



Broadband technologies transforming business models and challenging regulatory frameworks – lessons from the music industry

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New embryonic business models and value chains

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Abstract:

This report is the third deliverable from the project Musiclessons: Broadband technologies transforming business models and challenging regulatory frameworks – lessons from the music industry. The overall aim of workpackage 5 is to synthesize the results from workpackages 2, 3 and 4 in Musiclessons. This deliverable is the first in workpackage 5 and analyses early business models on the Internet based on P2P (Peer-to-Peer) technology. The report covers also basic business models that have developed over time on the Internet and comments are made how P2P technology can enter these models. Characteristic for almost all P2P business models is that the P2P technology provider is not involved in content development and relies on users in that respect. Business models are complex interactions between copyright law, contract law, digital rights management (DRM) and business practices. A discussion on some of the most important interactions is included. DRM is a topic that goes far beyond prevention of illegal copying of copyright protected material. A special study on this topic is annexed to the deliverable. This study is directed to user acceptance and analyses content owners desire both to monitor and control the ways users interact with the content versus user acceptance of these aspects of DRM systems. Understanding users preferences is very important in business planning. A first approach to user oriented business models is included. This approach is based on results coming from workpackage 3.

Keyword list: P2P, Business models, Business plan, User preferences, DRM, Internet, File sharing

Executive summary

Content providers have realised the benefits of using new technology in delivering content to the market in new ways. For the music industry new technology has often been disruptive and a lot of efforts have been spent trying to stop new technology. But the historical lesson is that such disruptive technologies for distributing content can never be blocked. The Internet in particular has offered lower costs, easier reproduction and distribution and attractive means for distribution of content on top of the obstacles time and distance. But new technologies have been developed that have upset traditional business models. In particular Peer-to-Peer (P2P) networks have been a determinant in the emergence of new successful business approaches within the music industry. This technology has proven even more successful in the IP-based telephony sector with the telephone service provider SKYPE.

Discussing business models is very close to making business plans and pointing out where in the value chain the business is situated. P2P technology is a delivery mechanism and to be able to analyse business models pros and cons for that mechanism is of great value. The deliverable provides such an overview. One important observation is that anyone can participate. P2P networks do not respect any boundaries, national, between Internet Service Providers (ISPs) or otherwise. Most e-commerce and licensing agreements are tied to national boundaries. It is a difficult problem to solve but it has to be considered in a larger legislative perspective. Agreements between users and providers of P2P technology providers and rights holders will be very complex and difficult to design.

Over the years many business models have been developed on the Internet. Here we have gathered a list of the most common basic models and point out how P2P technology can enter these models. Many of the basic models will be underlying future models using P2P technology. In the report we combine a few of them into a hypothetical business model and analyses that one to get a little more realism.

P2P business models are complex interactions between copyright law, contract law, digital rights management (DRM) and business practices. A discussion on some of the most important interactions is included. The tricky question for directives on future business models is if the legal aspects in the relations between users and rights holders shall support an established content industry and traditional business models, where the industry can have a closer control on how, where and when content can be used or if it shall support users curiosity and interest to find new content and boost inspiration, experimentation and creativity.

DRM is a topic that goes far beyond prevention of illegal copying of copyright protected material. A special study on this topic is annexed to the deliverable. This study is directed to user acceptance and analyses content owners desire both to monitor and control the ways users interact with the content versus user acceptance of these aspects of DRM systems. One observation is that users will reject DRM systems that are controlling and intrusive. In future legislation this must be taken into account.

Not too many business models powered with P2P technology exist. Many are variants of each other but with different underlying P2P technology. One general observation is that very few P2P system providers own the content they are trying to earn money on. A large user base is often top priority. This spurs advertisers and a fairly steady revenue stream. Few of them have started to consider subscriptions as a steady income source. Web promotion – providing content for free and in return earn money on physical goods or experiences is a model that

seems to work for some content developers. Web promotion falls under the more general advertising business model

Understanding users preferences is most important in business planning. Customer fulfilment is on top of the list in a business plan. A first approach to user oriented business models is included. Results coming from Musiclessons Workpackage 3 show three categories of file sharers. Identifying groups of users with similar preferences is a very good start in a business plan and key knowledge to understand what the users are willing to pay for and how much and from there define offerings, delivery mechanisms, near and long term goals.

Table of contents

1. INTRODUCTION	9
2. P2P SYSTEM PROPERTIES	11
2.1 Advantageous properties	11
2.2 Disadvantageous properties	13
3. BASIC BUSINESS MODELS ON THE WEB	15
3.1 A new way of interacting	15
3.2 Basic business models	15
3.3 Brokerage	15
3.4 Advertising	17
3.5 Information intermediary	17
3.6 Merchant	18
3.7 Direct sale	18
3.8 Pay per click	18
3.9 Community	19
3.10 Subscription	19
3.11 On demand	20
3.12 Resale	20
4. DISCUSSION	21
4.1 General	21
4.2 Some legal and business issues	22
5. NEW EMBRYONIC BUSINESS MODELS IN THE P2P DOMAIN	27
5.1 The “weed” model	27
5.2 The advertising model	28
5.3 A give away model	29
5.4 Direct sales	30
5.5 Subscription model	30
5.6 User incentive model	31
5.7 DRM business models	31
5.8 DRM Business models for the future	32
6. ON VALUE CHAINS	33
7. USER ORIENTED APPROACH TO BUSINESS MODELS	35
7.1 A starting point for the discussion	35
7.2 Young people and adults	35
7.3 Copying replaces money	35
7.4 Quality deficiencies	36
7.5 No moral doubts	36
7.6 Forms of payment	36
7.7 Pay for convenience	36
7.8 Avoid social embarrassment	37
7.9 Communities	37
7.10 Free-riders and samplers	37
8. REFERENCES	39

ANNEX: DRM – INTRUSION OR SOLUTION?

Report by Ulf Blomqvist, Michael Fritzell and Marcus Olofsson

1. Introduction

The Internet has confirmed itself into the economy today. ICT technologies provide enormous opportunities to any business by removing two major obstacles – time and distance. Not only traditional business can be reinvented but also many new ways of doing business using the Internet have emerged – i.e. spelling out in a new way where in the value chain a company is positioned.

Content providers have realised the benefits of using new technology in delivering content to the market in new ways. The Internet in particular has offered lower costs, easier reproduction and distribution and attractive means for distribution of content on top of the obstacles time and distance. But new technologies have been developed that have upset traditional business models. In particular Peer-to-Peer (P2P) networks have been a determinant in the emergence of new successful business approaches within the music industry. This technology has proven even more successful in the IP-based telephony sector (SKYPE).

In this report we present a short overview of basic business models on the net. These models are included for reference and the intention is to demonstrate the diversity of existing models. The existing models on the net are generally not at all related to or dependent on P2P networks but one can expect that some of the P2P network properties will enter these models or that the models will inspire new business models for P2P networks. We also present P2P network properties that are possible to use in new business models and comment how they may enter traditional models used on the net.

We then present and describe a number of new emerging business models for P2P systems that are already visible or have been recently announced and outline some of their features.

In our user studies in WP 3 we can identify different user groups, each one with a set of characteristics that we believe are important for the future analysis. We outline these user groups here in this report since they will serve as a base for forthcoming workshops with experts from the field to provide input to identifying new business models as yet not defined. This is a user-oriented approach to business models.

DRM or Digital Rights Management is a term frequently referred to, both in copyright legislation as well as by content owners seeking to control use of their intellectual property. Since there is a special study of DRM within the framework of eEurope we have conducted some research to test the validity of the use of DRM systems in a content owner approach to new business models. These two contrasting approaches – user oriented and producer oriented – serve us in our forthcoming studies both on business models and recommendations on balancing the rights between rights holders (producers) and users and innovators and thereby providing a better comprehensive scientific base for pan-European policies.

In this report we will frequently refer to digital content or just “content”. Literary works and sound recordings provide the most readily available examples of such “content”. In principle anything that can be digitised in some fashion – and thus possible to transmit through computer networks and replicated without loss of quality is content. The following non-exhaustive list indicates what we mean with “content” in this report:

List of Information goods

- Literary works (includes maps, computer software and related preparatory design material)
- Musical works, including any accompanying words
- Scenic and dramatic works, including any accompanying music
- Pantomimes and choreographic works
- Photography, pictorial and graphical works
- Motion pictures and other audiovisual works
- Sound Recordings
- Architectural Works

Today most of the listed works are produced in the digital domain, are recorded digitally on some physical medium (CD, hardware memory etc.) and transported in a traditional physical manner and later replicated without loss of quality in a users terminal.

2. P2P system properties

Discussing business models is close to making business plans and pointing out where in the value chain the proposed business is situated. When writing a business plan it is necessary to have a good view of the offerings and how they meet the customers/users needs. Highlighting unique system features and properties are important. P2P systems have a host of interesting properties that can be explored in new business models outside the realm of uploading/downloading of music and film – the first areas where the P2P technology has struck producers and causing them to lose control. Many of the properties are advantageous as seen from a user perspective, but there are also some that are less advantageous.

P2P systems are also independent of ISPs business models and work on top of them as overlay systems. Many content owners/creators start to understand that such characteristics are very interesting and significantly can promote future business.

2.1 Advantageous properties

INDICARE [1] presents an interesting overview of many P2P properties.

- **Decentralised:** In [2] we classified P2P systems by their degree of centralization. The feature that they are decentralized and in principle no central server is needed makes the system very cost effective. The requirements on infrastructure seen from the content provider are very low and there are no scaling problems and practically no increase of cost when the system grows¹.
The content provider can use this and minimize costs for servers and network broadband access (transmission costs) but also server management costs. To make business though a fully decentralised solution may not be optimal – some tracks of users and/or content is needed.
- **Anyone can participate:** P2P networks do not respect any boundaries, national, between Internet Service Providers (ISPs) or otherwise (this may also be disadvantageous as commented below). Most e-commerce and licensing agreements are tied to national boundaries. It is a difficult problem to solve but it has to be solved.
- **Realised on many devices:** P2P networks are working on many different technical platforms and thus P2P networks provide content files on many user devices. Apart from that content is rendered on many different platforms, technology is a big hurdle to interoperability particularly for DRM (Digital Rights Management) schemes.
- **Permanent files:** Files that are available on P2P networks do not “expire”. They can be “consumed” indefinitely. Users are very much interested to own content. This goes

¹ An interesting example is the Internet telephony solution SKYPE using P2P technology and reporting
~0.01 cent for adding a new user.

particularly for the users favourites. It will take a long time for users to become accustomed to other ways than ownership.

- **Share with friends:** P2P networks in general do not restrict friends to share content although sharing content with others is an infringement on rights-holders rights. Users expect to have at least some freedom to make copies of content for friends and family. Private copying laws are different in many countries but it is not necessary that the law will be the limiting factors. Online sales are seldom real “sales” – they are license contracts and thus not subject to private copying law restrictions. This calls for a further developments of contract law and of Open Source (<http://www.opensource.org/> , http://en.wikipedia.org/wiki/Open_source) and Creative Commons (<http://creativecommons.org/> , http://en.wikipedia.org/wiki/Creative_Commons) licensing contracts.
- **Users add value:** Users add value in many ways:
 - they add content of various kind
 - they build the databases of content together
 - they provide recommendations of content to other users
 - they store otherwise unavailable content
 - they pay for storage and processing capacity
 - they pay for infrastructure like broadband access and contribute to ISPs core networks

One can view this as users that co-operate and thus in a larger context P2P networks are a subset of Collaborative Networks. According to Wikipedia (http://en.wikipedia.org/wiki/Collaborative_networks) Collaborative Networks focus on the structure, behavior, and evolving dynamics of networks of autonomous entities that collaborate to better achieve common or compatible goals. It is important to understand that users willingness to co-operate can be used in a business process and that users should have some credit for that. P2P technology, user behaviour and Collaborative Networks could be a research field.

- **Sharing of long-tail content:** It is generally thought that content, which is in low demand can have a considerable market if it can be distributed to a very, very large audience. Such content is too expensive to sell through traditional channels, which normally reaches only limited markets due to limited marketing on limited geographical spread. When broadband networks will have global penetration the opportunities will be huge to find large enough audiences for long-tail content, which often has a special cultural flavour [3], [4].
- **Sampling/taste-making:** P2P networks have functions for users to search and browse other users collections and/or recommendations. Such taste-making gives users a chance to sample content and try it in a matchmaking process before buying the content. Reference [5] analyses sampling and taste-making like this and one of the findings is that the matching effect may dominate over P2P networks downside that users are less willing to pay for an original when they already may have an imperfect substitute. The results are based on theoretical models but still interesting.

2.2 Disadvantageous properties

- **A software based business model on top of the ISP:** The Internet Multicast protocol, originally designed for efficient transfer of the same content to users, does not work between ISPs. This is because it is impossible for an ISP to estimate the cost to transmit multicast traffic beforehand coming from another ISP and thus it is very difficult to agree between ISPs on the service level and the cost model. P2P networks are realised on top of the ISPs network and have their own mechanisms to find a match between a user and the content he/she is interested in. The “routing mechanism” in P2P networks is very different from ISPs traditional routing mechanisms to move packets in the network to the correct user address. The ISPs do not add any particular value in the P2P network and thus there is no revenue to collect. In fact the ISPs experience difficulties since they cannot predict P2P traffic very well. The P2P traffic can negatively influence other important traffic that the ISP is earning money on (such as Voice over IP (VoIP)). For the ISP there is a dilemma if all packets shall be treated equally or if tiered services should be offered. This dilemma is sometimes referred to as Network Neutrality (http://en.wikipedia.org/wiki/Network_neutrality). If tiered services appear in the future (maybe they already are implemented at some ISPs) P2P traffic may be affected negatively and as a consequence one has left the original idea behind Internet.
- **Spoof files, low quality and spy-ware:** Some P2P networks are plagued with spoof files [6] that content companies have put there to degrade the P2P network and overall service quality. This can be counteracted in community of interest P2P networks with users adding value by watching the quality of the content put on the network. Interestingly, some spoof files have become collector’s item. They can be of interest in the future for showing what has happened in this transition period from the physical to the virtual world. Files may be incomplete or have other defects like bad image or sound quality or even bad translations. Mounting intrusive spy-ware on to users PCs is not unusual or forcing the users to view and listen to advertisements to make money are other negative properties of some P2P networks.

3. Basic business models on the web

3.1 A new way of interacting

Distributed computing, examples of which include software such as P2P and Grid applications represent very powerful and widespread applications. The technology has been adopted by about 900 000 (8.8 million June 2006, www.slyck.com) users around the world and these numbers are steadily increasing. Distributed computing represent a completely new form for individuals and groups to interact with each other, thus changing established business models both in the real and the virtual world.

We start by presenting basic business models on the web since they are very basic and try to discuss how P2P networks may enter these models or vice versa (comment in *italics*).

3.2 Basic business models

Basic business models on the web can be categorised² [7] as follows:

- Brokerage
- Advertising
- Information intermediary
- Merchant
- Direct sales (manufacturer)
- Pay per click
- Community
- Subscription
- On demand

These models are described below.

3.3 Brokerage

Brokers bring buyers and seller together and facilitate transactions. Brokers play a frequent role in business-to-business (B2B), business-to-consumer (B2C), or consumer-to-consumer (C2C)

² This categorisation follows rather closely a categorisation done by Professor Michael Rappa at North Carolina State University. [http:// digitalenterprise.org/models/models.html](http://digitalenterprise.org/models/models.html)

markets. Usually a broker charges a fee or commission for each transaction it enables. The formula for fees can of course vary. Some models include:

- Full range of services covering transaction processes from market assessment to negotiation and fulfilment.

GRID³ technology [8] may enter this business model since it provides the technology, methods and security functions for virtual enterprises.

- Conduct auctions for sellers (individuals or merchants) . The broker charges the seller a listing fee and commission in relation to the value of the transaction. Auctions vary a lot in terms of bidding rules etc.

In September 2005 the auction broker eBay bought the P2P-based telephone service SKYPE. The motive was to add voice calls to increase confidence between buyers and sellers.

- A third party payment for buyers and sellers to settle the transaction. Paypal (www.paypal.com) is a good example for this business model.

Third party payment models enters P2P business models rather than vice versa.

- Prospective sellers of goods or services “name-their-price” and buyers make final binding bids and the broker arranges the settlement.
- Operating a catalogue that connects a lot of product manufacturers with retail buyers that have volume sales.
- Software agents that search the price and availability for goods or services specified by a buyer.

This model can very well enter P2P “networks than vice versa and help users to find specified content which resides in other users servers but have very limited information about the content.

- Software agent that locate information that is hard to find.

This model can very well enter P2P “networks than vice versa and help users to find specified content which resides in other users servers but have very limited information about the content.

- Virtual mall.

³ In Musiclessons Deliverable D1 GRID technology is discussed and compared with P2P technology.

3.4 Advertising

A web site that provides content (usually for free) and services (mail, blogs, discussions) mixed with advertising messages. Advertising may be the major or the only source of revenue for the web site owner. The web site owner may be a content creator or a distributor of content created elsewhere.

Advertising is always interesting when there is a large number of users or when the content of the site is highly specialised. P2P networks tend to have many users⁴ since they have interesting content and are thus subject for advertising.

Some examples are:

- Portals, usually with a search engine for specialised content or services.
<http://web4health.info/> is one example
- Content based sites that are free to access but require user to register and provide an email address or some personal or demographic data.
- Paid placement link positioning or advertising keyed to particular search terms in a user query.
www.google.com is one example
- Advertising targeted to content. Identifying the meaning of a web page and automatically deliver relevant advertisements when a user visits that page.
<http://web4health.info/> is one example

3.5 Information intermediary

An actor that collects data about consumers and their consumption and habits and perhaps also carefully analyses the data and uses this in helping in marketing campaigns. Data about users and their habits is valuable data to use in for example marketing campaigns.

Can also be an actor that collects data about producers and their products and make it available to consumers.

Assists consumers and/or sellers to understand a certain market.

Major record and film companies base their marketing strategies more and more on user activities in P2P networks. The USA based company Big Champagne is one of the major collector and provider of such information [9].

⁴ Here are some examples of number of users on some P2P networks in June 2006: eDonkey2K have 3 108 000 users; FastTrack have 2 848 000 users. In total BigChampagne reports 9.7 million simultaneous users in June 2006.

3.6 Merchant

Mainly a substituted virtual retailer for a traditional physical one. Relies considerably on existing firms to source and store goods and use traditional distribution methods.

(Example: Amazon)

P2P networks can enter this business model from several angles. Here are some examples:

- *The virtual retailer may want to lower its costs for servers, management and broadband communication and thus turn to distributed P2P solution.*
- *Align with a specialised P2P network to get users recommendations*
- *Align with a specialised P2P network if the goods is specialised and develop a global distribution channel*
- *For digital content this business model can change considerably, since part of the value chain disappears (storing goods; traditional physical distribution) and new parts appear (servers, server management). New printing technology for local printing of a few copies can also enter this business model. (The interested reader can preferably read “Digital alternatives: Solving the problem or shifting the cost” by Colin Day available at <http://www.press.umich.edu/jep/04-01/day.html> .)*

3.7 Direct sale

An actor that helps a manufacturer to reach buyers directly and thereby compress the distribution channel. Uses tools such as improved customer service and/or better understanding of consumer preferences.

(Example: Dell Computer)

P2P networks can enter this business model in much the same way as the Merchant business model:

- *Align with a specialised P2P network to get users recommendations*
- *Align with a specialised P2P network if the goods is specialised and develop a global distribution channel*

3.8 Pay per click

Sites that pay members (affiliates) for a user click-through by offering financial incentives to member sites by revenue sharing. This model is well suited for the web and not surprisingly has become a very popular business model. The model is generally used in combination with other business approaches (<http://www.barnesandnoble.com/affiliate/intro.asp>).

The pay-per-click model can also be used in reversed mode. If users are very active they can gain “points” which they can trade with other users or the business owner.

A reversed pay-per-click model is used (June 2006) in P2P networks and one example is www.qtrax.com.

3.9 Community

This model is based on user loyalty. Users participate with time, commitment or emotion. The revenue is based on sale and related products and services. Examples are:

- Open source software developed voluntarily by a global community of programmers who share code openly. Instead of licensing code for a fee, open source relies on revenue generated from the related services like system integration, product support, tutorials and user documentation. Red Hat (<http://www.redhat.com/>) is probably the most well known example.
- Public broadcasting where users contribute by non-profit radio and television broadcasting extended to the web. Voluntary donations pay an important role here.
Example: <http://theclassicalstation.org/>
- Knowledge networks. Discussion sites that provide information on the sharing of expertise among professionals.

The community business model is very attractive in a P2P network. The main reason is that it keeps control over users and content. Direct Connect is a very good example of a community P2P network where there is strict control. Direct Connect allow users to share files over the Internet without restrictions or limits. The service is free from advertisements but relies on voluntary donations. To join the network each user has to make content available from his/her hard-disk. Dependent on how much a user makes available he/she can enter certain "hubs". Each hub has its own rules and is governed by an operator that has the power to exclude members if they do not behave according to the rules. In the Direct Connect software for hubs there are mechanisms to check content with respect to mal-ware, spy-ware, quality etc.

3.10 Subscription

Users are charged a periodic (daily, monthly or annual) fee to subscribe to a service. Combines often free content with premium content. This business model of often combined with the advertising model. Examples are:

- Text, audio and video content.
- Internet Service providers (ISP) offer network access and related services.
- Hosting

Subscription services are always very popular since there is a decent forecast of the service provider's income. Subscription services using P2P technology exist. One example is www.mp3.com, which offers the P2P file-sharing service iMesh and charge users to download music with the restriction that the music is available only as long as the user pay the subscription fee.

3.11 On demand

The “on demand” model is based on metering usage. Metering services are based on actual usage rates. Examples are:

- Internet Service Providers that charge usage by the minute.
- Internet Service providers that charge by the bit.
- Content providers offer a kind of metered service for example a user is allowed to read a certain number of pages for a certain amount of money. As an example www.slashdot.org offers 1000 pages for 5\$.

3.12 Resale

Resale of content, also called super-distribution means distribution that starts with the owner of the content and enables others to redistribute the content but under their own business terms. The prerequisites for this to be possible are functions such as payment and DRM technology [10]. A distributor buys content on his/her own risk and can then resale the content. In this virtual world it is not as in the physical world where one can send it back and be refunded.

4. Discussion

4.1 General

The business models presented here exist on the web today and most of them have gone through several steps of development. Some of the models mimic traditional business models in the real world but the web has lowered the barriers for new entrants in the marketplace and in particular it has been easier to find new customers worldwide.

The present technical solutions are classic client-server based realisations. P2P systems have quite different characteristics, as we have described, that will lower the barriers even more than the web has done so far. After the closing down the first P2P network Napster⁵ a large number of P2P networks have been started. Most of them choosing more and more distributed technology to circumvent the problems for users to be discovered or the content they are sharing, since many of the networks have been declared illegal by the content industry.

The reason for choosing P2P network technology is simply because the initial investments are so low. The cost for the server from where the users download the P2P client (often available in the open source domain) and other content linked to the service plus cost for broadband communication is so low that almost anybody (that has the skills) can do it. A moderate server costs less than 1000 € and installing the server in the premises at a hosting service provider, which includes broadband communication, costs about 260 € per year. This means that the initial investment costs are very low, and can be even less if you have the skills.

If there is interesting content (music, video etc) there is a good chance that quite many users will be attracted. For a site with many users there is always a possibility to get some income from advertisements. The problem for most networks has been to organise the business in such a way that they are respectful to content owners. A large proportion of the P2P networks in mid 2005 are not respectful to content owners. On the other hand most of the networks have content that is in the open domain in combination with copyright protected content. For the average user it is very difficult to judge which is which.

In June 2006 many early P2P networks have either closed down or started a journey towards becoming legal. The methods to become legal are to introduce technology such as DRM, fingerprinting, watermarking, end-user licensing agreements for the P2P network software or combinations thereof. Of course agreements with content owners are necessary. Revenues will come from the users, advertisers and sponsors. This revenue is used to pay the fees to the content owner

With new technology, new actors between content owners and users, new business models will be based on a complex interaction between copyright law, contract law (licensing agreements), business practices and technology (DRM, watermarking, fingerprinting).

We have listed a number of already existing basic business models on the web. It is likely that new models will be combinations of several of the basic business models.

⁵ Comment: Napster was not a P2P network in a strict sense since its operation relied on a central server.

4.2 Some legal and business issues

On line and in particular P2P business models are complex interactions between copyright law, contract law, digital rights managements (DRM) schemes and business practices. It is not the purpose here to cover all complex interactions but merely point to some of the most important ones to be able to comment some of the business models later in this report.

It is important to understand that there are two ways (refined here) to look at business models and business development from a legal side:

a) support an established content industry, where the industry can have a closer control on how, where and when content can be used.

or

b) support users curiosity and interest to find new content and boost inspiration and creativity.

In case of a) there is a stronger emphasis on the IPR regime and use of DRM for control and in case of b) the emphasis is more on contract and licensing issues. Case b) is closer to the open content/open source movement than to the IPR regime.

Contract – copyright intersection:

This intersection is about using contractual means to reallocate copyright entitlements.

In P2P networks there is (or should be) a contract or a license agreement (often referred to as terms) that regulates the users obligations when he/she has downloaded the P2P network software. There are many features in such a contract and the variations are large but the main ones in this context is that

- the terms refer to copyright law. The user must bind him-/herself not to deal with copyrighted content in such a way that rights are infringed. The difficulty here is that normally the user do not know what rights are connected to a specific content or where such information can be found.

- the terms refer often to a geographical law (e.g. a country, a state) that governs the contract. On the other hand the contract sometimes mentions that Internet is global and **all** laws have to be followed. The problem here is that it must be very difficult to impose laws from one geographical area in other territories. The other problem is that the user will not have any possibility to conclude which laws apply.

- the terms refer to the liability of the content/business owner.

In general the owner do not accept any liability and put all the requirements on the user.

DRM and copyright intersection

This intersection is on how to use DRM technology to enforce anti-circumvention laws. DRM is a collective name for many methods to protect content. First generation DRM technology protected the content, second generation DRM goes further and tries to protect also how

content is used. The first generation technology protected content through encryption and the content could only be read with hardware in combination with a correct key. The shortcomings of this method are the length of the key. As processing capacity increases it becomes easier and easier to break the protection. Thus the second generation DRM has another approach. One is licensing rules built into the content. Rules embedded solely in the content are vulnerable and easy to circumvent. To solve this metadata are built into the content and rules are linked to these data in special license servers, which the user needs to connect to. Once “payment” is secured the material can be sent to the user. The user can be verified by user accounts and the content controlled according to the rules. Besides just controlling who can access the content it is possible to prescribe how the content can be used. Examples are which media player must be used, if the material may be copied, how many times a certain content can be used and even if copies are allowed on other terminals.

Belonging to the second generation DRM methods are digital watermarking. Here a content identity is created by combining a series number of the users hardware with the content product key. This identity is sent to a server, which later controls usage. Digital watermarking is also vulnerable and if copies are made they can be distributed in large quantities.

Another type of second-generation DRM methods are methods that supervises the users activities. They are software-based systems, often in the form of a drive routine (sometimes also masked), that can take control over the hardware and for instance enforce the user to use specific software to read or play content.

DRM and user acceptance

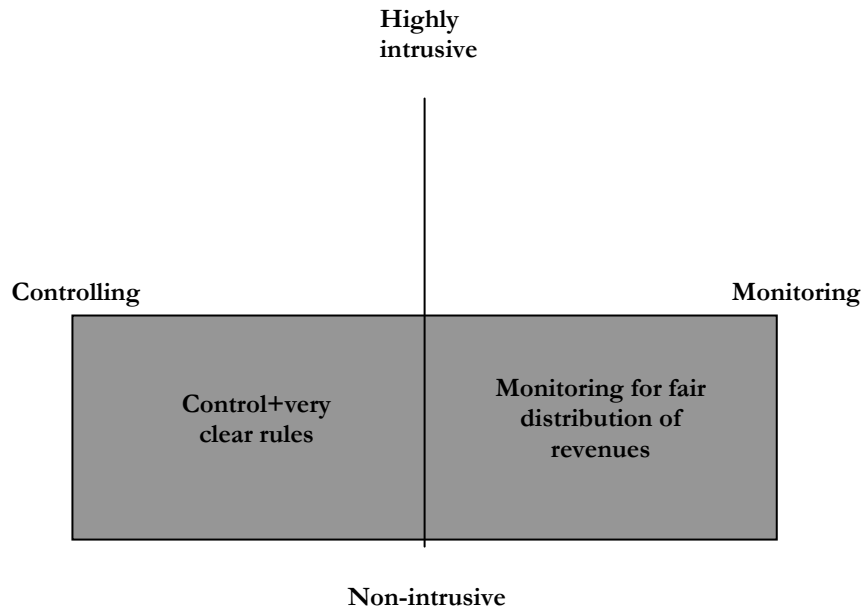
There are several critical issues related to DRM. The Annex to this report, which is a focused study and submitted to eChallenges2005, discusses content owners desire both to monitor and control the ways users interact with the content versus user acceptance of these aspects of DRM systems.

High control makes users less active and low control makes users to experiment and gain experience. There are several examples of new business development showing that experimentation is crucial to business success. Development of SMS-based services is one such example, where user experimentation has played a significant role in showing what new applications should be developed.

DRM systems can also have different levels of intrusion. Highly intrusive systems give the content owners possibility to access the users terminals and can in such cases control usage and thereby also infringe user privacy. As an example, early subscription business models could incorporate methods to delete or make the content unavailable, if the subscription was not paid. Users subjective experience was that the content was deleted from their hard-disk and thus very intrusive and unacceptable.

One of the observations in the annexed study is that users are one step ahead of the content industry and finds ways to circumvent DRM. It is likely that the users will continue to be one step ahead as long as DRM control prevents users from experimentation and imposes a strict control of usage. Another conclusion in the study is that users and content owners will

find a mutual area where DRM is accepted by both parties for future development of business models. The grey area in the figure below indicates this.



Related to DRM is the issue of fair use. Fair use is a fuzzy concept and DRM systems today do not allow for fair use. It is possible to design DRM systems that within limits allow something like fair use, but then the user have to give up some of his/her privacy. An example is that content may be used on a certain number of terminals that are authorised by the content owner/ business owner. Privacy issues here are that terminals must be authorised and permission asked for. Apples I-Tunes use this principle.

Another critical issue is how transparent the DRM technology is – if content can be moved or not between technical platforms. It is in the users interest that DRM systems are transparent but from a business point of view it could be worth very much if a company can bind users to a technical platform for a particular content.

Another fuzzy area is the intersection between DRM and open source. As we described above open source is a creative community process developing computer software, which in the general case falls under the copyright regime but is complemented with special user license agreements. In open source software security functions such as eligibility to grant whom for instance has the right to make program up-dates. Such security functions can be developed using DRM technology or vice versa. This could be interpreted as technological lock-in to a special product. To avoid this lock-in the security functions must be made available to everybody, which in turn means that malicious software can be put into the open source software and thus it opens up the way for malevolent persons.

DRM – contract intersection

It is not uncommon that the user through terms in the contract is obliged to download software either from other vendors for a particular reason (statistics, firewalls, virus and other control) (Kazaa end user license agreement. www.kazaa.com) or software and/or content from the business owner but with no reference for what purpose and the user has to agree beforehand to agree also to any additional terms for that software and/or content (Myspace.com Terms of Use Agreement. www.myspace.com). Such additional terms will not be sent to the user but posted on the business owner's homepage and it is the user's obligation to check this.

Business practices – DRM intersection

In a business plan one of the most important section is about customer benefits. What does the business offer the customers and how does it fulfil customer expectations. Which needs do the offerings fulfil? In case of a) above we may very well come close to a situation where the business is like “we want to sell what we have and develop and we want to protect the product and keep close control of its use”. In case b) the business situation is different – the protection and control need not be so tight. In both cases good understanding of the customers expectations are necessary but the DRM solutions are quite different. In case a) we probably have a controlling and intrusive DRM solution and in case b) it is monitoring the use. Both situations may be acceptable to the users as long as they fulfil customer expectations and requirements. Many initiatives have been taken to develop DRM technology [11] but few of them have started with user acceptability and requirements. The Annex to this report analyses acceptability as functions of controlling versus monitoring and intrusiveness.

Discussion around a hypothetical business model

P2P network business models listed above will probably be used in combination. It could be worthwhile to formulate a hypothetical combination and discuss it a little.

For this hypothetical business model we combine

Advertising model: a fee zone with public domain content.

Subscriber model: a closed zone available only if the users pay the subscription.

An incentive program: Users are “paid” for their participation.

Why has this hypothetical model been chosen for discussion? It is a very natural approach. To our knowledge the combination has been around on the web since at least 10 years.

How does this model work?

In the free zone the user is free to use the available content as much as he/she likes but is subject to advertisements of “any” kind that the business owner decides. (A reasonable license agreement contains a note that the user will be subject for advertising). In the free zone the P2P software can keep track of the users preferences and communicate this back to the business owner (should also be reflected in the license agreement but seldom is) so

- advertising can be shaped according behaviour
- knowledge can be sold to advertising agencies
- etc.

In the free zone there could also be some “registered” content for the user to sample. This content could be there also with an advertising purpose (the business owner wants to promote related virtual content, which can be found in the closed zone or even something in the physical world (happenings, concerts, books, clothes, films, etc)). In the free zone the user will frequently be encouraged to subscribe to the closed zone.

Users can opt to subscribe to a paid version of the service – a closed zone that offers the users access to all the content in the closed zone. This zone is governed by DRM and the content is available as long as the subscription is active.

Various methods for DRM can be used depending on the business owners strategy. The range of control can be very large – from just monitoring how often content is used to controlling software with properties to discover known programs for copying files and methods to enforce the user to use special software to be able to read or play the content. The debate on DRM is very vivid to say the least.

Income from advertising and from subscriptions will be used for payment to content owners, cover costs for operations, development of the site and P2P software, and profit.

Incentive program: in combination with the free zone and the subscription service there may be some incentive program to encourage users to be active. Users may “earn points” if they participate in different activities. Points can be traded for content, goods, subscription fee etc. (compare with point earned for flying with a certain airline).

The license agreement should reflect both the rules for the closed zone and for the incentive program.

5. New embryonic business models in the P2P domain

So far there are not too many emerging business models that are clearly visible together with P2P systems. Here we present the ones we have found. But let us start with the general observation that in principle no P2P system provider owns the content they are trying to earn money on.

The models are not presented in any order of priority.

5.1 The “weed” model

This model can be best described in 5 steps.

GET MUSIC	PLAY	WEED SOFTWARE	BUY MUSIC	SHARE MUSIC
By visiting other “weed” files	Listen 3 times for free and then buy	Install “weed” software for free to buy, find and organise music	Play, burn on CD	Using P2P systems to share music on web site or on CD. Earn money when others buy from you.

This business model is the one we have called “resale or super-distribution” above. In this model it is advocated that all can sell content and earn money. In fact all are buyers. Those who buy content do it on their own risk. Compared to the physical world there is a large difference. In the physical world you can often negotiate to return what you have bought and not been able to sell. In the physical world there is a possibility to share risks. This opportunity does not exist in this particular business model. On the other hand in this model you buy only what you like and then resell, so the situation is different to the physical world where part of what you sell maybe you do not like.

In our analysis in databases from earlier studies on users on the university network SUNET we found dedicated collectors of music. Such collectors could potentially be interested in this business model. Collectors of content could add substantial value, not only by the collection itself, but through comments on the content and providing content of guaranteed quality.

5.2 The advertising model

The advertising model is very suitable for the web and it is not surprising that this model also turns up in P2P systems. There are 2 examples:

Grokster

Provides a P2P environment where users share music and the Grokster site earns money on advertising. The model builds its business on the idea that a large user group is interesting for advertisers.

Note June 2006: Grokster closed its operation in November 2005, when the United States Supreme Court found the service illegal. The history around this case can be read in short form at <http://en.wikipedia.org/wiki/Grokster>. The general conclusion and the future impact of the case may only be to require software companies to more carefully advertise in their terms to discourage illegal downloading, which grokster had not done.

Going through the terms of several of P2P networks it is easy to find paragraphs saying that the user must bind himself/herself not to transmit material that is either copyright protected or unlawful or something similar. The case has not caused P2P networks to stop, but has clearly shifted the obligations to the user. For the user it can be very difficult to find specific data if a piece of content is copyright protected or not. To elaborate somewhat on this let us look at the search engine Google.

Grokster "vs." Google:

The search engine Google (and others i.e. Yahoo) earns a lot of money on advertising (general advertisements and sponsored links etc). Doing some datamining in the Google indexed material it is not too difficult to find material that is copyright protected. The following links leads to such material:

<http://www.granquist.de/uddevallanoter.html> which can be found when taube + noter⁶ is written in the Google window. The website lists several Swedish artists music notes and lyrics on PDF:s.

Using a little more elaborate search elements in the Google window one can find: <http://www.iol.ie/~murphypj/Stones.htm>. Here there is advertising for a guitar course but there are also lyrics from Rolling Stones together with chords (Rolling Stones?).

Google is not very different from Grokster in the sense that it provides addresses on Internet where it is possible to find content and much of that content is copyright protected material. The user client to find it is the browser and not a specific P2P client. It is up the users that provide content on own servers to understand and mark what content Google is allowed to index and publish if the server is "made public".

⁶ Taube was a famous troubadour in Sweden and the question asks for his (music)notes.

Bit Torrent

The Bit Torrent business belongs also to the advertising business models but it accepts donations to the development of the P2P open source protocol underlying all clients and services. In this business model users agree to submit content in the form of “torrents” which they agree to share with others. It is up to the provider of “torrents” – e.g. the users – not to submit any copyright protected material.

Evolved Bit Torrent

Bit Torrent is starting to enhance their P2P system and expects to add to it search result oriented advertising – i.e. understand the queries and the content the user asks for and draw intelligent conclusions on the type of advertising that could be of interest for that particular user.

Note June 2006: After the Grokster case Bit Torrent decided in November 2005 to change terms and business model to a legitimate service.

(http://www.businessweek.com/technology/content/may2006/tc20060508_693082.htm)

5.3 A give away model

This model is not part of the basic models on the net described above.

In this model the business owner provides ”something” for free that users want or is interested in and earn money on supplementary services/information/goods. There are a few examples:

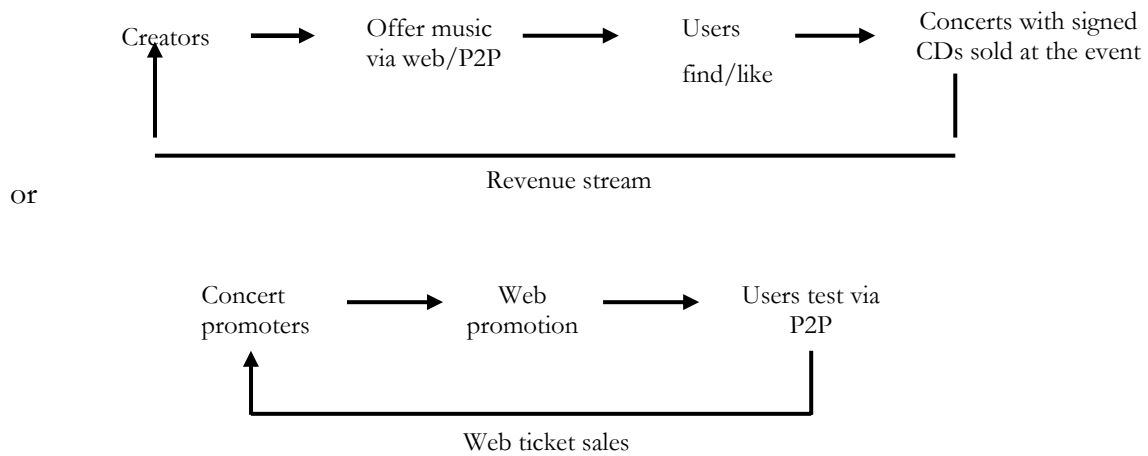
SKYPE

Here the business owner provides Internet telephony for free with a P2P system and earns money on supplementary services such as

- links to the fixed telephone network
- links to the mobile telephone network
- fax
- voice mail
- videoconference

Web promotion model

In this give away model the creators offer music for free on the web with P2P technology and the consumers like and find it and go to concerts and buy signed CDs.



5.4 Direct sales

Sell content to consumers in the P2P marketplace - first by using DRM, then through universal ISP-based billing.

Implement and build-out the new business model in three phases:

- Phase 1: Make the content of top-five major labels available for sale in the P2P marketplace with existing credit-card billing
- Phase 2: Expand payment options for consumers by adding the option of charging music track downloads to phone bills
- Phase 3: Implement ISP-based billing that will allow for universal payments for the majority of downloads of copyrighted content.

This model has been presented by DCIA⁷ in October 2003.

5.5 Subscription model

Sell content to consumers in the P2P marketplace - first by means of a universal basic subscription, then through tiered genre-and-theme channels, and ultimately per-track sales.

Implement and build-out the new business model in three phases:

⁷ DCIA: Distributed Computing Industry Association

- Phase 1: Impose a monthly music-access fee to be paid by all broadband ISP subscribers who have installed P2P file-sharing applications.
- Phase 2: Introduce optional premium channels of newer music and editorial content using broadcast encryption technology.
- Phase 3: Add DRM protected a la carte offerings of individual music tracks of newest releases with value-adding features.

This model has been presented by DCIA in December 2003.

5.6 User incentive model

Sell content to consumers in the P2P marketplace - first by digital watermarking and DRM, then through up-loader incentives and user participation programs.

Implement and build-out the new business model in three phases:

- Phase 1: Combine file-fingerprinting with DRM for label-seeded and consumer-originated copyrighted music in P2P.
- Phase 2: Provide incentives to high-volume file-sharers to convert legacy music collections and become licensed redistributors.
- Phase 3: Introduce user-friendly software system to permit consumers to register and monetize original musical works.

This model has been presented by DCIA in February 2004.

5.7 DRM business models

DRM has been heralded as THE solution to the content industry's dilemma. There is a great interest from the industry in this subject, which also manifests itself in the special study carried out within eEurope on this matter. We have carried out a special study (and workshops) on this. This study is annexed to this report and also submitted to the eChallenges2005 conference.

The DRM models defined in this study are:

B2C (business-to-consumer) DRM business models

Classical supplier-recipient payment models, where the supplier (business) delivers all the products to all recipients (consumers), whose payment is then transferred back to the supplier. In this model P2P systems are not used and content is stored on central servers, which means that DRM is easy to control.

C2C (Consumer to Consumer) DRM business models

The producer uses the consumers' computers to distribute music, and a central server to validate the copyright status of the files to be distributed. Only approved files are distributed and sold through the network. The difficulty with this model is that once the DRM protection is removed the content owner loses the ability to make profit.

ISP (Internet Service Provider) DRM business models

The ISPs pay a certain fee per subscriber to the content owners. This is based on the facts that a fast connection is required to easily download music, movies, games and other content and that the ISPs already charge the subscriber a monthly fee for unlimited use. This model was used early in the web's history but was not developed very much since ISPs did not want to be connected to content.

5.8 DRM Business models for the future

The Annex to the report presents a few business models for the future.

Licensing models

Users buy a license to freely download and share files on the Internet, using whatever technological solution is best for the purpose. Copyright owners will in turn receive statutory license fees, fairly distributed amongst them.

Two Micro models

Micro-refund: Collecting small fees for each copyrighted work accessed and totalling them into a monthly bill. Collecting all small payments into one bill that is paid by the consumer could be expensive. Flat rate or prepayment could be solutions.

Micro-payment: Voluntary payment for content that is free to download.

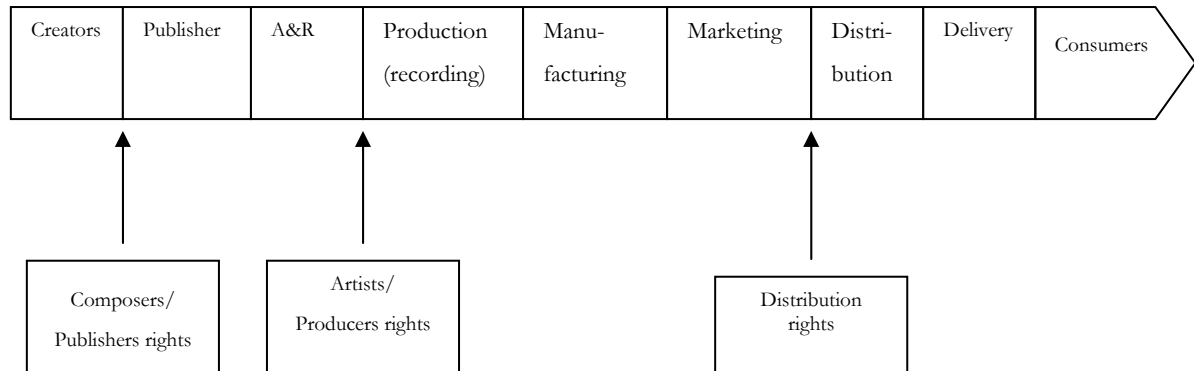
No copyright

Earlier in the document this method is also referred to as "a give away model:"

In the music case earning money on concerts and commercials by creating interest on the web with free content. This model has been tried and worked very well for some artists. Regarding other content the company SKYPE offered free P2P telephone connections and earned money on other services. Other examples, although not P2P, are blogs, where authors present free material in the blogs and thereby promote books (Cory Doctorow, an award-winning science fiction writer and co-author of the blog BoingBoing.) Linda Skugge, a Swedish writer has started a blog, which you can access if you pay ~70€ as member.

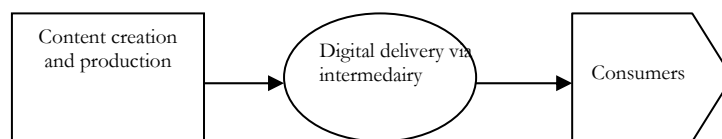
6. On value chains

The traditional value chain in the music industry is described in the figure below together with the location of different rights holders.



A lot of friction in this value chain is caused by the increasing roles of new emerging players particularly involved in digital music distribution. The new players are on-line portals, content encoding technology providers, P2P technology providers, hosting, DRM providers, encryption technology providers, providers of watermarking and fingerprinting technology of digital content etc. On top of that one has to take into account the characteristics of P2P systems discussed in chapter 2, lowering the barrier of entry for most of the players and in particular for content creators.

A simple new value chain for on line content (not only music) could look as the figure below where P2P technology plays an important role in digital delivery



7. User oriented approach to business models

7.1 A starting point for the discussion

In our future work we are going to analyse business models from different points of view. In order to carry out this analysis we need some reference points and requirements. We are of the opinion that such requirements are best found by studying the users. In-depth interviews with experienced file sharers from the user studies (Work package 3) will serve as starting point for the discussion of business models. From the interviews we can identify different user groups, each one with a set of characteristics that we believe are important for the analysis. That means that the reasoning at this stage of investigation should be considered as a hypothesis, with the main purpose to serve as a base for forthcoming workshops with experts from the field. Below we outline 3 different user categories to be used in the future:

- Free-riders
- Samplers
- Community members

7.2 Young people and adults

First we can divide the users into two groups: young people and adults. Young people do not work, they have limited income and thus very little money for consumption. On the other hand they have quite a lot of free time at their disposal. Most of them prefer spending their leisure time with friends and classmates, where a popular discussion topic is popular music, the artists and everything else surrounding it.

For the adults the situation is the reverse: Working means less free time but more money for personal consumption. With no family there is still time for a social life, often with music as an important ingredient.

7.3 Copying replaces money

By their friends or elder brothers and sisters, young people are introduced to the world of music, where they try to orient themselves. In the best cases they can afford to buy the CDs of their favourite artists, where the pictures, texts and biographies contained are sometimes as important for the fan as the songs.

The rest of their abundant music listening they have to get for free. In the past radio and TV offered this “free” source of music. What we have witnessed in the past 6-7 years is a shift to the Internet with its huge availability of diverse materials. Individuals use any technology

available to copy the records of their friends or the top lists from the radio; burning a CD or copying to the hard disk. One generation ago cassette tapes were used as copy medium.

The Internet made it possible to exchange songs in digital form on the net. In the early years they used BBS software passing the songs as attachment between each other, from 1999 and on by Napster and other file sharing services.

7.4 Quality deficiencies

It is important to keep in mind the quality deficiencies of copies compared to the original records. The missing CD cover is already mentioned and in many cases the sound quality of the copy is inferior. The storing and retrieval of the copies tend to be quite messy, specially when there are a lot of downloads, as each user makes a personal system that is often not very structured.

Often the process of downloading is not successful. The desired recording is not found, the transmissions is interrupted and has to be repeated, or more recently, “spoof files” introduced by the record industry have started to disturb the process. . However, for most young people the alternative is not having access to the songs at all.

7.5 No moral doubts

Young people do not perceive any moral doubts about copying. There are at least three explanations: 1) All their friends are doing the same, 2) their parents do not mind as they did the same thing when they were in that age, and 3) a copy is not considered the same thing as the original record. Conversely most parents and children would feel uncomfortable with original records that have not been paid for.

7.6 Forms of payment

Other matters of importance are forms of payment that are available. Young people have no credit cards or Internet bank accounts. On the other hand they are often very skilled in managing the cash cards of their mobile phones and they know how to pay a subscription to a magazine.

7.7 Pay for convenience

The music consumption of adults differs from that of young people in many respects. In general there is less time to spend searching and downloading songs on the PC. This is particularly the case with families with children. Secondly, the tolerance towards the less than perfect quality associated with copied music tend to be less. Although a song may be available

on the Internet for free, for quality reasons the adult consumers often prefer to get the original CD, at least if there is a convenient way to purchase and the price is considered a fair one.

7.8 Avoid social embarrassment

The decision to choose original CDs is further strengthened by the fact that dealing with copies offers very little of prestige amongst peers. Many people would feel a bit ashamed to tell colleagues and neighbours about their darknet activities. The negative social aspect is likely to be reinforced when entering a stage of family responsibilities requiring people to identify themselves with respectable citizens.

7.9 Communities

There are cases where file-sharing activities are likely to be continued even among people with good financial and social resources. Sometimes the music listening develops into a very personal directions This is taking place regardless of age; young people as well as grown ups may express deviations from mainstream taste. Then they often find that the market does not offer a satisfactory range of choice on the supply side. Instead the music consumers organise themselves in Internet communities, often with a high degree of personal involvement, where one important purpose is to share their records within the group.

From a social point of view the community members do not consider themselves as law-breakers or anything related to immorality, rather they look upon their activities as a hobby with certain degree of exclusiveness. There are examples of similar activities from other cultural areas: Hobby planters organising meetings for the exchange of plants, and reading circles where the participants circulate fiction. These enthusiasts would not for a moment imagine that their activities would harm the interests of the seed company or the publisher. Indeed many publishers would probably see this as a vital indirect way to market products.

7.10 Free-riders and samplers

In his article *A Grand Unified Theory of File sharing*, Edward Felten, Professor in Computer Science at Princeton University [12], suggests a breaking down of the users of file sharing into two subpopulations, *Free-riders* and *Samplers*.

Free-riders are generally young. They have few if any moral qualms about file sharing, and they tend to assume that others feel the same way. They use file sharing to accumulate libraries of music, as an alternative to buying CDs.

Samplers are generally older and more risk-averse. They are highly engaged with cultural products of all sorts. They are aware of a moral conflicted regarding file sharing, and use it mostly to download songs that either aren't for sale, or that they don't value enough to pay for. They buy music that they really like, and file sharing causes them to find more music they like, so it tends to increase their CD purchases.

The observations are based on his synthesis of two econometric studies [13] *Oberholzer & Strumpf (2004)*, [14] *Boorstin (2004)* and various survey-based studies. This taxonomy adapts well to the characteristics of our user groups.

Young people are mostly free-riders. Their limited economic capacity restricts them from buying original CDs only with their very favourite artists. For the rest of their music consumption they are dependent on copies, and where the lack of quality and convenience is the price to be paid in order to get any access to the music at all.

Adults, with better purchasing power, have less available time to get access to the music. They tend to be samplers, using file sharing as a tool for music selection, but prefer to pay for quality and convenience if the conditions are fair.

Community members of all ages tend to develop exclusive demands that may be difficult for a mainstream distributor to satisfy. Besides, the exchange of comments, tips, recommendations and opinions related to the music or the artists may be as important an activity as the exchange of the music itself.

It comes therefore as no surprise that the established recording industry demonstrates an ambivalent approach. Whilst officially preaching a convincing message that file sharing is stealing and that P2P networks (and the technology) are illegal, the industry is engaging more and more in “sniffing”, i.e. listening to what is going on in these communities, in order to better judge that fickle quality, public taste, or in order to make their own marketing more efficient.

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DRM – Intrusion or Solution?

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Abstract: DRM could be the solution to the content industry's P2P dilemma, but content owners' desire to monitor and control the consumer's use of content can be perceived as an intrusion of privacy. High control makes consumers less active and low control invites them to experiment and to gain experience. Digital music files can easily be spread. Therefore legal services prefer keeping control over the music. This study reveals that consumers are one step ahead of the content industry, finding ways to circumvent protection and laws, and that the music industry is awaiting the "right" DRM business model. Online Music sellers basically rely on B2C DRM business models, but attempts have been made with C2C models, using consumers as distributors, and ISP models, where ISPs pay to collecting societies for all file transfers of copyrighted material in their networks. Future models include licensing models, micro models, and no copyright at all.

1. Introduction

DRM or Digital Rights Management is a term frequently referred to, both in copyright legislation as well as by content owners seeking to control use of their intellectual property. However, the concept encompasses two very separate issues. DRM systems can have a monitoring function (observing what is transferred over the network), as well as a controlling function (affecting what consumers can/cannot do with content in the network or on their own computers), or a mixture of both.

Content owners desire as a rule, to both monitor and control the ways the consumer uses their content. It has become more and more difficult, however, to distinguish between monitoring and control aspects of DRM systems. Consumers may accept monitoring to a certain extent but not all forms of control. High control makes consumers less active and low control invites consumers to experiment and to gain experience. Low control generates traffic in the network and can allow for new and unexpected applications to emerge. On the other hand low control may facilitate for illegal activities to flourish.

DRM systems can also encompass different levels of intrusion. A highly intrusive system allows the copyright owner access to the equipment a consumer uses to play or store digitised materials, as well as the ability to control such usage. A highly non-intrusive system merely observes in general terms which materials are consumed, but not in detail by whom, where and when.

In the U.S. as well as in Sweden and other European countries, content owners and their representatives have started several legal processes to stop and prevent illegal distribution of copyrighted material. In March of 2005, the Swedish Branch of IFPI, the Swedish Performing Rights Society (STIM) and the Swedish Anti-Piracy Bureau (Antipiratbyrå) together with three content owners, applied for and were granted a court order for an "intrusive investigation" (the term intrusive investigation, or 'intrångsundersökning' in Swedish, was implemented in Swedish Copyright law a few years back) on the premises of a Swed-

ish ISP, claiming that they would find 12 named, copyright protected works owned by the content owners. [1] To be able to perform this investigation the ISP was not notified in advance to prevent the company from deleting the works in question from their server, and the server was to be confiscated awaiting technical investigation. This event merely shows the need for all parties to seriously addressing the DRM issue in a positive and solution-oriented manner.

2. Objectives

The objective of this study was to test the validity of a hypothesis that DRM systems must not be overly intrusive to enjoy long-term consumer acceptance and thereby be successful. Foremost the Online Music Industry was studied to verify or reject the hypothesis. Furthermore the objective was to refine solutions for balancing the demands of security/integrity and control and to suggest business models and design solutions for such DRM systems. The study would investigate, among other things, the possibilities to apply similar methods as are used for auctions and similar applications where the individual behaviour is confidential but the result for the whole group is open.

3. Methodology

The analysis is based on the following framework that considers the balance between control – monitoring, on the one hand, and intrusive – non-intrusive technologies on the other.

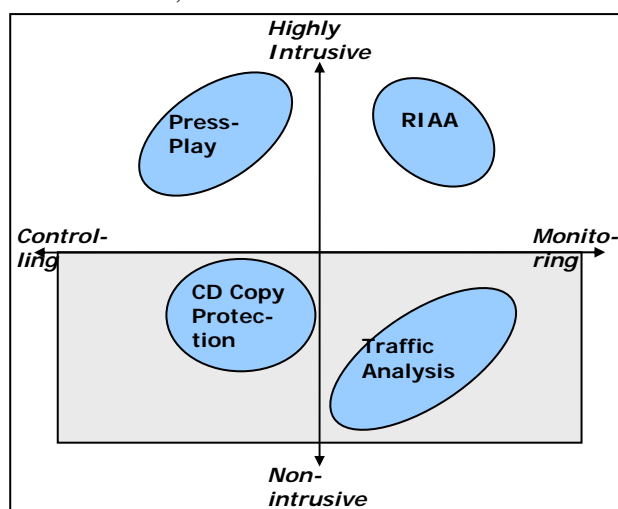


Figure 1. DRM Security/Integrity Issues

In the NW (i.e. highly intrusive/controlling segment) and NE segments in figure 1 above one can find examples of DRM activities which have not fully met with consumer acceptance, or have risked a severe consumer backlash. Highly intrusive DRM systems are those, for instance, which involve a supplier having direct access to a consumer's hard disk with the ability to reform or even erase different files remotely. An example from the NW area is the now defunct music service Pressplay. Here, on-line users could subscribe to a music service, but what they had bought became erased once the monthly subscription lapsed. In the NE segment we have the monitoring used by the Record industry in the USA to find "illegal" files on consumers' hard discs, trace their origin, and in some cases even sue some such consumers.

In the SW segment we find some current methods for hindering the copying of commercial CDs, most of which are not particularly foolproof; the control function is clear, but so are the rules of play for the consumer. Finally in the SE segment one can conceive a number of DRM systems which monitor actual usage of protected content openly for the consumer, the only purpose being to facilitate a fair distribution of potential revenues. Our

hypothesis is that DRM systems which will work and be acceptable to both users and suppliers must reside primarily in the SW and SE segments (the grey area in figure 1).

Our focus was on studying how monitoring and controlling through DRM systems is used in the music industry. A number of different music services have been categorised based on the levels of intrusiveness and control in their embedded DRM systems. The lowest level of intrusiveness, as defined above, is characterized by interested parties merely collecting personal information about consumers use and habits, albeit often without their consent. The highest degree refers to companies having the ability to reform or even erase files remotely.

4. Business Models

In most cases consumers have been one step ahead of the music and film industries. From yesterday's sneaker-nets to today's "illegal" Peer-to-Peer (P2P) networks, users have always been pioneering the quest to circumvent protection mechanisms as well as laws and regulations. [2] Users have tended to opt for the easiest approach in order to acquire music. A new and in many cases better way of distributing music arose with the advent of the MP3 format. Adjacent to the MP3 format, MPEG2 and MPEG4 formats have simplified and improved movie distribution. These inventions led users to come up with new, ingenious, yet often illegal ways of copying and distributing music and movies. In the music area this also led to new ways of marketing and making music available, especially for bands that were practically unknown, except for a local community. These bands could release their songs on the net and receive feedback from all over the world.

The introduction of MP3 also led to a quick rise in popularity for P2P networks, which are far from being invented by any copyright infringers, and the popularity is still rising. With millions of music files available just a click away, and "free" of charge (i.e. no added charges), there is no reason for the networks not to increase in popularity and number of users. The simplicity and "low cost" are the main reasons for people to download copyright protected music from P2P networks, even if it means they are criminals, and aware of it. Why pay for something free? In comparison to purchasing music in a legal online music store, there are also other aspects to a P2P network that makes it far superior [4]:

				Cost per Album	Percent Savings	
1	Producer	→ Wholesaler	→ Retailer	→ Consumer	\$20	0 %
2	Producer	→ Wholesaler	→ Retailer	→ Consumer	\$17	15 %
3	Producer	→ Wholesaler	→ Retailer	→ Consumer	\$7	65 %

1. Traditional Value chain
 2. Producer acting as retailer e.g. web-based CD outlets
 3. Producers selling digital content directly to the consumer

Figure 2 - Different value chains for the music industry[3]

- the recording industry has been very reluctant to embrace the new opportunities made possible with new technology
- the music industry is awaiting the right model enabling safe distribution and ensuring high revenues – many proposed new models have been opposed by the industry
- major labels have just recently started to accept the potential when combining traditional value chains with digital technology – several levels in the value chain can be eliminated resulting in reduced cost, and thus higher revenues. (see figure 2, above).

When extending the third value chain to include the following step, where the consumer looks for the physical experience (i.e. concerts, CDs, t-shirts and souvenirs, etc), only a fraction of the revenue stream comes from sales of recordings on physical carriers. [5] The changing prerequisites of the market have forced many record companies to try to reduce their reliance on mechanical revenues. [6]

Some of the advantages from a producer/consumer perspective with the third value chain, apart from fewer value adding steps, is a closer contact with the consumers, reduced selling time, lesser need of warehouses and, perhaps most importantly, more customers. There are also environmental advantages, assuming that the first value chain implies an overproduction of the physical carriers, and heavy environmental load due to physical transports. However, music services today are generally not profitable since most of the revenues goes to the music industry. [7] It can even be argued that offering music free over the net, where a vast audience can be reached using file-sharing technologies, in fact can be more profitable than producing physical products before reaching the market. [8]

Consumers and producers of digital content, as well as network and service providers, must make efforts to reach compromises and overcome cooperation issues in order for the digital-content services and market to evolve. [9] The three parties, including the network operators, are inter-dependant, thus, in a long-term perspective, lawsuits, piracy, and other malicious activities will be counter productive. Below, some essential issues are listed, which, in the relationship between the producer and consumer – which either directly or indirectly involves the network and service providers – will make digital music distribution truly accepted. [10]

Control over files – digitally distributed music tracks can easily be spread to other users; legal services tend to prefer keeping control over the music using a central server to keep track of all downloads and streams, central server facilitates payment regulation and access control. Control over revenues – the recording industry seeks to adopt a way of collecting and distributing royalties generated from digital music services; few online stores today have been able to gain the major record labels' confidence. Satisfying consumer needs – attracting customers is crucial for business success, thus the service must satisfy real consumer needs.

4.1 – The virtual and the physical.

Many business initiatives that started in the virtual world with very high expectations have now incorporated physical attributes that are characteristic for traditional consumer-producer relationships. Evidence from the music industry suggests that the huge availability of music in the virtual market has triggered an equally impressive increase in consumer demand for physical experiences in form e.g. live concerts. The virtual cannot exist without some physical connection in the digital economy. However, assuming that the physical artefacts can have a variety of qualities, some prerequisites are essential for both customer and content-owner satisfaction:

1. a token for the customer that provides exclusive access or even status
2. an artefact that provides content owners “sufficient” possibilities to monitor and control the customer without placing unreasonable demands as regards e.g. privacy
3. a solution where limits to the consumer's freedom to experiment and adapt are on an acceptable level

4.2 – B2C (business-to-consumer) DRM business models

The B2C models are classical supplier-recipient payment models, where the supplier (business) delivers all the products to all recipients (consumers), whose payment is then trans-

ferred back to the supplier, although advance payments to personal accounts and subscription solutions exists.

Online Music sellers basically rely in the main on B2C models. iTunes and Napster2.0 are two different examples, with the former relying on unit sales via downloads, and the latter offering a subscription model. Music downloaded via the subscription model usually results in all purchases being un-accessible once the subscription is cancelled. iTunes and Wal-Mart offer the possibility to purchase single tracks that can be copied to physical carriers (CDs or DVDs) for unlimited use. Other B2C models are:

- Advertising models; content providers (mainly small and unsigned acts) can upload music for free distribution and rely only on revenue from ad sales or promotions
- Value-added models; adding a case and a book with lyrics to the CD, or a membership to a fan-site where extra tracks and videos can be downloaded

The advantage of the B2C models is the fact that content is stored on a central server, making DRM much easier to control. The negative impact of the B2C model is that when starting an online business, the outlay for buying a server, maintaining it plus the cost of purchasing adequate software, may result in the initial costs being too significant for an entrepreneur to regard the model as viable. Another drawback is the sensitivity of the system. If the server goes down, everything stops and customers may opt to visit another store instead and the business loses predicted revenue. [11]

4.3 – C2C (Consumer to Consumer) DRM business models

There have also been attempts to introduce C2C models, where the producer uses the consumers' computers to distribute music, and a central server to validate the copyright status of the files to be distributed. Only approved files are distributed and sold through the network. Weedshare and Altnet are two examples. Altnet even uses the P2P client KaZaA as an infrastructure for distribution, thus creating an overlay network on top of the Internet [6]. The drawback of the Altnet solution is that once the DRM protection is removed the copyright owner loses the ability to profit on his or her creative work.

In the C2C models the supplier makes the recipients act both as distributors and customers, and as a consequence the supplier is able to reduce its cost for distribution. It is fair to say that this way of distributing legal music online has its origin in the rise and fall of P2P networks such as Gnutella.

The subscription C2C model also exists, which is almost identical to the B2C case, except for the use of consumers in a P2P service for distribution, however, traffic is monitored and only approved tracks can be distributed.

4.4 – ISP (Internet Service Provider) DRM business models

A third group of business model where the problem of digital rights owners' revenues could be solved are the ISP models, where the ISPs pay a certain fee per subscriber to the owners. This is based on the facts that a fast connection is required to easily download music, movies and games, and that the ISPs already charge the subscriber a monthly fee for unlimited use. This is the model used in another service, PlaylounderMSP, which was launched commercially in early 2004 [12]. Playlounder MSP is a partnership between the music site playlound.com and the broadband service provider Bulldog, and offers fast broadband access to the internet, guaranteed quality, legal music – no additional charges for music service, files are guaranteed quality with full information, no spoofs, no viruses, no lawyers, and one inclusive price

By using fingerprinting technology the downloading can be monitored, facilitating the fair distribution of royalties to the rights owners. Playlounder MSP works as a "walled gar-

den” where users can share music with each other inside but not outside the network. Only tracks from recording companies that have a deal with Playlouder MSP are swapped and it also allows high-speed transfers between the users.

Similar to the above is the model where ISPs are treated as digital retailers with some content responsibility. In this model the ISPs would control all file distribution over the Internet. This would involve watermarking and fingerprinting technology to monitor all files transferred from websites and P2P networks.

5. DRM Business models for the future

The future business models that the study included can be grouped into one out of three different categories; licensing models, micro models, and no copyright. The models attempt in different ways to compensate creators for usage of copyrighted works.

Licensing models can, in its turn, be grouped into three different categories; “Voluntary Collective Licensing” (VCL), “Individual Licenses”, or “Statutory Licensing”, each having its pros and cons. VCL is based on the model used by radio for more than 70 years, where major labels join forces and offers licenses that allow stations to play their music. In the online-music case this would eliminate the basis for a majority of all lawsuits, and no need to change the copyright law. [13] Individual Licenses is a scheme where the individual consumer (voluntarily) buys a license to freely download and share files on the Internet, using whatever technological solution is best for the purpose, i.e. not only P2P. Copyright owners will in turn receive statutory license fees, fairly distributed amongst them. Companies offering content for these licensees could make different offers, e.g. monthly license fees or per downloaded file, allowing the consumer to choose according to their preference. Statutory Licensing is a more controversial scheme. Government would here force the copyright owners to make all their works available and in turn they would receive some kind of compensation. These licenses have been used earlier in history with pianolas, cable TV, etc.

There are mainly two different kinds of micro models; “Micro-Refunds” and “Micro-Payments”. The micro-refund scheme involves collecting small fees for each copyrighted work accessed and totalling them into a monthly bill. This has been seen as problematic in earlier studies, due to two different reasons; collecting all bills into one bill that is paid by the consumer could result in the consumer experiencing it is expensive and is reluctant to continue using the service, or the consumer receives too many bills and experience problems to see “the whole picture”. Both reasons are recognised by the content providers as well as the network operators. [9] The micro-payment scheme is also called voluntary tipping as it is based on voluntary payments for content that is free to download. Freeware programs are proof that the scheme works, but not all agree. Content owners argue that consumers’ voluntariness can not be trusted, and consumers think micro-payments makes it hard to understand the total cost of the content accessed.

A No-Copyright scheme is foreseen by some for the music industry. Concerts and commercials are important sources of revenue for artists today, and it is even argued that only the top-10 percent of the artists make money selling records. Because of this some people, including David Bowie [14], believe that copyright is an old relic that will not be part of the future. Another person who agrees with this is Wilfred Dolfsma, assistant professor at Delft University of Technology, who affirms that copyright for the music industry has served its purpose [15]. Bain & Company presented a report in 1999 [16] which analysed the revenues and the profit of the record industry. According to their findings the retail sale of music generates only 10 percent of the total profit. The main profit share resulted from advertising revenues and concerts.

6. Likely effects or results

The content industry can position itself between two extreme ends of a spectrum when considering implementing a DRM system. The first option is to stay with the traditional solution of seeking a maximum of control over consumer usage. This is characterized by restricting the content that is sold such as limiting the number of times content can be burned, copied and transferred. Since basically all systems can be circumvented it is imperative, in order to protect both rights owner and the content available, to have some sort of law enforcing body. This is the current model used in the U.S. where the RIAA is filing lawsuits against copyright infringers, and is being picked up in many European countries, e.g. Sweden. The problem with these highly intrusive and controlling DRM systems is that they can lead to consumer resistance as there is a clash with the traditional interpretation of ownership from the physical world. People are used to the physical ownership interpretation – in which you can do practically anything within reason with your bought CDs, such as making a copy at convenience, lending the CD to a friend, etc. – and they expect similar rules to apply for “legally” downloaded songs. Another, rather controversial, method that could be used to prevent “illegal” P2P file sharing is to infect the system with malignant “anti-piracy” viruses, which has just started to appear in P2P networks [17]. Some even argue that the music industry is responsible for these occurrences, though there is no evidence to back such an accusation. Furthermore, actions like this could easily backfire, resulting in evermore troublesome bad-will and bad business.

In the wake of the “intrusive investigation” mentioned in the introduction, lawsuits against the initial plaintiffs have been coming thick and fast. One reason is that the Swedish Anti Piracy Bureau had used a mole inside the ISP organisation to secure evidence in advance, or to “plant evidence” according to some critics. Another reason is that the listed works, in fact, were not found. This is, by some, proof that the investigation was illegal, based on guesses or defiance, or that the problem is not as big as the music industry implies. The Swedish Data Inspection Board stated in early June [18] that the actions taken by the Swedish Anti Piracy Bureau were in fact violating the Personal Information Act (personuppgiftslagen). It is only legal for public bodies to register information on criminal activities. Public manifestations against intrusiveness and control mechanisms have been organised by “pirates” in various places of the world, and at some occasions anti-piracy organisations have tried to intervene, both legally and illegally [19].

The second option will be viewed by content owners as somewhat controversial. This would require that the whole online music distribution must be redesigned in order to function. The idea is inspired by the non-intrusive model used by collecting societies all over. The approach is to monitor all transfers of music files through P2P networks, web pages etc. and by doing so gaining an overview of how collected money is to be distributed. How the money should be collected is debatable, but there are several alternatives that can be used, e.g. included in the subscription fee for the broadband service. This strategy is not intrusive since only the traffic is monitored, and not by whom a file is downloaded.

7. Conclusions

Our research has shown that the media industry has always been very reluctant in implementing new technology. This phenomenon can be enlightened with several examples, one being the introduction of the radio. However, once demand from the public has reached a critical level, the industry has been forced to accept a change. These changes have then proved to benefit both parties resulting in higher earnings for the industry. The same resistance to adopting new solutions can be clearly observed in the digital music industry.

Since P2P services enable lower costs, more power and more efficient utilisation of resources, they can be of crucial importance for businesses in the future. Although there are

many advantages with P2P services there are still several areas that need to be investigated or improved, in particular how property rights should be managed in such environments.

Even though an entirely new distribution channel has been revealed with the advent of Internet, music services, for instance, have not yet been able to fully exploit its potential. As a consequence, the public has not embraced en masse available “legal” services even though one can see the huge popularity of the so-called “illegal” P2P-networks.

Internationally, voices have been heard stating that the music industry will win the fight to get the legislation they want, but they will lose the battle against technology development, and always have. The music industry, though, will eventually, in its turn, overcome this obstacle and regain control.

There is a need to investigate further the qualities of the physical/virtual relationships in these contexts, and to verify with tests that suitable combinations of physical/virtual products and services can provide both consumers and content owners with greater possibilities to experiment with new applications

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