licensing Links, Protection tools plugins, Attacks detection, Users may gen licenses, Domain support, REL Rights Supported
- Content acquisition: Download, Progressive download;
- Technical details: easy to install via certified CAB and/or exe, plug in technology to add features and protection tools, developed in C++;
- Open and customizable according to needs.

*Automating content production protection and distribution*

The AXMEDIS player is automatically downloaded and proposed for installation at the first opening of the WEB page containing the content player. It is a certified tool and thus it is recognized to be a secure tool by any Internet Explorer without asking to the user to reduce its level of protection. The Cross Media Finder helps the users that are registered to make the tool certification and those that does have been registered to make the registration and the certification.

In the above figure, an example of cross media content is reported. The example reports a collection of short video of secret camera that the user may select clinking on the photogram. Once downloaded the same content is accessible as unique file from the disk.

Architecture of the Cross Media Finder Social Network

The Cross Media Finder can be installed on single server or scaled up to a cluster of servers according to your number of users and downloads. It may be customized in several manners

- **to create your Custom Social Network, providing a different** look and fill, user profile, content profile, number of distribution channels, thematic goal of the social network (ethical, singers, political topics, etc.)
- **to work with generic files and/or with AXMEDIS/MPEG-21 content**. The users provided content files are automatically reformatted and adapted according to the distribution defined format by using AXCP. The production of AXMEDIS/MPEG-21 Objects and their templates can be performed with the AXMEDIS Editor/authoring. AXMEDIS provides also players for: MS Windows, Linux, Windows Mobile 5 and 6, and java mobiles, STB/PVR/HDR, Media Centers, PDA, and mobiles. They can be customized as GUI and functionalities. Examples of customizations are available: http://www.axmedis.org/documenti/view_documenti.php?doc_id=3634
- **to be as single WEB portal and/or integrated with P2P** network and client tool as described before; The P2P network is obtained with the AXMEDIS P2P, a BitTorrent enhanced solution for P2P: http://www.axmedis.org/documenti/view_documenti.php?doc_id=3612
- **to collect and manage in different manners user generated content**. The processing of the user generated content can be supervised or performed automatically. The supervision can be performed ad hoc or managed by Workflow management systems. The automatics processing is performed with the AXMEDIS Content Processing tools, AXCP, that can be scaled up to managed large amount of content per day to automate your content production, protection and distribution as stated above and in more details into the technical note: http://www.axmedis.org/documenti/view_documenti.php?doc_id=3624
- **with or without the support for business models such as VOD, Pay per View, that is the AXMEDIS DRM**. A solution to adopt MPEG-21 DRM with other DRM solutions includes servers and licensing tools and allows DRM, detection of attacks, black list management, collection of actions logs containing traces about the rights exploitation, tools for administrative management, etc. http://www.axmedis.org/documenti/view_documenti.php?doc_id=3616
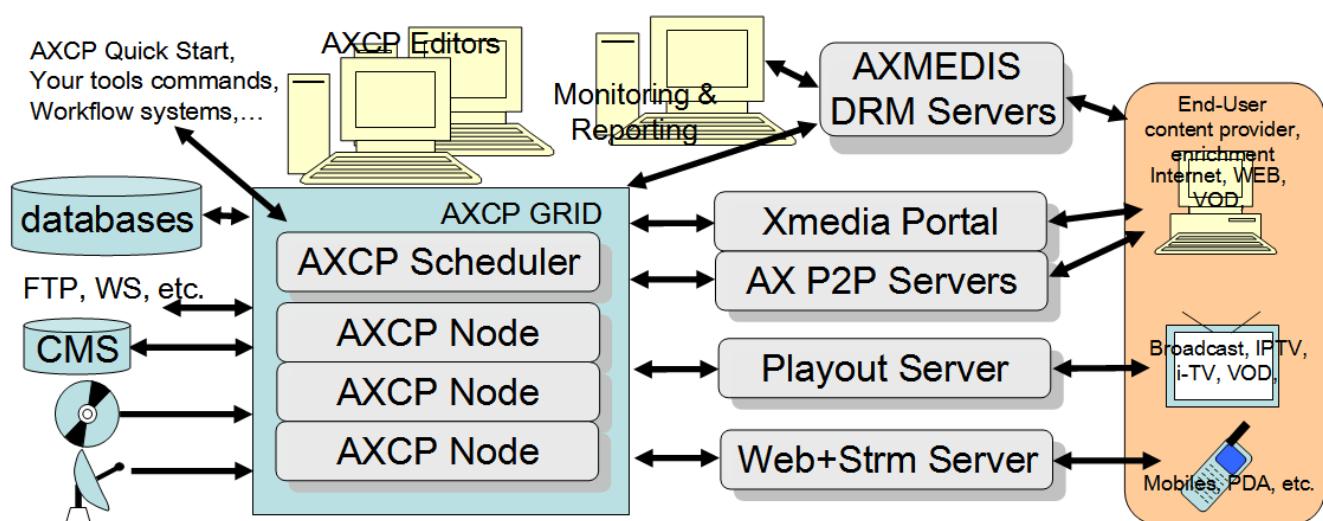
AXMEDIS Demo Tools for your download

In the following, the links to download the most important AXMEDIS player are reported. It is also possible from the AXMEDIS portal to download additional AXMEDIS tools and content:

- o PC players:
  - o AXMEDIS stand alone PC player;
    http://www.axmedis.org/documenti/view_documenti.php?doc_id=3767
  - o AXMEDIS Skin based PC player;
    http://www.axmedis.org/documenti/view_documenti.php?doc_id=3716
  - o AXMEDIS Active X, for usage into HTML pages and simple VB and/or .NET applications
    http://www.axmedis.org/documenti/view_documenti.php?doc_id=4222
  - o AXMEDIS plug in for Mozilla Firefox 2 and 3
    http://www.axmedis.org/documenti/view_documenti.php?doc_id=4174
- o PDA Windows Mobile 5 and 6 player, supporting: SMIL, HTML, MPEG-4, video, audio, documents, images, etc.; http://www.axmedis.org/documenti/view_documenti.php?doc_id=3842
- o Mobile player:
  http://www.axmedis.org/com/index.php?option=com_content&task=view&id=172&Itemid=91
- o Production tools:
  http://www.axmedis.org/com/index.php?option=com_content&task=view&id=83&Itemid=55

References

AxMediaTech AXMEDIS portals http://www.axmediatech.com and http://www.axmedis.org on which you can find:

- • Technical note on AXMEDIS players:
  http://www.axmedis.org/documenti/view_documenti.php?doc_id=4315
  Technical note on AXMEDIS DRM:
  http://www.axmedis.org/documenti/view_documenti.php?doc_id=3616

- • **AXMEDIS tools**:
  - o production tools: editor and automated production, AXCP tools, players for several platforms;
- • **AXMEDIS objects and examples**
  - o audio, video, images, collection, education, cross media, training objects, documents, etc.;
  - o Interactive and smart objects;
- • **AXMEDIS P2P network** that you can freely and easily join for trial;
- • **AXMEDIS Technical Notes, white papers** on:
  - o AXCP, Automated production tools;
  - o AXMEDIS Model;
  - o AXMEDIS P2P;
  - o AXMEDIS DRM;
  - o AXMEDIS DRM how to integrate and use
  - o AXMEDIS DRM for dummies
  - o VOD for PC and STB
  - o Usage intelligent content with the show case of BBC
- • **AXMEDIS show cases:** of TISCALI, EUTELSAT, BBC, TEO, ELION, Giunti LABS, ANSC, Telecom Italia, VARIAZIONI, SIAE, etc.
  - o examples and technical documentation about AXMEDIS distribution cases for : VOD, IPTV, mobile, PDA, STB, etc., download and streaming, etc.
- • **AXMEDIS tutorials**:
  - o videos, slides, and documents
  - o example of AXCP rules

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