The Interactive-Music Network

DE4.4.2
Distribution of Coded Music

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Abstract:
The Working Group on Distribution of Coded Music analyses different aspects of the multimedia content distribution phenomenon, investigating the major problems, the different approaches and business models.
The main focus for this work is on distribution of multimedia content using the Internet to perform transactions and/or content delivery. Key issues are business models, new technologies and distribution media (mobile environments, Web services, XML, Web-TV and streaming), content protection aspects (mechanisms like encryption and watermarking applied to on-line distribution systems), content information retrieval (metadata management). Special attention will be given to the legal framework were the market is developing and to the quality and accessibility of music distribution services.

Keyword List:
Music distribution over the Internet, multimedia content, DRM, MPEG21, IPR, copyright, fair use.

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1 Executive Summary

This report describes the results of the activities performed by the **Working Group "Distribution of coded music"** as part of the MUSICNETWORK project, a centre of excellence financed by the **IST Program** of the **European Commission**. The content of this report is the outcome of the different initiatives undertaken the results achieved in terms of market analysis, technology surveys, analysis of products and services, emerging business models, existing problems and potential solutions.

The Working Group on "Distribution of Coded Music" focused on different aspects of the multimedia content distribution, investigating the major problems, the different approaches and business models. Active **participation** to the working group has been stimulated and open discussions and **workshops** have been organised with the aim to create a common test bed for exchanging of information, knowledge, point of views and experiences. Such a challenging objective involved a lot of work in several correlated fields causing the working group's **scope** to be very wide. The main focus during the work is the distribution of multimedia content **using the Internet** to perform transactions and/or content delivery. **Key issues** are business models, new technologies and distribution media (mobile environments, web services, XML, web-TV and streaming), content protection aspects (mechanisms like encryption and watermarking applied to on-line distribution systems), content information retrieval (metadata management). Special attention has been given to the legal framework, to the developing market of digital music and to the quality and accessibility of music distribution services.

The working group analysed in deep the **structure of the market** of digital music and multimedia content distribution, considering all the actors in the content value chain, all stakeholders and their complex relationships: technology providers, software developers; content owners, music publishers, music labels; copyright collecting societies; content providers and distributors; end users (musicians, musicologists, audiophiles, music amateurs…).

A market survey as well as analyses of technology, user needs and research activities was being performed and updated during the whole project life-cycle, in order to collect data and evaluate the bleeding-edge of products, systems, tools and research, gathering at the same time business an user needs. The most important fair and conferences are monitored and most promising research projects contacted. A special section of the working group is bringing to attention the most important **issues**, **problems** and **barriers** affecting the development of the multimedia content distribution sector, also collecting case histories and significant experiences from external participants and submitters.

The analysis work put good effort in highlighting **the importance of the needs of end-users and consumers** of music when considering the major problems as well as the new behaviours and possibilities originated by the availability of music in digital format. To this aim, copyright can represent the tool to get a trade-off between the sometimes conflicting interests of users and publishers-majors-authors, balancing the needs of the rights holder against those of society, users and consumers.

More and more authors, copyright collecting societies and independent labels are embracing the conviction that economic and business models generated or based on new communication and transaction schemas, like P2P, are totally **positive** in terms of distribution, selling and knowledge of music. Such authors and their representatives are inviting the major labels to start a new **innovative** and **creative approach**, involving also the Internet Service Providers in the process and allowing the user, paying a fee, to access music and possibly re-distribute rights via the peer-to-peer and a new licensing scheme.

Proposition and contributions to **emerging standards** are considered for critical aspects of multimedia content delivery systems, as for instance, for the protected communication protocol used for communications and transactions management between the delivery systems and the related clients or third-party applications. **Standardisation** initiatives and activites can play a primary role for the full exploitation of the Internet in terms of content exchange and especially to ensure the development and deployment of viable and interoperable solutions. In particular, **MPEG-21** appears to fit well the music distribution scenario, providing an interoperable multimedia framework and supporting users in accessing, exchanging, and manipulating digital music.

2 Introduction

2.1 Document History

The following table contains reference information about the subsequent versions of the present document.

Version	Date	Notes – what's new
1.0	2002-25-09	First version published (delivered at first review meeting – March 2003)
1.5	2004-01-29	Version of the report delivered as DE4.4.1 (and peer-reviewed by experts): ρ Updated Table of Content ρ Added chapters on Independent Organisations and on Business Models ρ Deeper analysis related to major problems of the market ρ Improved analysis of basic technologies, existing products and services
2.0	2004-06-10	Major revisions according to peer-review feedback: ρ Improved description of the scope of this report, the objectives and the scope of this Working Group. Added chapter 2 (Introduction), describing the Scope, Target Audience, Document History and Abbreviations for this report. Expanded (and renamed) chapter 3.1 (Objectives, scope and integration with other Working Groups). ρ Expanded chapter 4.1.4 (Copyright collecting societies) with more details on author's societies and their international collaborations and federations. ρ Added chapter 5 (Copyright, author's rights, intellectual property,) to analyse in deep and clarify the aspects related to the collective administration of rights and the different kind of rights and licenses available/needed for the distribution of digital music. ρ Added Appendix 1 with a list and brief description of the members societies of the European Music Office. ρ Fixed inconsistencies in Table 9 : Members societies of the European Music Office ρ Added Audio Engineering Societies (AES) in sub-chapter 4.1.6 (Main actors in the market, Other Organisations). ρ Description of the Recording Industry Association of America moved to sub-chapter 4.1.6 (Main actors in the market, Other Organisations) from sub-chapter 4.1.4. Added descriptions of WIPO and Creative Commons to the same chapter 4.1.6. ρ Updated chapter 6 (On-line music distribution services) with new services and news from the on-line music distribution market, especially related to the European market. Added or expanded sub-chapters on OD2 SonicSelector, Roxio Napster 2.0, Sony Connect Music Service and Warner ρ Added chapter 11.1 (An innovative approach) and sub-chapters 11.1.1 (A new strategic vision) and 11.1.2 (Balancing author's rights and user rights) ρ Improved chapter 11.2 (Business models) with special focus on the novelty of P2P-based business models. Added chapter 11.2.1 (The importance of business models). ρ Added chapter 12 (Conclusions) and chapter 13 (Acknowledgements). ρ Enriched the Bibliography.
2.1	2004-08-12	Revision and comments by Martin Schmucker.
2.2	2004-12-02	DE4.4.1 v2.2 delivered and uploaded. Minor revisions.
3.0	2005-05-24	MUSICNETWORK deliverable DE4.4.2 due originally (before project extension) for M34 according to workplan. Revisions and updates: ρ General updates for Technologies for DRM and Distribution, Download Services, Major players in the market. ρ Added chapter 9, "Interoperability and the role of standardisation initiatives", page 65.
3.1	2005-06-21	Revisions and updates:

		ρ Description of Yahoo!'s and Microsoft's Music Distributions Services ρ Minor revisions and error corrections.

Table 1: Document History

2.2 List of Abbreviations

Abbreviation	Description
CMS	Content Management System
EMO	European Music Office
DAMS	Digital Asset Management Systems
DI	Digital Item
DIA	Digital Item Adaptation
DID	Digital Item Declaration
DII	Digital Item Identification & Description
DMCA	Digital Millennium Copyright Act
DRM	Digital Rights Management
IPMP	Intellectual Property Management & Protection
MPEG	Motion Picture Expert Group
REL	Rights Expression Language
RDD	Rights Data Dictionary
URI	Uniform Resource Identifier
WG DCM	Working Group on Distribution of Coded Music (MUSICNETWORK)
WIPO	World Intellectual Property Organisation
XML	Extensible Markup Language (data modelling and transfer language).
XrML	Extensible rights Markup Language

Table 2 : List of abbreviations

2.3 Scope of this report

This report presents activities and initiatives undertaken by the Working Group on "Distribution of Coded Music" of the MUSICNETWORK project during the first year-and-half of work, as well as the main results achieved. It covers a wide range of issues and topics which are relevant to the study of on-line distribution of music and the digital content value chain.

This report summarizes the outcomes of the following **activities** an **initiatives** coordinated by the Working Group on "Distribution of Coded Music".

- ρ Technology surveys, analysis and comparisons,
- ρ Market analysis (service, products, driving forces, market players, content value chain),
- ρ Analysis of new and emerging business models for on-line distribution of multimedia content,
- ρ Analysis of existing and emerging standards, opening to potential contributions and extensions,
- ρ Discussions among the community built around the MUSICNETWORK portal (mainly the forum),
- ρ Discussions and exchanges at the sessions organised during the MUSICNETWORK Open Workshops,

- Dissemination and presentations kept at major relevant events, fairs, conferences and workshops (both research and industry related),
- Exchanges and cross-fertilisation among the different Working Groups of the MUSICNETWORK to integrate the results obtained.

The core partners of the Working Group performed a work of **coordination** of the activities mentioned above. However, in some cases, the partners were directly involved also in the **execution** of such activities, balancing coordination and execution according to the quantity and quality of **available contributions** from collaborations established with external members of the MUSICNETWORK and the feedbacks received from the community built around the MUSICNETWORK portal.

Since this document contains mainly an account and a description of the activities and outcomes of the Working Group "Distribution of Coded Music", further details about the scope of this report can be derived from chapter **3 (Working Group description)** and, in particular, from sub-chapter **3.1 (Objectives, scope and integration with other Working Groups)** presenting the aims and topics of this Working Group.

2.4 Target audience

The MUSICNETWORK is "a distributed Centre of Excellence to bring the **music industry**, **content providers and research institutions together**" offering a comprehensive package of valuable services to professionals and to "**everyone** who is interested in the future of music and multimedia technologies"[1].
Hence, this report, as part of the activities of the MUSICNETWORK, is aimed at **many different audiences** from policy makers, to music end-users and consumers, like music enthusiasts, audiophiles, music teachers and musicians, to those who create content, like author's and publishers, to those who develop enabling technologies to distribute and protect content, and in general to all the players in the digital music content value chain. Each one of the player is characterised by having a deep and very specific knowledge concerning his core business but sometimes a limited understanding of the needs and processes of the other players, partners and (sometimes) even customers. Moreover, being the target audience widespread in the European continent, linguistic, cultural and social diversity contributes to the differentiation of the potential readers of this document.
Considering such usage scenario for this report, every attempt has been made to make the document as readable and usable to such differentiated audiences as possible while still retaining the accuracy and clarity needed in a technical report.

[1] Quoted from MUSICNETWORK Project definition, dissemination material and website: http://www.interactivemusicnetowork.org

3 Working Group description

3.1 Objectives, scope and integration with other Working Groups

The Working Group on Distribution of Coded Music analysed different aspects of the multimedia content distribution, investigating the major problems, the different approaches and business models. The Working Group management activities involved stimulation of open discussions and active participation to the working group as well as organisation of workshops, with the aim to create a common test bed for exchanging of information, knowledge, point of views and experiences.

A primary objective of the working group was to extend and improve the **knowledge** of the state-of-the-art of **technologies** and **products**, the main **obstacles** and barriers to on-line music distribution as well as the awareness of the **driving forces** ruling the market.

The Working Group aimed also to gather, develop and disseminate a collection of **guidelines**, **best practices** and **success story** to help the main actors to create a more efficient and satisfactory market. General rules and best practices for systems and services for delivering digital music and multimedia content via the Internet may include:

- how content is organized, which type of files are expected to be included, which audio and image format are to be preferred, which information should be added;
- how content is protected, i.e. if hidden information should be embedded (for example, by means of a watermark treatment), which data should be contained in this hidden information (identification of the owner and the distributor of the coded music, etc.), which kind of encryption algorithms should be applied;
- how content is delivered via the Internet, that is, either by creating a unique encrypted file which includes all the files selected for the multimedia object, or to send these files separately, or to properly packing the required files, like in the WEDELMUSIC system;
- how content is used, opened and managed by the final users, how to keep trace of the operations performed on digital content and when such tracking is appropriate.
- how content can be promoted, marketed and disseminated to end-users/consumers; which are the emerging business models and how the new technologies support them.

Proposition and contribution to **emerging standards** have been addressed for critical aspects of multimedia content delivery systems, as for instance, for the protected communication protocol used for communications and transactions management between the delivery systems and the related clients or third-party applications.

Finally, as the main tool for obtaining the objectives mentioned above, the Working Group aims to create a collaborative environment (a **community**), bringing together the different actors, to share experiences, know-how, vision and ideas.

To resume, the objectives of the Working Group can be summarised as from the following table:

	Objective
1.	To investigate the major problems affecting the market of digital content
2.	To analyse enabling technologies, products and services
3.	To analyse new and emerging business models
4.	To propose new approaches, best practices and collect success stories
5.	To provide new solutions for digital content distribution, also considering emerging standards,

6.	To create a community to enhance know-how and improve awareness

Table 3 : Objectives of the Working Group (summary)

The **scope** of a working group addressing the "Distribution of coded music" and multimedia content in general, can be very wide and present overlapping as well as collaboration opportunities with other Working Groups of the MUSICNETWORK, and with external organisations, projects and initiatives.

The developed workplan tried indeed to focus on the key strategic issues presented in the following table, along with an early identification of other Working Groups (within the MUSICNETWORK) potentially involved in the same topics:

Key Issue	Description and topics	Other WGs
Multimedia content delivery over the Internet	Products, services, formats and media supporting on-line distribution of music. Quality of service. Major problems: authors' rights, consumer needs/rights, …)	WG NOT WG MMS
Technologies insight	Deeper analysis of enabling technologies and systems for on-line distribution of music. Possibilities and quality of service offered by mobile technologies (Wi-fi, UMTS…), streaming, movies and so on.	WG PCM WG MMS
Content protection aspects	Estimation of costs in terms of financial costs, costs for end users (lower quality, higher response times, labour, …), system requirements, labour of operators and providers; issues about protection levels and digital rights management; evaluation of the business models concerning these aspects.	WG PCM
Content information retrieval	Management of metadata and information contained in libraries and mediatheques, producing of hash values for accessing data, watermarking for embedding metadata	WG ML WG MMS
Business models	Advantages and disadvantages of the several approaches adopted in Business-To-Business, Business-To-Consumer and Peer-To-Peer models.	
Legal framework	Access to information available and safe for all, relevant regulations.	WG PCM

WG NOT: WG Music Notation
WG PCM: WG Protection of Coded Music
WG MMS: Multimedia Standards
WG ML: Music Libraries

Table 4 : Scope, key issues and links to other WGs

As a consequence, the following items can be placed into the in-scope list:

- Overview of the market for on-line distribution of digital music,
- Identification and description of the main players in the content value-chain,
- Overview of the major products and services,
- Major problems affecting the market, the main players and other stakeholders,
- Basic technologies enabling the major products and services,
- Emerging and promising technologies that can be used to solve some of the existing problems and/or to moderately improve the current situation,
- Existing business models for the on-line distribution of digital music,
- New business models and approaches to the market better accommodating the changed usage environment and users needs,

While the following are out of scope of the Working Group:

- ρ Traditional distribution of digital/analogue music,
- ρ Tiny details related to the laws and the legal framework,
- ρ Ethical and philosophical consideration concerning the boundaries of individuals' freedom of action against the enforcement of intellectual property right,
- ρ Semantic considerations and aspects related to the nature of the content (content retrieval and analysis, content structuring and formatting, metadata, ontology, music coding)[2].

3.2 List of partners involved and their skills

The core members of the MUSICNETWORK involved in the Working Group on "Distribution of coded music" are representatives from different players from the content value chain, as well as experts on the main topics considered by the Working Group. The core members retain diversified know-how and cover together a wide spectrum of skills, competencies and knowledge.
The following table presents a list of the core members of the Working Group, along with a brief description of each:

Partner name	Description	URL
Rigel Engineering S.r.l. (Working Group Coordinator)	ICT provider, software developer. Rigel participated to several European R&D projects, such as: • **I'M EASY**: interactive and easy to use system to simulate and produce spatial effects in real-time. It provides a device for creating in real-time original specialisation effects that cannot be pre-encoded or pre-recorded, and need to be created during the performance of live events, theatre applications, interactive museum shows and entertainment parks. • **WEDELMUSIC**: distribution of interactive music via the Internet through the definition and implementation of a unified model for distributing music and multimedia content in its several formats (audio, symbolic and image), and the implementation of reliable mechanisms for protecting music based on encryption , watermark and secure transaction management.	http://www.rigel.li.it
Exitech S.r.l.	Technology providers, adoption of technology for real applications for the market	http://www.exitech.it/
Fraunhofer (IGD)	Institute for Computer Graphic Research. Research Institute, protection aspects (encryption, watermarking, use tracking, transaction models)	http://www.fraunhofer.de/english/profile/igd.html
Giunti Interactive Labs	Multimedia Publisher	http://www.giuntilabs.it
Music Information Centre Austria (mica)	Music Library paying great attention to accessibility, preservation, IPR enforcement and content retrieval aspects.	http://www.mica.at
Listesso	Music Publisher with wide experience in on-line sheet music distribution.	http://www.listesso.com

Table 5 : Core members of the Working Group DCM

[2] Such aspects have been addressed by the other Working Groups of MusicNetwork.

4 Background

4.1 Main actors in the market

The market of digital music and multimedia content distribution can be structured according to the following categories of players and their role in the market:

Role	Description
Content Creators	Artists, multimedia creators, performers
Content Distributors	Broadcasters, TV, retailers (shops), webcasters, labels, score publishers, recording industries
Technology Providers	Develop the technology (hard and soft) enabling the distribution market.
Collecting Societies	Organisations devoted to the collection of IPR payments
End Users	Multimedia content users (musicians, amateurs, audiophiles, …)
Independent Organisations	Standardisation bodies, industry organisations, independent market researchers, other special purpose organisations
Governmental Organisations	Policy and decision makers
Law Experts	Experts in legal aspects of IPR protection
Projects & Research Centers	Large projects, Universities, Research Centers

Table 6 : Roles in the content distribution value-chain

In general these categories can present overlapping, since, for instance, a technology provider can also play the role of music distributor. Examples in such sense are Liquid Music Network and Real Networks which provides both multimedia content distribution technologies (servers, systems and models) and music download services.

Each one of the participants in the content delivery chain has very different requirements for on-line music distribution:

- ρ typical consumers are not concerned with DRM and just want their content to play the same way on any device.
- ρ Content owners and Content Distributors services want DRM options. They want to be able to choose, in a competitive marketplace, among multiple DRM technologies that offer first-class security, quality content rendering, and flexible business model implementations, customized for the type of content being offered or other relevant considerations.
- ρ Technology providers such as device manufacturers are concerned with cost margins and usability and therefore want to limit the number of DRM formats their devices have to support. They, as well as other technology providers, also want to control as many aspects of their product designs as possible.
- ρ Infrastructure service providers such as cable companies, ISPs, and portals seek to control their technology environments for similar reasons.

On the Internet, where many of these providers meet, the dilemma posed by these conflicting needs is causing deadlock. In the absence of a solution, the market is evolving towards piracy as the path of least resistance.

4.1.1 Content creators

Content creators generally are music authors, musicians, multimedia artists and they represent the first step in the content value chain. They are often also the very holder of the Intellectual Propriety Rights for a piece of music or multimedia content in general.

4.1.2 Content distributors

Content distributors are companies and organisations who make business at providing music to end-users or resellers, buying the rights form the respective rights holders. They exploit technologies and the Internet to provide their services. Music pieces and licences are the core business for content distributors but other revenues and value added also come from providing background information and additional services, like selling events tickets or providing direct contact between performers/authors and their fans. In some case, publishers and labels of any dimension directly sell their music on their Internet, playing both the roles of publishers and content distributors.
Music authors and content creators are usually represented by their labels, major or indies, or their publishers. In some (rare) cases, they might directly distribute their own music. There is also an unexplored space of the market, at this moment, however: new authors of multimedia content in various format.

The following table lists the main Content Distributors currently active in (or approaching) the market of on-line music distribution:

Content Distributor	URL
BMG	www.bmg.com
EMI	www.emigroup.com
Sony Music	www.sonymusic.com
Warner Music	www.wmg.com
Universal Music	www.umusic.com
BMG Ricordi	www.bmg.com
Sugar Music	www.sugarmusic.com
Casa Ricordi	www.ricordi.com
Nuova Carish	www.spartiti.it
Rugginenti Editore	www.rugginenti.com
Edizioni Curci	www.edizionicurci.it
AOL Music	www.aolmusic.com
Artist Direct Network	www.artistdirect.com
buymusic.com	www.buymusic.com
Casa Ricordi	www.ricordi.com
Echo	www.echo.com
Edizioni Curci	www.edizionicurci.it
Elektra Records	www.elektra.com
IFPI	www.ifpi.org
J Records	www.jrecords.com
Music Choice	www.musicchoice.com
Music Notes	www.musicnotes.com
Music Sales	www.musicsales.com
Napster	www.napster.com
Nuova Carish	www.spartiti.it
RCA Music Group	www.rcarecords.com
Rugginenti Editore	www.rugginenti.com
Sheet Music Direct	www.sheetmusicdirect.com
Sony Music Entertainment	www.sonymusic.com
Sugar Music	www.sugarmusic.com
Universal Music Group	www.umusic.com
VH1.com	www.vh1.com
Virgin Records America	www.virginrecords.com
Vitaminic	www.vitaminic.com

Content Distributor	URL
VivaldiStudio	www.vivaldistudio.com
Warner Music Group	www.wmg.com

Table 7 : Main content distributors and publishers

The main on-line content distributors currently in (or approaching) the market can be divided into the following categories.

ρ Labels:

- **Sony** (www.sony.com)
  The SonyMusic website contains a section, called Digital Downloads, with three links to different websites (Bolt, MTV and VH1) selling Sony Music downloads (albums, tracks or multi-tracks) in ATRAC3, MP3, SAF or WMA format.
  Sony has developed ATRAC3 (Adaptive Transform Acoustic Coding), a sound compression technology. Sony states this technology can reduce the size of a Compact Disc audio track to 1/10 of its original size, with virtually no loss in audible quality. ATRAC3 files are protected with Windows Media DRM (digital rights management) technology.
  ATRAC3 content has the following usage rules:
  - o unlimited local playback
  - o one permission to burn audio track to CD
  - o unlimited permission to transfer to 3 different SDMI compliant devices with ATRAC3 support
  - o three total installs from My Account
  - o ATRAC3 music will only work on Sony devices.

- **Warner** (www.warnerbros.com)
  The Warner web site provides a music section with several services to the users.
  It is possible to browse a music catalogue by genres or authors to listen to or buy their music.
  The Warner web site offers free streaming of music and videos: music videos in the "Music Video Jukebox", complete albums in the "Listening Party" section, live concerts in the section "Live Concert Series".

- **Universal Music Group** (www.umusic.com)
  Universal Music Group intends to develop strategic marketing initiatives and opportunities in new technologies such as the Internet. It owns or administers more than 850,000 copyrights.
  Universal has got eLabs which serves as a strategic knowledge and research division dedicated to developing, and implementing global e-business and new technology distribution strategies for UMG.
  An equally held venture of Sony Music Entertainment and Universal Music Group created **pressplay** (www.pressplay.com), an online music service company which offers consumers on-demand access to music that can be streamed, downloaded, burned to a CD and transferred to portable devices, respecting and protecting artists' rights.

- **BMG-Ricordi** (www.bmg.com)
  BMG has signed agreements for the development of its Internet digital commerce.
  On October 29, 2001, BMG's Buddha Records (created in September of 1998 to mine BMG Entertainment's vast back catalogue utilizing BMG Distribution to reach the marketplace) and Digital World Services announced the launch of a secure digital downloads offering as part of the label's Black Anthology Web site (www.blackanthology.com). The Tracks was protected by Digital World Services' Promotional Products Solution.
  On January 31, 2002, BMG Music Publishing has launched BMG MusicSearch, a global online search engine for both popular and production music designed for the film, television, advertising and multimedia professional.

On March 11, 2002 Liquid Audio announced that it has signed an agreement with BMG to provide the company with digital music services including encoding, hosting, digital rights management and clearinghouse functions.
On June 19, 2002, BMG and FullAudio announced that the companies have entered into a licensing agreement that allows FullAudio to include BMG's extensive catalogue of recordings in its digital music subscription service.

- Publishers and distributors of music scores, which are converting their musical archives from papers to digital images and need to distribute music and multimedia content at a lower cost and to a wider audience with a strong control on the rights:
  - **SugarMusic** (www.sugarmusic.com): it is going to manage all its archives in digital format.
  - **Casa Ricordi** (www.ricordi.com): it has 2 Million pages of music in his current classical archive. The cost of digitisation is presently too high with respect the potential revenue for making the step.
  - **Nuova Carisch** (www.spartiti.it): it has an online catalogue with music sheets, CDs and other musical products.
  - **Rugginenti Editore** (www.rugginenti.com)
  - **Edizioni Curci** (www.edizionicurci.it)

- Company addressing the market of music and multimedia authors interested in new, direct methods of distributing their works, and promote their art and skills without companies financing costs for the distribution. As an example, **ARTISTdirect Network** (www.artistdirect.com) is a company which enables artists to control their own websites, online stores and downloadable music.

- Concerning music scores, big publishers (such as Casa Ricordi) prefer to delegate the on-line distribution of music scores to third companies which are more focused on delivery a service for distribution of music and multimedia content. This is mainly due to the fact that current core business for major publishers is mainly on CD audio distribution rather than on music scores or multimedia objects, their name, the label, is mainly connected to those of the authors and not the product. Major players in the market sector of pure music distributors which distribute third-party-owned multimedia content are:
  - **Net4Music** (www.net4music.com): provided by MakeMusic! Inc. (www.makemusic.com), it is a system to download music sheets paying for them.
  - **Music Sales** (www.musicsales.com):
  - **VivaldiStudio** (www.vivaldistudio.com): it consists in a set of interactive scores, the software tools to listen to and customize them and a music subscription service via email to discover new interactive scores.
  - **MusicNotes** www.musicnotes.com, distribution of sheet music in their format with a plug in of the Internet Browser.
  - **SheetMusicNow (www.sheetmusicnow.com)** distribution of music sheet in PDF
  - **SheetMusicPls (www.sheetmusicplus.com)** only off line distribution
  - **FreeSheetMusic (www.freesheetmusic.net)** distribution of free sheet of music
  - **Virtual Sheet Music (http://www.virtualsheetmusic.com/),** sheet of classic music, off line distribution
  - **Sheet Music Company, (**http://www.sheetmusicco.com/index.php3) only off line distribution
  - **Music Scores, (http://www.music-scores.com/)**, to download music sheets and MIDI files

4.1.3 Technology providers

Technology providers are innovators, know-how and software developers providing technology transfers and/or tools for the management of multimedia content and related distribution and commercialisation in the

net/digital world. The following list presents an overview of the main technology providers active in the market.

Technology Provider	URL
Adobe	www.adobe.com
Apple	www.apple.com
Beep Science	www.beepscience.com
ContentGuard	www.contentguard.com
Digital World Services (Bertelsmann)	www.dwsco.com
DMDsecure	www.dmdsecure.com
element 5	www.element5.com
Frontcode Technologies	www.frontcode.com
IBM	www.ibm.com
Intertrust	www.intertrust.com
LiquidAudio	www.liquidaudio.com
Lockstream	www.lockstream.com
Macrovision	www.macrovision.com
MakeMusic!	http://www.makemusic.com/index.html
Mforma	www.mforma.com
Microsoft	www.microsoft.com
NDS	www.nds.com
On Demand Distribution	www.ondemanddistribution.com
Overdrive	www.overdrive.com
Panasonic Europe	www.panasonic-europe.com
Philips	www.philips.com
RealNetworks	www.realnetworks.com
Roxio	www.roxio.com
Sharman Networks	www.sharmannetworks.com
STARBAK	www.starbak.com
StreamCast Networks	www.streamcastnetworks.com
Tornado	
WebWare	www.webwarecorp.com
WEDELMUSIC	www.wedelmusic.org
Yacast	www.yacast.com

Table 8 : Technology providers

Technology providers and software developers' typically provide their technologies to:

- content owners, music publishers, music labels;
- content providers and distributors;
- end users.

For example, **Liquid Music Network** (Liquid Digital Media) is composed of hundreds of music and lifestyle Web sites that offer Liquid Audio downloads including Amazon.com, Barnes & Noble, Best Buy, CDNow.com, Hard Rock, HMV, J&R Music World, Sam Goody/Musicland, and Sony Music Club.
Liquid Audio is partnering with content owners and Web sites interested in promoting and selling music on the Internet. Liquid Audio also partners with consumer electronic manufactures, chipset manufacturers, and embedded operating system developers who are interested in using this technology to create secure digital music players.
Liquid Audio's Consumer Electronics Partner Program provides device manufacturers, chipset providers and embedded operating systems developers with a comprehensive digital music solution to get to market quickly with digital audio devices.
Liquid Music Network also distributes its Liquid Audio Player enabling end users.

Currently there is a battle between some major technology providers. They are aggressively pushing their proprietary technologies to become market leaders. This might imply that their licensing schemes are dictating the content distribution, which is an undesired side effect. Thus, open formats and standards might

be important to avoid content distribution affected by technology providers. (So format is not only a matter of compatibility but also a business model influencing issue.)

4.1.4 Copyright collecting societies

Copyright collecting societies are non-governmental organisations which represent rights holders (authors, creators and publishers), and look after the enforcement of their rights, ensuring that authors are rewarded for their creativity. The societies negotiate licences with users and receive payments which they pass onto their members. Each collecting society represents a different aspect of copyright.

Typically, Copyright Collecting Societies offer the following services to their affiliates (content creators, author's, rights holders):

- licensing copyrights with record companies,
- collect and distribute the income (royalties) earned from the exploitation of copyrights;
- aim to advance the economic and creative interests of the rights holders that they represent;
- registering copyrights throughout the world and collect mechanical and performance royalties,
- enter into reciprocal arrangements with foreign collecting societies to collect and distribute local royalties to foreign and to receive and distribute royalties earned overseas to local rights holders,
- providing regular royalty statements, personal service and ongoing, aggressive pursuit of unpaid royalties,
- issuing synchronization licenses to film, television, radio, advertising agencies and new technologies and media (gaming, mobile phones ring-tones, flash productions),
- Additional services including sub-publishing and exploitation of copyrights,
- Legal support, such as drawing up of model contracts, issuing licences and authorising uses; negotiate rates and terms of use with users;
- Political action in favour of the effective protection of author's rights; such action can be undertaken before national or international bodies representing the author's right community, be it governmental or non-governmental;

In addition to their task of management of rights, some copyright collecting societies have developed social and cultural activities such as the support of young talent, the economic support for the realization of innovative projects and the promotion of their repertoire.

Copyright collecting societies fulfil their functions by means of collective administration. The status of collective administration bodies is recognised in European Union community law and national law. More details on copyright, collective administration of rights and different categories of rights are available in **Chapter 5, Copyright, author's rights, intellectual property, and fair use**.

Copyrights collecting societies are typically and historically organised on a country basis, each society dealing with and providing expertise for the specific national regulation, market and legal framework. There is no single collective rights management body covering all countries or all of the web. As the market has become internationalised, especially in the last decade, due to the Internet and digital revolution, and the legal framework evolved towards unified models, collecting societies started to group together at international level.

A Brussels-based European-level umbrella body, **GESAC** (www.gesac.org), was Created in December 1990 in the form of an EEIG (European Economic Interest Grouping) and encompasses 25 of the largest **authors' societies** in the EU, Norway and Switzerland. GESAC represents around 480,000 authors or their successors in title in the area of music, visual arts, literary, dramatic works, audiovisual and music publishers.
The objects of the Grouping, in particular with regard to the institutions of the European Union, are the support and development of the legal, economic and cultural activities of its members.
Within the framework of the European construction, GESAC's purpose is to ensure effective copyright protection at the highest level in particular by means of:

- close collaboration with the institutions responsible for the preparation and implementation of European legislation. This legislation must take into account both the cultural dimension and the economic aspects of copyright and must be adapted to the increasing internationalisation of exchanges of cultural products and to the emergence of new technologies.
- participation in technical assistance programmes in the matter of intellectual property initiated by European Union institutions in third countries.

Since September 1994, GESAC is in charge of the implementation of the Phare Programme "Intellectual Property Rights" in favour of the PECO and Baltic Countries.

The International Confederation of Societies of Authors and Composers, CISAC, works towards increased recognition and protection of creator's rights. As of January 2004, CISAC represents **210 authors' societies in 109 countries**. Thus, CISAC indirectly represents more than 2 million creators, covering all the artistic repertoires: music, drama, literature, audio-visual works, graphic and visual arts.

Its activities are aimed at improving the position of authors and composers, and at enhancing the quality of the collective administration of their rights throughout the world. With the growing importance of the Internet and its challenge to the administration of authors' rights, CISAC reinforces its role as a service-driven organisation. Not only does the Confederation offers its members a knowledge base on intellectual property and on the business of collective administration, CISAC now provides confederated societies with the tools and standards that they need to feel confident about making their repertoire widely available in the online world.

The total amount collected by CISAC members within the framework of rights administration increased in 2000 to almost than 6 billion Euros (5,802 billion Euros). Income from music currently represents well over 90% of all revenue.

Founded in 1926, CISAC is a non-governmental, non-profit organisation. Its headquarters are established in Paris. Furthermore, CISAC has regional offices in Buenos Aires and Singapore. The International Confederation of Societies of Authors and Composers, CISAC, works towards increased recognition and protection of creator's rights.
CISAC fosters a global network of collective administration organisations, within which this principle is upheld under reciprocal representation agreements. They allow organisations to administer foreign repertoires on their national territory, exchange information and pay royalties to foreign right owners.

Another international association for music copyright is the **European Music Office** (www.musicineurope.org), an international not-for-profit association (under Belgium law is termed "Asbl", Association sans but lucratif) gathering professional organisations, associations and federations from the music sector in the European Union. It represents more than 600 000 people from all music genres and sectors (authors, composers, performers, publishers, producers, managers; those involved in live music, education and training…).
EMO's mission is to promote the interests of the music sector at the European Union level. Its main objective is thus the conception and implementation by the European Union of a music policy - a specific and necessary support to the European music industry.
EMO's main activity concerns lobbying at the EU level, which implies regular meetings both with EU representatives and music professionals. Valid and updated information on issues related to the music sector are provided to the EU.

EMO priorities objectives are:

1. The adaptation of the existing European legal, fiscal and social framework to render it more favourable to the development of artistic creation, artistic life and the activities of music companies. Legal requirements would include intellectual property legislation, anti-piracy regulations, reduced VAT on recordings, etc..

2. The adaptation of the existing European cultural programme to the needs of traditionally recognised cultural activities, such as classical music, opera, contemporary creation and amateur music.

3. The implementation of a Music Industry Programme, which would support the initiatives of cultural entrepreneurs on the European market.

About 30 associations are EMO members, as listed in the following table:

Collecting society	Description	URL
AKM	Autoren, Komponisten und Musikverleger, Austria	www.akm.co.at
Austro Mechana	Gesellschaft zur Wahrnehmung mechanisch- musikalischer Urheberrechte, Austria	www.auma.at http://www.mica.at
BEMF	Bureau Export de la Musique Française, France	www.french-music.org
CONAMUS	Foundation to promote Dutch Music, The Netherlands	www.conamus.nl
EFA	European Festivals Association, Switzerland	www.euro-festival.net/efichome/efa.cfm
EMMEN	European Modern Music Education Network, Belgium	www.emmenet.org
FAMDT	Fédération des Associations de Musiques et Danses Traditionnellles, France	www.famdt.com
FCM	Fonds pour la Création Musicale, France	www.lefcm.org/
FIA	Fédération Internationale des Acteurs, United Kingdom	www.fia-actors.com
GEMA	Gesellschaft für Musikalische Aufführungs und Mechanische Vervielfältigungsrechte, Germany	www.gema.de
ICMP	International Confederation of Music Publishers	
IDKV	Federal Association of the Performance Industry, Germany	www.idkv.com
IMPALA	Independent Music Companies Association, Belgium	www.impalasite.org
IMRO	Irish Music Rights Organisation, Ireland	www.imro.ie
IUC	Music & Experience Industry, Sweden	www.iuchultsfred.nu
JMI	Jeunesses Musicales International, Belgium	www.jmi.net
KODA-MIC-DMF	Danish Music Information Center, Dansk Musiker Forbund., Musicians Union, Denmark	www.dmf.dk
MERCAT DE MUSIC VIVA DE VIC	Mercat de Music Viva de Vic, Spain	www.mmvv.impevic.net
MMF	Music Managers' Forum, United Kindom	www.ukmmf.net
Prime Art	Management and concert/tour promotion, Greece	www.primeart.gr
SABAM	Société Belge des Auteurs, Compositeurs et Editeurs, Belgium	www.sabam.be
SACEM	Société d'administration des droits des Auteurs, Compositeurs et Editeurs de Musique, France	www.sacem.fr
SACEM Lux.	Société d'administration des droits des Auteurs, Compositeurs et Editeurs de Musique, Luxembourg	www.sacem.fr
UGDA	Union Grand-Duc Adolphe, Luxembourg	www.ugda.lu
SGAE	Sociedad General de Autores y Editores, Spain	www.sgae.es
SIAE	Società Italiana degli Autori ed Editori, Italia	www.siae.org
SPA	Sociedade Portuguesa de Autores, Portugal	www.spautores.pt
STIM-SVENSK MUSIC	Swedish Performing Rights Society, Sweden	www.stim.se
TEOSTO-GRAMEX	Finnish Composers' Copyright Society and Producers' Copyright Society, Finland	www.teosto.fi
TONO	Performing rights Society for Composers, Authors and Music Publishers, Norway	www.tono.no
UEM	Union Européenne des Musiciens, Luxembourg)	www.uem.lu
UGDA	Union Grand-Duc Adolphe, Luxembourg	www.ugda.lu
WBM	Wallonie Bruxelles Musique, Belgium	www.wbm.be
YOUROPE	Sweden	www.yourope.org

Table 9 : Members societies of the European Music Office

Further details on EMO members societies can be found in the Appendix at the end of this report.

Since January 2004, the European Music Office has created a European Platform for Music for the launch and management of pilot projects in the music industry, with the support of the European Commission.

Other bodies and federation of collecting societies are the International Federation of Reproduction Rights Organisations (IFRRO), and the Bureau International des Sociétés Gérant les Droits D'Enregistrement et les Reproduction Mecanique (BIEM).
IFRRO began in 1980 as a working group of the Copyright Committee of the International Publishers Association (IPA) and the International Group of Scientific, Technical & Medical Publishers (STM). It is primarily concerned with photocopying and digital dissemination of text publications.

4.1.5 End users

Users of digital music distribution system can be divided in two categories:

- **Business users**, that are music distribution organisations and companies, music labels, which are described above as current players in the market. Besides, there are a lot of smaller entities willing to enter the market of digital music, multimedia and on-line distribution/interaction. They are potentially interested in acquiring the a system for music and multimedia content distribution, even for small-scale distribution (for instance, distribution within their organisations). Such entities are mainly:
  - Orchestras,
  - Theatres,
  - Conservatories and music schools,
  - Libraries and mediatheques.

- **End users**, that are users which are mainly interested in using and interacting with music and multimedia content, accessing the catalogue from the web, selecting and purchasing the content they need, downloading it in a protected way and finally using it by the proper music/multimedia players. They are typically the business users' customers.

More details about user rights and fair use are presented in chapter **5.4 (Consumer rights and fair use).**

By now, it is convenient to highlight the **importance of the needs of users** and consumers when considering the major problems as well as the new behaviours and possibilities originated by the availability of music in digital format. As in widely adopted design models, from ICT to building houses to developing appliances, the final user should stand **at the centre**[3] of the development process and should be involved in the design process from the early stages.

Briefly, the main objective of users of digital music is to have access to the desired music, at a "good enough" quality, "reasonable" cost and in "short" time. On the other hand, authors, creators, publishers and other rights holders aims at widely distributing and (in the most cases) selling their music at a competitive price while maximising revenues and profit.
Copyright can represent the tool to get a trade-off between these sometime conflicting interests. Copyright should be based on a **balancing principle**: the needs of the rights holder should be balanced against those of society, users and consumers. Copyright law lists the exclusive rights (generally Publication, Reproduction, Adaptation, Public performance or display, Broadcasting) of the rights holder, which will normally be balanced by making the work available to the public.

While copyright law has existed for hundreds of years, founding a balance in the market, the advent of new technologies such as electronic storage and Internet distribution have broken such balance. The balancing principle behind copyright should be spelt in terms of the **new digital environment** to ensure that users have sufficient and easy access to music, while still protecting the interests of rights holders. This will involve publishers, recording labels, authors and users working together to understand each others needs and experimenting new solutions.

4.1.6 Other Organisations

Within the present document, and coherently to the WG activities, the term "Other Organisations" refers to a an heterogeneous group of entities composed of:

[3] Human-centred or user-centred approach. See bibliography for more details.

- Standardisation bodies and initiatives,
- independent market researchers,
- industrial organisations,
- special purpose organisations,
- governemnt and sovranational organisations.

The following table lists the most relevant organisations:

Organisation	URL
AES	www.aes.org
SDMI	www.sdmi.org
MPEG (Motion Picture Expert Group)	www.mpeg.org
OMA (Open Mobile Alliance)	www.openmobilealliance.org
OASIS (Organisation for advancement in Structured Information Standards)	www.oasis-open.org
CRF (Content Reference Forum)	www.crforum.org
OeB (Open eBook Forum)	www.openebook.org
SMPTE (Society of Motion Picture and Television Engineers)	www.smpte.org
WS-I (Web Services Interoperability Organisation)	www.ws-i.org
ISMA (Internet Streaming Media Alliance)	www.isma.tv
TV-Anytime Forum	www.tv-anytime.org
DMP (Digital Media Project)	www.chiariglione.org/project/
RIAA (Recording Industry Association of America)	www.riaa.com
WIPO (World Intellectual Property Organization)	www.wipo.int
CC (Creative Commons)	http://creativecommons.org/
CORAL Consortium	www.coral-interop.org
EC HLG-DRM (European Commission High Level Group on Digital Rights Mangement)	www.europa.eu.int/information_society
ODRL (Open Digital Rights Language) Initiative	http://odrl.net/

Table 10 : Independent organizations involved in music distribution

The most relevant organisations are briefly described in the following paragraphs.

AES

The **Audio Engineering Society** is a professional society devoted exclusively to audio technology. Members are of leading engineers, scientists and other authorities throughout the world.

The AES serves its members, the industry and the public by stimulating and facilitating advances in the constantly changing field of audio. It encourages and disseminates new developments through annual technical meetings and exhibitions of professional equipment, and through the Journal of the Audio Engineering Society, the professional archival publication in the audio industry.

Conventions are held annually in the U.S. and Europe. Each meeting has valuable educational opportunities, including a full program of technical papers, seminars and workshops covering current research and new concepts and applications. An integral part of each convention is a comprehensive exhibit of professional equipment.

Special Publications are developed as required to reflect the new directions the industry is constantly taking. The Cumulative Index of AES Journal articles is issued every five years. An ongoing program of Anthologies of selected Journal and Conference papers in significant subject areas now includes volumes on Loudspeakers, Sound Reinforcement, Microphones, Disk Recording, Time-Delay Spectrometry and Digital Audio. The papers on Digital Audio have become worldwide references unequalled by anything else in print today.

Technical standards are continually being developed under the auspices of the society. Many of them have since been accepted by international standards organizations as the model for their standards on the same material.

SDMI

The **Secure Digital Music Initiative** (SDMI) is a forum that has brought together more than 200 companies and organizations representing information technology, consumer electronics, security technology, the worldwide recording industry, and Internet service providers.

SDMI's objective is to develop open technology specifications that protect the playing, storing, and distributing of digital music such that a new market for digital music may emerge. The open technology specifications released by SDMI will ultimately:

- Provide consumers with convenient access to music both online and in new emerging digital distribution systems,
- Enable copyright protection for artists' works, and
- Promote the development of new music-related business and technologies.

At the moment of writing this report, the SDMI plenary has been evaluating proposals for technologies to be used in the protection of digital music. These evaluations have included assessment of performance, efficiency, audio quality, and survivability to attack, and were based on a consideration of consumer and industry requirements. Based on all of the factors considered by the SDMI plenary, it was determined that there is not yet consensus for adoption of any combination of the proposed technologies. Accordingly, as of May 18, 2001 SDMI is on hiatus, and intends to re-assess technological advances at some later date.

This decision does not affect the prior adoption of SDMI's portable device specification and Phase I watermark, which are in widespread use today.

DMAT (Digital Music Access Technology) is the trademark for products that are compliant with SDMI specifications.

MPEG

The **Moving Picture Experts Group** (MPEG) is a working group of ISO/IEC, JTC 1 / SC 29 / WG 11 in charge of the development of international standards for compression, decompression, processing, and coded representation of moving pictures, audio and their combination. It is expected to be advanced to International Standard by this ballot.

OASIS

The **Organization for the Advancement of Structured Information Standards** (OASIS) develops standards largely based on XML, providing an open forum with broad industry participation, for the future development of the Rights Languages. OASIS founding members include Hewlett Packard, Microsoft, Reuters, VeriSign, IBM, ContentGuard.

CRF

The **Content Reference Forum** (CRF) is a newly formed standards group of leading technology and content-related companies chartered to develop a universal way to distribute digital content across various mediums and geographies. Its goal is to create a dynamic marketplace where consumers can get and share the right content for their platform and preferences, and where underlying commercial agreements and rights are respected. CRF promotes the adoption of specifications and design guidelines, leveraging existing standards, to create an open framework for interoperable, platform- and business model-independent digital content distribution.

OeB

The **Open eBook Forum** (OeBF) is the leading international trade and standards organization for the eBook industry, running a Rights & Rules and an IP Policy working groups. The Rights and Rules Working Group (RRWG) has selected XrML as a foundation rights expression language for developing detailed material in its Rights Grammar specification. The working group has also established a formal liason with MPEG-21.

TV-Anytime

The TV-Anytime Forum is an association of organizations which seeks to develop specifications to enable audio-visual and other services based on mass-market high volume digital storage in consumer platforms. XrML is under consideration as a standard rights expression language by their Rights Management and Protection working group. The Rights Management and Protection Information subgroup has developed tvax, an XrML extension for TV-Anytime. TV-Anytime Forum issued a Call for Contributions in April 2002

for its Phase Two activities. Three distinct areas of enhancements has been identified for Phase Two: New Content Types, Targeting, and Redistribution.

STMPE
The **Society of Motion Picture and Television Engineers** (SMTPE) is the leading technical society for the motion imaging industry. ContentGuard is actively engaging the Digital Cinema Technology Committee of this organization.

WS-I
The **Web Services Interoperability Organization** (WS-I) is an open, industry organization chartered to promote Web services interoperability across platforms, operating systems, and programming languages. ContentGuard is a member & will support initiatives to address Web Services security.

ISMA
The **Internet Streaming Media Alliance** (ISMA) is a non-profit corporation formed to provide a forum for the creation of specifications that define an interoperable implementation for streaming rich media (video, audio and associated data) over Internet Protocol (IP) networks. This alliance of streaming media innovators is actively involved in the development of rights language requirements and to contribute specific domain knowledge about DRM interoperability.

OMA
Formed in June 2002, the **Open Mobile Alliance** delivers open specifications for the mobile industry, helping to create interoperable services that work across countries, operators and mobile terminals and are driven by users' needs. To expand the mobile market, companies that support OMA work to stimulate the fast-and-wide adoption of a variety of new and enhanced mobile information, communication and entertainment services. OMA includes all key elements of the wireless value chain and contributes to the timely and efficient introduction of services and applications.
The mission of the Open Mobile Alliance is to facilitate global user adoption of mobile data services by specifying market driven mobile service enablers that ensure service interoperability across devices, geographies, service providers, operators, and networks, while allowing businesses to compete through innovation and differentiation.

DMP
The **Digital Media Project** (DMP) The DMP is an independent standards initiative that was started by Leonardo Chiariglione, the founder of MPEG, in September 2003. DMP focuses toward solving large problems perceived in the DRM world: interoperability among closed systems; disruption of the balance of control over usage among content owners and consumers; and the potential neglect Traditional Rights Usages (TRUs), i.e. content usages that consumers have enjoyed in the pre-digital era and therefore have come to expect in the digital world, irrespective of whether or not those usages are guaranteed by law.
DMP is still in its starting phase, having recently named a board of directors and established a membership policy. It also issued a call for submissions of information about traditional content rights and how they might map to sets of precisely described rights in the digital media world.

RIAA
The **Recording Industry Association of America,** http**://**www.riaa.com**,** is the trade group that represents the U.S. recording industry. Its mission is to foster a business and legal climate that supports and promotes our members' creative and financial vitality. Its members are the record companies that comprise the most vibrant national music industry in the world. RIAA members create, manufacture and/or distribute approximately 90% of all legitimate sound recordings produced and sold in the United States.
In support of this mission, the RIAA works to protect intellectual property rights worldwide and the U.S.'s First Amendment rights of artists; conduct consumer industry and technical research; and monitor and review state and federal laws, regulations and policies. The RIAA also certifies Gold®, Platinum®, Multi-Platinum™, and Diamond® sales awards, and recently launched Los Premios De Oro y Platino™, a new award celebrating Latin music sales.

WIPO
The **World Intellectual Property Organization,** http://www.wipo.int is an international organization dedicated to promoting the use and protection of works of the human spirit. With headquarters in Geneva, Switzerland, WIPO is one of the 16 specialized agencies of the United Nations system of organizations. It

administers 23 international treaties dealing with different aspects of intellectual property protection. The Organization counts 180 nations as member states.
The objectives mandated by the Convention Establishing the World Intellectual Property Organization, Article 3 are:

- "to promote the protection of intellectual property throughout the world through cooperation among States and, where appropriate, in collaboration with any other international organization."
- " to ensure administrative cooperation among the Unions."

CC

Creative Commons was founded in 2001 with the generous support of the Center for the Public Domain. It is led by a Board of Directors that includes cyberlaw and intellectual property experts James Boyle, Michael Carroll, Molly Shaffer Van Houweling, and Lawrence Lessig, MIT computer science professor Hal Abelson, lawyer-turned-documentary filmmaker-turned-cyberlaw expert Eric Saltzman, renowned documentary filmmaker Davis Guggenheim, noted Japanese entrepreneur Joi Ito, and public domain web publisher Eric Eldred.

Fellows and students at the Berkman Center for Internet & Society at Harvard Law School helped get the project off the ground. Creative Commons is now housed at and receives generous support from Stanford Law School, where Creative Commons shares space, staff, and inspiration with the Stanford Law School Center for Internet and Society. Creative Commons is sustained by the contributions of a growing group of supporters.

Creative Commons is working to revive balance, compromise, and moderation, "once the driving forces of a copyright system that valued innovation and protection equally" which have become "endangered species" in a world where the debate over creative control tends to the extremes. "At one pole is a vision of total control – a world in which every last use of a work is regulated and in which *all rights reserved* (and then some) is the norm. At the other end is a vision of anarchy — a world in which creators enjoy a wide range of freedom but are left vulnerable to exploitation".

The aim of Creative Commons is to offer creators a best-of-both-worlds way to protect their works while encouraging certain uses of them, to declare "some rights reserved". Thus, a single goal unites Creative Commons' current and future projects: to build a layer of reasonable, flexible copyright in the face of increasingly restrictive default rules.

CORAL

Coral Consortium (http://www.coral-interop.org/) is a cross-industry group aiming to promote interoperability between digital rights management (DRM) technologies used in the consumer media market. The Consortium's goal is to create a common technology framework for content, device, and service providers, regardless of the DRM technologies they use. This open technology framework will enable a simple and consistent digital entertainment experience for consumers.

On October 4, 2004, in Sunnyvale, California, seven major media and technology companies have joined together to form the Coral Consortium: HP, Intertrust Technologies Corporation (owned by Sony and Philips), Koninklijke Philips Electronics N.V., Panasonic (Matsushita Electric Industrial), Samsung Electronics, Sony Corporation and Twentieth Century Fox Film Corp. Note that HP is Philips's partner in the digital home entertainment.

The Coral Consortium seeks to ensure interoperability so that today's digital music and video can be easily accessed and enjoyed, regardless of the service provider or the device. While recent innovations in digital media distribution provide consumers with new channels to acquire music and video, proprietary differences still exist in underlying DRM or content protection technology. At times, these technologies conflict and prevent consumers from playing content packaged and distributed using one DRM technology on a device that supports a different DRM technology. Coral's focus is a new technology layer that will allow existing DRM solutions to co-exist, thereby promoting content and devices that play well together.

EC HLG-DRM

The establishment of a **High Level Group** to address current issues arising from **Digital Rights Management** (DRM) was announced by the **Commission** in its Communication "Connecting Europe at high speed: recent developments in the sector of electronic communications", adopted on 3 February 2004.

The Communication acknowledge the key role of DRM for e-content distribution and underlines the importance of DRM's availability for new business models to develop in the broadband market. The usefulness of DRM has been recognised by the European Parliament in its Report of 11 December 2003 on a Community framework for collecting societies for author's rights.

The advent of broadband networks and their capacity to transmit large volumes of multimedia content at high speeds emphasises the importance of ensuring that digital content is available under the appropriate conditions, which meet the interests of all stakeholders. In this context, according to EC HLG-DRM, DRM technologies are promising to establish the right incentives for this development, notably a secure environment for ensuring remuneration of right holders in the context of private copy, payment for online content as well as preventing illegal copying.

HLG-DRM recognize that new business models for the delivery of online content are increasingly being experienced in the market. Yet some issues deserve attention at this early stage of commercial implementation; amongst these issues the interoperability of DRM remains to be addressed together with concerns of stakeholders or consumers such as privacy concerns.

The High Level Group on Digital Rights Management provides an opportunity for stakeholders to raise their essential concerns and to discuss about possible co-operation between businesses and governments, while the outcome of the Group should be submitted for a large consultation at a later stage. The Group will comprise high level representatives of interested parties ranging from right holders, collecting societies, content providers and the ICT sector to research and consumers organisations.

A first meeting of the High Level Group on DRM with Commissioner Liikanen took place on 31 March and has been followed by another meeting on 5 July to finalise its positions on the appropriate response to the policy challenges posed by DRMs. At the second meeting of the High Level Group on DRM (8 July 2004) it was decided to launch a wider consultation of all stakeholders on the Final Report. This informal consultation allowed views to be expressed by interested parties on the outcome of the High Level Group.

ODRL

The **Open Digital Rights Language (ODRL) Initiative** is an international effort aimed at developing and promoting an open standard for the Digital Rights Management expression language.

The ODRL Initiative is focused on fostering and supporting open and free standards for the specification of media commerce rights languages. The ODRL Initiative is a forum used to propose, discuss, and gather consensus for a language that it will subsequently nurture via formal standards bodies. The ODRL Initiative will strive to openly participate in standards groups that allow for the adoption of royalty-free specifications. The ODRL Initiative is committed to supporting MPEG-21 and is a compatible Rights Language that will support open and free interoperability within and across the MPEG-21 Multimedia Framework. ODRL has been submitted to formal Standards Groups.

4.2 Relevant national and international projects and research

Potentially interesting experiences and useful information can be gathered by previous projects, such as:

4.2.1 AMIDE

(copyright, electronic payment)
The AMIDE (Advanced Multimedia Information Dissemination) system enables electronic shopping centres to be set up either on the Internet or on CD-ROM. Customers can use the system to make purchases or to order services from suppliers represented in the "shopping centre". Service providers advertise their services in the Global Directory which customers can browse. Customers then pay the suppliers for any items or services they require.

4.2.2 CANTATE

(music delivering from publisher to libraries distribution of music scores to create a virtual library on Internet)

CANTATE is the acronym for the project “Computer Access to Notation and Text in Music Libraries”. The Consortium has researched the current state of Music Libraries and Music Publisher to report on the extent to which music is already encoded and through which programs. It has also tested the reaction of these parties to the ideas contained within CANTATE.
The project has examined the encoding of music in Standard Music Description Language (SMDL) and has encoded a number of pieces of music. This has been carried out in conjunction with the design of the complete hardware and software system.
The tasks of this system are:

- to handle the input of sheet music either directly or through scanning, into databases
- to allow for remote access through an Internet client-server architecture to bibliographic databases and make links to bitmap or coded music files where available
- to enable the selected music to be displayed on the terminal screen
- to allow for the printing of the selected music
- to ensure control of the printing through the payment of fees and to regulate their redistribution

4.2.3 COPEARMS

(derived from CITED, copyright)
The aim of COPEARMS (Co-ordinating Project for Electronic Authors' Rights Management Systems) is to assist other projects and organisations in the development of electronic rights management systems (ERMS). By doing this the Consortium hopes to encourage interoperability between systems and to prevent duplication of research and development in this important field. Technical partner, Euritis, uses the COPYSMART ERMS for exploiting COPEARMS experience and results.

4.2.4 COPYSMART

(derived from CITED, use of smart card)
The CopySmart project aims at the development of an industrial low-cost solution for implementing Intellectual Property Rights (IPR) management based on the CITED model.
The fast expansion of information networks like Internet and the introduction of digital broadcasting technology has risen the problem of media copyrights, author rights, access control and payment for digital multimedia material. Once published it is difficult to control the use, manipulation and distribution of digital information and to guarantee related rights. This issue needs to be addressed for the development of the information society, for the creation of business and services on open networks and for the protection of the European cultural heritage.

4.2.5 CUIDADO

(content processing of music and music indexing in Mpeg7, www.ciudado.mu)
CUDADO is a European project for music and content that tackles the twin problems of information overload and information uselessness on the Net. CUIDADO aims to develop special content-based technologies using the latest multimedia indexing standard MPEG-7.
CUIDADO targets two pilot applications and various modules for audio feature extraction, statistical indexing, database management, networking and constraint based navigation and much more:

- the Music Browser to find music
- the Sound Palette to edit music and sounds

4.2.6 DECOMATE

(copyright, distribution material, http://www.ifla.org/IV/ifla62/62-dijj.htm)
This project, currently being executed under the framework of the Libraries Programme by Tilburg University (NL), the London School of Economics and Political Science (UK) and the Universitat Autonoma de Barcelona (ES) is a project that aims at the development of an integrated electronic system for searching, browsing and printing scientific and copyrighted journals in a World Wide Web environment. This new system opens the way to electronic journal management by exploring issues relating to technical and copyright questions, and providing he generation of valuable statistics on its use. Production of usage statistics will be particularly valuable in collection management terms, since usage of traditional printed journals has always been notoriously difficult to monitor.

4.2.7 DEESD – DIGITAL EUROPE

(e-commerce and sustainable development, www.digital-eu.org)
The Digital Europe project is a criss-cross sector partnership between three leading think tanks: FORUM, FEEM, and WIMFSC and twelve major European companies. At the core of the project there are three distinct but inter-linked research themes, each of which led by one of the think tanks. Around each theme there is a research group of four corporate partners across the entire project. These are major European companies, with an interest in the digital economy, and include a mixture of "bricks and mortar" companies now involved in e-business, and "new economy" companies with a business model based entirely around the Internet.
The Digital Europe project explores the relationships between e-business and sustainable development, two of the key challenges currently facing policy-makers and business leaders in Europe. The project provides original research to fill the current knowledge gap, and make recommendations based on this research. Acting on the assumption that information technology, e-commerce and e-work can generate real gains in environmental productivity, social cohesion and quality of life, researchers aim to carry this to the next level, by undertaking a comprehensive assessment of the environmental and social opportunities of e-business in Europe. There are six ways in which the "Digital Europe" project advances the state of art in the area: it provides the first comprehensive analysis of the relationship between e-business and sustainable development in Europe; it promotes synergy between policy on sustainable development and e-business at an European level; it creates novel and diverse partnerships; it investigates new and emerging business models and working methods; it develops detailed case studies of eight sectors, and it provides an European input to emerging international initiatives.

4.2.8 ECUP

(European Copyright User Platform, http://www.eblida.org/ecup/), **ECUP+** (derived from ECUP for libraries)
The objectives of the European Copyright User Platform were:

- to make librarians\information professionals aware of copyright
- to identify the copyright problems in electronic services
- to discuss these problems with the rights
- to draw up a code of good practice for the use of electronic information

ECUP+ follows up the results achieved under the first contract (ECUP I) but also extends its scope to the establishment of a Copyright Focal Point for participants under the Libraries Programme and members of EBLIDA.
The objectives are:

- to continue discussing the library privileges in electronic services and model clauses for licenses for the use of electronic information with a larger group of right holders and collecting societies;
- to continue making librarians aware of the implications of copyright on electronic services and to introduce the results of the discussions with the right holders and the collecting societies;
- to establish a focal point for questions on copyright and information on EU legislative developments in this area;
- to reinforce the position of libraries in discussions about copyright issues with the appropriate bodies.

4.2.9 G-FORS

(Generic Format for Storage, www.g-fors.com)
The goal of the G-FORS project is to reduce the cost of European programme production. This will be achieved by handling content efficiently and cost effectively throughout the broadcast chain compared to tape-based systems.
The project will provide the flexibility and speed required for nonlinear editing, connection with telecommunications channels, storage of HDTV / electronic film images and faster than real time data transfer. A generic file "wrapper" format will be created for the distribution and storage of programme content. This will provide interoperability between acquisition, storage and contribution systems. The flow of essences (video, audio and data) and metadata ("bits about bits") will be seamlessly interchanged between elements of the demonstration system.
Faster than real time interchange will be explored within the context of a broadcast environment where low latency and minimal overall buffering are operationally important, particularly in a live environment.

The project will develop transcoding techniques to increase flexibility of the proposed system. It will deliver a broadcast chain consisting of camcorder, solid state/disk based camcorder cartridge, server, transcoders and very high resolution viewer for monitoring images. The viewer will be capable of displaying the advantages of the transcoding techniques developed within the project as it will be capable of showing the artefacts present in other coding schemes.
The project will communicate with standardisation bodies (such as EBU / SMPTE) to ensure that a standard for the seamless interchange of content via a generic format is achieved.

4.2.10 HARMONICA

(harmonisation of actions in the area of libraries, copyright, delivering identification of the most relevant requirements of publishers and consumers in terms of copy right protection, http://www.svb.nl/project/harmonica/harmonica.htm)
The HARMONICA project aims to provide a solid strategic framework for networked access to music and related multimedia services, including technologies, existing and emerging standards, exploration of network options and improved interfaces. This will entail fostering consensus between the broad range of players involved in the field.
The overall objectives are:

- realistic guidelines and recommendations targeting the wide and varied user community;
- a review of national, European and international initiatives in the area of music information;
- technical issues, in particular those involved in ensuring interactivity, interoperability and user interfaces;
- the role of public library users of music information (in addition to users from the professional music community).

4.2.11 HOMESTEAD

(shopping mechanisms from home)
The objective of the HOMESTEAD project is to develop a CD-I based home shopping facility.
HOMESTEAD will test three pilot applications in actual and simulated home environments. These will cover the areas of interior design, travel and holidays, and a composite involving fashion, DIY, and financial services. CD-I equipment will be placed in a selection of homes and their sales generation abilities carefully assessed. These homes and the application areas have been chosen to represent different consumer requirements (such as "browse" or "select") and to test simple selection systems based on easy-to-operate interaction devices connected to domestic television receivers and the CD-I discs in the equipment supplied.
HOMESTEAD plans to produce standard methods of information loading, data storage, searching and retrieval, and to design a low cost, simple user interface for home users. HOMESTEAD is expected to demonstrate the practicalities involved in introducing multimedia technologies into the home environment.

4.2.12 IMPRIMATUR

(Intellectual Multimedia Property Rights Model and Terminology for Universal Reference — delivering, protection, copyright definition of a general framework for distributing protected multimedia content by using transaction models, encryption and watermarking, www.imprimatur.net)
The Imprimatur project is concerned with methods of buying and selling creative works on networks. The essential aim of Consensus Building in the Imprimatur Project is for all sections of the community to agree on how to trade in electronic versions of works of art — whether written, composed or otherwise created. Without agreement amongst all those involved in the processes, any solutions are likely to fail. Imprimatur has spent three years in honing down the most important issues from a long list of concerns.
The key issues for IPRs, as initially identified by the scenario-analysis, were: Eavesdropping (Encryption), Ownership (Watermarking), Primary Access (Browsing, Acquiring), Manipulation (First copying, Retransmitting), Confidentiality (Defamation, Pornography), Commercial (Transaction system, Collection), Legal (Existing law, New laws).

4.2.13 JUKEBOX

(audio distribution via network, http://www.sb.aau.dk/Jukebox/edit-report-1.html)
The aim is to set up and test a pilot system for a new library service, where library users at remote distances can get online access to sound recordings held in their own national media archives as well as archives in

other European countries. The project only deals with a *prototype*, and the pilot to be tested only comprises a small-scale service.
The JUKEBOX pilot will consist of a data network between local libraries and national sound archives. The libraries will be equipped with a multimedia terminal (*the user system*) which is connected to a server (*the archive system*) installed in the sound archives.
The archive system can be considered as a "full-text database". Not only will it contain bibliographic data related to the sound documents, but also digitised sound. The user system will enable users to make bibliographic searches in the archive databases and listen to the sound through headphones.
The choice of libraries as the focal point between users and sound archives is significant. The library sector already has a well-functioning and efficient system for inter-lending printed materials. It is also important that libraries provide an institutional structure able to conform with copyright restrictions attached to the sound recordings.
Recently many libraries have introduced audio-visual services as a supplement to the traditional printed information. The introduction of special music lending departments in public libraries has attracted new users, and one assumption of this project is that a JUKEBOX service as proposed - providing online access to the comprehensive and unique collections of sound archives - will strengthen the role of libraries as the central information suppliers of the future.
JUKEBOX will concentrate on online access to audio. But in future developments the system could be extended to include electronic documents and visual information such as still pictures (e.g. photographs, music scores, covers and labels) or moving images (e.g. television news, documentary films or art videos).

4.2.14 MODE

(music delivering, audio format)
The overall objective of the MODE project is to test, evaluate and implement a viable commercial service for the promotion of the European music industry. The service will provide access to a telematic service targeted for both private consumers, radio stations, music schools and the music industry. The service will comprise electronic ordering, listening, purchasing and delivery of recorded music covering a broad spectre of music styles. The content of the service will be delivered by independent record labels, and eventually, international labels associated with the International Federation of Phonographic Industry (IFPI).

4.2.15 MOODS

(music distributed system, music model for distributed systems, http://www.dsi.unifi.it/~moods/)
MOODS project consists in realizing a distributed system of lecterns/editors for music by starting from stand-alone editors/lecterns for music.
A MOODS system consists in an integrated system of computer-based lecterns/stands which can be used for both editing and visualizing music in cooperative manner. The distributed system of lecterns is an innovative idea for automating and managing the large information used by

(i) orchestras during rehearsals and public performance of concerts, operas, ballets, etc.
(ii) students of music during lessons in conservatories and schools of music
(iii) publishers during massive editing of music.

The targeted end-users are theatres, itinerant orchestras, groups of musicians, schools of music, television network orchestras, and publishers of scores.
Main objectives and results of MOODS project are:

- the adoption of HPCN technology for drastically reducing the time needed for modifying main scores and parts during rehearsals of concerts, ballets and operas; at least a 20% of reduction of costs for preparing performances for orchestras, theatres, schools of music has been estimated;
- the introduction of HPCN technology in a new environment;
- the deployment of HPCN technology for creating of a new product and for opening a new market for many products (lectern systems for orchestras, lecterns for pianists, lecterns for small group of musicians, etc.), using electronic versions of scores already available in the archives of publishers, on the basis of already present stand-alone editors/lecterns for music scores;
- the dissemination of results at European level.

Other interesting features of the MOODS system are:

- managing (saving and reloading) the instrumental and personal symbols on main score and parts; Thus saving artistic details never save up to now;
- managing (saving and reloading) the exact tempo in which each measure of the score has been executed;

- avoiding, by automating all mechanisms, the turning of pages during rehearsals and final performances;
- visualizing in few minutes any score on the lecterns of musicians, fast changing of music piece of reference point, or arrangement;
- manipulating in real-time main score in parts as a whole music score, thus presenting the final version of the score in short time to musicians.

4.2.16 MUSE

(copyright, watermark on audio)
The MUSE project focuses upon the following objectives:

- standardisation of interfaces within digital media management systems to facilitate the electronic delivery of sound recordings, text and artwork
- survey embedded signalling systems with a view to selecting one system to develop as worldwide standard
- survey encryption technology applicable to digital media files, with a view to selecting one system to develop as a standard.

The MUSE project will work towards a generic scheme which enables the European music industry to safely offer in free competition recordings to professional and private users. The scheme is to consist of:

- conceptual design of a digital media management system
- functional and syntactic specifications of the public interfaces which are part of a digital media management system
- selecting an embedded signalling system suited for use as a worldwide standard
- selecting encryption methods suitable for use as a worldwide standard.

Furthermore the project will contribute to the ongoing development of the CITED data model on copyrights.

4.2.17 MUSICA

(a choral documentary search tool for conductors, musicologists, music schools, music stores, etc., www.musicanet.org)
MUSICA is a project those goals is to gather information on all choral music of the world into the single research tool. It is an international project and the database is therefore multilingual (French, German, English and Spanish), containing over 90,000 references (October 2000), what represents dozens of year-men of work. Its evolution to become a virtual multimedia library is underway.
The documentary structure of each record is a set of 80 different types of information (composer, arranger, publisher, title, genre and form, level of difficulty, type of choir, language, century, instrumentation, etc ...). Even the musical themes are input for search and display.

4.2.18 MUSICWEB

(music delivering, educational)
The European project group "MusicWeb" came into existence January 1995 with the objectives to take an inventory of the problems in computer-aided music education and to produce software solutions for the future years. In 1996, eight universities and research centres in Europe was participating actively.
The system encompasses a central object-oriented database containing music objects (midi, sound, wave, objects with a self-made data structure, etc.), visual and text objects (text, video, pictures), and complex objects (whole applications, multimedia documents with links, complex music objects, etc.).

4.2.19 MUSTUTOR

(OMR, music notation, http://www.ilsp.gr/mustutor_eng.html)
The object of this programme is the completion of new technologies in audio recognition (analysis of acoustic data for defining the fundamental frequencies, the timing of musical notes and their dynamics) in an instructive multimedia environment which will include musical content, video, animation, performance accompanied by notes, voice recognition and optical recognition in scores with typed notes. The completion of these technologies will function as the basis of a virtual music lesson and practice environment, which will help the study of music at home or at the conservatory.

This programme aims at a thoroughly improved environment via audio recognition of non-MIDI instruments like flute, violin, saxophone, which will include videotaped exercises presented by real teachers. The system will analyse the student's performance and this way help him/her to improve him/herself.

4.2.20 OCTALIS

(Offer of Contents through Trusted Access LInkS, www.octalis.com)
The Octalis ACTS project aims to combine together access control and copyright protection technologies for various applications. Two large scale trials are conducted: delivery of still pictures on the internet, delivery of video between professional users.
INA also makes a feasibility study on the use of an Octalis high bitrate system for delivery of archives.
These trials are implemented using tools provided by other ACTS projects among which watermarking, labelling and monitoring, smart-cards and trusted third party.
The technical approach is based on the separation between the management signals, vehiculated on an intranet (TCP/IP specific network) which allows the (de)scrambling keys and the labels management and the video sources which are transmitted through classical broadcasting links. Interoperation and evolutivity of the management network have to be ensured. The project studied compliance with emerging standards (DAVIC) and with future developments of Internet (IETF, FIPA).
Key Issues was:

- integration of copyright protection and conditional access;
- management of the copyright protection and conditional access through specific TCP/IP

Expected Achievements was the demonstration of a system for securing primary distribution for video signals, and the demonstration of its potential use for archives databases access and extension for Internet delivery of photographic pictures.

4.2.21 PAIDFAIR

(protecting accumulated intellectual data for accounting in real-time, accompanying measure to give support in setting up paying solution for electronic commerce, www.paidfair.com)
The Trial intends to adapt and introduce not already established leading edge technology for protecting and usage measuring of IP contents and software supporting e-Commerce models in different fields of applications. The ultimate strategic goal of this trial is setting a world wide standard for payment for IP content or software usage.
The trial is proposed to give trust and confidence for software and IP content vendors and users. It is solved by implementation of a protection and accounting system, adopted to different partners business fields:

- secure electronic software distribution and pay per use
- distribution of music content
- e-payment and authentication integration with Smart Card technologies
- IP Distribution through broadcast/multicast and satellite communication
- biometrical authentication and secure downloads for open Multimedia Home Platform (MHP) set-top-box.

The ultimate strategic goal is setting a worldwide standard for payment for IP content or software use according to the slogan: Fair Pay-Per-Use.
The innovations used in protection and accounting use the latest encryption algorithms (Rijndael, Elliptic curves), use public key schemes for secure downloading of usage credits. Technical objectives are demonstration systems in fields of secure electronic software distribution and pay per use, distribution of music content, e-payment and authentication integration with Smart Card, IP Distribution through broadcast/multicast and satellite communication, biometrical authentication and secure downloads for open Multimedia Home Platform (MHP) set-top-box.

4.2.22 PARAGON

(audio distribution via network, a virtual catalogue of three databases of music in sound format)

4.2.23 PLAY and PLAY2

(music tools for visually impaired people, http://www.ice.ge.cnr.it/Attivita/Progetti/PLAY.html)
PLAY2 is aimed at offering the blind an easy approach to the IT world, by also offering the opportunity of exchanging information with sighted users. PC tools are meant to solve several problems met by the blind.

An easy system to compose music Braille scores, by converting them from most codes used by such commercial programs as Coda Music's Finale is provided. Exchanging scores converted in PLAYcode among blind users is another remarkable opportunity; PLAY2 also can successfully meet the need of blind musicians, who are complaining that Braille scores are little available in libraries, and too long is taken to get texts, because they can be distributed as raised hard copies and by conventional mail only. IT can drastically help reduce the high costs of scores, especially when drafting has to be commissioned, and start a service for exchanging music texts among libraries and from these to users.

4.2.24 RADICAL

(Research Agenda Developed in Creative Arts Labs, www.get-radical.net)
RADICAL project aims, through a programme of residential creative labs, to help create sustainable working relationships between the creative community, represented by digital practitioners, content developers and creative micro-enterprises, and the research and development community, comprising of researchers, software developers and publishers.

4.2.25 RIGHTSWATCH

(accompanying measure to find an agreement about the regulation on rights control and collection, www.rightswatch.com)
RightsWatch is a research project aiming at developing consensus and promoting awareness of self-regulatory notice and takedown (NTD) procedures for Europe, as a tool to achieve prompt removal of copyright-infringing material from the Internet.
The project objectives are:

- Considering procedures for managing the notification of copyright infringement which benefit ISPs and rights holders without unreasonably prejudicing the interests of legitimate ISP customers, including businesses and individuals.
- Preventing malicious notification by examining validation procedures for the notifier, or the notice, that can be trusted by the ISP. Such procedures would require agreements with rights holders and may be facilitated by the use of digital rights management systems.
- Investigating options for collective risk management for rights holders and ISPs. This may take the form of insurance or indemnity.
- Considering how best to facilitate access to information about licensing procedures operated by rights holders.
- Considering resolution of disputes covering any period of infringement where the material was not licensed. The framework may need to include arbitration or mediation procedures, to complement formal legal procedure.
- Taking into account the needs of users, including individuals, consumers and businesses.
- Promoting understanding and awareness of Intellectual Property Rights ("IPR") issues.
- Considering appropriate approaches to governance of self-regulatory notice and takedown regimes in Europe.

4.2.26 RITMO

(Research on Integrated Trading Model for Music On-line performing a comparative analysis of legal aspects related to the distribution of music)
The aim of this project is to establish a consensus building platform for supporting the online music economy.
The project objectives are:

- Carry out a comparative legal analysis of music distribution contracts in Europe.
- Study the interaction between interests addressed by these contracts and new technologies for on-line music distribution.
- Elaborate experimental model contracts for European on-line music distribution.
- Clarify technology solutions for rights management, royalty collection and payment in relation to on-line music distribution.
- Develop business models for on-line distribution suitable for adoption by SMEs.
- Develop globalisation strategies for the technology driven development of the European independent music industry.
- Elaborate a sectoral profile of the independent music industry in Europe.

- Disseminate these results to the independent music industry, to researchers and to the developers of technologies for on-line music distribution, to intermediaries and third parties such as collection societies and the providers of infrastructures for trust and confidence brokerage

4.2.27 TALISMAN

(Tracing Author's rights by Labelling Image Services and Monitoring Access Network, http://www.tele.ucl.ac.be/TALISMAN/)
TALISMAN goal is to provide European Union service providers with a standard copyright mechanism to protect their digital products against large scale commercial piracy and illegal copying.
The major aims for the TALISMAN project are:

- set-up an end-users driven task force defining a Common Functional Model, addressing the following issues:
  - legal aspects
  - rights management organisation and identification of the related roles
  - definition of different scenario of products circulation
  - marketing and economic studies
- specify an open and monitoring framework system having the ability to integrate hierarchical protection system in an evolutionary way
- propose this evolutionary and hierarchical model as a standard to standardisation bodies.

4.2.28 WEDELMUSIC

(Web Delivering of Music Scores, flexible and complete music and multimedia content distribution system with DRM protection, www.wedelmusic.org).
WEDELMUSIC goal is to allow the distribution and sharing of interactive music via Internet totally respecting the publisher rights and protecting them from copyright violation.
WEDELMUSIC allows publishers, archives and consumers (theatres, orchestras, music schools, libraries, music shops, musicians) to manage interactive music; that is, music that can be manipulated: arranged, transposed, modified, reformatted, printed, etc., respecting copyright. It is an innovative support for preparing performances, studying music, analysing music, learning instruments, distributing music at low cost, etc. The same music objects will be available for traditional media and Braille. These features are possible thanks to the definition and implementation of

- a unified XML-based format for modelling music including audio, symbolic, image, document, etc.,
- reliable mechanisms for protecting music in symbolic, image and audio formats.
- a full set of tools for building, converting, storing, distributing music on the Internet

To distribute, share and receive music in symbolic format also allows to commercially exploit new functionalities for music consumers and, thus, it allows the opening of a new market for several specific applications: sharing of multimedia music objects among archives, libraries, publishers, music groups, etc.

4.2.29 AXMEDIS

(Automating Production of Cross Media Content for Multi-channel Distribution) is a newly started and overfunded 6FP IST Integrated Project aiming to meet the challenges of market demand by (i) reducing costs for content production and management by applying Artificial Intelligence techniques to content creation, representation (format) and workflow; (ii) reducing distribution and aggregation costs in order to increase accessibility with a Peer-to-Peer (P2P) platform at Business-to-Business (B2B) level, which can integrate content management systems and workflows; (iii) developing and providing new methods and tools for innovative and flexible Digital Rights Management (DRM), including the exploitation of MPEG-21 and overcoming its limitations, and supporting different business and transaction models.

The AXMEDIS consortium consists of leading European digital content producers, integrators, distributors and researchers. The main objective of the project is to create the AXMEDIS framework to provide innovative methods and tools to speed up and optimise content production and distribution, for production-on-demand, for leisure, entertainment and digital content valorisation and exploitation in general. The AXMEDIS format can include any other formats and it can exploit and expand MPEG-4, MPEG-7, MPEG-21, as well as other de facto standards.

AXMEDIS is to organise and realise several demonstrators, which are managed by the project partners, to bring different types of digital contents (such as music, video/film, educational materials, documents, images, programmes, etc) via different distribution channels (such as the Internet, mobiles, PDA, PC, i-TV, satellite, etc). These demonstrations will further highlight the innovative results from the AXMEDIS platform in a variety of activities including content production, automated formatting and distribution (protected or unprotected), via i-TV, mobiles, kiosks, Internet for PC through mechanisms of Business-to-Consumer (B2C, Client Server) and Peer-to-Peer (P2P). Furthermore, the AXMEDIS platform, AXEPTool, will be developed to distribute P2P protected contents at B2B level. At a later stage, the AXMEDIS consortium will grant the sum of 1 million Euro to companies and research institutions interested in developing real solutions by exploiting AXMEDIS technologies (this is referred to as take up actions).

Some didactic events will be organised to provide better understanding of the AXMEDIS technologies with further information about the potentialities of AXMEDIS. Business delegates could attend these events so as to take part in the project and bring AXMEDIS technologies to their company. Special trainning sessions and courses will be held for managers, content managers, content producers and integrators, and digital content distributors. Workshops and courses will be organised in several venues in Europe. To provide better understanding of the new solutions, AXMEDIS is providing a forum for discussion, with technologiests and experts who are ready to assist with any AXMEDIS related problems and concerns. Futhermore, with the AXMEDIS portal, access is provided to a substaintial pool of information and examples of technical solutions, digital contents, software components and systems, which are provided by the project partners from the very beginning of the project (mainly in Open Source, but also including some proprietary formats).

4.2.30 TIRAMISU

The Innovative Rights and Access Management Inter-platform SolUtion (TIRAMISU) project (http://www.tiramisu-project.org/) addresses the problem of creation, delivery and consumption of audio-visual media across a wide range of hybrid networks and platforms, where security issues, such as intellectual property rights protection, privacy, access rights and transaction tracing are of major concern.

The objective of TIRAMISU is to unleash the full potential of digital media, addressing the complete consumption chain - media creation, delivery and consumption, while removing the Digital Rights Management (DRM) barrier.

The project is sponsored by the European Commission and consists of eleven partners. These include Optibase (Israel), Imperial College of London (United Kingdom), NagraVision (Switzerland), Industrial Technology Research Institute ITRI (Taiwan), University of Ljubljana (Slovenia), Ecole Nationale Supérieure des Télécommunications ENST (France), Fraunhofer-Gesellschaft (Germany), ARTTIC Israel (Israel), France Telecom (France), Orange (United Kingdom).

TIRAMISU media creation, delivery and protection framework developed in the TIRAMISU project enables usage scenarios, in which users are able to get media content from various sources (DVB broadcast, service provider's portal for example). Content entering the user's home domain can be subsequently further distributed over a variety of distribution channels, such as peer-to-peer networks without compromising the rights of the rights holders. Content is always distributed in protected form. End users are encouraged to post it on internet portals, share it within peer-to-peer networks and by means of physical media copies. However access to content is subject to availability of a specific license issued by the rights owner for each content instance. These licenses are stored on smart cards which are portable between devices to enable user access to content from several devices.

The TIRAMISU framework provides answers to the dilemmas that hinder wider adoption of DRM technology and prevent more liberal and effective content distribution policies:

- "Unobtrusive DRM": The TIRAMISU DRM system is based on the principle that the only difference between free content and protected content is the price. Metered access to content is as easy and straightforward as making a call on your mobile phone.
- "Rights management, not rights deprivation": The TIRAMISU approach to DRM will ensure that user maintain all the rights they used to have in the analogue era, including the ability to create personal copies, the ability to play owned content on any owned device, the right to lend content to friends, etc.

- "Protect the item, not the channel": The TIRAMISU approach focuses on protecting digital items regardless of delivery channels. An item may travel along different routes, sometimes morphing through heterogeneous networks, and still be protected end-to-end so that only the final authorized consumer is able to play the item.
- "Super-distribution": The TIRAMISU system enables exposure of content, so that content will reach the maximum number of potential customers, through diverse delivery means including state-of-the-art peer-to-peer networks, while monitoring content consumption and ensuring proper compensation to rights owners.
- "DRM for all": The TIRAMISU solution makes use of international standards and affordable technology, so that its implementation does not require hefty investment. This enable amateurs and private artists to enjoy the benefits of content protection.

TIRAMISU delivers two simplicistic messages to end users and professional content providers. For end users it aims to create an atmosphere where DRM systems are not perceived as an obstacle in content consumption, which complicates the user experience, increases costs and "eventually motivates illegal content distribution". For content providers the TIRAMISU message is "to not hide content from your potential customers". That is a protect mechanism to enforce IPR in a way that will allow providers to get compensation from each user accessing their content, do not hinder distribution, but motivate distribution over a variety of distribution networks to reach a larger number of potential customers.

4.3 Relevant conferences, events and fairs

Most important e-commerce, e-learning and music and multimedia related fairs and workshops, are:

- Frankfurt Musik (music tools, computer music, audio, multimedia)
- MILIA (France, multimedia)
- MIDEM (France, audio, music, performance)
- LEARNTECH (Germany)
- ONLINE EDUCA BERLIN (Germany)
- EUROCHINA (co-operation forum with IST)
- Frankfurter Buchmesse (Germany, multimedia publishing)
- ECTS (UK, multimedia, manufacturing, courses)
- SMAU (Italy, e-commerce, e-business)
- CHILDREN'S BOOKFAIR (Italy, multimedia, innovation)
- Information Society Technology (IST) fairs
- Information technology fairs sponsorised by European Commission
- Streaming Media Europe
- MUSICNETWORK OpenWorkshops, http://www.interactivemusicnetwork.org/events.html
- International Conference on Web Delivering of Music, WEDELMUSIC, http://www.wedelmusic.org
- AES Conventions, http://www.aes.org/events/#conv
- AES International Confernces, http://www.aes.org/events/#conf

5 Copyright, author's rights, intellectual property, and fair use

5.1 What is copyright

When a person creates a literary, musical, scientific or artistic work, he or she is the owner of that work and is free to decide on its use. That person (called the "creator" or the "author" or "owner of rights") can control

the destiny of the work. Since, by law, the work is protected by copyright from the moment it comes into being, there is no formality to be complied with, such as registration or deposit, as a condition of that protection. Mere ideas in themselves are not protected, only the way in which they are expressed.

> **Copyright** is the legal protection extended to the owner of the rights in an original work that he has created. It comprises two main sets of rights: the **economic rights** and the **moral rights** [WIPO].

The **economic rights** are the rights of reproduction, broadcasting, public performance, adaptation, translation, public recitation, public display, distribution, and so on. The **moral rights** include the author's right to object to any distortion, mutilation or other modification of his work that might be prejudicial to his honour or reputation.

This entitlement, which belongs initially to the author, may be transferred in order to allow a work to be exploited. In return for the transfer of rights, the author will receive remuneration, which must be proportional to the revenues generated by the exploitation of the work.

Both sets of rights belong to the creator who can exercise them. The exercise of rights means that he can use the work himself, can give permission to someone else to use the work or can prohibit someone else from using the work. The general principle is that copyright protected works cannot be used without the authorization of the owner of rights. Limited exceptions to this rule, however, are contained in national copyright laws. In principle, the term of protection is the creator's lifetime and a minimum of 50 years after his death.
These legal aspects are specified in international conventions to which most countries are now party. On their accession, member States should have national legislation that are in line with the international standards.
At the international level, the economic and moral rights are conferred by **the Berne Convention for the Protection of Literary and Artistic Works**, commonly known as the "Berne Convention". This Convention, which was adopted in 1886, has been revised several times to take into account the impact of new technology on the level of protection that it provides. It is administered by the World Intellectual Property Organization (WIPO), one of the specialized international agencies of the United Nations system.

The terminology concerning rights and obligations related to the use of the intellectual work of others can be quite confusing. From one continent to another, people speak of author's right and copyright as if it were the same thing. Underlying this verbal blur are two differing conceptions of author's right, on which the legal systems in the world are based. **Author's right**, (“droit d'auteur” in French) is founded on the idea, born in continental Europe, that a work of creation is intimately linked with its creator. The **copyright** concept stems from the Anglo-Saxon tradition, according to which authors hold a property right to their creations, that can be traded on the basis of economic principles. Most copyright laws of most societies support a wide definition of author's right, combining the idea of droit d'auteur and that of copyright.

Closely linked to the discussion about copyright and author’s right are the two theories, which are at the heart of current international copyright law. The first theory establishes economic rights. It holds that authors need to be rewarded for their unique creative abilities. The second theory supports the intimate connection between author and work and states that authors should be given a moral right to limit the alteration and display of their works, even after they have transferred their economic rights to a third party such as a publisher.

Authors enjoy an exclusive right to certain forms of exploitation of their works. Every time that such a work – a book, a play, a song, a painting, a film – is created, its author becomes the owner of the copyright of that work – he or she acquires the author's right. Basically, this means that the creator decides if and how his work will be used. To become holder of this right generally requires no formalities whatsoever. All that is needed is that a creative work becomes fixed in a tangible form. From that moment on, an author is granted legal protection, the nature of which is provided by copyright law.

The legal protection offered by copyright law grants authors both the recognition of their work and allows them to obtain fair economic rewards for their creative activities. The kinds of works covered by copyright include: literary and artistic works. *"The expression "literary and artistic works" shall include every*

production in the literary, scientific and artistic domain, whatever may be the mode or form of its expression, such as books, pamphlets and other writings; lectures, addresses, sermons and other works of the same nature; dramatic or dramatico-musical works; choreographic works and entertainment in dumb show; musical compositions with or without words; cinematographic works to which are assimilated works expressed by a process analogous to cinematography; works of drawing, painting, architecture, sculpture, engraving and lithography; photographic works to which are assimilated works expressed by a process analogous to photography; works of applied art; illustrations, maps, plans, sketches and three-dimensional works relative to geography, topography, architecture or science." (Berne Convention, art. 2 (1)).

The international standard for protection, established by the Berne Convention, is the life of the author and fifty years after his death. However, in many countries, such as the United States and in those of the European Community, the protection is extended for the life of a work's author plus an additional **seventy years**. Once the term expires, the work enters the public domain where it can be freely used by anyone, and in particular it can be:

- Copied by anyone, without fees and form-filling,
- Published and edited in different versions and editions,
- Commercialised at fair prices with value-added features like critics, special editions, …

Before the term, works are still subject to copyright, meaning in brief that only the rights holder, usually a publisher who acquired the rights after the death of the author, can decide:

- How much the work costs
- If the works can be published or not
- Who distribute the work and how

The copyright extension after the author's life was introduced at the beginning of 18th century in the UK for an ethic consideration: to ensure an economic support to the author's family for a reasonable period. In 1790 in the U.S. a similar law established that the reasonable period was intended as **fourteen years**.

From the original 14 years, the "reasonable" period is now 70 years (and will probably become 95 years in the future in the US).

5.2 Different categories of rights

Rights management is complex and concerns widely differing rights such as:

- reproduction rights (e.g. copying by publishers, schools, businesses, government agencies)
- public performance rights,
- resale rights,
- lending and rental rights,
- broadcasting and cable retransmission rights.

We should consider at least four different scenarios corresponding to the four main rights categories:

- Purchase of sheet music or audio recordings,
- Public Performance rights, paid by for the public performance (live or broadcasted) of a sound recording and music works,
- Mechanical Rights, paid for audio recording of songs and music works,
- Special rights (Synchronisation, Arrangements, Productions, Sampling)

Names used for such kind of rights can vary from country to country: the world "Licenses" and "Royalties" are all used in some cases to refer to "Rights".

The **purchase** of sheet music or audio recordings gives the right to use each single copy purchased. It does not give the right to produce additional copies (photocopying or digital copying), nor to perform the work in a live public performance, nor to record the work, nor to broadcast a recording or live performance.

Mechanical Rights cover the mechanical reproduction of a recording in multiple copies. All recordings must be licensed, even non-commercial recordings. They may be licensed by Rights Collecting Societies, or directly from the copyright owner by payment of fees.
Mechanical Rights are issued only for the recording of a copyrighted musical composition, or the duplication of a sound recording, or its synchronization to an audio-visual presentation, not for the public performance of the sound recording. A Mechanical Right can be sometimes issued for the streaming of the sound recording. The Mechanical Rights for the duplication is only issued after a sound recording has been distributed (released to the public). The license is then granted on a compulsory basis thereafter.

Public Performance Rights concern the public execution of a musical work, covering live performance situations and broadcasts of recordings, (however, Public performance rights do not provide the right to make a recording). Public performance rights may be licensed directly from the copyright owner or from one of the Performing Rights organizations.
Performing Rights Organizations represent the musicians that performed on a specific sound recording that is publicly performed in bars, dance halls, amusement parks, entertainment functions, retail shopping facilities, hotels, waiting areas, elevators.
The Performance Rights Organization will issue a license authorizing the public performance of a sound recording. The organization will also collect the licenses on behalf of registered performers on the sound recording and distribute that income in the form of royalty payments to the musicians and the artists on that sound recording who are entitled to an artist royalty (depending on the artist's contractual arrangement with the recording company).

The **Special Rights** category groups different kind of rights, like Synchronisation Rights, Arrangements Rights and Grand Rights.
The latter covers production of music with associated dramatic action, dancing or staging. It must be licensed directly from the copyright owner. Audio utilized from production music libraries also requires licensing for replication. The licensing may be in various forms depending upon the music library vendor. Traditionally, a Master Use Agreement will be issued by the music library vendor when the specific usage fees for the chosen music are paid.
Synchronization Rights allow to use music as part of video or film, film, television works, advertising and new technologies. Often Synchronisation Rights are considered as a special case of Mechanical Rights.
Arrangements Rights concerns the creation of arrangements on music pieces, whike Sampling is when portions of a previously recorded audio track are utilized in creating a new audio track. For tracks to be sampled, appropriate audio licensing for the sampled track are required from the recorded track IPR owner and music publisher.

For instance, recorded audio tracks require two different types of licensing:

- ρ a license for the recorded track from the artist.
- ρ a license for the published song used in the recording from the music publisher (mechanical rights).

The recorded track license must demonstrate a chain-of-title from the actual recording artist or organization representing the artist to the individual or organization recording the music. Use of a published song on an audio recording requires a per copy fee to be paid to the music publisher (mechanical rights) which can be paid directly to the publisher, or the publisher can establish a relationship with an agency to handle the negotiation of royalty payments, collections and disbursement to publishers.

A term commonly used in the music industry is **Compulsory License**. This is when a published song has been previously recorded by an artist and another artist wishes to re-record it. Federal copyright law allows for a compulsory license, which gives an artist the ability to re-record a song and pay a pre-defined mechanical royalty rate. Compulsory licenses only apply when the song has already been recorded by another artist.

5.3 Collective administration

It is increasingly difficult, if not impossible, for individual authors to monitor the uses of their work. For instance, the BBC uses almost 60,000 music items every week. Besides, authors are not supposed to spend their time going after their rights.

On the other hand, users of creative works would find it as impossible to address the proper right holder every time they use one, especially if this work, a film for instance, consists of the work of different authors of different creative disciplines. Just as authors, broadcasters like the BBC have better things to do.

The solution that individual creators have found to bridge the gap between themselves and the users of their works, has been to unite and to administer their rights collectively. They created collective administration societies.

> **Collective administration** is the exercise of author's right by copyright collecting organisations [WIPO].

For individual owners, it is often difficult to maximise the economic value of their rights and to protect those rights. Similarly, third parties who wish to use those rights must incur the trouble and expense of finding the appropriate rights owners, negotiating individual deals and administering and accounting to a vast number of such rights owners. The collective administration of copyright is often the most effective method of managing the rights, both for the owners of the rights and those who need access to them.

In much of the world collective administration is performed by a network of not-for-profit copyright collecting societies - sometimes known as authors' societies or reproduction rights organisations (RROs). They often have a statutory basis and may enjoy monopoly powers. In the US and some other jurisdictions administration is by for-profit entities on a almost competitive basis.

Collective administration, particularly of secondary uses such as broadcasting, has developed with the proliferation of rights and uses. Collective administration **spreads the cost of administration** (e.g. establishment and maintenance of databases, exemplary litigation, employment of advocates) over all members of the society. 'Blanket licensing' reduces the cost to consumers, with users paying a single fee for access to the whole of a society's repertoire, thereby eliminating high transaction costs that would be incurred through clearing rights with every individual author, publisher, composer, lyricist, artist, performer and record company. Rights management costs are deducted from the sums collected.

Collective licensing applies to a single territory but reciprocal agreements between societies mean that it allows rights holders to gain remuneration for uses across the globe.

The process of collective administration is activated as soon as a creator has finished a work, and aims to ensure the enforcement of his or her rights and it ends when the creator receives the benefits of his creation.
The process is made up of a number of steps. The first step is the **registration and documentation:** a creative work is protected by copyright law from the moment of its creation. It only needs to be tangible. Nevertheless, authors' societies encourage authors to register all the works they create. This will allow effective exercise of their rights. Some conditions for the registration of works vary from society to society. The basic information required to protect intellectual property rights effectively, are details on the creator and on his or her works. This documentation allows collective administration to carry out its task.
The next step is the **license issue,** for which collective administration societies deal with the authorisation of the use of the author's work. If a user meets the conditions set by the society, he will be licensed to use a specific work. The major condition for use will be the payment of royalty. Tariffs are generally set as a result of negotiation between author's societies and users. Sometimes, the law prescribes the tariff, like in the case of "droit de suite" (resale right) or of private copying.
According to the kind of work involved (music, literature, audio-visual works, "multimedia" productions, etc.), authors' societies will manage different kinds of rights, depending on the forms of exploitation of the repertoire it represents.

For **Multimedia** works, on account of growing popularity of "multimedia" productions, there is a growing tendency to set up "one-stop-shops". These are a sort of coalition of separate collective management organisations, which offer a centralised source where authorisations can be easily and quickly obtained. This

to suit users in the multimedia field, where the majority of productions are composed of, or created from, several types of work, which require a wide variety of authorisations.
The rights management of **audio-visual** works (feature films, short films, TV films, serials, cartoons and works involving multimedia and still images) can be compared to that of music.
On behalf of audio-visual creators, the collective management society negotiates general representation contracts with broadcasters like television stations, cable networks and satellite packages.
Societies may also assist individual authors negotiate production contracts for cinema, TV, radio and multimedia, providing them with standard contracts, for instance.
Concerning **musical works**, the author's society generally deals with the collective management of the rights of public performance and broadcasting. It negotiates with users, such as television stations, discotheques, cinemas, bars and determines the payment for the use of copyrighted works from its repertoire and the conditions under which users are authorised.

Some historical information on collective administration is available in **Appendix 2 : History of Collective Administration of Rights.**

5.4 Consumer rights and fair use

> **Fair use** is a copyright **principle** based on the belief that the public is entitled to **freely use portions** of copyrighted materials for purposes of **commentary** and **criticism**. Without this freedom, copyright owners could stifle any negative comments about their work [WIPO].

Unfortunately, if the copyright owner disagrees with the fair use interpretation, the dispute will have to be resolved by courts or arbitration, and in case of not a fair use, then the user is infringing upon the rights of the copyright owner and may be liable for damages.
The only guidance is provided by a set of **fair use factors** outlined in the **U.S.** copyright law. These factors are weighed in each case to determine whether a use qualifies as a fair use. For example, one important factor is whether your use will deprive the copyright owner of income. Unfortunately, weighing the fair use factors is often quite subjective. For this reason, the fair use road map is often tricky to navigate.
In its most general sense, a fair use is any copying of copyrighted material done for a limited and "**transformative**" purpose such as to comment upon, criticize or parody a copyrighted work. Such uses can be done without permission from the copyright owner.
There are no hard-and-fast rules, only general rules and varying court decisions. That's because the judges and lawmakers who created the fair use exception did not want to limit the definition of fair use. They wanted it, like free speech, to have an expansive meaning that could be open to interpretation

Most fair use analysis falls into two categories: **commentary/criticism** and **parody**. Unfortunately, the only way to get a definitive answer on whether a particular use is a fair use is to have it resolved in federal court. Judges use four factors in resolving fair use disputes, which are discussed in detail below. It's important to understand that these factors are only guidelines and the courts are free to adapt them to particular situations on a case-by-case basis. In other words, a judge has a great deal of freedom when making a fair use determination and the outcome in any given case can be hard to predict.

The four factors judges consider are:

1. the purpose and character of use,
2. the nature of the copyrighted work,
3. the amount and substantiality of the portion taken, and
4. the effect of the use upon the potential market.

After the enactment of the **Digital Millennium Copyright Act (DMCA)** in the United States, and the adoptio, two years later, of anti-circumvention regulations in the **European Copyright Directive,** the legal framework surrounding digital rights management systems has been severely criticized for hampering fair use and burdening free speech in the digital environment.

While one approach to solve this tension between fair use and DRM is to change the legal framework by legislative amendments and influential court decisions, another approach is to address it directly at the technological design level of DRM systems.

Current copyright law in both the **U.S.** and **Europe** does not recognize affirmative "user rights" to fair use, but merely acknowledges certain exceptions to the exclusive rights of the copyright owner as a defence to an infringement action. To preserve a balance between the interests of content producers and content users, it would be easier and more efficient to address such aspects not at the level of the legal DRM framework, but at the technological design level of DRM systems. The law might assist this development by influencing the technological design.[4]

A better solution to the tension between fair use and DRM systems may therefore be to design DRM systems in a way that such problems do not occur in the first place. This may include the use of **rights management languages** as a way to preserve fair use in DRM systems and the avoidance of the "security through obscurity" approach as well as the use of privacy-enhancing technologies. This approach provides also an international reach, since DRM applications are usually developed for a global market.

5.5 Impact of digital technologies on copyrights

The wide availability of music in **digital format** and of **broadband connections**, as well as the proliferation of effective hardware and software tools for **digital processing** of music, dramatically **changed the way music is consumed**, exchanged and created. Such digital revolution is having a side-effect too, making what was previously a series of relatively onerous unproductive tasks something of relative ease, leaving large gaps in the traditional business models, which started soon to fall apart:

The digital revolution has facilitated the following activities:

- **Copy** from disk to disk (carrier to carrier),
- Music **recording**, which can be now digital, allowing identical copies,
- Music **distribution**, which can leverage the ubiquity and speed of the Internet or massive copying of disks .
- Creative tasks such as music **production** and **adaptation**, which has gone digital (and computer aided).
- Music **compression** (mp3, divX, …), which reducing the size of music pieces, makes it easier to exchange and transport music over the Internet as well as other media (CDs, DVDs, media cards).

Anyone can now become a publisher, a distributor and a music store (of other people's music) as well as reducing the cost of being a producer, adapter and author of one's (or partially) own music. The separation of the content from the carrier has severely complicated the business model and the control of IPR implications to the extent that legal music sales have actually fallen, reversing a long growth trail

At first sight, one might be tempted to look at the Internet and the digital revolution as a threat to authors and their rights. The music industry was shocked when Mp3 technology and peer-to-peer services enabled worldwide use of copyrighted musical works for free. Furthermore, not only music is involved, since creative works of all kinds can be distributed over the Internet. According to figures from the majors, the global music pirate business is believed to be worth about €4 billion in 2001, whereas it is estimated that the audio-visual sector looses €2.8 billion per year due to illegal downloading.

More and more, however, creators and their representatives remember what was clear from the beginning: the world wide web also offers unprecedented opportunities to the world of creation. Never before had authors the possibility to make their works known to so many people, wherever they are.

Such considerations leads to a two-fold approach to the distribution of digital music, aiming both to protect the work of creators and to stimulate the distribution of music as a chance of strong social, cultural and economic growth.

[4] "Fair Use By Design or By Law?", Stefan Bechtold, Universitat Tuebingen and Stanford Law School, http://www.jura.uni-tuebingen.de/~s-bes1/pub/2001/Fair_Use_By_Design.pdf

5.6 References to the legal framework

Besides the legislation aimed at covering copyright matters on a worldwide scale, laws of supranational entities such as the EU and countries as the USA deserve attention, in view of the impact on copyright worldwide. According to the specific needs of their region of origin their objectives cover a wide range of items, such as the protection of databases or copyright protection in the digital age.

5.6.1 Europe

The main relevant EC directives are

- **Directive 92/100/EEC** of November 19, 1992 on rental right and lending right and on certain rights related
- to copyright in the field of intellectual property;
- **Directive 96/9/EC** of the European Parliament and of the Council of March 11, 1996 on the legal protection of databases;
- **Directive 2001/29/EC** of the European Parliament and of the Council of May 22, 2001 on the harmonisation of certain aspects of copyright and related rights in the information society.

5.6.2 USA

The Digital Millennium Copyright Act (1998)

The Digital Millennium Copyright Act (DMCA) seeks to update U.S. copyright law for the digital age in preparation for ratification of the World Intellectual Property Organisation (WIPO) treaties. Key among the topics included in the DMCA are provisions concerning the circumvention of copyright protection systems, fair use in a digital environment, and online service provider liability.

6 On-line music distribution services

This chapter presents a selection of the most known on-line music distribution services, for the most part providing purchasing and downloading services of music pieces via the Internet. As often, the pioneers in this market are US-based companies servicing only the US market. Besides the readiness of the US market the reasons for this limit are basically related to the agreement with music labels and publishers which are easier to set up on a national basis. Only very recently, starting from May 2004, some of the big players like Sony, Apple, Napster and OD2 entered the European market.

Napster constitutes a potential threat to the dominance of OD2 as the dominant online music distributor in the UK and the rest of Europe. Napster owns music distribution infrastructure, which its parent, Roxio, acquired from Sony Music and Universal Music, as well as a single retail site in each country. OD2, in contrast, is solely a distributor, but it has about two dozen different retail partners, some of which (such as MTV and Tiscali) cover multiple countries themselves.
The markets for distribution of physical media have evolved to near-monopoly distributorships over time. For each major type of physical media (CDs, books, videotapes, etc.), there are only one or two major distributors behind the many online retail sites, usually Amazon.com and maybe one other.
There is little reason for the situation to be any different with digitally downloaded content. Too much competition for essentially the same services will drive prices down and turn already-thin profit margins into loss-leading fights for market share. The result will be what is already the reality in Europe.

Of course, consumers will benefit as these services beat each other silly. OD2, evidently concerned with the competition, took the first step last week by cutting its prices for downloads in anticipation of the Napster UK launch. In this case, we can assume that the European model makes more sense than that of the US. In America, MusicNet is attempting to be what OD2 already is today. It is gathering momentum with an increasing number of retail partnerships, and it presumably hopes to be the last online distributor standing as the many other online music services inevitably consolidate over the next year or two.
And finally, MusicNet is primarily owned by major recording companies, just like the major distributors of physical music products.

6.1 Apple iTunes Music Store

Today, a healthy number of file traders are willing to pay for fee-based online music. As already discussed, among the reasons for the failure of current fee-based online music distribution sites are subscription based services (instead of pay-per-download) and the mediocrity of their offerings:

- Prices are too high,
- Music selection is too limited,
- Usage of licensed music is too restrictive for customers,
- The quality is not better than in free (illegal) offers.

A great potential to make significant revenue is there if the pay music service would only compete directly with free P2P services, leveraging their limitations. Additionally, P2P-networks are not considered as competitors to CDs but are seen as a promotional method like radio. Piracy is not the number one reason why the record industry wants to eliminate the free P2P services. New CD sales have dropped, that's true, but marginally. Used CD sales meanwhile have skyrocketed.

Thus Apple iTunes Music Store's success is not as astonishing: In less than 24 hours it nearly sold 300,000 tracks at $0.99. However, according to many customers feedbacks pricing is still too expensive especially considering the free, but illegal, P2P alternative. Furthermore, its success is achieved although only the Mac audience is addressed[5], which is about 5% of the today PC users.

One of the key factors for iTunes booming success resides in its usability, user friendliness and attractive user interface, as in the typical, traditional Apple-style.

The iTunes Music Store includes **200,000 songs**. It is directly accessible via iTunes 4. Due to the direct integration iTunes Music Store becomes a part of iTunes 4 which allows users to search or browse genres, new releases, exclusives and more. Additionally, any song can be previewed for free. The price for each song is 99¢: It can be downloaded immediately on the local hard drive or held in the shopping cart. A user can

[5] Since October 2003 iTunes is available also for Windows platforms.

perform searches by specifying criteria such as artist, composer title and genre. Then, he can buy tracks from the returned list, which are downloaded to final users' hard disks. It is possible to purchase both single songs and whole albums, too. The iTunes Music Store also provides artists' discographies and album covers.
For users with a broadband connection, iTunes Music Stores can play full-length music videos.

If the end-user doesn't have a broadband connection, he can download the previews (30 seconds long) to his desktop and listen to them, and use the shopping cart to hold all his music selection until he is ready to buy. Moreover, there is no limitation in listening to these previews. Songs are coded with the AAC compression technology and online transactions are protected by encryption software. The iTunes Music Store provides an email bulletin to keep users current with all the new releases and newly added back catalogue selections.

To buy tracks in Music Store, a user has to configure his own Apple account from the iTune application itself. The Music Store requires a credit card with a U.S. billing address.

So far, the success of Apple iTunes Music Store shows that a successful business model for online music distribution can be established. The model's major advantages are increased service and decreased restrictions. This also states the fact, that a major interest of participants in illegal P2P-exchange networks is the fact of the broad variety available in these illegal networks, which is beyond the daily mainstream, the advantage of pre-listening or evaluation and easily download.
If the market is the place where offer and demand meet, then Apple seems to have moved a step in the right direction, and customers undoubtfully showed their appreciation.

Thus it is interesting to see what might happen with the future of other online music distribution services: Apple's success put some pressure on the existing services which are partially owned by the record industry. Therefore the existing services will try to copy the model adopted in Apples iTunes Music Store. This will lead to a decrease of prices, as the copyright fees have to be lowered.

However, the importance of the target group cannot be neglected. Mac users seem to be ideal customers for online music distributions. On the contrary, PC users reflect the general population. Thus it is more difficult to achieve the same success as Apples iTunes Music Store. However, further solutions addressing the needs of future customers, e.g. providing a broad variety of artists customers are specialised, will be strong advantage when commercialising electronic music distribution.

If commercialising electronic music distribution succeeds – which will be the case sooner or later - the winners will be the record industry as more music is distributed, the online music services as more music is distributed online and customers who benefit from the increased service and who might benefit from the reduced prices.

A complete survey of Apple iTunes Music Store has been produced as a collaboration between the Distribution WG and Protection WG and can be found at:
http://www.interactivemusicnetwork.org/documenti/view_document.php?file_id=428

Apple launched later on also the Windows version of iTunes. In addition to the features of its original Mac version, the new iTunes includes over 20,000 hours of audiobook content made available through a partnership with Audible.com. iTunes uses Apple's proprietary **FairPlay DRM technology**, the **MPEG-4 AAC audio format**, and the **QuickTime player**.
For those who want to download individual tracks or albums, iTunes for Windows is going to be hard to beat in the heavy competition between a growing number of entrants into the paid-download sweepstakes that is shaping up for this year's holiday season. Factoring out handheld device portability, it would be fair to say that iTunes represents the furthest that anyone can take online music services that only offer downloads. On the other hand, iTunes doesn't offer a subscription model.

Since May 2004, Apple iTunes is available also for the **European** market.

6.2 BuyMusic.com

Founded in July 2003, South California-based BuyMusic.com offers approximately 300,000 songs for download in all categories of music from Top Ten to rare independents, from the big labels like BMG, EMI,

Sony, Universal, and Warner, as well as the independent labels. It Supports the most known hardware like Nomad, Irock, Yamaha, Sony, and Iomega in one convenient, easy-to-use site.
BuyMusic.com claims to be committed to deliver complete customer satisfaction, providing a customer service with convenient options to meet users needs, such as an online Help Center and easy-to-find policies and procedures to assist the customer through any purchase.
To ensure transactions are secure when placing orders online, BuyMusic.com uses Verisign, an Internet leader in security transactions, on every order processed, it uses advanced encryption and firewall technology throughout the ordering process, SSL (Secure Sockets Layer) encryption to protect personal information from unauthorized use. Any music download have its own DRM license so it is possible to listen to the music whether or not logged on to the internet.
Browsing and selection possibilities for the service are:

- browse the site or perform a search;
- listen to sample clips of the tracks he wants;
- view information and description of the found albums;
- click the ‘Download Album’ or 'Download Track' button: user’s music selections are temporarily stored in his Basket until he checkout;
- click the ‘Checkout’ button: user will be prompted to log in;
- verify the selected tracks and his credit card information;
- click the ‘Process Order’ button.
- Once user’s card authorizes, BuyMusic.com bills it and download music and licenses to his computer.

It is also possible to transfer songs to Digital Media Players and portable devices and to burn songs to CDs
At the moment, due to license restrictions, BuyMusic.com content is available only to residents of the United States.

Downloaded music files from BuyMusic.com are accompanied by a license with certain restrictions. The music files are encrypted with SDMI license technology to be sure that they are used according to license restrictions. The computer user buy from is the primary computer and contains the primary license for the downloaded files. Licenses are non-transferable to another machine.
Each record label has control over these license restrictions including the number of times user may:

- transfer songs other computers;
- transfer songs to an approved portable digital media player;
- burn songs to CD.

BuyMusic.com complies with each record label and adjusts the SDMI license on each of music downloads accordingly.
There are two types of licenses: Primary and Secondary. The primary license is downloaded to the machine used to buy music. The primary license enables user to copy his music from his primary computer to his digital media players and to burn it to CDs as many times as the record label allows.
If user downloads a secondary license, he do so onto a secondary computer. The secondary license enables user only to listen to his music on his secondary computer. A secondary license does not allow user to copy music from his secondary computer to digital media players or to burn it to CDs.
Licenses are downloaded together with songs. Each found song displays icons showing:

- the number of times the song can be downloaded to compact disks;
- the number of times user can transfer the song to digital media players;
- the number of computers user can download your music to in total.

The icons apply only to primary license on primary computer. The icons do not apply to the secondary license on secondary computer. User cannot use the secondary license to copy music at all.
After user has purchased music, he can go back to see how many downloads he have left and find out if there are any restrictions on the number of compact disks or media player downloads he can make.
License does not permit music files to be uploaded onto a shared server or made available on internet web sites. Although users might be physically able to upload the files to a shared server, the music files will be rendered useless to anyone who downloads them because of the SDMI license encryption technology.

The main advantages of BuyMusic.com service can be identified in:

- Using BuyMusic.com, one can purchase single tracks instead of entire albums.
- Users have not to pay for shipping.

- To obtain the purchased content, users have only to wait the spell occurred to download the file.
- Buying an entire album here is cheaper than buying it in a music shop or in a e-commerce site.
- By the prelistening, users can make sure they are purchasing what they really want.

On the other hand there are also some disadvantages:

- This service is available only to residents of the United States. This restriction is not applied in very popular e-commerce sites such as Amazon and AMG All Music, not to speak of P2P programs.
- BuyMusic claims to offer about 300,000 songs, but usually items found are outnumbered by the ones found using the above-mentioned sites.
- Sometimes, not all the tracks in an album are available, and some album is for sale as individual tracks only.
- Downloaded files are in a compressed format, so music quality cannot be as good as, for example, the traditional CD quality.
- Sometimes, information about performers is insufficient. For example, opera fans would be glad to find the complete list of performers,

BuyMusic.com is powered by BuyServices, a wholly-owned subsidiary of Buy.com, formally known as United Commerce Service Inc. (UCS). BuyServices will power the store, which will be fully integrated with digital and hard goods.
Founded in January of 2002, BuyServices is privately held and funded by Buy.com founder Scott Blum. The company develops and operates a cross platform capable, fully hosted e-commerce solution for media, retail and e-tail companies. BuyServices builds, hosts and maintains the site which is developed using the .NET framework as well as the **Windows Media Series** software including Media SDK, Media Digital Rights Management (DRM) and Media Encoder Microsoft technology. Microsoft Windows Media Digital Rights Management (DRM) 9 Series builds upon an end-to-end DRM system that offers content providers and retailers a flexible platform for the secure distribution of digital media files while providing users ease of use and opportunity to consume premium content.
Windows Media Rights Manager locks digital media files with a license key to maintain content protection, even if these files are widely distributed. Each license is uniquely assigned to each computer. This prevents illegal distribution of digital media files.

BuyServices has set a new standard for e-commerce transactions and created one of the most powerful engines on the market, capable of handling hundreds of thousands of transactions daily. BuyServices is creator of the proprietary technology powering Buy.com, the second largest pure-play online retailer in the world.
Licenses are issued independently of the actual digital media files. Each time a digital media file is played, Rights Manager checks to see if the consumer's computer has a license. Consumers who do not have a valid license are directed to a license registration page. Content providers can control license start times, stop times, and duration in order to create their own business rules. Using the counted operations (playback) option in the new license structure, content providers can create rental or preview licenses for viewing digital media files.
Rights Manager provides features such as pre-delivery of licenses and silent licensing (i.e. a content provider may deliver the license to the consumer without the need for the consumer to type more information) to improve the consumer's digital media experience by removing the barriers in acquiring and playing secure media files.
Windows Media Device Manager permits the secure transfer of protected digital media files to Secure Digital Music Initiative (SDMI) portable devices or media.

A complete analysis of BuyMusic.com service and the underlying Window Media Series technology has been developed as a collaboration between the Distribution WG and Protection WG and can be found at:
http://www.interactivemusicnetwork.org/documenti/view_document.php?file_id=599

6.3 MusicMatch Downloads service

http://www.musicmatch.com

Musicmatch, Inc., launched its new Musicmatch® Downloads service, on September 2003. The service on allows consumers to purchase and download music from a broad catalogue of music from all five major

labels and more than 30 independents - with no complex, restrictive usage rules. The new service offers access to high-quality, personalized music and the ability to purchase while listening to CDs, MP3s and Musicmatch Radio.
All Musicmatch downloads have the same, simple usage rules, without a subscription. Customers can play tracks on up to three PCs simultaneously and transfer them to Windows Media-supported music players. Tracks can be burned to CDs, but the same playlist may only be burned up to five times. Using the Musicmatch music personalization technology, the service helps music fans find the artists, albums and tracks that most closely match their personal music tastes. Musicmatch scours the music universe to find music that individuals will most likely enjoy and delivers it to them each time they log into their account. Fans can also browse the extensive Musicmatch web of inter-related artists to find new artists and easily sample and purchase the most popular songs. The service also allows customers to browse through the most popular music by year from 1960-2003, and through more than 100 distinct music genres.
At the time of its launch, the Musicmatch Downloads service offered consumers more than 200,000 songs for download from the five major labels and more than 30 independents and claimed to add thousands of tracks each week, with 500,000 tracks available by the end of the year. Actually, at the moment of writing this report, the number of tracks available is declared to be 360,000.

Musicmatch Downloads service lets consumers easily purchase tracks while they listen to them on Musicmatch Radio. Customers can view album reviews and artist biographies, and purchase songs or complete albums while listening to CDs and MP3s. Musicmatch also shows the most popular tracks for each artist, making it easy to build an extensive collection of favorite songs.
Musicmatch downloads are provided as 160 kilobits per second Windows Media files and can be played on different digital audio players. Devices supporting secure Windows Media Series 9 audio files play Musicmatch downloads - including more than 20 devices, such as all current Creative Multimedia and Rio portable players. Customers can also burn tracks and playlists to CDs.
Rob Enderle, principle analyst for the Enderle Group claims that "Musicmatch provides the closest thing to an acceptable balance between what users want and the record industry needs; it improves on Apple's iTunes and addresses the other 98 percent of the market."
Music tracks are priced at a flat rate[6] of US $0.99.

The service builds on MusicMatch's popular MusicMatch Jukebox user interface, providing a paid-download service on top of MusicMatch's existing streaming services and user interface, resulting in a single service that offers a wide range of choices in how users can listen to and pay for music.

6.4 Real Networks RealPlayer Music Store

http://www.real.com

Real Networks celebrates the 10th anniversary of company's founding in 1994 issuing a new player, the RealPlayer 10, and a new on-line distribution service, the RealPlayer Music Store. RealPlayer Music Store is integrated in the new RealPlayer 10, which is available from January 10th 2004, for free download from Real Networks.
Powered by the massive and easy-to-use music directory of the award-winning Rhapsody® digital music service, the RealPlayer Music Store is expected to have 400,000 tracks for download by the end of January 2004 available in the highest audio quality of any download store: 192 Kbps RealAudio® 10 with AAC. The player and service use MPEG-4 AAC audio format and RealNetworks's Helix DRM technology, and there are versions of the player for Windows, Mac, and Linux OSs.
The RealPlayer Music Store offers download at the going rate of US $0.99 per song and $9.99 for most albums. Its user interface is good, but it is a bit cluttered and slow compared to Apple iTunes because it offers all of the features of the previous RealJukebox product and tries to do too much at once.
The free RealPlayer music guide includes a wide array of music videos, exclusive live performance recordings, complete CD listening parties, and thousands of Internet radio stations. RealNetworks offers a RadioPass service for $49.95 a year that includes access to several premium streaming music channels. The services that RealNetworks bundles with RealPlayer 10 differ from RealNetworks's other service, Rhapsody ($10/month subscription), in that Rhapsody offers 40,000 albums' worth of music for streaming on demand,

[6] Flat rate has here the obvious meaning of "the same rate for each music track".

and Rhapsody's sound quality is better than the relatively thin 64kbps that RealPlayer 10's streaming "radio" offers.
RealNetworks launched Helix DRM a year ago, and acquired **Listen.com's Rhapsody** music service in April 2003.
The new player is able to play files in Windows Media, Apple iTunes, MP3, and other formats, in addition to RealNetworks's own formats. It can even play files purchased through services such as iTunes Music Store and Napster 2.0, as long as they are on the same machine on which they were downloaded.
In addition, consumers can securely transfer tracks purchased in the RealPlayer Music Store to their Creative Jukebox Nomad Zen Xtra devices from Creative Labs as well as to seven models of palmOne devices, including the Tungsten T, Tungsten T2, Tungsten T3, and Tungsten E, the Zire 71, and the Treo 600 beginning in late January, analogously to the Apple iPod for Apple's iTunes and various devices for Microsoft Windows Media-based services.
It should be noted that most of PDAs have storage capacity that is roughly three orders of magnitude smaller than hard-disk-based devices such as the iPod, making the compatibility with Palm's devices a low value added feature.
The free RealPlayer music guide includes a wide array of music videos, exclusive live performance recordings, complete CD listening parties, and thousands of Internet radio stations,.
By supporting most of the prevalent audio formats RealNetworks hopes that consumers who are tired of the format wars among Microsoft, Apple, and others will choose RealPlayer 10 and have a single place to play them. However, interoperability here remains one of the major issues since one cannot transfer his/her songs to from the RealPlayer 10 to, for instance, an Apple iPod.

6.5 Roxio Napster 2.0

http://www.roxio.com
http://www.napster.co.uk

Roxio officially launched its Napster 2.0 online music service on October 2003, after a couple of weeks' pre-release availability to PressPlay subscribers. Roxio had purchased the assets of Napster from Bertelsmann and then acquired PressPlay from Sony Music and Universal Music in order to provide the infrastructure for the new, legal version of the online music service, which features over half a million tracks from all major and many independent labels. Napster 2.0 uses **Microsoft Windows Media Audio** format DRM technology.
Roxio is also partnering with Samsung to produce portable music players that, like Apple's iPod and iTunes, are supposed to be tightly integrated with the Napster service and offer features that are not available with other portable music devices.
Napster 2.0 provides a friendly user interface, excellent searching and browsing capabilities, good sound quality, reliable music delivery, and a simple, easy-to-understand rights model. Its unique advantage stems from the fact that, by default, every user's selections are monitored and stored for the purpose of creating recommendations ("other Napster members who listen to Artist X also listen to these other artists..."). Users can turn off Napster's monitoring, though we detected no evidence that it exposes individual data in any way.
Users of Napster's premium service (see below) can also publish their own playlists and view others'; this was one of the few attractive features of the original PressPlay service. These features make Napster a good choice for the kind of exploratory listening that early online music service adopters are likely to do.
Napster offers paid downloads at US $0.99 each, just like Apple's iTunes. It also offers a premium service for $9.95 a month which includes "radio stations" as well as miscellaneous other features.
Roxio has been touting Napster's brand value, the implication being that Napster's name alone will catapult the service to the top of the increasingly large heap of paid online music services. But Roxio is trumpeting Napster as "the world's most recognized brand in online music." Using the Napster brand name may not directly bring them customers, but it has brought them a tidal wave of free press coverage, some of which is unavailable at any price, not even the $5 Million that Roxio paid for Napster.

On May 20th 2004, Napster® UK, Ltd., a subsidiary of Roxio, Inc., has announced that the highly anticipated Napster 2.0 legal online music service went live to music fans across the UK, providing the same services as its US counterpart, though with higher prices. UK residents can now download the new Napster 2.0 music service for free at www.napster.co.uk. The world's most recognised brand in online music provides both a subscription service and an "a la carte" download store putting the power of choice in the hands of music fans. Napster allows subscribers to listen legally on demand to more than 500,000 full-length, CD quality tracks - which will grow to over 700,000 tracks in the next 30 days as the company completes loading of its massive catalogue. For those who just want to buy songs to burn to CD or transfer to portable players,

Napster Light offers free 30-second samples of the entire Napster UK catalogue and the opportunity to buy singles or albums.

For £9.95 a month, **Napster subscribers** can listen to the largest digital music catalogue on demand, and download any track they choose onto the hard drives of up to three PCs and listen offline - to save bandwidth while they surf, or for convenience when on the go. Ten interactive advert-free Napster radio stations allow listeners to see which song is coming next, skip forward or jump back - with favourites easily added to their Napster library with one click. Napster's community features allow subscribers to browse each others' play lists and even share songs among other Napster users. Subscribers can also listen to and save full-length songs taken from the past 10 years of Official Charts Company UK charts, and can purchase and burn tracks for £0.88 per song when they buy multiple tracks.

If UK music fans are not interested in becoming subscribers, they can still purchase tracks an for £1.09 and albums for £9.95 after listening to free 30-second samples of the Napster UK library. At no cost, **Napster Light users** can organise their entire music collection in Napster by using the ripping software in the Napster jukebox to take tracks from CDs they already own to play on Napster, import MP3s into their Napster Library, or transfer tracks they've bought to a wide range of portable devices.

Napster, which has also just launched a service in **Canada**, has also retooled its marketing in an effort to steer more users toward its paid-subscription service and to differentiate Napster from the many paid-download services. The official UK launch of Napster 2.0 follows completion of agreements in the UK with all five major record companies - **BMG, EMI, Sony Music Entertainment, Universal Music International, and Warner Music International** - as well as independent labels body **AIM**. The company also recently announced an exclusive, multi-year partnership with Europe's consumer electronics goods retailer, Dixons Group plc, which kicks off a major Napster 2.0 promotion throughout all 1,100 Dixons, PC World, Currys, and The Link stores in the UK on May 21. Napster-branded CD-Rs are produced by Imation, the worldwide leader in removable data storage media. Napster-branded CD wallets are manufactured for Napster by Case Logic, the leading supplier of soft storage, protection and organisation solutions for personal technology.

6.6 Oxfam Big Noise Music

http://www.bignoisemusic.com/

On 26th May, 2004 the **charitable** organization Oxfam launched Big Noise Music, in collaboration with the UK-based online music distributor **OD2**, from which 10 percent of the proceeds will go towards Oxfam's global poverty-fighting efforts. Big Noise Music features downloads at GBP 0.75-0.99 (1– 1.3 euro) and streams at 1 pence (1 euro cent) each.
Big Noise Music use **Microsoft Windows Media Audi**o format and DRM technologies.

The idea of socially responsible music downloads is innovative and appealing, however, access to the service is up to now limited to:

- a PC with a Microsoft Windows Operating System; Windows 98, ME, 2000 or XP
- Internet Explorer (version 5.0 or above)
- Windows Media Player (version 7.0 or above)
- Flash Plug In (version 5 or above)

Unfortunately, **Big Noise Music** is currently not available to Mac users because “the service provider (OD2) is unable to obtain the necessary Digital Rights Management (DRM) software from Apple Computers Inc.”

6.7 Wal-mart online music

Wal-Mart expects to fully launch its online music download service in early 2004, focusing more on cost competition: Wal-Mart's service offers music tracks for US $0.88, instead of the more typical price of $US 0.99 (Apple iTune Music Store, RealPalyer Music Store).
Wal-Mart Music Downloads uses Microsoft Windows Media 9 DRM technology as well as file formats. Purchases give users the right to burn CDs and make backup copies of music tracks. Infrastructure for the

service is provided by Liquid Digital Media (formerly Liquid Audio), which was acquired by Anderson Merchandisers, Wal-Mart's music distributor, in January 2003.
Of the many announcements of new online music stores during the past few months, Wal-Mart is one that will have a big impact on the market. Wal-Mart's service has more or less the same track selection as the other sites and a perfectly serviceable user interface. The only true difference is price, and as it can be easily predicted, the going rate for single music tracks is being reduced over time.

6.8 OD2 SonicSelector-based services

On June 14th 2004, UK-based digital music distributor On Demand Distribution (OD2) launched its SonicSelector digital music jukebox, claiming to provide music lovers across Europe with the industry's first **"pay-as-you-go"** model.
SonicSelector is available from a number of leading European retailers including MSN, MTV, Packard Bell, and Tiscali, in the UK, France, Germany, and Italy
SonicSelector is a proprietary plug-in created by OD2 which creates a complete **on demand music service** within **Windows Media Player 9 Series**. It allows consumers to seamlessly browse an online store, stream and download tracks, burn copies to CD, or transfer this content to more than **70 different portable music devices**.
OD2 SonicSelector-powered retail sites offer a **catalogue of over 350,000 tracks**, from **12,000 artists**, with very strong local European catalogue representation. All songs can be downloaded from 75p (€0.99) per track[7].
The service stands apart from the competition by offering 'no-strings' interactive streaming. Users can listen to any song in the catalogue (full length) at any time. Users **"pay to play"** any track for 1p (€0.01) or download from 75p (€0.99) per track.
At the heart of the service is SonicSelector's **recommendation engine**, which monitors user search queries, matches them against the listening habits of the entire database of music fans, and generates intelligent recommendations for other titles that the user may like.
Each day the SonicSelector editorial team sifts through the masses of new releases, chart hits and Internet exclusives to offer their pick of what's hot and what's not, with selections and featured artists in key genres.
SonicSelector also provides a feature to automatically generate playlists from the online catalogue. Users can mix their own playlists by selecting their favourite artists or genres.
SonicSelector has been designed so that users can combine music and build playlists from tracks they have purchased on CD, with content downloaded from any number of other websites, as well as music downloaded or streamed from the SonicSelector catalogue. The user does not need to know where the music is coming from and can easily manage her digital music collection.

From a business model standpoint, the most interesting feature of SonicSelector is that it offers streaming from its library of 36,000 albums for GBP 0.01 (1p) per song. SonicSelector also offers paid downloads with a new pricing scheme that includes volume discounts.
No one knows whether this new **pay-per-stream business model** will be successful, but it is surely an attempt by OD2 to face the coming onslaught of **Napster** and **iTunes,** which launched its service in Europe just a day after OD2, with innovative business models, not just price cuts. The **flexibility** of DRM technologies like that of Windows Media Player can support a variety of new business models for content.

6.9 Sony Connect Music Service

http://www.connect.com

On May 4, 2004 Sony Connect Inc. formally announced the launch in U.S. of its new Connect online music store, offering consumers an easy-to-use, affordable and secure means of purchasing music online for download to a wide variety of Sony portable electronic devices.
Sony Connect is a paid-download service that uses Sony's proprietary ATRAC file format, Open MagicGate (OpenMG) DRM technology, and various Sony devices. It is essentially an analog to Apple's iTunes for PCs and iPod portable music players.

Connect.com has licensed more than **500,000 tracks from all major and many independent music labels**,

[7] The same price as other competitors (Apple iTunes, MusicMatch).

as well as exclusive content from such artists as Avril Lavigne, Yeah Yeah Yeahs, Snow Patrol, and Toby Lightman. The store will not employ a subscription model; rather, it will offer content “a la carte-style”, with singles starting at 99 cents, and entire albums starting at $9.99. Although many tracks are available for the current standard of US $0.99, Sony has apparently put a 7-minute limit on the 99-cent price and is charging $1.99 for longer tracks, not so good for fans of music genres like jazz, classical, and electronic music. As an additional threat to classical music fans, there is no chance of searching by composer, a feature included in iTunes, Rhapsody, and other online music services.

Users may play the Connect downloads an unlimited number of times on up to three personal computers that are registered with the Connect store, including the personal computer on which the Connect Downloads are originally downloaded. In general, users may then transfer the licensed Connect Downloads an unlimited number of times onto portable music devices and media that are compatible with the store. In addition, users may "burn" up to ten CDs (five in ATRAC format and five in Redbook format), providing more flexibility than iTunes, though Connect's track copying and burning rights are fairly similar.

Sony also celebrates the launch of Hi-MD Walkman digital music players. Hi-MD Walkman players are compatible with the Sony Connect online music store and use Hi-MD removable media, providing users with extended storage capacity with respect to traditional MiniDisc. In addition to Hi-MD, other compatible devices include Net MD Walkman recorders, ATRAC CD Walkman players, and Network Walkman players. In the U.S. alone, Sony has sold more than **two and a half million** Walkman-branded devices that are already compatible with the Connect store. By the end of the year, that number will increase to over seven million. Hi-MD compatible players can be less expensive than iPods, and the format features interchangeable discs, while iPods' fixed hard drives hold **an order of magnitude more music** than Hi-MD discs

The store will feature ATRAC3 audio compression that effectively reduces the size of audio files while keeping a medium-to-good sound quality. With ATRAC3 compression, music can be recorded and compressed to 132kbps (kilobits per second).
In the coming months, consumers will be treated to a steady stream of upgrades. Sony Connect plans to roll out newer versions of the software, providing users with more features and flexibility, and **compatibility** with devices from other manufacturers.

6.10 Warner Music UK

Warner Music UK is using the **Share!** file distribution service, from the UK-based European network service provider **Interoute**, instead of physical CDs for distributing promotional copies of music tracks. In using the service, Warner Music UK joins **BMG Music**, which piloted the service in distributing a new Avril Lavigne single to radio in the UK in March.
Share! uses **Windows Media DRM** to protect tracks that record labels send to reviewers, radio stations, clubs, ad agencies, distributors, and others. The service is also capable of distributing files in **Apple QuickTime Audio (AAC) format**, **but without DRM**. It also uses **watermarking technology** from UK-based **Central Research Labs** to insert into the audio files the identities of people to whom the files are sent, so that any pirated copies can be traced back to those users.

Share! joins a small list of software or service providers that are addressing the problem of pre-release media piracy, which many insiders view as an overwhelming contributor to piracy overall. Other players in this space include **DMOD** in the US and **MusicPoint** in Australia. These solutions are relatively easy sells, because **distributing files on the Internet is easier and cheaper** than doing so with physical CDs, and the security features are almost icing on the cake. Like many of these other services, Share! provides sophisticated workflow and **permissioning** functionality that mirrors the needs of several different music distribution paradigms.
The significant difference with Share! is that it primarily **uses Windows Media 9** as its file **format** and **DRM technology**, whereas the others tend to use their own proprietary DRM schemes. This reinforces a feeling in the music industry that, outside of Apple's iTunes service, Windows Media is becoming a **de facto standard** for digital music distribution.
Another interesting difference is that Share! requires the media to be distributed to be on CD to start with. A user at a record company inserts a CD into her drive, and the Share! application encodes it using Windows Media 9. In other words, Share! does not expect the file to already be on a user's hard disk drive, a file server, or in some sort of digital asset management system.

6.11 MSN Music

On September 2004, Micorsoft announced the preview release of MSN Music, a paid-download service. MSN Music is yet another 99-cent download service with a user interface that differs cosmetically from the umpteen other similar services, offers a search function, and otherwise has only one real differentiating factor, described in one word that means a lot to certain rock fans: Madonna. MSN Music is the only legitimate download service to offer what looks like a complete selection of tracks from the artist, although most are available for purchase as complete albums only. MSN Music also features albums from Metallica, the metal band that has outspokenly resisted the Internet though is also available on Napster.

Aside from that, MSN Music features the ability to transfer tracks to compatible portable devices, with DRM features from Windows Media Player 10. The media has made much of MSN Music and how it may compete against the many other services that use Windows Media technology, including Napster, MusicMatch, Wal-Mart Music Downloads, Loudeye/OD2's services in Europe, BuyMusic, MusicNow, Free Record Shop, etc, etc. -- as well as Apple's iTunes and RealNetworks's RealPlayer Music Store. Napster is also releasing features that take advantage of Windows Media DRM for portable devices, and other services should follow soon (if they do not first go bankrupt due to the excessive competition).

Microsoft is representing MSN Music, which should officially launch next month, as a first step. It plans to add other services in the future, such as paid-subscription features that carry higher profit margins. The media seems to assume that MSN Music will wipe out all of the other similar services simply because it's Microsoft. Unless MSN Music embodies some dirty tricks of the type that Microsoft has been accused of in the past, such as unpublished API calls in Windows Media Player, and despite MSN's built-in marketing base, we don't see why Microsoft should render redundant the likes of iTunes and Napster, both of which have big name recognition and marketing budgets behind them. At the same time, there are far too many of these services with little to differentiate among them and even littler profits between them; yet while many of them should disappear in the next year or two, Microsoft is certain to be one of the survivors.

Comparatively little attention is being paid to Microsoft's other announcement, the Portable Media Center. Creative Labs is producing the first example of such a device (the Zen Portable Media Center), which has a small video display and can be used to play audio and video content that is transferred from a PC. The device is not available yet and has no announced price point.

The Portable Media Center (PMC) is part of Microsoft's overarching strategy to make the PC, instead of a set-top box or other device, the center of any home digital entertainment network. It is intended to bridge the gap between home and portable devices.

6.12 Yahoo's Music Unlimited

On May 10, 2005 Yahoo (based in Sunnyvale, Calif.) announced a discount online subscription music service creating serious issues to its competitors. As an exampe, at the announcement, shares of RealNetworks plunged 21 percent while Napster fell nearly 27 percent. Apple Computer, whose iTunes music service has a 70 percent share of the online music market, declined 2 percent. Shares of Yahoo rose 82 cents after the news.

Yahoo's Music Unlimited service allows subscribers to retrieve songs from its catalog of more than a million tracks and listen to them on portable music players or on personal computers. The songs become unplayable if a user's subscription expires.

A user who wants to copy a song onto a CD and own it will have to pay an additional fee per song.

The service will charge users $6.99 if bought monthly. If a user pays for a yearly subscription, the cost will be $4.99 a month, or about $60 a year, which is about a third the cost of similar services from Napster and RealNetworks. Both of those companies charge $14.95 a month, or almost $180 annually for features similar to the Yahoo plan.

Apple does not offer a subscription service, but sells downloadable songs for 99 cents each. Though its business model is different, Apple competes in the same online market and could see some of its market share eroded by Yahoo's arrival.

The competition for Yahoo is on the price, that is on the service fee, which is low enough to worry financial analysts about future break even. The online services, according to industry analysts, typically pay the record labels about 65 percent of the subscription revenues. At about $60 a year Yahoo's music service will not be profitable on subscription sales alone.

But Yahoo, with a market value of about $48 billion and revenue of $821 million in the last quarter, has the resources to lose money while it squeezes its smaller competitors.

Yahoo's announcement has some analysts speculating that it will ignite a price war in online music. Napster or RealNetworks - two much smaller companies both trying hard to be profitable - could afford to cut their own prices anytime soon.

Besides attracting subscribers with its low price, Yahoo can now sell music to fans who already visit its existing online music sites, which let visitors play music videos, chat with other fans and look up information about CD's and artists.

A possible return for Yahoo could indeed be the traffic generated. Yahoo's music sites, including its streaming radio service, get about 25 million visitors a month. As one of the most popular sites on the Internet, Yahoo gets a total of 370 million visitors monthly.

Since record labels are hard to make large discounts on on-line services, very aggressive introductory pricing for portable subscriptions will likely be at negative gross margins and consumers should expect rapid price increases.

As it is, selling online music is a difficult way to make money.Apple Computer, which has sold more than 400 million songs from its iTunes music store, makes only a small profit from those sales. Apple executives have said that the iTunes store exists in part to help sell iPods. Steven P. Jobs, Apple's chief executive, has said Apple has no plans to offer a subscription service.

RealNetworks said it had more than a million subscribers to its music service.

Napster, which gained notoriety in the 1990's as the first music file-sharing service, had 410,000 subscribers at the end of March.

7 Technologies and products for on-line music distribution

7.1 Basic Technologies

The basic technologies supporting current and emerging products and services can be classified according to the following points[8]:

- Web technologies,
- Electronic payment,
- Information technologies (Databases, Middleware, Application Servers)
- User devices (hardware and software music players, mobile devices,…)
- Encryption and watermarking

Baseline features of such technologies are:

- a protection mechanism to avoid unauthorized communications (for instance based on encryption);

[8] This is an extension of classification of technologies for distribution of digital content from [DMP].

- information to register and identify the actors of the communication;
- messages to perform transactions;
- messages to request downloads;
- messages to resume failed downloads.

The main relevant technologies are summarised in the following table:

Technology	URL	Company / Organisation	Company URL
Adobe Content Server	http://www.adobe.com/products/contentserver/	Adobe	www.adobe.com
iTunes Music Store	http://www.apple.com/music/store/	Apple	www.apple.com
ADo²RA	http://www.dwsco.com/adora/index.html	Digital World Services (Bertelsmann)	www.dwsco.com
DMDFusion	http://www.dmdsecure.com/products/dmdfusion/overview.php	DMDsecure	www.dmdsecure.com
e-sales	http://www.element5.com/index.html	element 5	www.element5.com
WinMX	http://www.winmx.com/	Frontcode Technologies	www.frontcode.com
e-business on demand	http://www-3.ibm.com/e-business/index.html?P_Site=T53&P_Creative=B0LI00LE	IBM	www.ibm.com
IBM Digital Media Factory	http://www-1.ibm.com/industries/media/indseg/	IBM	www.ibm.com
Global Release Identifier	http://www.ifpi.org/grid	IFPI	www.ifpi.org
Rights|System	http://www.intertrust.com/main/technology/index.html	Intertrust	www.intertrust.com
Liquid Music Network	http://www.liquidaudio.com/services/distribution/lmn/index.asp	LiquidAudio	www.liquidaudio.com
LockStream DRM Solution	http://www.lockstream.com/hi_band/index.htm	Lockstream	www.lockstream.com
CDS System	http://www.macrovision.com/solutions/audio/system.php3	Macrovision	www.macrovision.com
Digital Asset Management	http://www.microsoft.com/windows/windowsmedia/mediaent/dam.asp	Microsoft	www.microsoft.com
Microsoft Windows Media 9	http://www.microsoft.com/windows/windowsmedia/9series/default.asp	Microsoft	www.microsoft.com
Synamedia	http://www.nds.com/broadband/broadband.html	NDS	www.nds.com
OMA DRM 2.0 Enabler	http://www.openmobilealliance.org/tech/release.html	OMA	www.openmobilealliance.org
DVD Audio	http://www.panasonic-europe.com/dvdaudio/index_frame.asp	Panasonic Europe	www.panasonic-europe.com
Super Audio CD	http://www.superaudiocd.philips.com/	Philips	www.philips.com
Helix	http://www.realnetworks.com/	RealNetworks	www.realnetworks.com
KaZaA Media Desktop	http://www.kazaa.com/us/index.php	Sharman Networks	www.sharmannetworks.com
Torrent Origin Streaming Appliance	http://www.starbak.com/products/origin_streaming_servers.html	STARBAK	www.starbak.com
Morpheus	http://start.musiccity.com/m20/index.html	StreamCast Networks	www.streamcastnetworks.com
ActiveMedia	http://www.webwarecorp.com/products_services_activemedia.html	WebWare	www.webwarecorp.com
WEDELMUSIC	http://www.wedelmusic.org	WEDELMUSIC	www.wedelmusic.org
XRML	http://www.xrml.org	ContentGuard	www.contentguard.com

A survey on the main existing technologies and products for the on-line music distribution market has been developed as a collaboration between the Distribution WG and Protection WG and can be found at: http://www.interactivemusicnetwork.org/documenti/view_document.php?file_id=361

Some of the most relevant technologies are briefly described in the following paragraphs.
We can anticipate that there exist a common feeling in the music industry. that outside of Apple's iTunes service, Windows Media is becoming a **de facto standard** for digital music distribution.

7.2 Products and applied technologies

7.2.1 Adobe Content Server

http://www.adobe.com/products/contentserver/

Adobe Content Server is a system for publishers, libraries, retailers, and application service providers to prepare and distribute eBooks and other digital content in Adobe Portable Document Format (PDF). It integrates preparation, procurement, distribution, fulfilment, and rights management of digital content.
The system helps manage back-end marketplaces of publishers, distributors and retailers, following a business-to-business model. Retailers can also use the system to distribute eBooks directly to consumers. On the back end, Adobe Content Server links to relational database using ODBC, so it can access eBook content stored within itself or on other servers. On the front end, the software connects either to e-commerce servers to enable financial transactions or to a library's online catalogue to enable lending, Approved clients or patrons can log on securely, place an order, and receive content immediately.
These are the features of the system:

- lending of digital content with automated check-out and check-in of titles;
- addition of new content with bulk uploads;
- enabling of numerous business models that provide user management and content management capabilities;
- managing of an unique encrypted Adobe PDF file for multiple uses and creation of usage rules for each transaction;
- support for ONIX, an industry-standard metadata format;
- protection of copyrighted content with 128-bit encryption;
- use of the EBX digital rights management system, which supports several business models through a rich set of usage rules;
- expiration of content on a specific date or after a specific amount of time.

7.2.2 Apple iTunes and the iPod

http://www.apple.com/music/store/

The technology behind Apple iTunes Music Store distribution service is iTunes 4. Apple iTuned Music Store distribution service is described in a previous chapter.

iTunes 4 is the Mac/Windows application (a 'jukebox software') which enables users to enter the iTunes Music Store. Its music player supports the new AAC audio format, and let users share their music with other Mac computers on local Ethernet or AirPort wireless networks.
Using a Mac with a SuperDrive, it is possible to archive music to DVDs. iTunes 4 has a Music Sharing feature that uses Rendezvous to give user remote streaming access to his personal music library. It automatically synchronises with the iPod device (a digital audio player, cf. below) at high speeds over FireWire, by connecting iPod to a Mac computer with FireWire. An entire music CD can be downloaded in about 10 seconds. Moreover, iTunes lets user stay in sync with Play Count, Last Played, Song Ratings (the service that provides digital versions of over 18,000 books as well as publications like The New York Times and the Wall Street Journal, and archived radio shows such as NPR) spoken word content left off.
It is possible to generate dynamic Smart Playlists that reflect user preferences and listening habits. To create these playlists, a user only has to indicate what kind of music he prefers: iTunes 4 lets user set the parameters — indicating attributes such as My Rating, Genre, Composer, Artist, Play Count, Last Played and so on — and then creates a personalized playlist.

Because iTunes 4 seamlessly connects to the rest of iLife (Apple's software for digital music, photography, moviemaking and DVD creation), it is possible to access iTunes digital music library and playlists from iPhoto, iMovie and iDVD. Moreover, iTunes 4 can burn audio CDs.
As for the DRM in iTunes, letting users burn CDs in unprotected formats can appear as a gaping security hole. However, having to buy blank CDs and spend the time burning them is a serious deterrent to large-scale piracy. Being able to burn CDs is a convenient feature that helps meet reasonable usage expectations; Apple, and the record companies who have licensed their material to iTunes, are betting that the value of that convenience is larger than the size of the piracy loophole.

ITunes integrates the Music Store by providing a link on the menu on the left hand side of the application window, like the following picture illustrates:

The operation of iTunes Music Store is quite simple and can be described according to the folloqing steps:

1. iTunes application connect to the Music Store via the Internet, using the Web – HTTP protocol.
2. The user can browse and select the music pieces he/she wants,
3. The user can listen to 30 seconds preview and when convinced, he/she can purchase the desired music pieces[9],
4. The purchased music pieces are then downloaded through an encryption-protected channel,
5. The user can listen to the music directly from iTunes, burn it to a CD or put the music pieces onto the iPod to listen to them in a mobile style.

iPod (for Mac and Windows) is a digital audio player which can download music files and hold up to 7,500 songs. It is a very slim device (0.62 inches thick and 5.6 ounces weight) and includes a 10GB, 15GB or 30GB hard drive. The 15GB and 30GB models have a docking station to make them able to charge and sync via FireWire or USB 2.0. They can be connected to a home stereo system, too. iPod supports the most several audio formats, including MP3 (up to 320 kbps), MP3 Variable Bit Rate (VBR), WAV and AAC (Mac-only).

A complete survey of Apple iTunes technology has been developed as a collaboration between the Distribution WG and Protection WG and can be found at:
http://www.interactivemusicnetwork.org/documenti/view_document.php?file_id=428

7.2.3 ContentGuard XrML

http://www.contentguard.com
http://www.xrml.org

Launched in April 2000, ContentGuard conducts its operations in Bethesda, MD, and El Segundo, CA. The company is owned by Xerox Corporation, with Microsoft Corporation holding a minority position. The company focus on the distribution and management of digital works (content or services), including the use of a rights language, and its right language, XrML, were originally developed at the Xerox Palo Alto Research Center (PARC).
These core technologies enable the efficient creation of DRM applications, simplify the digital distribution process and increase revenue opportunities for content or service providers deploying varied business models, while protecting their intellectual property.
The company is focused on creating a single worldwide standard Digital Rights Language. It believes that such a standard will enable interoperability across DRM systems for digital content or services, including web services. Towards this end, ContentGuard has proposed XrML to numerous standards bodies and provides technical expertise in support of their work. MPEG, officially known as ISO/IEC JTC1/SC29/WG11, selected XrML as the basis for the development of the MPEG-21 REL.
Separately, ContentGuard licenses its patents and technology to companies developing software and systems to distribute and manage digital works. It also develops and licenses tools to help companies implement systems using XrML
XrML - eXtensible rights Markup Language – is based on research at Xerox Palo Alto Research Center (PARC) and provides a universal method for specifying and managing rights and conditions associated with digital content as well as services. The XrML specification can be obtained at the XrML.org site at www.xrml.org .

[9] Details about the electronic payment and registration are not considered.

Foundation technologies, such as the XrML, will accelerate high value digital content distribution and Web Services initiatives by enabling standards-based interoperability and alleviating the concerns of being restricted to a technology platform, a business model, a media type, a format, a proprietary solution or a particular vendor. XrML is extensible and fully compliant with XML namespaces using XML schema technology.
ContentGuard has committed to give governance and control of XrML to the international standards community. This process has already begun. ContentGuard proposed XrML to MPEG-21 where it was selected as the basis for the development of the MPEG-21 REL. The XrML-based MPEG-21 REL has advanced to Final Draft International Standard, FDIS, in the ISO standardization process. International balloting on the standard should be completed in Q'1 2004. The Open eBook Forum is also in the development process to create a REL solution for the electronic publishing domain and that work is focused on the development of an extension to the MPEG-21 REL. Similarly, work has commenced in SC36, another ISO Working Group focused on Learning Technologies, to develop a rights language solution based on the MPEG-21 REL.
Because of this progress ContentGuard has frozen its release of XrML at Version 2.0. This is the final release ContentGuard expects to post to XrML.org. ContentGuard will maintain and support version 2.0 until such time as it is replaced by a release from a standards body and is no longer needed by our customers.
In addition, the availability of the XrML 2.0 SDK allows developers to quickly and easily build XrML-based applications for commercial use in various hardware and software products.

ContentGuard provides developers with a collection of tools that facilitate learning as well as the development of applications that use XrML based rights language standards:

- RightsExpress is a demonstration service for creating ISO standard - MPEG REL licenses using easy-to-use entry forms and for editing licenses previously created using a compatible version of this service. It generates valid MPEG REL expressions based on your input and builds licenses appropriate to commonly-used business use cases. ContentGuard provides this service to help you understand the MPEG REL syntax and semantics.
- The XrML SDK Release 2.0 is designed to support XrML 2.0. XrML was submitted by ContentGuard to the MPEG-21 REL Working Group (ISO/IEC, JTC 1 / SC 29 / WG 11), to the Open eBook Forum for their rights language development and to the OASIS Rights Language Technical Committee. Future SDK releases from ContentGuard will support MPEG REL as well as other XrML based rights language standards.

7.2.4 Digital World Services ADo²RA System

http://www.dwsco.com/adora/index.html

ADo²RA from Digital World Services (www.dwsco.com) is a content independent digital distribution solution. It's a system that makes the creation, protection and distribution of digital content — text, music, software, games, and video — possible to access and enjoy from all mobile devices and methods.

7.2.5 DMDfusion

http://www.dmdfusion.com/

DMDfusion is a product consisting of flexible software components and applications including Digital Rights Management and Conditional Access technologies that manages the access, usage, protection and licensing of digital content. Central to DMDfusion is the concept of a separation of layers that each performs its own tasks.

DMDfusion offers the following features and benefits:

- DMDfusion is a server-side product and does not involve client side software or a plug in. In fact, DMDfusion leverage on existing trusted software player and devices and to allow for the delivery of content to desktops and (mobile) devices without the use of proprietary plug-ins, thus maximising the end-user experience.
- DMDfusion is designed for, and typically operates within, the content delivery supply chain involving content creation, management and distribution.

- DMDfusion incorporates both Digital Rights Enforcement (DRE) and Digital Rights Management (DRM) in one solution.
- DMDfusion provides server side license delivery conditions (e.g. geolocation) as DRM technology agnostic mechanisms to allow for more diverse business models than would be enabled by the various proprietary DRM technologies alone.
- DMDfusion is a tool enabling a single market application as well as being a core component in a value added service platform for multiple applications.
- DMDfusion is a software product combining the best of breed technologies, which is suited to your own content protection and business requirements and needs.
- DMDfusion enables multiple content providers, distributors and operators to -jointly- create content services.
- DMDfusion enables interoperability of third party DRM technologies.
- The separation of protected content from licenses is a fundamental principle of DMDfusion. This allows for content to be delivered using a wide variety of distribution channels such as content delivery networks, peer-to-peer distribution systems, physical carriers etc.
- DMDfusion's scalable and distributed architecture allows for future growth and distributed ownership.
- Platform, database, web server and application server independence permits deployment on existing IT-infrastructure.
- The use of open standards (such as HTTP, FTP, XML, SOAP) and the provision of APIs facilitate rapid and seamless integration with third party systems. API documentation is available on request at dmdfusionapi@dmdsecure.com

7.2.6 element 5 e-sales

http://www.element5.com/index.html

e-sales is element 5's (www.element5.com) solution to perform online sales of software through unique marketing campaigns to lower distribution costs, develop new international markets, increase customer loyalty and implement new licensing models. The element 5 Control Panel enables a complete overview of online activities and sales data, to adjust sales activities at any time to meet individual needs.
element 5 e-sales offers order processing and all associated communications, in ten major languages. It supports local payment options for various countries, and all forms of payment commonly accepted across the globe including credit cards, checks, purchase orders, cash and bank transfers.

7.2.7 RealNetworks Helix

http://www.realnetworks.com/

Helix from RealNetworks is both a platform and community that enable creation of digital media products and applications for any format, operating system or device.
The Helix platform combines extensive, proven digital software technology with a rich set of application interfaces. It empowers developers, information technology and consumer electronics companies to easily integrate digital media. The Helix community enables companies, institutions and individual developers to license Helix DNA platform source code in order to build Helix-powered server and client products. RealNetworks has also released a family of products built on top of the Helix DNA platform, including the Helix Universal Server.
The Helix product suite comprehends the Helix Universal Server, the Helix Universal Gateway and the Helix Producer.
The Helix Universal Server and Helix Universal Gateway stream and cache all major media types — including RealAudio/RealVideo, Apple's QuickTime, MPEG-2, MPEG-4 and Windows Media — improving the cost of digital media delivery.

Helix Producer is a GUI-based production tool used to convert live and prerecorded audio and video to RealAudio 8 and RealVideo 9 formats for live broadcast, on-demand delivery, and download
Features of Helix Producer include:

- RealVideo 9
- RealAudio Surround: provides a multi-channel audio experience by preserving embedded surround sound audio
- GUI batch processing to queue multiple encoding jobs to execute sequentially
- Multiple destination support to send encoded output to multiple servers and and/or file destinations simultaneously
- Firewire (IEEE 1394) support
- Audience, Server Templates and Job Files allow users to save encoding settings to keep, reuse, and share to create consistent quality output

7.2.8 Liquid Music Network (Liquid Digital Media)

http://www.liquidaudio.com/services/distribution/lmn/index.asp

The Liquid Music Network system from Liquid Audio (www.liquidaudio.com) is based on two products for final users, the Player and the Secure Portable Player Platform (SP3), and a Server.

The Liquid Music Network system from Liquid Audio is based on two products for final users, the Player and the Secure Portable Player Platform (SP3), and a Server
Liquid Player for Windows enables streaming, downloading, purchasing, playback, ripping and CD burning of digital audio. Liquid Plug-Ins enable third party music players to access secure music in the Liquid Audio format.
Liquid Audio's SP3 provides consumer electronics companies, chipset manufacturers and embedded operating systems developers with a digital music solution to get to market with digital audio devices. Combined with a custom-branded version of Liquid Player Plus software, SP3 enables the rapid development of secure digital audio devices that are compliant with the guidelines established using the Secure Digital Music Initiative (SDMI).

Liquid OEMs can also choose to take advantage of Liquid Audio's turnkey Online Store to offer music from the Liquid Catalog which contains more than 150,000 digital downloads. These solutions enable manufacturers to bring new products to market quickly.
Liquid Server provides a system for content management and delivery of streaming and downloadable music through the Internet. It is designed for web administrators and features:

- Extensive transaction and rights-reporting tools
- Real-time delivery of music and additional media to users
- Integration with most E-Commerce software
- Integration with SQL and Oracle 8 databases
- Customization of the graphical user interface of Liquid Player
- International database support using UTF-8

Liquid Digital Media (formerly Liquid Audio), which was acquired by Anderson Merchandisers, Wal-Mart's music distributor, in January 2003

7.2.9 IBM Digital Media Factory

http://www-1.ibm.com/industries/media/indseg/

IBM Digital Media Factory (DMF) is an open-technology framework comprised of e-business infrastructure that can help companies manage, store, protect and distribute digital video, audio and images.
Digital media is unstructured content - video, audio and images not stored in traditional databases. The content can have intrinsic value, such as movies on demand, and business process value for managing large

media files such as medical images and corporate media assets. Both uses require specially configured systems, including hardware, software and services to create the digital media, manage it efficiently and securely, distribute it and then process transactions.
Digital media is being used in many ways across a range of industries — from retail kiosks, to government video surveillance, to wireless content distribution in the telecommunications industry.
IBM products included in DMF are IntelliStation workstations, Electronic Media Management System, IBM Content Manager, DB2 Universal Database, WebSphere Commerce For Digital Media, IBM @.server, TotalStorage solutions and IBM Global Services.
IBM Digital Media Factory technology purposes are:

- protecting and preserving valuable content in digital form
- optimizing its use for new revenue generating purposes
- finding, sharing, reusing and re-purposing content
- streamlining production, shortening cycle times and reducing costs
- distributing content to multiple delivery platforms - Web, wireless, set-top-boxes
- improving communications, increasing customer loyalty and brand awareness
- securing the preparation, delivery and consumption of high-value content

7.2.10 Microsoft Digital Asset Management

http://www.microsoft.com/windows/windowsmedia/mediaent/dam.asp

Digital Asset Management is the Microsoft technology to lower operating costs and increase productivity. The search and report system locates the assets, while Windows Media's DAM allows media companies to deliver encrypted Windows Media audio and video assets to any desktop.
Windows DAM offers compression mechanism which enables asset owners to reduce bandwidth and storage costs. It allows digital distribution of video from low bit rate previews to full 720p high-definition resolutions.
Windows Media-based DAM solutions include advanced security features which allow asset owners to control access to media assets even over public networks such as the Internet. Digital asset management couples user authentication databases and Microsoft Windows Media Digital Rights Management. Windows Media Digital Rights Management is the end-to-end digital rights management (DRM) system that offers asset owners and distributors a platform for the secure distribution of digital media files. It contains several definable business rules, which allow asset owners and distributors to configure their own rules and criteria for delivering secure media, while providing experience for authorized viewers.
Concerning search, reports and metadata, assets imported into the system will automatically read metadata from the media files themselves, and offer the ability to add or edit this information. Assets can be located through the search and report engine of the Digital Asset Management solution, and can be previewed. Assets can then be used directly from the digital files, or pulled from tape inventory using the SMPTE timecode and tape information from the asset metadata.

7.2.11 LockStream DRM Solution

http://www.lockstream.com/hi_band/index.htm

LockStream DRM Solution from LockStream (www.lockstream.com) includes a suite of products: Secure Package Creator Module, Secure Package Reader Module, License Generator Module, Media Manager and Deployer.
The Secure Package Creator Module packages up digital media into Objects, encapsulating one or more pieces of digital content into LockStream's proprietary format. Then it creates a license template creating and registering DRM rules with the License Generator Module. Finally, it turns Objects into Protected Objects by associating DRM usage rules to them.
The Secure Package Reader Module provides a set of component that developers can use to build LockStream DRM support into client applications on a multitude of client devices, platforms, and networks.
The License Generator Module issues licenses based on the DRM rule set and to manage those licenses.

The Media Manager is an executable file capable of interpreting LockStream's proprietary file formats, managing access to content encoded in the file formats, creating playlists for that content, rendering that content on computer desktops, and synchronizing the content on authorized mobile devices.
The Deployer is an ActiveX control for browser integration that manages the download and installation of software for content playback, media files used within the Media Manager, licenses issued by the License Generator and other files.

7.2.12 NDS Synamedia

http://www.nds.com/broadband/broadband.html

Synamedia from NDS (www.nds.com) is the broadband operators' gateway to earning new video-based incremental revenues from broadband IP networks. It delivers a truly multi-service mix that lets distributors control, manage and personalize the way of providing content.
NDS Synamedia allows broadband IP networks to offer interactive entertainment package and develop new business models around the following services: Secure digital broadcast TV, Video-On-Demand (VOD), Personal Video Recorder (PVR) functions, Pay-per-view and pay-per-use functions, Interactive applications.

7.2.13 Microsoft Windows Media 9

http://www.microsoft.com/windows/windowsmedia/9series/default.asp

Microsoft Windows Media 9 is a suite of programs which form a complete platform for digital media distribution.
The components of the Microsoft Windows Media 9 Series are:

- Player: for audio and video, both on-line and off-line.
- Encoder: tool for producing audio and video contents.
- Server: for media streaming.
- Codecs: audio and video compression tools.
- DRM: end-to-end system that offers content providers and retailers a platform for the secure distribution of digital media files.

The Windows Media Rights Manager includes both server and client software development kits (SDKs) that enable applications to protect and play back digital media files.
Using the server SDK, developers can create applications that encrypt (package) digital media files and issue licenses for those digital media files. A packaged Windows Media file contains a version of the file that has been encrypted with a key so that only the person who has obtained a license for that file can play it. The license is separate from the packaged Windows Media file, which means that the content and license for that content can be acquired at different times. Encrypted files can be either streamed or downloaded to the consumer's computer.
To enable digital media playback applications to play packaged Windows Media files, acquire licenses for them, back up and restore licenses, and issue security upgrades for its DRM component, developers should use the client SDK.

7.2.14 OMA DRM Enabler Release (Version 2.0)

http://www.openmobileaccess.org

In an ongoing effort to accelerate the wireless industry's adoption of rich and accessible mobile services, the Open Mobile Alliance (OMA), an industry organization delivering specifications for interoperable mobile service enablers across the world, recently (Feb. 2, 2004) announced the release of the OMA DRM 2.0 Enabler Release, designed to protect high-value content produced and distributed by a wide range of content and service providers. The OMA expects to release the specification during the first half of this year.
OMA DRM 2.0 is backward compatible with OMA DRM 1.0 but goes considerably beyond it in the functionality it supports. OMA DRM 1.0 was designed for a world of simple, low-cost devices with not much memory, no trusted system clocks, and no sophisticated content rendering capabilities - that is, it was designed to support ring tones and wallpaper graphics. OMA DRM 2.0, in contrast, is designed for more

powerful devices that have the ability to play higher-resolution audio (such as actual music tracks) and video, send content to other devices and storage, and so on.
The OMA DRM 2.0 Enabler Release enables the protection of premium content such as music tracks, video clips, and games with enhanced security and improved support to preview and share content, among other new features. It aims to help the entertainment and media industries deliver premium content to millions of mobile consumers in a trustworthy and secure way with special focus on the importance of content and copyright protection when using mobile devices.
For handsets and other mobile devices, the enhanced OMA DRM 2.0 Enabler Release represents the next step in pervasive mobile access. While the OMA DRM 1.0 Enabler Release, issued in November 2002, provides the basic protection functions for limited value content, OMA DRM 2.0 with its added trust and security illustrates how OMA has enhanced the functionality of the specification to address the needs and principal concerns of content providers.
The new enabler release takes advantage of expanded device capabilities and offers improved support for audio/video rendering, streaming content and access to protected content using multiple devices, thus enabling new business models.

7.2.15 STARBAK Torrent Origin Streaming Appliance

http://www.starbak.com/products/origin_streaming_servers.html

The Torrent Origin Streaming Appliance (OSA,) from STARBAK (www.starbak.com) is a network appliance. A network appliance is a specialized device that is dedicated to performing one function very well. The Torrent OSA was specifically designed to stream media. Since it is not a normal multipurpose server, it is very easy to use.
The Torrent OSA utilizes web-based administration. This means that it can be controlled from any computer that has a web browser. No special software needs to be installed. It can also be administered from any location on the network.
The Torrent OSA streams all major streaming formats including Microsoft Windows Media, Apple QuickTime, MPEG-1 and MPEG-2. All formats can be streamed simultaneously from a single Torrent OSA.

7.2.16 WebWare ActiveMedia

http://www.webwarecorp.com/products_services_activemedia.html

ActiveMedia software from WebWare (www.webwarecorp.com) provides a secure repository to manage, share, distribute, and publish rich media content, such as graphics, images, layouts, animation, video and documents. ActiveMedia is designed for wide-scale deployment and allows content sharing throughout global organizations among employees, partners, agencies, and distributors.
WebWare ActiveMedia can be used as a stand-alone content management system or incorporated into an existing enterprise content management system (ECM) as the backend digital media repository. It can be implemented as installed software in-house or as an outsourced service.

7.2.17 WEDELMUSIC

http://www.wedelmusic.org

WEDELMUSIC is a complete system for distribution and sharing of interactive music via Internet totally respecting the publisher rights and protecting them from copyright violation.
WEDELMUSIC allows publishers, archives and consumers (theatres, orchestras, music schools, libraries, music shops, musicians) to manage interactive music; that is, music that can be manipulated: arranged, transposed, modified, reformatted, printed, etc., respecting copyright. It is an innovative support for preparing performances, studying music, analysing music, learning instruments, distributing music at low cost, etc. The same music objects will be available for traditional media and Braille. These innovative features are possible thanks to the definition and implementation of:

- a unified XML-based format for modelling music including audio, symbolic, image, document, etc.;
- reliable mechanisms for protecting music in symbolic, image and audio formats;
- a full set of tools for building, converting, storing, distributing music on the Internet.

To distribute, share and receive music in symbolic format also allows to commercially exploit new functionalities for music consumers and, thus, it allows the opening of a new market for several specific applications: sharing of multimedia music objects among archives, libraries, publishers, music groups, etc.
The WEDELMUSIC system is composed by the following applications:

- the Music Editors and Visualisers, to edit, view and manipulate music scores, and create multimedia musical objects, including images, video, audio, lyrics, documents and so on;
- the Server for preparing and delivering WEDELMUSIC objects considering protection and accounting, fast retrieval of any component: images of music sheets, scores, audio files, documents, video, etc.;
- the Local Distributor for locally storing and distributing music in the local area, suitable for music shops, theatre archives, music schools, conservatories, libraries, etc.

Transactions between the Servers and the Local Distributor and from the latter to the clients are performed via Internet using a secure protocol which protects the message with symmetric and asymmetric encryption algorithms.
The object are protected against breach of the copyrights by means of a double protection system, both active and passive:

- the Server embeds a watermark to the content to be delivered, so to recognize improper distributions of this content and track back who breaches the content owner rights (passive protection);
- the Server encrypt the objects to be delivered and controls the requests of the key to open them, so to avoid unauthorized operations on these objects (active protection).

7.2.18 KaZaA Media Desktop, WinMX, Morpheus

http://www.kazaa.com
http://www.winmx.com
http://start.musiccity.com/m20/index.html

KaZaA Media Desktop, WinMX) and Morpheus use peer-to-peer technology. This means that individual users connect to each other directly, without need for a central point of management.
The user can choose which files he wants to share and how many files are allowed to be downloaded by other users at any one time. All these programs allows the users to search and download the shared files. All items shared on the user network may be categorized by attributes such as category, author, description, language, etc.
KaZaA searches occur through users with fast connections, called supernodes. KMD users with the fastest internet connections and the most powerful computers are automatically designated as supernodes. A supernode contains a list of some of the files available and where they are located. When a user performs a search, his KMD first searches the nearest supernode to him, and then sends him immediate results. This first supernode then refers your search to other supernodes and so on.
WinMX uses a multi-sourced downloading technology for increasing speed on broadband connections, while auto-complete feature continuously seeks out new download sources, even after WinMX is restarted. A detailed bandwidth monitoring and throttling controls enable the user to monitor his download activities. Moreover, there is a complete upload and download queuing system.
In Morpheus application, when searching the user network, there is no limit to the number of results that may be received. This allows more sources to be found; thereby increasing the reliability and speed of downloads. Also, Morpheus allows users to perform up to 10 different searches at the same time.
When popular content exists in many places throughout the user network, it is downloaded from multiple hosts simultaneously. Different parts of the content are received from different sources, increasing the speed of the download.
These applications have not a digital rights management, so they only inform their users that they are not authorized to share contents which breach the copyright laws.

Another example of music distribution with digital rights management is the Sony-OpenMG technology (www.sel.sony.com/SEL/consumer/openmg/index.html), which includes the download of music from multiple electronic music distribution platforms, the playback of music files and the recording of music from

audio CDs to the PC (OpenMG Jukebox Software) and the secure transfer of content to and from the PC and portable digital music player.

8 Comparing technologies and services: definition of metrics

In order to perform a comparison among the described technologies, a list of common metrics, both quantitative and qualitative, have been identified, as summarised in the following table:

Criteria	Metrics			
	name	**Description**	**type**	**unit / range**
Usability (effectiveness, efficiency, user's satisfaction)	Success rate	Percentage of times the user succeed in retrieving the desired multimedia content, given the content is present in the catalog.	statistical	%
	Mean service time	Mean time from when the user start the search to the beginning of file download. Assume user finds the object.	feature	sec
	Average bandwith available	Average bandwidth available during download (can depend on a lot of things).	statistical	Kbit/sec
	Resumable download	Possibility to recover an interrupted or failed downolad.	feature	yes/no
	Number of failed downloads	Average number of failed downloads (recovered or not)	statistical	
	Number of errors	Average number of errors presented to user during a single complete operation (from entering the site to successful delivery)	statistical	
	Number of different support channels	Support via email, web form, phone calls, Instant Messaging	feature	
	Help and support quality	Overall quality of information available to users as a support to the service utilisation (guide, user manual, contextual help). 0 if not available	subjective	0-5
	Overall service quality	The overall perception of quality by the end user (through questionnaire).	subjective	0-5
Customisation of service	Collection of customer information (profile)	The service provides to collect information from customers and end users to personalise the offer and service itself. User's information can be can be manually inserted by users theirselves using forms, automatically gathered from users' behaviours (previous purchases and searches) or BOTH.	feature	AUTO, MANUAL, BOTH
	Personalised catalog	Possibility to propose to the user a personalised catalog on the basis of her/his preferences.	feature	yes/no
	Personalised promotions	Possibility to send to users personalised offers and promotions throug alternative channels (emails, newsletters, Instnt Messaging, SMS).	feature	yes/no
Search and retrieve	Number of different search criteria	Possibility to use different query criteria (by artist, title, genre, ...)	feature	
	Simple/Advanced search	Possibility to perform searching with different difficult/completeness level	feature	yes/no
	Audio preview quality	Quality of audio in kbit per sec	feature	Kbit/sec
	Overall preview quality	User's perception of the overall quality of the previews considering the presence of sample images, the video preview quality, audio and video previews duration, …	subjective	0-5
	Review quality	Editor's and users' reviews quality	subjective	0-5
	Description quality	Precision, usefulness, … of the description of each multimedia object	subjective	0-5
	Additional information quality	Quality of possible additional information proposed along with search results (ex. Credits, music piece's history, notes)	subjective	0-5
	Refine search	Possibility to refine the search, to reduce the final number of results.	feature	yes/no
Payment	Pay-per-volume		feature	yes/no
	Pay-per-time		feature	yes/no
	Pay-per-track		feature	yes/no

	Pay-per-album		feature	yes/no
	Credits	Users can buy credits in advance, each song costs them a certain amount of credits for downloading.	feature	yes/no
	Contract's duration		feature	months
Search option	Amount of criteria			
	Advanced search			
	Amount of found items			
Offer	Number of pieces in catalog	Total number of multimedia object available to purchase/use.	feature	
	Available formats	List of all available formats (mp3, aiff, mpeg, avi, …)	feature	
	Average number of hits	Average number of times the user founds what is looking for. Obviously it depends on WHAT the user is looking for, but it still gives a good statistical measure of the service's impact on users.	statistical	
	Quality	User's perception of the overall quality of the catalog	subjective	0-5
Allowed processing	Export to devices		feature	yes/no
	Burning CD		feature	yes/no
	Format conversion		feature	yes/no
	ID3 Tag		feature	yes/no
	Level of Interoperability	Overall level of interchangeability of content with other devices (of different types and manufacturers), formats and services.	statistical	0-5
Additional Services	Periodic newsletters		feature	yes/no
	Forum		feature	yes/no
	Chat		feature	yes/no
	Editor's choice	Presence of a list of recommanded buys.	feature	yes/no
	Direct contact with artists	Effective.	feature	yes/no

Table 11 : Metrics for comparison of music distribution services and products

The results of the comparison will be provided at the Music Network websites soon as they become available, and they will be included into the final version of the present deliverable document.

9 Interoperability and the role of standardisation initiatives

Standardisation initiatives on DRM have always been inherently problematic due to the combination of the complexity of DRM and the rapidity with which the digital media market is developing. There are tradeoffs between generality and likelihood of market acceptance. DRM standards initiatives often aim at a particular emerging market segment as participants hope that their timing makes them neither premature nor too late to prevent proprietary technologies from rendering them irrelevant.

An interoperability standard for DRM has many technical hurdles to overcome. Among them is the task of translating the semantics of license terms from one system/service to another, especially where pre-digital licensing conventions, "fair use," and other forms of consumer expectations have to be taken into account and adjudicated, and of dynamically getting blessings for such translations from all of the players in arbitrary content value chains. Another is the difficulty of establishing comparative measures of trust among arbitrarily different systems. Although work has been done in both areas (the MPEG Rights Data Dictionary and the Digital Media Project's Traditional Rights Usages for the former, and some of InterTrust's other research in the latter), practical applications are not within sight.

9.1 OMA

Formed in June 2002, the **Open Mobile Alliance** delivers open specifications for the mobile industry, helping to create interoperable services that work across countries, operators and mobile terminals and are driven by users' needs. To expand the mobile market, companies that support OMA work to stimulate the fast-and-wide adoption of a variety of new and enhanced mobile information, communication and

entertainment services. OMA includes all key elements of the wireless value chain and contributes to the timely and efficient introduction of services and applications.

The mission of the Open Mobile Alliance is to facilitate global user adoption of mobile data services by specifying market driven mobile service enablers that ensure service interoperability across devices, geographies, service providers, operators, and networks, while allowing businesses to compete through innovation and differentiation.

Maintaining an open organization is key to OMA's vision for broad industry participation and adoption. Openness in this sense comprises of actively collaborating with other organizations and inviting comments and communications with other industry organizations. Openness also means developing industry solutions in a transparent manner, allowing other organizations insight into the technical aspects of the organization. Being able to see and comment on early versions of documents and contributions allows external organizations to be more involved in and aware of evolving service enablers. Finally, openness means that any interested party may join OMA and contribute to the technical specifications, and any entity (both members and non-members) may build applications and services in accordance with OMA's open specifications and interfaces under the same conditions.

The OMA Technical Plenary is responsible for the delivery of technical specifications for application and service frameworks, with certifiable interoperability, enabling deployment of rich mobile applications and services.

In addition, the Technical Plenary oversees the technical specification drafting activities, approval and maintenance of technical specifications, as well as the resolution of technical issues within the OMA organization.

The Technical Plenary is organized around a collection of technical working groups, each focusing on a particular technology area. Currently, there are 15 Technical Working Groups and 2 Committees of the Technical Plenary. The documents and specifications created within the Technical Plenary can be found within the Technical Section of this web site.

Since its inception in June 2002, the Open Mobile Alliance has grown nearly 350 companies representing mobile operators, device and network suppliers, information technology companies, and content providers.
Willms Buhse is vice chair of OMA's DRM Working Group.

9.2 DMP

The **Digital Media Project** (DMP) The DMP is an independent standards initiative that was started by Leonardo Chiariglione, the founder of MPEG, in September 2003. DMP focuses toward solving large problems perceived in the DRM world: interoperability among closed systems; disruption of the balance of control over usage among content owners and consumers; and the potential neglect Traditional Rights Usages (TRUs), i.e. content usages that consumers have enjoyed in the pre-digital era and therefore have come to expect in the digital world, irrespective of whether or not those usages are guaranteed by law.

DMP is still in its starting phase, having recently named a board of directors and established a membership policy. It also issued a call for submissions of information about traditional content rights and how they might map to sets of precisely described rights in the digital media world.

Three major vendors of consumer media technology have expressed interest in joining the DMP and may do so after their respective internal reviews. This is good news for this very well-intentioned though wildly ambitious meta-standards initiative. The bad news is that there appears to be no interest so far from any of the major media companies. Such interest will be necessary if the DMP is to have any credibility with the standards processes it intends to influence.

On May 5, 2005 DMP released its first major set of specifications, which were approved at the DMP General Assembly in San Diego on April 15. At the heart of this set of documents is a specification called **IDP-1 (Interoperable DRM Platform, Phase 1)** for portable audio and video devices. IDP-1 specifically addresses the subset of portable devices that depend on connections to other, more powerful devices -- such as PCs -- for the network connectivity required to obtain licenses to content and perform various types of authentication. IDP-1 is actually just one piece of an overall framework that the new set of documents defines, with th aim to cover a broader swath of the digital content value chain than any other DRM standard. The framework defines entities and interactions all the way from the originator of a piece of intellectual

property (in the most abstract sense) through to the end consumer, and various well-considered steps in between.

The Architecture document, for example, represents the effort that the DMP has put into defining the tricky concepts of works and the forms they take, such as particular manifestations (e.g., performances) and instances (e.g., files containing those performances). These concepts have created some issues to other standards bodies, particularly those focused on content identifiers (URN, DOI, GRid, ISAN, ISWC, UMID). The DMP establishes these principles well enough to enable them to define a "DMP End-to-End Value Chain" and explicitly leaves further elaboration out of scope.

However, the Use Cases on which IDP-1 is based reflect the fact that the DMP's membership contains no representation from major content owners, whose blessing will ultimately be needed to give its work-product any market impact. The basic philosophy of the DMP is that the entire digital media value chain requires digital "governance" in order to ensure that all parties involved can be treated fairly, and that today's DRM technologies are doomed to fail because they do not adequately take consumers' needs or TRUs into account; consumers will ultimately vote with their feet and wallets. Accordingly, the scenarios in the Use Cases document are primarily those that fill "holes" in the capabilities of existing DRM technologies; in particular, those that represent the needs of consumers and independent content creators.

As for the particulars of the IDP-1 design: they are primarily derived from MPEG-21 standards. In fact, IDP-1 is one of the first complete DRM specs based on MPEG-21. IDP-1 calls for the use of content identification schemes that conform to the MPEG-21 Digital Item Declaration (DID) framework, though it does not specify any particular ID standard. It defines a subset of the MPEG-21 File Format as its DMP Content Format (DCF). It incorporates a rights expression language (REL) that is an extended subset of the ISO MPEG REL (with Standard and Multimedia Extensions), which in turn was derived from ContentGuard's XrML 2.0. IDP-1 also employs the MPEG IPMP framework, which specifies how to associate content with rights information, license issuance services, and other rights-related metadata.

Other elements of the IDP-1 technology include 128-bit AES (US government standard) encryption for content, X.509 digital certificates, and various other XML-related standards.

Interestingly, the spec includes authentication mechanisms for devices and domains (groups of devices), but not for users. There is no way to define a user identity, let alone associate it with a device or domain (to establish device ownership). It is possible that the DMP considered user identity management to be unnecessary or too complex for use with the kinds of portable devices envisioned for Phase 1.

Beyond that, the spec contains a number of notions that are in line with the principles of modern DRM implementations and emerging home-networking paradigms, including: the option to keep licenses separate or bundle them with content, supporting both network-based and physical-media distribution, and digital signature-based trust authorities.

However, not much in these specs truly addresses the problem of DRM interoperability. There is no explanation, for example, of how other DRMs would interoperate their rights specifications with IDP-1's extended subset of the MPEG REL. Content owners (as opposed to consumer electronics makers) are increasingly receptive to the idea that consumers should be able to use content on multiple devices. Yet mappings of rights in one scheme to another are often subjective exercises that ultimately require the content owner's permission. The piece of MPEG-21 that was designed to help address this issue, the Rights Data Dictionary (RDD), is not included in the IDP-1 specifications.

The next steps in the DMP's work plan include development of a reference implementation of IDP-1, and it is asking for contributions of existing (as well as new) technology toward that effort. The DMP also intends to map its exhaustive collection of TRU definitions to its technology spec. At this point, the IDP spec covers little that proprietary solutions don't already do (e.g. Microsoft's Windows Media DRM 10 for Portable and Network Devices).

DMP is sympathetic to consumer advocacy organizations that espouse the idea that DRM is necessary and that it can and should be used in a fair and responsible way, taking this argument a step further by predicting that market forces will eventually harm those who do not implement fair and reasonable DRM. The DMP's specs, especially once they are linked with TRU definitions, could be an excellent tool for such organizations to use in evaluating actual DRM-based content services.

The DMP pays considerable attention to the rights of independent content creators to distribute their content under a more expansive set of “governed” conditions, a more detailed version, in a way, of what the Creative Commons licensing scheme supports. But there is also no explanation of how this spec helps support consumers’ rights to content any more than some existing technologies can, as opposed to how they are actually used in content services. Intense competition, both among copyright-respecting content services and between them and free file-sharing networks, is sometimes resulting in more rights for consumers, not just emulations of pre-digital rights (or what DMP calls TRUs) but also innovative ones.

Finally, as we've said before, the DMP represents a technological view of digital content and DRM, in that it calls for a comprehensive technology framework to govern content creation, distribution, and usage with managed rights. Although the DMP understands the market forces correctly from the consumer's perspective, its ideas are not evident of how the economics behind all that technology should play out. In other words: who is going to pay for all that technology? Certainly not the leading consumer electronics vendors, which have emerged as the true enemies of interoperability. And not content owners, who are underrepresented in the DMP's membership, and notwithstanding their growing support of controlled interoperability.

9.3 CORAL

Coral Consortium (http://www.coral-interop.org/) is a cross-industry group aiming to promote interoperability between digital rights management (DRM) technologies used in the consumer media market. The Consortium's goal is to create a common technology framework for content, device, and service providers, regardless of the DRM technologies they use. This open technology framework will enable a simple and consistent digital entertainment experience for consumers.

On October 4, 2004, in Sunnyvale, California, seven major media and technology companies have joined together to form the Coral Consortium: HP, Intertrust Technologies Corporation (owned by Sony and Philips), Koninklijke Philips Electronics N.V., Panasonic (Matsushita Electric Industrial), Samsung Electronics, Sony Corporation and Twentieth Century Fox Film Corp. Note that HP is Philips's partner in the digital home entertainment.

The Coral Consortium seeks to ensure interoperability so that today's digital music and video can be easily accessed and enjoyed, regardless of the service provider or the device. While recent innovations in digital media distribution provide consumers with new channels to acquire music and video, proprietary differences still exist in underlying DRM or content protection technology. At times, these technologies conflict and prevent consumers from playing content packaged and distributed using one DRM technology on a device that supports a different DRM technology. Coral's focus is a new technology layer that will allow existing DRM solutions to co-exist, thereby promoting content and devices that play well together.

Coral's answer is to separate content interoperability from choice of DRM technology by developing and standardizing a set of specifications focused on interoperability between different DRM technologies rather than specifying DRM technologies. The resulting interoperability layer supports the coexistence of multiple different DRM technologies and permits devices to find appropriately formatted content in the time it takes to press the play button, without consumer awareness of any disparity in format or DRM technology. Coral will provide interoperability for secure content distribution over web and home network-based devices and services.

Coral Consortium brings together key players from all ends of the content distribution value chain, including content owners, content delivery service and technology providers, DRM developers, and device manufacturers to work on an open, lightweight, and easy-to-license "interoperability layer" framework with short, medium, and long-term deliverables. In order to provide the desired interoperability, the Coral Consortium specifications must:

Ensure that participating DRM solutions enforce content providers' rights securely through certain minimum requirements appropriate to the nature of the content. For example, for a film in current release, the Coral Consortium specifications must require a high threshold level of security across all compliant systems (i.e., the lowest common denominator must be set high) and any participating DRM must be renewable and resilient in the face of malicious attacks.

- Be agnostic to any particular DRM implementation. They must offer packaging, service provisioning, and device interfaces that can be used to achieve interoperability on any compliant system.

- Provide device makers with the ability to maximize control over their components. Device makers must be able to provide a clean user experience, while minimizing device complexity.

The Coral Consortium specifications will be as functionally rich as the technologies they interconnect, but no more complex than they absolutely need to be. These specifications will leverage commonly deployed security standards, and build on developments in networking standards and device-to-device communication. Specifically, in order to achieve these goals, Coral Consortium will need to address four key areas:

- Infrastructure Interoperability: As a primary activity, Coral Consortium will develop rigorous specifications for network interoperability between DRM systems. This will allow device-to-network and device-to-device interoperability in a DRM-agnostic fashion.
- Usage Rules and Business Models: Coral Consortium will serve as a forum to discuss prevalent business models and usage rules for content distribution, with the goal of influencing requirements for interoperability and DRM systems and driving towards a common understanding of typical usage rules and distribution models.
- Client Requirements: Coral Consortium will also derive a set of common requirements for DRM client systems in order to develop parameters on how client-side DRM connects to the infrastructure interoperability environment mentioned under 1 above.
- Compliance: Coral Consortium will develop strict notions of compliance with its interoperability specifications, as well as requirements for renewable security and other ways to ensure that the Coral Consortium environment is robust and secure.

The ultimate product of this effort is a set of specifications that permit secure interoperability at all levels, whether between devices in a home network or between diverse content distribution services and devices from different vertical markets. Under these specifications, content owners and content service providers will be able to use common rights expression mechanisms to set policies in a way that can be interpreted as content travels through its lifecycle. Ultimately, these specifications should support a competitive, cost-effective ecosystem of content, services, and devices that leverage appropriate proprietary and open DRM technologies in a manner that is most effective for a given application, while providing the consumer with “universal” play functionality.

The Coral Consortium v1.0 specifications were approved on 1 March 2005.

Coral Consortium builds on InterTrust’s work in DRM interoperability. They have built a testbed system called NEMO (Networked Environment for Media Orchestration) that achieves interoperability among a wide range of devices, formats, networks, and types of services. NEMO is the first substantive public development to come out of InterTrust since Sony and Philips bought it in 2002. The company published a couple of papers on it in January of this year, including one called "The Long March to Interoperable Digital Rights Management," a thoughtful paper on the general theme of DRM interoperability as well as on NEMO as a set of choices about how to solve interoperability problems.

The basic assumption behind NEMO is that people should be able to use content on whatever devices they own, as long as it's possible to legitimately obtain the rights to it; protocols, formats, and services should not stand in the way. The NEMO technology includes what amount to wrappers around existing (or future) DRM technologies that communicate with each other, in the manner of IIOP/CORBA object request brokers, or, in the case of devices that are too simple to do it themselves, with gateways that translate such things as rights specifications, license terms, identities, and trust parameters among devices and services. The idea of NEMO is to provide DRM interoperability through services.

Coral's stated intent is to bring about technology that can work with existing or future DRM systems, with little or no modification. This means that the resulting technology should play even with those vendors who don't want to participate. The standards are apparently meant to foster development of interoperability services for consumers. In addition to the technical hurdles, there are companies that have disincentives to participate in Coral: the device and DRM technology makers behind the currently leading content services -- namely Apple, Microsoft, and Nokia (the latter being the leading force behind the OMA standards taking off in Europe). These companies want to contain users in the worlds surrounding their devices: PCs and Windows Media-compliant portable devices (Microsoft's recent effort to open its Windows Media APIs to non-Windows devices notwithstanding), iPods, and OMA-compliant mobile phones.

Coral Consortium's approach to DRM interoperability is based on the principle that interoperability is best viewed as a service with specific value to the consumer rather than as an ideal. Coral's objectives are designed so that its success does not depend on those companies taking part, though at the same time, as InterTrust says in its paper, "A DRM system will not interoperate if it does not want to."

Lots of other interoperability problems are sure to result from the coming explosions of devices and services in the mobile and home-network spaces, however history teaches us that market forces will lead to only a handful of different and incompatible systems for any given type of content, 3 or 4 at most. When that happens, it should be possible for those same market forces to produce ad-hoc interoperability solutions that work well enough, as RealNetworks proved recently with its **Harmony** technology. Apple's hostile stance toward Harmony is evidence enough that any technology that Coral produces will have to work with Apple products, at best without Apple's blessing.

9.4 ODRL

The **Open Digital Rights Language (ODRL) Initiative** is an international effort aimed at developing and promoting an open standard for the Digital Rights Management expression language.

The ODRL Initiative is focused on fostering and supporting open and free standards for the specification of media commerce rights languages. The ODRL Initiative is a forum used to propose, discuss, and gather consensus for a language that it will subsequently nurture via formal standards bodies. The ODRL Initiative will strive to openly participate in standards groups that allow for the adoption of royalty-free specifications. The ODRL Initiative is committed to supporting MPEG-21 and is a compatible Rights Language that will support open and free interoperability within and across the MPEG-21 Multimedia Framework. ODRL has been submitted to formal Standards Groups.

The Open Digital Rights Language (ODRL) is a proposed language for the Digital Rights Management (DRM) community for the standardisation of expressing rights information over content. The ODRL is intended to provide flexible and interoperable mechanisms to support transparent and innovative use of digital resources in publishing, distributing and consuming of electronic publications, digital images, audio and movies, learning objects, computer software and other creations in digital form. The ODRL has no license requirements and is available in the spirit of "open source" software.

10 Major problems and requirements

The market of music and multimedia content distribution over the Internet currently presents different problems, related to the different market actors and sectors. Up to now, problems the major problems have been identified in the market structure, basically caused by the evolving technologies and digitization of contents. Other issues are related to systems, solutions and technologies currently available on the ICT market for securely distributing multimedia content technology providers need to guarantee the music content protection to copyrights owners, together with acceptable performances in content retrieval and delivery.. Moreover, end users must consider these new distribution systems convenient compared to the traditional ones.

10.1 Technical problems

The digital revolution has facilitated:

- Copy from disk to disk (carrier to carrier)
- Music can be recorded digitally.
- Distribution can be made on the internet or by massive copying of disks .
- Music can be digitally produced or adapted (usually, a creative task?)

Anyone can now become publisher, distributor and music store (of other people’s music) as well as reducing the cost of being a producer, adapter and author of one’s (or partially) own music. The separation of the content from the carrier has severely complicated the business model and the control of IPR implications to the extent that legal music sales have actually fallen, reversing a long growth trail

From a technological and infrastructure point of view, the major problems are identified in:

- Need for efficient, secure, non-intrusive content protection mechanisms,
- Lack for interoperability and compatibility among the different solutions and systems for multimedia content distribution, needs for standards.
- Infrastructure aspects like insufficient availability and limited geographic distribution of broadband connections, network of trusted content (re)distributors,
- Protection and security issues related to the extension of on-line distribution to mobile technology (UMTS, WiFi)
- Limited availability of secure micro-payments systems needed to enable mass purchasing of inexpensive items (e.g. like single music pieces, single “hits”, special offer album)

From a technical point of view, a fundamental feature of a system for the distribution of coded music according to the rights of the owners of the musical contents is the **security**, that is the capability to protect and avoid unauthorised uses of these contents. To accomplish it, this system should fulfil at least the following guidelines:

- avoid intrusions into the server system through bugs and exploits of the server software
- avoid intrusions into the server system through bugs and exploits of the Operating System and the Web Server
- avoid intrusions into the network where the server system is located;
- provide a secure and protected way to perform transactions via the Internet;
- avoid illegal copies of the digital content;
- allow only authorized/selected operations on the music/multimedia object;
- keep control of the operations performed on the various objects downloaded.

The security matter must be faced even from the point of view of the hardware and software used to set-up the music distribution systems: in fact, it is useless to set up a secure music delivering system in a non-secure machine or environment. It could be worthwhile to define guidelines to establish when computer can be considered secure at a good level, specifying:

- which hardware components are suitable to work with music delivering applications;
- how to patch the operating systems (if there are known bugs which can threaten the security of the system) hosting the music delivering applications;
- how to patch the services (such as the web server) with known bugs which can threaten the security of the system.

Another important aspect to be considered when providing a suitable environment for hosting music delivering applications and multimedia content servers is related to the **performance** of the whole system.
The cost in terms of performance of each step and operation involved in the content distribution, from the digitalisation to uploading in the server to downloading to remote clients should be investigated.
Documents and data sheets containing information about performances should be extremely useful to help content providers, publishers and content distributors to choose the proper system according to their needs and expectations. This should avoid problems arising from the installation of a good tool in unfitting computers. In fact, in many cases, organisations willing to adopt a music distribution system may have not skilled people available to properly configure and dimension an installation, or even to properly carry on the decision process.

10.2 Market issues

The major problems affecting the structure and efficiency of the market can be summarized in:

- Lag in e-publishing at European Level, with respect to US market,

- Lack of efficient Business Models, which are and satisfactory for all the stakeholders,
- Uncertainty due to new untested business models,
- The Complexity of business models often generates confusion in customers,
- Lack of confidence in content providers and distributors, due to
- Reduced barriers to entry (it's also an opportunity, indeed), piracy threats, fears of adopting of the "wrong" technology.
- Lack of content offer, in general, due to publishers' lack of confidence into protection of IPR. Lack of content specifically in high specialized niche markets, posing the need for valorization of cultural heritages (traditional music and representations, ancient music).
- Also the high cost and resources required to digitize existing content and prepare the multimedia objects with the proper quality level, is preventing the content offer to spread and grow.
- Political aspects, such as the high competition in the market, the presence of contradictions at any level of the digital value chain, the major changes to come in the traditional structure and the shifting in the role of traditional content distributors/retailers,
- Social aspects: the needs to provide wider accessibility for everyone to digital resources,
- Excess of investments in the past without support of sound business plan (euphoric financial markets of late 90),

10.3 General requirements

Concerning music authors, one of the most important requirements is to improve their control on the music distribution chain and payments of right management as they are now usually represented at national and international level by a few, very large institutions for the collection of property rights. At the same time, artists are interested in increasing the knowledge and distribution of their works to end users, so to raise their profits.

Content providers and distributor, such as major labels or companies providing only distribution systems are mainly focused on the security aspects and on protection of copyrights in particular. The main issue here is to enhance their confidence and thrust in the new technology for on-line content distribution.

Protection of copyrights should preferably cover the spell of content providers' ownership of these rights. On the other hand, the cost of applying this protection must be acceptable, in terms of needed resources. In general, the application of protection systems to coded music is a time-consuming and space-consuming process. The more robust the protection algorithm is, the more time and space it requires to be applied.

Another important aspect in the distribution of coded music via Internet is related to the time needed to send the purchased ware to end users. This problem is related mainly to the size of the files to be delivered and to the type of connection purchasers are using. In turn, the size of the digitalized music depends on its quality. Usually the distribution system creates compressed files so to make the delivering of music files via Internet as a matter of minutes. But the algorithms which perform this compression cause a loss of quality, which can be more or less patent. In general, a compression algorithm can reduce this loss so to let it be detectable only to a professional musician. The cost is, a part an increasing of the time to create the compressed file, the growing of the size of these files.

From the point of view of end users, besides quality of downloaded files and time needed for the downloading process, there is a great interest in the functionality provided by the system and especially in the tools for downloading and using the multimedia content. Additionally, they want simple systems, user friendly and easy to customize for their own needs. The main issue related to end users is to give the most possible visibility to music distribution systems.

Another important aspect is the restrictions in the use of downloaded files. In fact, in the traditional music market, a purchased item, such as a CD, is regarded by the vendee as something that can be used without limitations. In the online music market, content owners want to keep control of the delivered files, even if they have been legally bought, by applying restrictions in the use of these files.

These restrictions could keep away users from joining the online music market, all the more so as many people has been accustomed to free downloading and usage of music files, because of the success of peer-to-peer distribution systems without control of copyrights, such as Napster, KaZaA and WinMX. On the other hand, avoiding of illegal use of coded music appears to be a feature not to be set aside from the point of view of the content owners. Consequently, whatever online distribution system aims at conquering the major discography labels confidence, has to cope with the preventing of illegal use of downloaded files. Since it is

accomplished by applying restrictions to the use of the downloaded files, it is important not to over restrict this use, not to run the risk of having a secure but boycotted system.

10.4 Political problems: the SDMI case and the P2P case

On 15 December 1998, leaders of the recording industry announced the SDMI. SDMI published its first specification on 13 July 1999. It shall ensure that there is an interoperable standard for downloading and that copyright is protected. Manufacturers should use this standard to develop new portable devices expected for the end of 1999 - this activity failed the commercialisation. This had the intention of preventing consumers to play illegal content including existing CDs or MP3 files when phase II technology will filter out pirated copies of music. Moving to Phase II will require consumers with existing phase I devices to voluntarily upgrade their systems. SDMI has decided that watermarking will be the screening technology. SDMI executive director is Leonardo Chiariglione, leading figure of the MPEG standard. This initiative requires collaboration by all parties and set an example of music and IT industries working together, involving 130 representatives of the music (including collecting societies), consumer electronics and IT industries (www.sdmi.org). On 9 august 1999, SDMI announced that it had selected an audio watermarking technology to indicate consumers that they can upgrade their portable devices so as to only record lawful copies.
In parallel to the SDMI initiative software firms are working on coming up with a definitive format that will rival MP3 and offer both copyright protection and a way of charging fees. IBM and Real Networks have paired to develop a secure delivery system. Universal joined AT&T, Matsushita and BMG to develop a secure technology to digitally deliver music. In relation to DVD Audio and Super CD launch, hardware manufacturers have already announced the development of watermarking and encryption technologies to provide some copy protection for music made available on the new formats. In short, it provides consumers with the ability to make one digital copy, per recorder of the original - for personal use - at a sound quality equal to CD-Audio or less. More copying might be possible if authorised by the content owner. Technical solutions will also have to be implemented by digital broadcasters, web-casters and Internet radio if rights are to be enforced for all form of commercial exploitation. Failure to carry the technical mechanism or identifier along the audio signal will mean the inability to control copying or collect royalties.
In effect SDMI failed with its initial intention and time schedule. SDMI is capable to cope with a limited protection and Digital Right Management (DRM) Model. This is probably the limitation that has partially stopped its evolution. SDMI has been mainly produced for Audio content while today several other types of content are distributed on the network and via traditional supports.

Peer-to-peer applications (P2P) such as Napster, Gnutella, Morpheus, KaZaA, AudioGalaxy, iMesh, LimeWire, etc., are the perfect examples of optimal distribution system. Their cost is practically null for the publishers; they are capable to reach a very huge number of consumers destroying barriers of nations with a very efficient distribution in terms of delivered number of copies. The “only” problem is that the lack of control about the distribution of copyright protected content without authorisation or recognition of the fees due to the copyright owner.

10.5 Legal problems

The Internet offers several new opportunities to the music distribution market. But every new business model has to cope with the pre-Internet laws about music trade, such as copyright. In fact, many of these laws apply in cyberspace. Moreover, several new measures were enacted in the last few years to address issues that could not previously have been identified.
From the point of view of music contents owners, such as the **Recording Industry Association of America (RIAA)**, the central issue is copyright, that can be defined as the “protection of the original expression of an idea, whatever form is used to express it”. It is considered a sort of “financial incentive for individuals to share ideas and inventions by granting that everyone is able to protect his or her artistic work”. Hence, copyright owners believe that downloading music online do not breach copyright laws.
Current laws protect content owners by granting their right to control the reproduction, distribution and adaptation of their work, including public performance and display of it. There is not an international copyright law, but many treaties establishing mutual respect for countries’ copyright laws have been signed. The basic reference for these treaties is the **Berne Convention for the Protection of Literary and Artistic Works**, administered by the **World Intellectual Property Organization (WIPO)**.
Moreover, specific legislation has been passed to best cope with digital matters. For example, the **No Electronic Theft (NET) Act** “criminalizes sound recording copyright infringements occurring on the Internet regardless of whether there is financial gain from such infringements”. To infringe copyright, it is

sufficient making a music piece available to the public without authorization from the copyright owner, by whatever mechanism (uploading it to an Internet site to be downloaded by other people, sending it via e-mail or chat service…).
Copyright is breached with or without money exchange for the music (civil cases), and whenever there is a possibility of financial loss to the copyright owner or financial gain to the infringer (criminal cases). "The NET Act defines "financial gain" as the receipt or expectation of receipt of anything of value, including receipt of other copyrighted works (as in MP3 trading)"[10].

On the other side, the **Electronic Frontier Foundation (EFF)** promote "rights to think, speak, and share ideas, thoughts, and needs using new technologies, such as the Internet and the World Wide Web".
In EFF opinion about copyright law, "the movie and recording studios are trying to dumb down technology to serve their "bottom lines" and manipulate copyright laws to tip the delicate balance toward intellectual property ownership and away from the right to think and speak freely"[11].

Concluding, the legal framework is basically out-of-date, applicable only at national level and not world-wide, not considering the new needs of end-users/customers and those of content providers/distributors.

11 Solutions

Innovation at level of multimedia and music content management and online distribution can be introduced both at levels of technologies and at level of market structure and business models. From the technological side different solutions and system exist, still with some significant drawbacks, to partially solve some of the problems, and more attention is needed towards standardization of protocols, procedures, mechanisms as well as on interoperability and compatibility of systems. In such direction, the emerging of Web Services and the work on MPEG standardization is surely promising. In particular, the activities performed under the **MPEG21** and **MPEG7** frameworks are relevant to content protection and classification issues respectively.
From the marketing side, new and efficient business models and licensing scheme still need to emerge to cope with the new, different nature of the multimedia products and the new needs and demands from customers.
To have a better idea of the structure and the complexity of the music distribution market, it can be convenient to consider the different categories of actors involved, as described in chapter 4.1 (Main actors in the market).
Each one of these categories has different objectives, interests, points of view, competencies, organizations and size, bringing into the "distribution". From a strictly technical point of view, the several different aspects involved in multimedia content management and on-line distribution are mainly related to Intellectual Property Rights (IPR) clearing, content protection and Digital Right Management (DRM) systems, and can be summarized as:

- encryption of data
- managing of on-line transactions
- compression and storing of digital content files
- managing of delivering of digital content files
- prevention of illegal use of digital content

But as mentioned before, the large gap to cover is on the market side, where new business models and licensing scheme are most than needed, and where political aspects and competition are major the driving forces.

11.1 An innovative approach

11.1.1 A new strategic vision

More and more authors, copyright collecting societies and independent labels are embracing the conviction that economic and business models generated or based on peer-to-peer communication schemas are totally positive in terms of distribution, selling and knowledge of music.

[10] Quoted sentences from RIAA web site (www.riaa.org).
[11] Quoted sentences from EFF web site (www.eff.org).

Moreover, such models are considered as the basis to recover from the decreasing sells of CDs, a model which is outdated for certain specific targets. Some of the authors and their representatives, in some countries (e.g. ADAMI in France) are inviting the major labels to stop a war sometimes directed against their direct customers and against their own revenue streams and to start instead a new innovative and creative approach, involving also the Internet Service Providers in the process and allowing the user, paying a fee, to access music and possibly re-distribute rights via the peer-to-peer and a new licensing scheme.
The approach aims to remunerate rights holder without limiting too much the freedom of end users, providing value to all the players in the content value chain.

11.1.2 Balancing author's rights and user rights

Copyright can represent the tool to get a trade-off between the sometimes conflicting interests of users and publishers-majors-authors. Copyright should be based on a **balancing principle**: the needs of the rights holder should be balanced against those of society, users and consumers. Such balancing principle behind copyright should be translated in terms of the new technologies and the digital scenario to ensure that users have sufficient and easy access to music, while still protecting the interests of rights holders.

As an example iTunes, provide users with the possibility to burn CDs in unprotected formats. Even id this can appear as a gaping security hole, having to buy blank CDs and spend the time burning them is a serious deterrent to large-scale piracy. Being able to burn CDs is a convenient feature that helps meet reasonable usage expectations; Apple, and the record companies who have licensed their material to iTunes, are betting that the value of that convenience is larger than the size of the piracy loophole.

11.2 Business models

11.2.1 The importance of business models

Transaction and business models are really at the heart of the problem. An industry that had very clear business models is finding that all previous assumption on conducting its normal line of business are gradually becoming extinct, whilst, at the same time, many new opportunities are developing. However, many of the players in the industry are purely creative, lacking in many of the basic marketing, administrative or even technical skills required to take advantage of the new opportunities offered and, at the same time, unable to defend themselves from the challenges of a shrinking market in other segments.

New technologies are opening up new market opportunities for the music business, as the digital world is converting the mass market into a mass of niche markets. Also, opportunities for content from economically marginal groups or regions could be promoted.

The large variety of software and hardware devices, players, DRM systems and other software involved in the whole music content chain, particularly in the end-user side, makes it very difficult to find a business model that will satisfy the needs of consumers, authors, publishers and soft or hardware device manufacturers. The market scarce responsiveness to technological advancement and changes in the way end-users consume music, has kept traditional business model in place, without giving birth to an accepted alternative, further complicated by the traditionally slow legal response of the lawmakers.
A further issue is the difference between Anglo-Saxon and other European legal systems and tax laws. All these conflicting interests make it difficult for a new model to emerge.

11.2.2 Different models

Different business models exist for the on-line music distributions service:

Business to Business (B2B)
Business to Business is the most important part of the total electronic commerce (70-80% of the total). Despite to the different trends that are present in different countries, the total trend foreseen for Europe is similar to that of US.
B2B e-commerce provide benefits for managing inventory more efficiently, adjusting more quickly to customer demand, getting products to market faster, cutting the cost of paperwork, reigning in rogue purchases, obtaining lower prices on some supplies.

Potential applications of B2B approach to the on-line music distribution are:

- On-line licensing of music for "traditional" multimedia content productions like advertisement, movies, cover songs, derivative works,
- On-line licensing of music and multimedia for new rich media content productions like flash and web productions, entertainment and infotainment, especially directed to SMEs,
- On-line licensing of music and multimedia content for education and e-learning services,
- On-line licensing of music for developers and publishers of interactive entertainment software for personal computers and advanced entertainment systems such as the PlayStation®2 Computer Entertainment System, the PlayStation®, Xbox™ video game console from Microsoft, the Nintendo GameCube™ and the Game Boy® Advance,
- Value added services such on-line music collaborations and services for DJs,
- Artist management and relationships services.

Business to Consumer (B2C)
B2C applies to any business or organization that sells its products or services to consumers over the Internet for their own use like, for example, Apple iTunes or Amazon.
Examples of innovative models of on-line music distribution services based on the B2C approach are:

- Webcasting,
- Niche-market subscription services,
- Subscription services for mobile content and wireless devices,
- "Direct from the artist" services.

Peer to Peer (P2P)
A P2P business model is a business model which leverages the P2P communication approach to build a business case and provide revenue from the distribution of content according to a file-sharing schema.
P2P communication (also called peer to peer and file sharing) is the hottest and fastest growing media breakthrough in the world. The "Napster phenomenon", which was responsible for single-handily developing the unique and simple idea of P2P File Sharing, allowed users to keep files on their computer, add a naming scheme, and create and use different identities regardless of their IP number. Peer-to-peer networks are generally simpler and less expensive, but they usually do not offer the same performance under heavy loads.
But, now with legal issues and lawsuit risks surrounding the use of a P2P file sharing program, many people are turning to "legitimately licensed" music download websites instead of the controversial "Napster alternative" file sharing sites that are popping up all over the web. However, there are legal ways to implement a P2P music distribution system, even if at the cost of minor restrictions to the operations users can perform on their digital music.
Fraunhofer IDMT's Potato System, as an example, comes up with an innovative solution to this problem, particularly developed for unknown authors and independent music labels and operators of music download portals. It is based on a commission model: the consumer receives a commission for redistributing a music file. That means, within the Potato System, the user does not just pay for the right to hold a music file but also for the right of redistribution.
An even more significant argument in favour of P2P business models is the recent presentation (17th June 2004, Maison de la Mutualité, Paris, France) of a study titled "Peer-to-Peer: un autre modèle économique" (P2P: another business model), by French collecting society ADAMI.
The study, developed by a pool of experts coordinated by P2P-supporter Tariq Krim, presents the different possible P2P business models, their advantages and disadvantages, and proposes P2P-based solutions preserving authors- and rights owners' interests, but also of the interests of users and consumers.

11.2.3 New business models from emerging on-line music services

The business model for **iTunes** is really something of a throwback compared to other online media models. It is not much more than a purely digital version of a traditional record store; the only real difference is that users can buy their choice of individual tracks instead of having to buy either an entire album or those tracks the record company selects as singles. **Rhapsody**, as well as others, like **MusicMatch** and **MusicNow**, charges a monthly subscription fee. While that arrangement may not be appropriate for everyone, it does offer **value** in the form of **unlimited streaming**, **artist information**, **recommendations**, **radio-like listening experiences**, and so on.

The advantage of "owning" vs. "renting" music, provided by on-line stores like iTunes over others like Rhapsody, is quite limited in benefits for “advanced” users: ownership of music in performance form is a concept of convenience that did not exist a century ago, and it need not exist in the not-so-distant future when most music will be **ubiquitously available on demand**, in one form or another.
The real problem is that Rhapsody and other services - to say nothing of record companies - have done a terrible job of educating the public on music-listening modes other than purchasing individual items of music; the only modes that people understand are record stores and radio stations (and, at a stretch, jukeboxes and libraries). The new technologies and the Internet enable many interesting new business models, but some serious marketing is mandatory to gain confidence from end users.

11.2.4 Common aspects of enhanced business models

Whatever approach is selected, more efficient and satisfactory business models need at least to have the following features:

- They address new ways of delivering and consuming music (digital revolution)
- They address the diversity of targeted market sectors and final customers,
- There are efficient, safe, performing and possibly standard protection mechanisms, enabling the operation of the business models,
- They are Flexible, and their flexibility is supported by the underlying technologies
- They re developed and diffused by more dynamic and flexible companies with respect to the existing, often static, giants,
- They leverage the interactive and multimedia aspects of the digital content and music in particular,
- The revenue streams are mainly from added value services and features, focusing on what the customers really want and need,
- They leverage the reduction in distribution costs to make niche markets (vanity publishing, national and regional markets, cultural heritages) as new revenue streams,
- They are based on multiple revenue streams and on reuse of content for different markets and markets sectors (entertainment, advertising, multimedia content production, infotainment, education),

Solving the above addressed issues, or at least finding a path to improve the situation, would bring the on-line digital music market into a new era of expansion and development. In fact, an widely trusted environment, from the point of view of protection and security, would increase supply and demand of digital music via the Internet. Consequently, more people would be stimulated to provide themselves with high-speed Internet connections. This would increase the average availability of bandwidth, inducing other markets (such as movies or software ones) to increase investments on on-line market.

In particular, a list of possible benefits can be summarized in the following points:

- Reduction in distribution costs,
- Chances to reach a wider audience,
- Higher flexibility in the offer,
- Access to “niche” markets previously not economical to enter,
- Exploitation of new services (infotainment, edutainment, e-learning, …) and new media (3G mobile, Wi-fi, broadband internet),
- Valorisation of existing archives, valorisation of cultural heritage
- Creation of a standard in content protection: new distribution systems could refer to a proved and trusted way of protecting digital content. This could be the starting point to develop new on-line markets which distribute other kind of content, such as e-books, digital movies or software.
- Improvement in quality of digitalized content: the digitalized content quality could almost match the quality of the non-digitalized one. Customers could find more and more convenient buying digital content.

- Increasing in quantity of on-line distributed content: this could reduce the prices of digital content. Moreover, the traditional distribution system (shops) should improve their supply to try to regain positions in the market.
- Increasing of average availability of bandwidth: if Internet users had a better quality Internet connection, digital markets would increase the amount of sold digital content.
- Impulse in developing of on-line distribution to mobile technology (UMTS, Wi-fi): a robust on-line distribution market would naturally expand to alternative way of selling digital content.
- Creation of a standard in distribution systems: it would be easier to develop new distribution systems.
- Creation of a standard in exchange formats: the distribution systems could refer to a unique way of exchanging format, so to improve the interoperability among them.

11.3 MPEG-21

11.3.1 Aims and basic concepts

MPEG-21 aims at defining a normative open framework for multimedia delivery and consumption for use by all the players in the delivery and consumption chain. This open framework will provide content creators, producers, distributors and service providers with equal opportunities in the MPEG-21 enabled open market. This will also be to the benefit of the content consumer providing them access to a large variety of content in an interoperable manner

MPEG-21 is based on two essential concepts: the definition of a fundamental unit of distribution and transaction (the Digital Item) and the concept of Users interacting with Digital Items. The Digital Items can be considered the “what” of the Multimedia Framework (e.g., a video collection, a music album) and the Users can be considered the “who” of the Multimedia Framework.

The goal of MPEG-21 can thus be rephrased to: defining the technology needed to support Users to exchange, access, consume, trade and otherwise manipulate Digital Items in an efficient, transparent and interoperable way.

During the MPEG-21 standardisation process, Calls for Proposals based upon requirements have been and continue to be issued by MPEG. Eventually the responses to the calls result in different parts of the MPEG-21 standard (i.e. ISO/IEC 21000-N) after intensive discussion, consultation and harmonisation efforts between MPEG experts, representatives of industry and other standardisation bodies.

MPEG-21 identifies and defines the mechanisms and elements needed to support the multimedia delivery chain as described above as well as the relationships between and the operations supported by them. Within the parts of MPEG-21, these elements are elaborated by defining the syntax and semantics of their characteristics, such as interfaces to the elements.

MPEG-21 will create an open framework for multimedia delivery and consumption, with both the content creator and content consumer as focal points. It will define a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices used by different communities (called simply “*Users*”).

MPEG21 aims to enable electronic creation, delivery, trade of digital multimedia content, to provide access to information and services from almost anywhere at anytime with ubiquitous terminals and networks and to identify, describe, manage and protect the content in order to the **entire multimedia content delivery chain** encompassing content creation, production, delivery and consumption. Many standards exist for delivery and consumption of multimedia contents, but there is no 'big picture” to describe how these elements relate to each other.

The following table shows as MPEG21 relates to other MPEG standards that cover different areas:

MPEG Standard	Targeted Usage

MPEG-1 MPEG-2 MPEG-4	Coding of audio/visual content
MPEG-7	Providing metadata that describes multimedia content
MPEG-21	Providing a framework for the all-electronic creation, production, delivery and trade of content. Within the framework we can use the other MPEG standards where appropriate.

11.3.2 Digital Item and Standard Elements in the framework

The digital item is the fundamental unit of transaction in the MPEG-21 multimedia framework.
It is composed of:

- Essence (i.e., media resources);
- Metadata;
- Rights expressions;
- Identifiers.

Examples of Digital Items are**:**

- A simple "web page" can be considered as a Digital Item;
- A CD package with music + video + graphics;
- A photo album.

The following picture (like all the following pictures in this section, from S. Fontanelli, "MPEG21 easy. A tutorial on MPEG21 framework activities", references in bibliography) shows the structure of the MPEG21 framework and the composing element, at a high level.

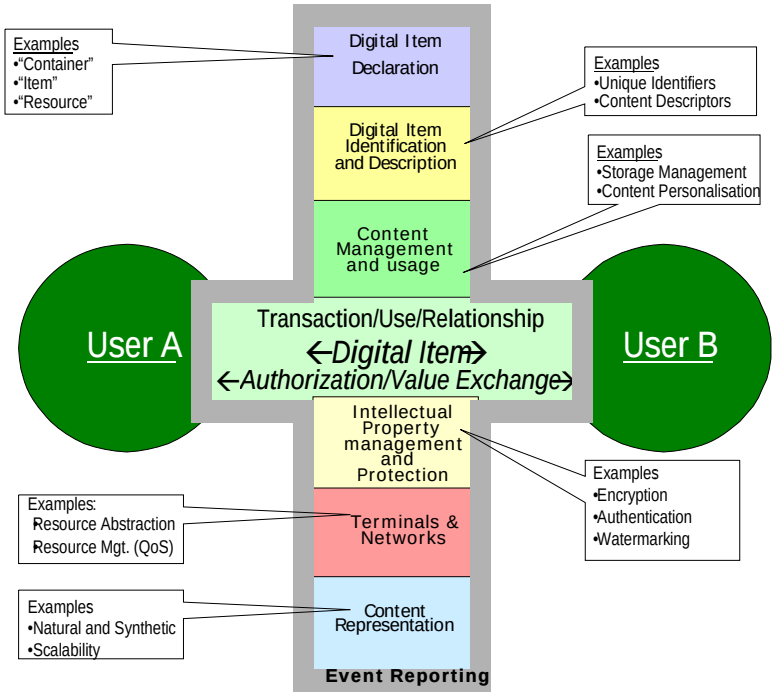


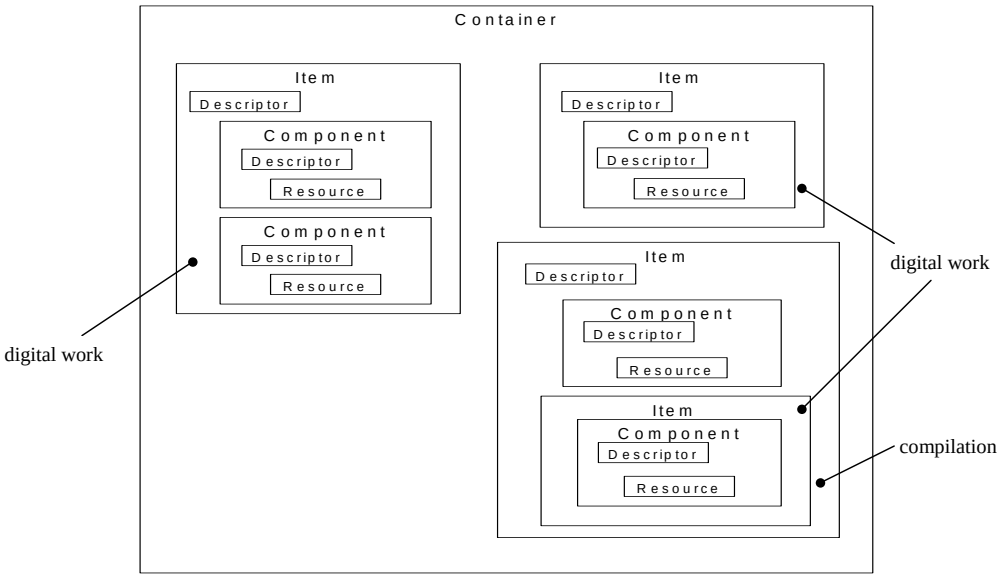
Figure 1 : High-level representation of MPEG-21 framework

11.3.3 Digital Item Declaration

Specifies an *XML Schema-based language* for declaring Digital Items, which are packages of media resources and metadata.

The important concepts of Digital Item Declaration are as follows:

- **Container** – groups *items* and/or *containers* to form logical packages for transaction or distribution;
- **Item** – corresponds to a group or choice of sub-items or components that forms a logically indivisible work (item contains sub-items) or compilation (item that does contain sub-items);
- **Descriptor** – associates metadata, i.e., MPEG-7, or descriptions with elements within the digital item, such as items, components, and so forth;
- **Resource** – corresponds to an identifiable media resource i.e., image, video, audio, or other media asset;



11.3.4 Digital Item Identification

Specifies an identifier naming and resolution system that allows digital items and their parts to be uniquely identified.
The identifications can be embedded within a digital item declaration and associated with the item, a component or sub-item in order to uniquely identify the item, its resource, or description schemes.
Identifiers covered by this specification can be associated with Digital Items by including them in a specific place in the Digital Item Declaration. This place is the **STATEMENT** element. Examples of likely STATEMENTs include descriptive, control, revision tracking and/or identifying information.
MPEG-21 does not specify new identification systems for the content elements for which identification and description schemes already exist and are in use (e.g. ISO/IEC 21000-3 does not attempt to replace the ISRC (as defined in ISO 3901) for sound recordings but allows ISRCs to be used within MPEG-21).

Examples of identification systems that may be used include: cIDF, DOI, EAN/UCC, ISAN, ISBN, ISSN, etc.

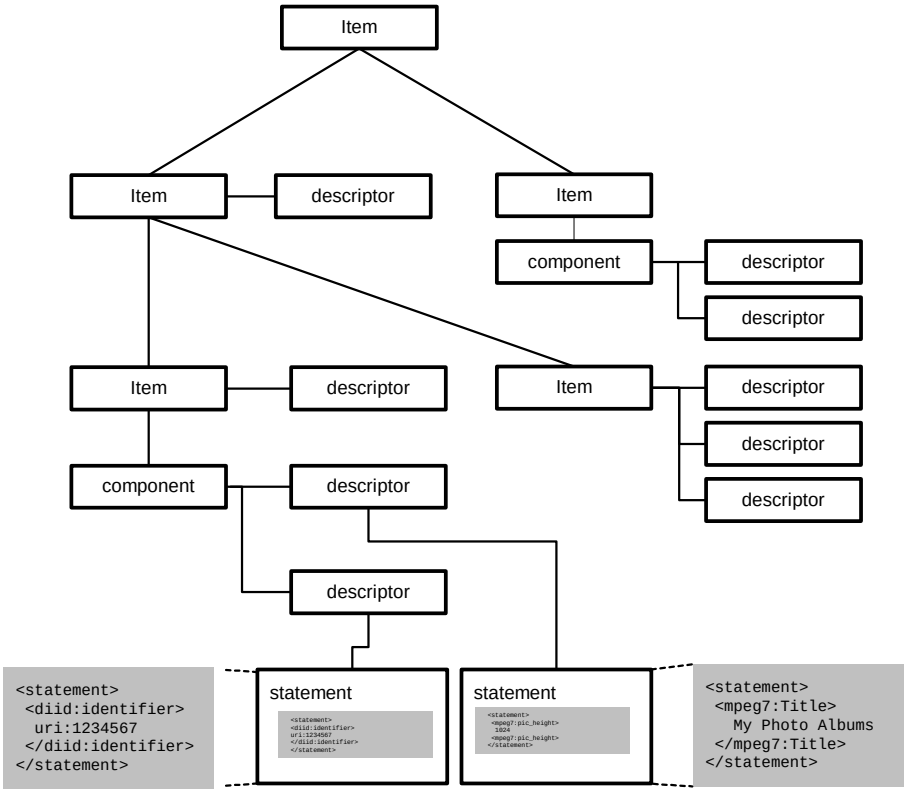


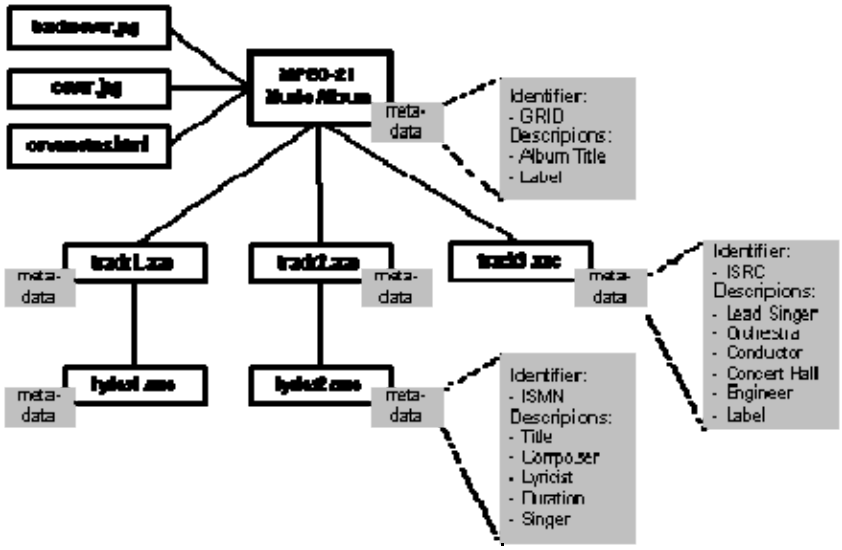
Figura 1 : DID and DII

The shaded boxes are subject of the DII specification while the bold boxes are defined in the DID specification.

Digital Items and their parts within the MPEG-21 Framework are identified by encapsulating **Uniform Resource Identifiers** into the Identification Description Schemes. A Uniform Resource Identifier (**URI**) is a compact string of characters for identifying an abstract or physical resource, where a resource is defined as "anything that has identity".

Identifying Digital Items:

ISO/IEC-21000-3 allows any identifier in the form of a URI to be used as identifiers for Digital Items (and parts thereof). The specification also provides the ability the register identification systems through the process of a Registration Authority.



Example: Metadata and Identifiers within an MPEG-21 Music Album

Where:

- ISRC = International Standard Recording Code
- ISMN = Internationa Standard Music Number

11.3.5 Intellectual Property Management & Protection

- Standardized ways of retrieving IPMP tools from remote locations, exchanging messages between IPMP tools and between these tools and the terminal.
- Addresses authentication of IPMP tools.

MPEG is currently developing a multimedia digital rights management framework that will enable all Users to express their rights to, interests in, and agreements related to Digital Items. It will also enable all Users to derive appropriate levels of assurance that those rights, interests and agreements will be persistently and reliably managed and protected across a wide range of networks and devices.

11.3.6 Rights Expression Language (REL)

The RLL specifies a language for declaring rights and permissions associated with use of digital items. The rights expressions use terms as defined in the Rights Data Dictionary.
A Rights Expression Language is seen as a machine-readable language that can declare rights and permissions using the terms as defined in the Rights Data Dictionary.
The REL is intended to provide flexible, interoperable mechanisms to support transparent and augmented use of digital resources in publishing, distributing, and consuming of digital movies, digital music, electronic books, broadcasting, interactive games, computer software and other creations in digital form, in a way that protects digital content and honours the rights, conditions, and fees specified for digital contents. It is also intended to support specification of access and use controls for digital content in cases where financial exchange is not part of the terms of use, and to support exchange of sensitive or private digital content.
Each REL Grant contains four elements:

- **Permission** - this articulates what usage of the Digital Item one user is providing to another.

- **Condition** - this articulate the constraint that the first user places on the second as a result of the use of their Digital Item. Example: you can play my movie, in return for a payment of $1. This statement includes the Permission "You can play my movie" and the condition "in return for $1".

- **Principle** - this identifies exactly the User to who the Permission is being granted. i.e. "User XXX (You) can play my movie".

- **Resource** - this identifies exactly the Digital Item (or part thereof) for which a Permission is being granted. E.g., "User XXX can play Item YYY (my movie)".

From this simple model of Grant =Permission + Condition + Principle + Resource very flexible rights expression can be generated.
The Rights Expression Language is intended to provide a flexible interoperable mechanism to ensure personal data is processed in accordance with individual rights and to meet the requirement for Users to be able to express their rights and interests in a way that addresses issues of privacy and use of personal data.
The standard Rights Expression Language is able to support guaranteed end-to-end interoperability, consistency and reliability between different systems and services. To do so, it must offer richness and extensibility in declaring rights, conditions and obligations, ease and persistence in identifying and associating these with digital contents, and flexibility in supporting multiple usage/business models.
MPEG has developed its REL to meet the requirements it defined. MPEG recognizes that several industries and User communities will need to modify the language to better meet their specific needs. To facilitate easy mapping of the REL to these industry specific applications MPEG has developed a process of Extension and Profiling of the Language.
The Extension process allows individuals to define elements of the language specific to their needs. This includes development of new verbs and schematic elements to improve efficiency in their specific domain. MPEG has also developed the Rights Data Dictionary to ensure the semantic interpretation of new verbs is unambiguously understood to promote interoperability.
The Profile process allows individuals to select only the parts of the language applicable to their application. This optimizes payload of Digital items and computation requirements of MPEG terminals. MPEG recognizes that different applications require different levels of complexity and flexibility in the REL. The Profiling process allows one community to select only the elements they feel they need to meet a specific application need.
It is important to note that an Extension and Profile can be used concurrently to optimise the applicability of the REL to one specific application.

11.3.7 Rights Data Dictionary (RDD)

The RDD specifies a model and dictionary for clearly and consistently defining terms for use in rights expressions.

- **Principal**
  A principal encapsulates the identification of principals to whom rights are granted.

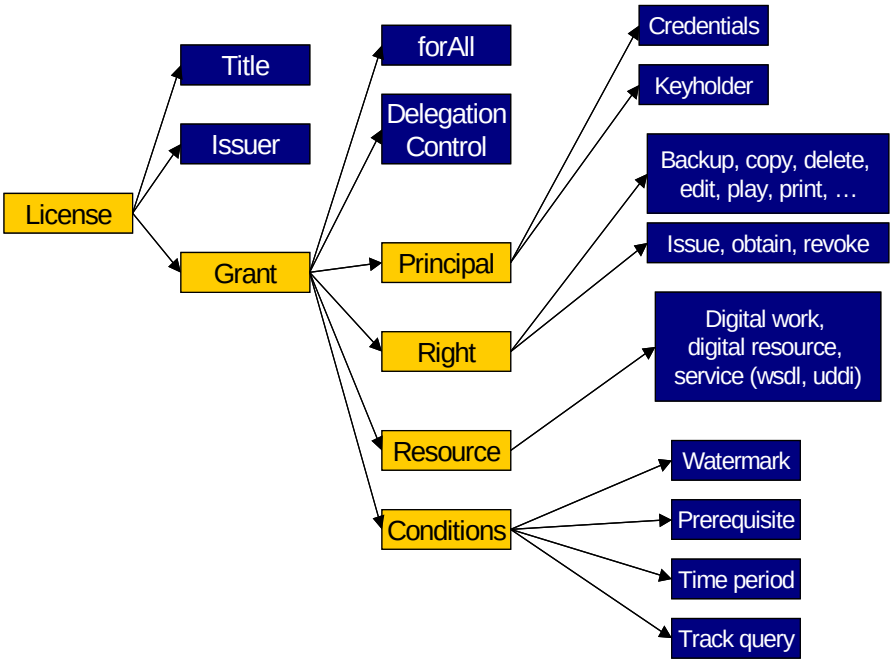
- **Right**
  A right is the "verb" that a principal can be granted to exercise against some resource under some condition.

- **Resource**
  A resource is the "object" to which a principal can be granted a right.
  [e.g. a digital work (such as an e-book, an audio or video file, or an image), a service (such as an email service, or B2B transaction service), or even a piece of information that can be owned by a principal (such as a name or an email address)].

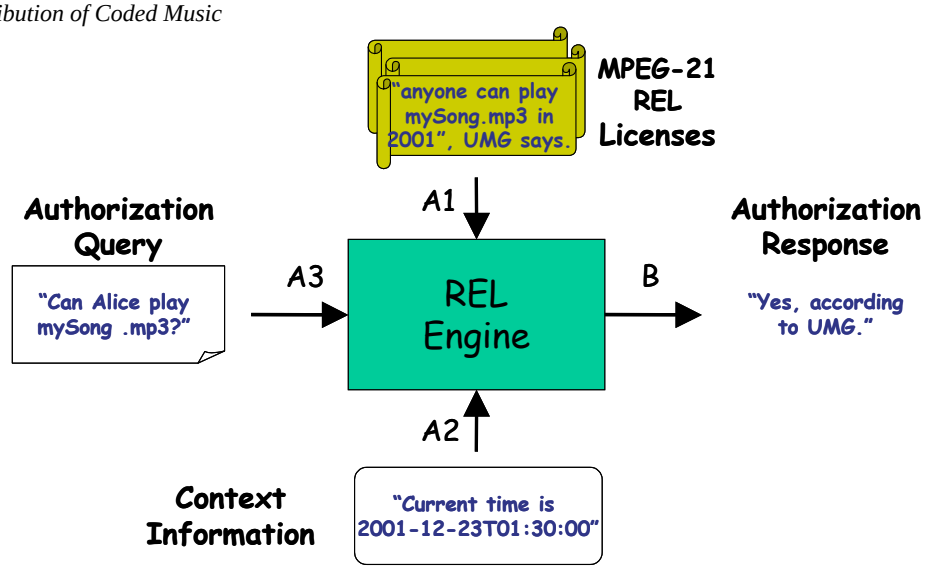
- **Condition**
  A condition specifies the terms, conditions and obligations under which rights can be exercised.

Rights authorization: "Is **PRINCIPAL** authorized to exercise **RIGHT** (under some **CONDITIONs**) against **RESOURCE**?**"**

XrML used as initial basis for REL.

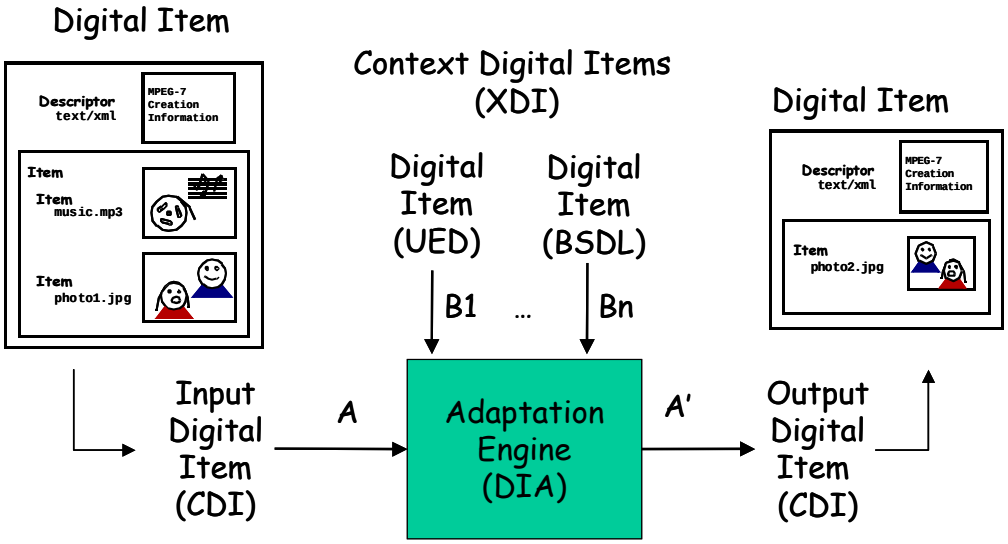


Rights Expression Language (XrML Core Schema)



11.3.8 Digital Item Adaptation

Specifies specifies an XML Schema-based language for describing media resource adaptability, user environment, and others.



12 Conclusions

This report reflects the outcome of activities and unitiatives undertaken by the MUSICNETWORK's Working Group dedicated to "Distribution of Coded Music" and the major **results** achieved through technology surveys, market analysis, reflection on major problems, analysis of business models, sharing of experiences and discussions at workshops.

The **scope** of the problem is very wide and the analysis work quite laborious due to the complexity and heterogeneity of the market, the quick and dynamic evolution of the enabling technologies, the contrasting interests and opposite driving forces.

The analysis work put good effort in highlighting **the importance of the needs of end-users and consumers** of music when considering the major problems as well as the new behaviours and possibilities originated by the availability of music in digital format. Copyright can represent the tool to get a trade-off between the sometimes conflicting interests of users and publishers-majors-authors. Copyright should be based on a **balancing principle**: the needs of the rights holder should be balanced against those of society, users and consumers. Such balancing principle behind copyright should be translated in terms of the new technologies and the digital scenario to ensure that users have sufficient and easy access to music, while still protecting the interests of rights holders.

More and more authors, copyright collecting societies and independent labels are embracing the conviction that economic and business models generated or based on **peer-to-peer** communication schemas are totally **positive** in terms of distribution, selling and knowledge of music.
Such authors and their representatives are inviting the major labels to start a new **innovative** and **creative approach**, involving also the Internet Service Providers in the process and allowing the user, paying a fee, to access music and possibly re-distribute rights via the peer-to-peer and a new licensing scheme.
The approach aims to remunerate rights holder without limiting too much the freedom of end users, providing value to all the players in the content value chain.

However, the lack of standards for interoperability between proprietary technologies is a serious impediment to the broad deployment of consumer-friendly legitimate media distribution. **Standards** can play a primary role for the full exploitation of the Internet in terms of content exchange. Within these activities protocols and interfaces are standardized to enable exchange of content. MPEG initially addressed the issues of coding of moving pictures and audios. Areas addressed by MPEG include (de-) compression, processing and coded representation of moving pictures, audio and multi-media content. Within the "MPEG family" each member is addressing specific issues: **MPEG-21**'s aim is to provide an interoperable multimedia framework and to support users in accessing, exchanging, and manipulating digital items.

13 Acknowledgements

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[CC] Creative Commons website, http://creativecommons.org/

[WIPO] WIPO, World Intellectual Property Organisation website, http://www.wipo.int

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- "The Design of Everyday Things", Donald A. Norman, Basic Books, September 2002
- CISAC, International Confederation of Societies of Authors and Composers, http://www.cisac.org
- Open Mobile Alliance, http://www.openmobilealliance.org/
- DRMwatch website, http://www.drmwatch.com
- DRM News Blog, http://www.drmblog.org/
- MPEG, http://mpeg.telecomitalialab.com

Appendix 1: EMO members

AKM
Autoren, Komponisten und Musikverleger
Baumanstrasse 10
Postfach 55
A - 1031 Wien
Tel: +43 1 717 14 0
Fax: +43 1 717 14 107
Email: direktion@akm.co.at
Website: http://www.akm.co.at/

AKM is the oldest and biggest copyright society in Austria and stands for Autoren (authors), Komponisten (composers) and Musikverleger (music publishers). The full name is: Staatlich genehmigte Gesellschaft der Autoren, Komponisten und Musikverleger reg. Gen.m.b.H.
AKM is a service company for music authors and organisers alike: through AKM music authors and their publishers easily receive the fees for the utilisation (public performance and broadcasting) of their works. Organisers can acquire the necessary authorisations for the entire world repertoire of music through AKM. Currently AKM has 14 000 members.

Austro Mechana
Gesellschaft zur Wahrnehmung mechanisch- musikalischer Urheberrechte
/ Society For The Protection Of Mechanical Musical Copyrights
Baumanstrasse 10
Postfach 55
A - 1031 Wien
Tel: +43 1 717 87
Fax: +43 1 712 71 36
Email: office@aume.at
Website: http://www.mica.at/

Austro Mechana is the copyright society which administers the "mechanical" rights in musical works of its members (currently 13 500 composers, authors and publishers). It operates in Austria as well as in conjunction with collecting societies administering mechanical rights all over the world. Its main activity is the collection and distribution of royalties for the use of music on a variety of audio and audiovisual carriers - including CDs, MCs, videos, CD-Rom, DVDs. It also collects and distributes royalties for recordings and re-recordings made for or by broadcasting stations for Radio and TV. The online field of activity of Austro Mechana concerns the storage and the downloading of music in/from the net, e.g. mobile phone ringtones.
Furthermore Austro Mechana deals with the collection of the blank tape levy for all the right-owners in Austria. Part of Austro Mechana's share of the blank tape levy income is used for social and cultural purposes.

CONAMUS
Foundation to promote Dutch music
Vaartweg, 32
Postbus 929
NL - 1200 Ax Hilversum
Tel. +31 35 621 87 48
Fax +31 35 621 27 50
Email: info@conamus.nl
Website: http://www.conamus.nl/

The Conamus Foundation was founded in 1962 to assist in furthering the work of Dutch music creators, to promote Dutch-penned material and to encourage the performance of Dutch popular music in Holland and abroad. Conamus is a non-profit subsidiary of the Buma author's rights organization and maintains close contacts with all relevant parties in the Dutch music branch. Covering all types of light and pop music ranging from metal and dance to mainstream and cabaret, the only genres not covered by Conamus are jazz and classical.

BEMF
Bureau Export de la Musique Française
/ French Music Export Office
2, rue de la Roquette
Passage du Cheval Blanc
Cour d'Avril

3ème étage droit
F - 75011 Paris
Tel: +33 1 4929 5227
Fax: +33 1 4929 5224
Email: burex@french-music.org
Website: http://www.french-music.org/

The French Music Export Office was created in 1993, on the initiative of record producers, with the support of public authorities and music industry professional organisations. Its mission is to promote French music abroad through varied programs of information, co-ordination, communication and commercial networking between its partners in France and the rest of the world.
The Export Office is also devoted to the creation of a European policy for the music industry by developing exchanges between the different musical cultures. BEMF has created a network of French Music Offices in Germany, the USA, the UK and Brazil.
Currently the BEMF has 42 members.

AEF
Association européene des festivals
Chateau de Coppet
Case Postale 26
CH - 1296 Coppet
Tel: +41 22 776 86 73
Fax: +41 22 776 42 75
Email: geneva@euro-festival.net
Website: http://www.euro-festival.net/

AEF aims to promote the significance and reputation of European music festivals, and to encourage international co-operation among these festivals and other similar organisations and institutions. Furthermore, AEF wishes to represent music festivals in national and international organisations. It aims to establish a common working practice amongst artists, visitors and authorities alike. Today a total of 75 music festivals are members of AEF.

EMMEN

European Modern Music Education Network
9 Rue Paul Emile Janson
B-1050 Bruxelles
Tel. (France): +33 47 97 17 640
Fax (France): +33 47 97 17 649
Email: apejs@club-internet.fr
Website: http://www.emmenet.org/

The European Modern Music Education Network (EMMEN) is committed to establish itself as a representative interlocutor for the European popular music education and training sector. Its founding members include 26 schools representing nearly 8,000 students and 700 teachers. Member schools are located in France, Belgium, Spain, Italy, Germany, the UK and Switzerland.

FAMDT
Fédération des Associations de Musiques et Danses Traditionnellles
BP 136
90, rue Jean Jaurès
F - 79204 Parthenay Cedex
Tel: +33 5 49 95 99 90
Fax: +33 5 49 95 99 95
Email: famdt@cc-parthenay.fr
Website: http://www.famdt.com/

FAMDT is the French Federation of Traditional Music and Dance Associations. Fields of intervention are: providing information, research documentation, teaching and training. FAMDT is also interested in publication, distribution, dance and European co-operation. It is a member of the European Network of Traditional Music and Dance and currently has about 65 members.

FCM
le Fonds pour la Création Musicale
141, rue Lafayette
F - 75010 Paris
Tel: +33 1 48 78 50 60
Fax: +33 1 45 96 06 97
Email: fcm@club-internet.fr
Website: http://www.lefcm.org/

FCM offers support to music professionals of every repertoire for all music communication activities : recordings, live music, teaching, audio-visual activities.

FIA
Fédération Internationale des Acteurs
Guild House
Upper St Martin's Lane
GB - London WC2H 9EG
Tel: +44 20 7379 0900
Fax: +44 20 7379 8260
Email: office@fia-actors.com
Website: http://www.fia-actors.com/

The International Federaton of Actors (FIA) is the body which represents the trade unions and associations of actors, singers, dancers and other perfomers internationally. FIA works to represent and co-ordinate the interests of performing artists and their professional organisations. Currently the FIA represents 100 members in 70 countries.
FIA is active in lobbying governments, institutions and the European Commission and it is a recognised non-governmental organisation alongside UNESCO, the International Labour Organisation (ILO), the World Intellectual Property Organisation (WIPO), the International Theatre Institute (ITI) and the Council of Europe.

GEMA
Gesellschaft für Musikalische Aufführungs- und Mechanische Vervielfältigungsrechte
Rosen Heimerstrasse 11
D - 81667 Munich 80
Tel: +49 89 480 0300
Fax: +49 89 480 03 424
Email : gema@gema.de
Website: http://www.gema.de/

GEMA is the oldest, best-known and economically the most important collecting society in Germany. Its name is a clear indication of its field of activities: "Gesellschaft für musikalische Aufführungs- und mechanische Vervielfältigungsrechte (Society for Musical Performing Rights and Mechanical Reproduction Rights)". GEMA not only acts as a collecting society, but also stands up nationally, internationally and in the EC for the legal advancement of copyright, which in economic terms represents an important aspect of intellectual property.
Currently the GEMA has 55 000 members.

ICMP/CIEM
International Confederation of Music Publishers
47, Rue de Turbigo
F - 75003 Paris
Tel: +33 1 42 72 38 99
Fax: +33 1 42 72 38 05
Email: 101374.25@compuserve.com

The International Confederation of Music Publishers represents the music publishing community globally, serious and popular music, independent and major publishers, in Europe and worldwide. ICMP/CIEM includes the quasi-entirety of all national music publishers' trade associations in and outside Europe, as well as regional (Latin America and Asia) and international (IMPA) associations.

IDKV
Federal Association of the Performance Industry

Lenhartzstr. 15
Postfach 202364
D – 20249 Hamburg
Tel: +49 40 460 50 28
Fax: +49 40 46 88 14 17
Email: idkv@idkv.com
Website: http://www.idkv.com/

IDKV - Bundesverband der Veranstaltungswirtschaft (formerly: Interessenverband Deutscher Konzertveranstalter und Kuenstlervermittler e.V.) is the German professional association for promoters, artists' managers and concert agents. IDKV has over 240 members.
The aim of the Association is to draw together all those professional groups active in the entertainment industry under a united professional umbrella. It promotes the professional interests of its members and represents them in dealings with third parties, in particular with the authorities and legislators, but also with the public. It endeavours, as far as cartel legislation permits, to contribute to the professional regulation of the entertainment industry.

IMPALA
Independent Music Companies Association
Rue du Trône, 51
B – 1050 Bruxelles
Tel: +32 2 289 26 00
Fax: +32 2 289 26 06
Email: pkern@kernnet.com
Website: http://www.impalasite.org/

The Independent Music Companies Association (IMPALA) is a not-for-profit organisation with a scientific and artistic purpose. It aims at promoting the interests of the independent music industry among governments, international organisations (WTO/WIPO) and European institutions.
Founded in 2000, the organisation is based in Brussels. The membership of IMPALA embraces independent music companies active in the production and distribution of sound recordings as well as in music publishing. Members are both individual music companies as well as national trade associations. Currently IMPALA has 1500 members.

IMRO
Copyright House
Pembroke Road
Lower Baggot Street
IRL - Dublin 2
Tel: +353 1 661 48 44
Fax: +353 1 662 03 96
Email: info@imro.ie
Website: http://www.imro.ie/

IMRO is the national body administering the performing rights in copyright music in Ireland on behalf of its members (about 3500) - songwriters, composers and music publishers - and on behalf of the members of the 562 overseas societies affiliated to it. IMRO issues licences to those wishing to use copyright music in public. It is working to better protect the rights of those whom it represents by promoting awareness about copyright issues, working with governments, and educating the music-using public. It is committed to giving new creative talent a chance.

IUC
Music & Experience Industry
P.O Box 139
S - 577 23 Hultsfred
Tel: +46 495 696 75
Fax: +46 495 696 51
Email: info@iuchultsfred.nu
Website: http://www.iuchultsfred.nu/

IUC is a development company for the Swedish Music Industry in particular and Experienceindustry in general, which supports good new product ideas, services, processes and concepts by using capital, expertise and contact networks. It also acts as a think-tank for the investigation and examination of the music industry's needs in connection with important issues, such as Educations, Livestage and Research.

IUC Hultsfred is owned by 50 different bodies from within the industry, incl. SAMI {Swedish Artists' and Musicians' Interest Organisation}), The Hultsfred Festival, Studiefrämjandet Musik & Media (Study Promotion Accociation Music And Media department), MNW Records, Sony Music, Almi Företagspartner.

The board includes:

Pia Kalischer Head of Music, Swedish Radio, Channel P3

Per Sundin Managing Director Nordic Countries, Sony Music AB Sören Victorsson Administrative Manager, SAMI Petri H. Lunden, Manager The Cardigans, Talent Trust AB

JMI
Jeunesses Musicales Internationales
Palais des Beaux Arts
Rue Royale 10
B - 1000 Bruxelles
Tel: +32 2 513 97 74
Fax: +32 2 514 47 55
Email: mail@jmi.net
Website: http://www.jmi.net/

JMI is the regional subsidiary of Jeunesses Musicales International, and brings together European member countries of Jeunesses Musicales International (JMI).
JMI, a worldwide network for youth and music, has spread a message of friendship and understanding through music. By providing young people with access to music, both as performers and as listeners, Jeunesses Musicales serves the needs of young people involved in diverse styles of music in countries around the world. Currently JMI has 500 000 members.

KODA-MIC-DMF
° Performing Rights Collecting Society
° Danish Music Information Center
° Dansk Musiker Forbund./Musicians Union
Sankt Hans Torv 26
DK - 2200 Copenhagen N
Tel: +45 35 240 240
Fax: +45 35 240 214
Email: dmf@dmf.dk
Website: http://www.dmf.dk/

KODA is a Danish society that administers Danish and international copyrights for composers, writers and music publishers when their musical works are performed in public.
Through agreements with approximately 24,500 Danish composers, songwriters and music publishers, together with reciprocal contracts with foreign sister societies, KODA represents almost the total world repertoire of protected music in Denmark, Greenland and the Faroe Islands. KODA is in charge of the administration of the public performing rights, but has transferred the mechanical rights to the jointly owned Nordic society, Nordisk Copyright Bureau (NCB).

The Danish Musicians' Union is the trade union for approximately 6000 professional musicians in all genres of music in Denmark.
DMF offers its members legal advice, tax advice and hands-on contract negotiation assistance, a selection of discount schemes on many music related services including various insurances, financial support for projects, a wide range of educational courses etc.
DMF represents musicians' interests in all political, cultural and music related matters nationally as well as internationally.
DMF works in close co-operation with the musicians' unions in the Nordic countries within NMU - Nordisk Musiker Union, as well as with musicians' unions around the world within FIM - Fédération Internationale des Musiciens.

MMF UK
Music Managers' Forum
7 Russell Gardens
GB - London W14 8EZ
Tel: +44 20 7751 1894
Fax: 44 20 7603 4411

Email: office@ukmmf.net
Website: http://www.ukmmf.net/

The International Managers Forum is an organisation that represents the interests of artist managers worldwide. The UK chapter has 400 members (approx) bringing the total to 2000 members worldwide.
The formation of MMF has given managers an opportunity for sharing and learning and also a much-needed voice within the industry. The forum has provided a chance for meaningful dialogue with the Government and other industry organisations as well as between managers themselves.
As a body representing managers the MMF seeks to raise professional standards in management. It also helps its members develop management skills and knowledge of the music industry.

MMVV
Mercat de Music Viva de Vic
Edifici et Sucre
c/ Historiador Ramon d'Abadal i de Vinyals, 5, 2° planta
SP - 08500 Vic
Tel: +34 93 883 31 00
Fax: +34 93 883 26 26
Email: mmvv@ajvic.es
Website: http://www.mmvv.impevic.net/

Prime Art
Management and concert/tour promotion
3, Hadjiyanni Mexi st. & Vass. Sofias Ave.
GR - 115 28 Athens
Tel: +30 10 7293 820
Fax: +30 10 7293 822
Email: primeart@primeart.gr
Website: http://www.primeart.gr/

Prime Art was established in 1997 by Natasha Pavlopoulou and Olga Kalogriadou, two professionals greatly experienced and widely known throughout the field of arts management and cultural activities in Greece. Prime Art's primary objective is to offer its services in the field of culture, responsibly and professionally, covering the following directions:

- management and promotion of Greek artists,
- organisation of cultural events and festivals in Greece and abroad,
- promotion of Greek art productions,
- engagement of foreign artists and ensembles in Greece,
- production of cultural events by private financial resources.

SABAM
Société Belge des Auteurs, Compositeurs et Editeurs
Rue d'Arlon 75-77
B - 1040 Bruxelles
Tel: +32 2 286 82 11
Fax: +32 2 230 05 89
Email: info@sabam.be
Website: http://www.sabam.be/

Composers, lyricists, publishers, authors of dramatic works, scriptwriters, dialogue writers, photographers, subtitle authors, directors, translators, novelists, poets, sculptors, painters, drawers, choreographers are all members of SABAM, the Belgian Society of Authors, Composers and Publishers. SABAM attaches much importance to the promotion of the arts and encourages several cultural initiatives in Belgium. As a collecting society SABAM has more than 4 million listed works and represents thousands of creative artists.

SACEM
Société d'administration des droits des Auteurs, Compositeurs et Editeurs de Musique
225, av. Charles de Gaulle

F – 92521 Neuilly sur Seine cedex
Tel: +33 1 47 15 47 15
Fax: +33 1 47 15 48 85
Website: http://www.sacem.fr/

SACEM Lux.
Société d'administration des droits des Auteurs, Compositeurs et Editeurs de Musique
46 rue Goethe
L -1637 Luxembourg
Tel: +352 47 55 59
Fax: +352 48 02 76
Email: bob.krieps@sacem.fr
Website: http://www.sacem.fr/

UGDA
Union Grand-Duc Adolphe
2 rue Sosthène Weis
L - 2722 Luxembourg-Grund
Tel: +352 46 25 36-1
Fax: +352 47 14 40
Email: uem@ugda.lu
Website: http://www.ugda.lu/

SGAE
Sociedad General de Autores y Editores
C/ Fernando VI, 4
SP - 28004 Madrid
Tel: +34 91 349 95 00
Fax: +34 91 349 96 00
Email: infoweb@sgae.net
Website: http://www.sgae.es/

SGAE (Sociedad General de Autores y Editores) is a not-for-profit organisation which defends and represents the rights of authors belonging to more than 50,000 member associations (including composers, script writers, publishers, directors and playwrights).
This collective society represents a total of over one million musical, theatre, choreographic, pantomimic, cinematographic, audiovisual and documentary works. SGAE' s mission is to grant authorization for their use and check they be used in appropriate way. To that end its activity consists in granting licences, setting up tariffs and collecting and redistributing among its associates the sum attached to each author's work.

SIAE
Società Italiana degli Autori ed Editori
Viale della Letteratura 30
I - 00144 Roma
Tel: +390 6 599 01
Fax: +390 6 596 47 052 /050 /049
Email: rapporti.internazionali@siae.it
Website: http://www.siae.it/

SIAE (Italian Society of Authors and Publishers) is an organisation for the protection of intellectual works. Its aim for over a century has been that of joining together authors, publishers and other copyright owners in order to protect copyright works in Italy and abroad.
SIAE authorises the utilisation of works under its protection, collects the sums required for the issue of authorisations and distributes these sums to the authors and publishers of the works utilised. SIAE currently has 54 459 members.

SPA
Sociedade Portuguesa de Autores
Duque de Loule 31
PT - 1069 Lisboa Codex
Tel: +351 21 35 944 00
Fax: +351 21 35 302 57
Email: geral@spautores.pt
Website: http://www.spautores.pt/

SPA is a co-operative which was created in 1925 to administer Authors' rights (copyright), under the terms of national laws and international agreements (such as the Bern Convention of 1886 and Universal Convention of 1952, both reviewed in 1971).
The aims of SPA are to authorise the utilisation of the works of copyright holders it represents, to establish the terms of this utilisation and to collect rights in respect of this utilisation. Furthermore, SPA aims to distribute the amounts collected by the copyright owners concerned, after deduction of its commissions. SPA also wishes to represent neighbouring rightholders, such as artists, phonographic and videographic producers, and audio and visual broadcasting organisations.

STIM/Svensk Musik
Swedish Performing Rights Society
Swedish Music Information Center
c/o SVENSK MUSIC
Sandhamnsgatan 79
SW - 102 54 Stockholm
Tel: +46 87 83 88 00
Fax: +46 86 62 62 75
Email: swedmic@stim.se
Website: http://www.stim.se/

STIM, the Swedish Performing Rights Society, is the Swedish link in an international system which was established to safeguard the financial rights of composers and lyricists under copyright law. STIM currently has approximately 40 000 members.

TEOSTO-GRAMEX
Finnish Composers' Copyright Society
Artists and Producers' Copyright Society
Lauttasaarentie 1
FIN - 00200 Helsinki
Tel: +358 9 68 10 11
Fax: +358 9 67 71 34
Email: teosto@teosto.fi
Website: http://www.teosto.fi/

Teosto, the Finnish Composers' Copyright Society, was established to administer the copyright of Finnish creators of music.
Through the reciprocal representation contracts made with foreign copyright societies, Teosto also represents foreign copyright owners -composers, lyricists, arrangers and music publishers- in Finland. Equally, foreign copyright societies represent Finnish copyright holders in their territories.
Teosto grants, on behalf of copyright owners, all permits and licences required for the use of music. It also collects the licence fees and distributes the collected fees to the copyright owners.
Gramex is a copyright society which promotes and administers the rights (prescribed in the Copyright Act) of performing artists whose performances have been recorded on phonograms. It also promotes and administers the rights of producers of phonograms.
The most important practical function of Gramex is to collect remunerations for the use of phonograms and to distribute the collected remunerations to those entitled to them.

TONO
Performing rights Society for Composers, Authors and Music Publishers
Galleiret
Toyenbekkan 21
Postboks 9171
Groenland
NW - 0134 Oslo
Tel: +47 22 05 72 00
Fax: +47 22 05 72 50
Email: tono@tono.no
Website: http://tono.no/english.html

TONO was established in 1928 and protects the performing (financial and legal) rights of Norwegian and foreign composers. It also protects the rights of authors and publishers of music performed in Norway.

WBM
Wallonie Bruxelles Musique

18 pl. E. Flagey (Bte 10)
B - 1050 Bruxelles
Tel: +32 2 218 62 09
Fax: +32 2 218 34 24
Email: wbm@cfwb.be
Website: http://www.wbm.be/

WBM's objective is to promote artists, producers and publishers from Wallonia and Brussels abroad- in all music fields. Its activities include : the organisation of shared stands for trade fairs for the recording and live music industries; participation in information- and artistic exchange networks ; participation in promotion events ; provision of accessible documentation, provision of "tour support" for bands touring abroad and the production of promotion tools.

YOUROPE
European Festival Association
Rosenbergstrasse 14
CH-9000 St. Gallen
Tel: +41 71 223 41 01
Fax: +41 71 223 41 09
Email: yourope@yourope.org
Website: http://www.yourope.org/
YOUROPE was founded in November '98. The association presently has 22 members among the most well established festivals in Europe. They are all dedicated to strengthen the festival scene in Europe in terms of working conditions, safety, environmental awareness and exchange of performing talent across borders. The aim of the association is to locate and highlight all common grounds for collaboration and the potential problematic areas where a joint approach is called for.

Appendix 2 : History of Collective Administration of Rights

Collective administration **dates from 1851**, when the **Societe des Auteurs, Compositeurs et Editeirs de Musique (SACEM)** was established in France as a copyright collecting society for creators and publishers. SACEM replaced the Société des gens de lettres (Society of French Writers), founded in 1837 by Honore de Balzac and Victor Hugo.

SACEM's establishment followed an 1847 ruling by the Tribunal de Commerce de la Seine, based on a 1793 French law specifying that the works of living authors could not be performed in a public theatre without the author's assent. Songwriter Ernest Bourget - now known only as an associate of Offenbach - along with composers Victor Parizot and Paul Henrion refused to pay for food or drink consumed at the fashionable Ambassadeurs cafe on the Avenue des Champ-Elysees in Paris.

They argued that the cafe benefitted by playing their scores every day, without payment and without acknowledgement. They had to pay for their seats and meals but neither the cafe proprietor nor fellow customers intended to pay for their creativity. The proprietor agreed that the music was important - he kept the band - but declined to pay the creators.

The court ruled that justice meant the composers (and their publisher) should share in the benefits from that amenity. It ordered payment - the trio supposedly received exemplary damages - but left the copyright owners to identify the use of their works and secure payment from thousands of cafes, theatres and other venues.

In 1850 Bourget and music publisher Colombier formed the Agence Centrale pour la Perception Droits Auteurs et Compositeurs de Musique, which was replaced by SACEM as a national body in 1851. It served as a model for other societies such as the UK Performing Rights Society (PRS), German Gesellschaft fur Musikalische Auffuhrungs (GEMA) and Australia's Australian Performing Right Association (APRA).

The American Society of Composers, Authors & Publishers (ASCAP) was established in 1914 and flourished despite the 1939 creation by broadcasters of Broadcast Music Incorporated (BMI) and other competitors.

BONUS, the first RRO, was founded in Sweden in 1973 to serve right owners and users of printed materials, which since the late 1960's had been subject to extensive photocopying.