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PEER-TO-PEER MARKETING FOR CONTENT PRODUCTS - COMBINING DIGITAL RIGHTS MANAGEMENT AND MULTILEVEL MARKETING

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ABSTRACT

Digital rights management (DRM) systems emphasising piracy protection in content distribution have not gained major momentum in mainstream content distribution markets e.g., in sales of music, movies, publications, and software. In this paper we present a peer-to-peer marketing approach for content products combining content protection using a DRM system with the multilevel marketing model. Ability to trace the three phases of life cycle of a digital license is required to track delivery chains of digital products, which in turn, is the key technical enabler for peer-to-peer marketing.

KEYWORDS

Peer-to-peer marketing, digital rights management, electronic commerce, multilevel marketing, channel separation model, delivery chain tracking.

1. INTRODUCTION

Digital content, such as music, movies, documents, and software, seem to be the optimal merchandise for e-commerce operating through the Internet. However, out of the $32 billion market for music in 2002 [19] only about $0,09 billion is sold by paid downloads [11] and online retailers accounted for a mere 1% of music sales [17]. One of the reasons for this is the availability of free content over the Internet. Over half of teenagers use peer-to-peer networks as their primary source of music and 29% of adults have downloaded music over the Internet [7]. Sony blamed digital piracy for causing losses of $0,16 billion in 3 months in 2002 in its music business [12], and IFPI estimates the global sales of pirate music to be more than $4,6 billion in 2003 [19]. The US movie industry estimates losses due to unauthorized copying and redistribution to exceed annually $3 billion [2, 14].

Digital Rights Management (DRM) technologies have been used for controlling and managing digital rights over intellectual property in content distribution [8, 18]. Emphasis on DRM has been on protecting intellectual property during delivery of digital content using e.g., rights expression languages, encryption, and watermarking, on integrating DRM with content delivery and payment systems, as well as on business models for content distribution. However, regardless of the availability of DRM systems, most of digital content is still sold and delivered on physical media although the use of e-commerce systems and digital delivery would provide major cost savings [17]. Other elements are needed to complement the security features of DRM systems.

The activities in an electronic commerce value network can be analysed using the Channel Separation Framework [21]. It restructures organizations and their information systems in the digital environment into four channels providing distinctive functions and services for the customers. Applying the framework in the context of digital content business, the Channel of Commitments takes care of defining, agreeing and controlling of rights and obligations on content e.g. using DRM technology. The functionalities provided by the Channel of Financing enable management of financial transactions, e.g. using clearinghouse services

connected with DRM systems, ISP services, credit card, or micro payments. In the Channel of Transfer the distribution of digital content is facilitated e.g., using content encryption and packaging or superdistribution, while the Channel of Marketing is used to persuade parties to acquire digital content. When we examine the framework in terms of delivering digital content, such as music, we end up with a situation, where DRM and other complementing contemporary technologies provide strong support for the most of the channels (see Table 1).

Table 1. Channels of e-commerce on the left [21] with DRM and complementing contemporary technologies on the right

Channels	**Technologies**
Channel of Financing - enables financial transactions	Payment systems, ISP, Telecoms, Clearinghouses
Channel of Commitment - agree on rights and obligations	DRM / IPR Protection (encryption, hardware locking)
Channel of Transfer - enables distribution of content	Peer-to-Peer, Superdistribution (LAN/WAN, cable, xSDL, satellite,..)
Channel of Marketing - persuade parties to acquire content	Resellers → **?** - peer-to-peer networks? - reward resellers for 1$ transactions?

2. DRM SYSTEMS

DRM systems used for content protection aim at enforcing licence conditions by controlling access to protected content with access control systems. The content is typically encrypted and associated with a digital licence. A digital licence identifies the content product and the authorized user. It also describes the rights the user has to the digital resource in a computer readable format using some digital rights expression language (DREL), such as XrML [3, 4] and ODRL [15], that in addition to the usage, reuse, asset management and transfer rights describes the related constraints and conditions.

Figure 1 [9, 12] represents the components of a typical DRM system used for content protection. The content provider represents a publisher, record label, or a movie studio holding the rights to the content and with interest to sell content products safely. The content distributor packages the content obtained from the content provider using encryption techniques and delivers the protected content to the customer using Internet, on CD-ROM etc.

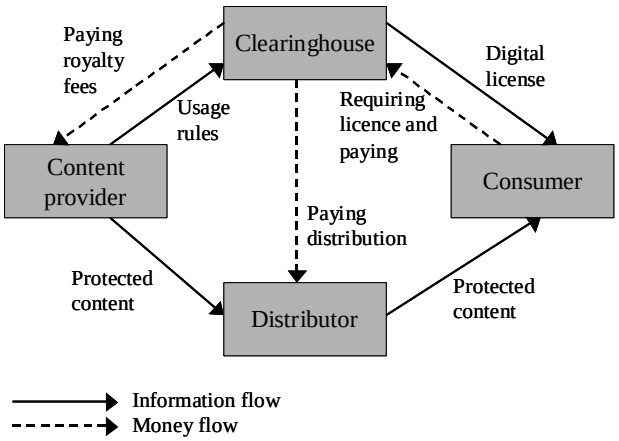

Figure 1. The common components in a content protection oriented DRM system, adopted from [9, 12].

Consumers willing to purchase the content pay the fee and request for a digital licence from a clearinghouse. The clearinghouse delivers the digital licence containing the decryption key enabling use of the content to the consumer and credits the content provider and the distributor for the sales. In this model, the user is able to use the content to the extent the software interpreting the digital license permits. The same DRM technology can be applied to a variety of business models by encoding the usage rules of the business model with the DREL to the digital licenses.

In superdistribution [13] the content delivered to each user is encrypted with the same key. This enables broadcasting the content with satellite or with other high-bandwidth devices (see Figure 2). After acquiring the content, the user can acquire a license for the use of the content from a clearinghouse or the user may be charged periodically for the use of the content. Delivering digital licenses from the clearinghouse to the consumer requires limited communication capacity [10].

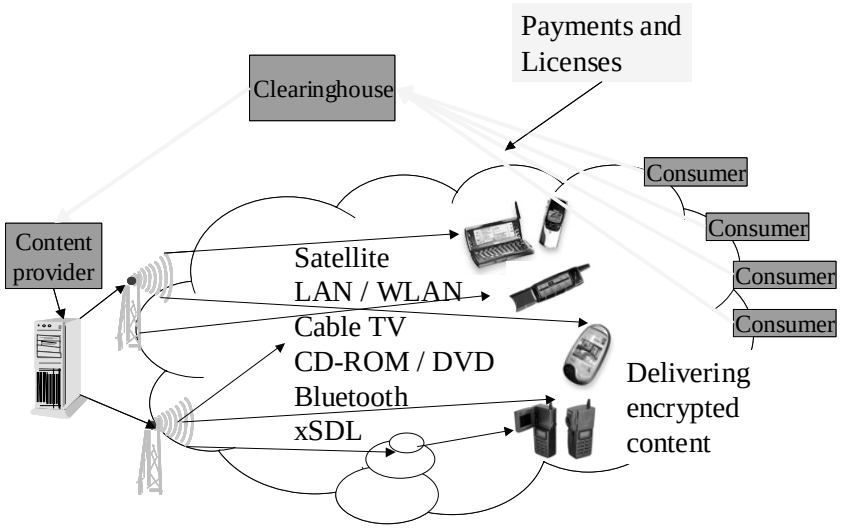

Figure 2. In superdistribution, the delivery of content is separated from the delivery of licenses. High band-width communication channels are needed only for the delivery of content.

3. SALES OF DIGITAL CONTENT

According to Premkumar [17], digital delivery of music would save 16-64% of costs if either the publisher or resale organizations were excluded from the delivery chain from the artists to the customers. However, neither the DRM systems as such nor the superdistribution include efficient marketing function or technology (other than payment systems).

Advertising and mass media marketing methods can well be used with content products, but efficient and effective personal marketing of digital content is hard to implement without a high number of motivated resellers simulating the effect of a fan community in a peer-to-peer networks. Implementing efficient business models using direct marketing is difficult for products with low resale value, such as a piece of music downloadable for 99 cents. The margin available for rewarding and motivating resellers from such a transaction is easily spent on the transaction costs of the payment system. Further, the cost of hiring desired number of resellers would be enormous.

The approach closest to our goal is multilevel marketing (MLM). Next we present MLM and analyse its applicability for marketing of digital content.

4. MULTILEVEL MARKETING

Multilevel marketing (MLM) is a way of distributing products or services in which the distributors earn income from their own retail sales and from retail sales made by their direct and indirect recruits. As a form of direct selling MLM involves nonstore retailing based on face-to-face communications between a selling representative and a potential buyer. Although MLM is estimated to account for less than 1% of retail marketing in the US, it has dramatically increased in size and expanded internationally during the 1990s. [16, 20] According to DSA [5], in USA alone, more than 13 million people participated in direct selling in 2002, with the total of $28,7 billion worth of sales. 129 out of the 163 DSA member companies use multilevel marketing.

The main motivation for resellers in a multilevel marketing organization lies in the compensation gained from sales to customers and from sales of resellers recruited (see Figure 3). For example, the compensation could be made up as follows (modified after [20]): Person B earns a 30% retail margin on direct retail sales (e.g. to customers B2 and B3), as well as 15% on retail sales made by his or her immediate resellers/recruits (e.g. B1) on retail sales made by B1's retail sales, and 10% of retail sales made by any recruit of the distributor's recruits (e.g. sales of B1A, B1B, and B1C assuming them to be resellers).

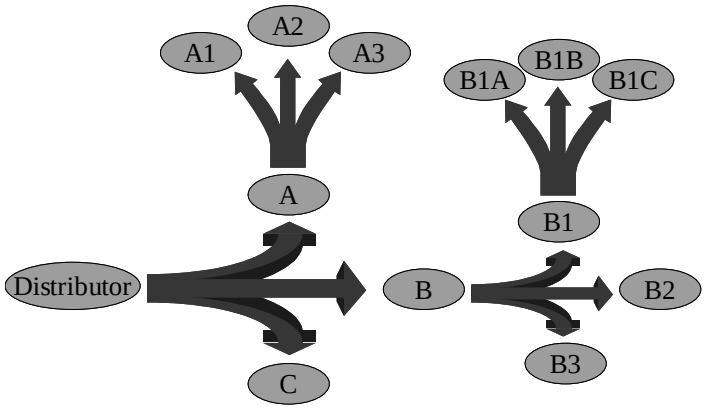

Figure 3. Flow of goods in multilevel marketing through a network (tree) of distributors. Persons/distributors A, B, and C purchase products on stock from Distributor and sell them to their clients (A1, A2, and A3) and their resellers (B1, B2, and B3) which can further have their own resellers (B1A, B1B, and B1C).

With this approach, the marketing companies have been able to increase the number of salesmen to reach millions in number; e.g. Amway reports to have 3,6 million independent distributors in 80 countries and territories selling 450 products for the annual sum of $4,5 billion [1]. Typical products sold by multilevel marketing organizations have included a number of small physical items with sales prices ranging from tens to hundreds of dollars, including home technology, homecare, nutritional supplements, and personal care. However, clearly the transaction costs of a typical multilevel marketing organization exceed the resale margins available for sales of a single piece of music and form a major portion of the total cost of a movie.

5. REQUIREMENTS FOR PEER-TO-PEER MARKETING

The main motivation to sell products in a multilevel marketing organization is in the monetary rewards for sales whereas the motivation to recommend a piece of music to a friend in a music consumer community is in the faith on the value of the music. The value of a person is characterized more by his or her taste of music and ability to recommend good music than by the number of pieces recommended. In case the music is

"cool" or "really good", the friend wants to get it fast and is even willing to pay something for getting it and owning legally instead of downloading a poor copy of it from unreliable peer-to-peer networks, potentially containing viruses.

On this basis our goal is to design a peer-to-peer marketing system combining a multilevel marketing and IPR protection provided by DRM systems that
- enables recommending content to a peer user,
- enables sales of content,
- enables rewarding the recommender/seller/re-sellers according to the multilevel marketing model,
- enables minimal transaction costs, and
- enables content protection using a DRM system.

6. PEER-TO-PEER MARKETING MODEL

The proposed peer-to-peer marketing model combines the typical features of hardware locked DRM systems and makes use of superdistribution, as described in Section 2. It also adopts the rewards scheme of multilevel marketing, as described in Section 4. This will lead us to a scenario for marketing, as represented in Figure 4. There the customer, B1, has purchased a piece of music from B and sold it further to B1A, B1B, and B1C, who pay for the content to the clearinghouse (dotted straight arrows in Figure 4) and receive licenses enabling use of the content.

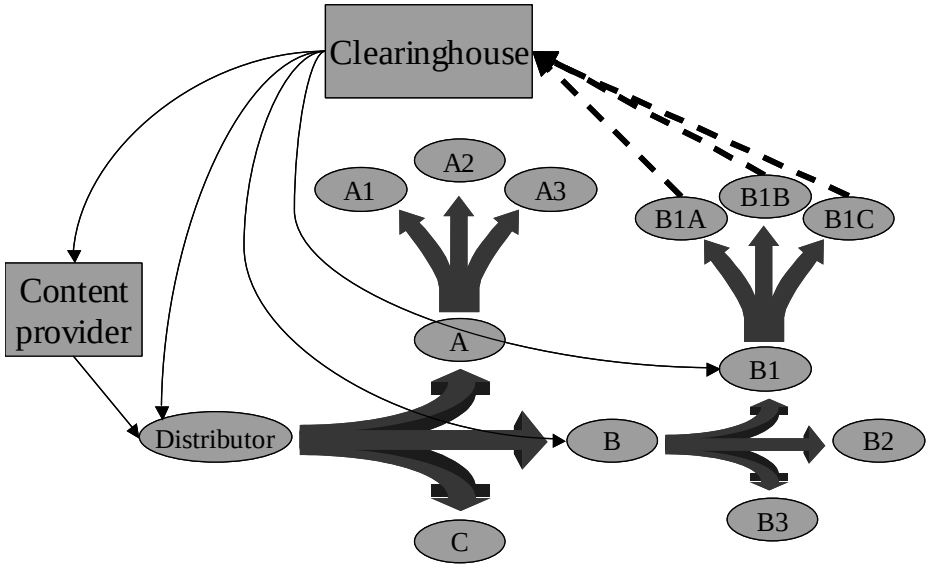

Figure 4. Rewarding in peer-to-peer marketing. B1 sells content to B1A, B1B, and B1C. Dotted straight lines represent money flow from customers to clearinghouse (and flow of licenses backwards) while curved continuous arrows starting from the clearinghouse represent rewarding parties for these sales.

After this the clearinghouse rewards the accounts (represented with curved continuous arrows starting from the clearinghouse) of the content provider and members of the delivery/marketing chain which contributed to the purchase, e.g. the Content Provider, Distributor, A, B, and B1. This may take several forms, such as a money transfer for content producers and crediting the accounts of B ad B1 enabling them to download free content in the future. For example, by selling a content product to three peers B1 is able to download another content product for free.

When compared with the multilevel marketing model, this peer-to-peer marketing model of digital content has some special features. First, the resellers do not need to stock their digital products prior selling them to their customers – they simply copy the product copy they have. This avoids the problems of inventory loading present with some multilevel marketing organizations. Secondly, technically it is easy to change and fine-tune the rewarding models by modifying the rules used in the clearinghouse. This enables changing the business model on demand. For example, it is easy to provide separate "reseller licenses" and "private user licenses" for the same piece of music (see technical details in the next section) in case the multilevel marketing entry fees are needed. However, due to the nature of network communities no such reseller fees are recommended. Thirdly, it is easy to collect statistics about the transactions. For example, the proportion of sales to customers not included in the re-seller network compared to the sales to the network members can be calculated exactly from the sales statistics. Fourth, the transaction costs are minimal based on the technical approach represented in the next section. This is needed to enable applicability to small, low price content products.

7. DELIVERY CHAIN TRACKING

The peer-to-peer marketing model can be implemented with contemporary DRM systems to a large extent. The content can be locked to a specific hardware and a license enabling use of the content is delivered to the customer during the purchase process. However, one key feature requires special attention: how to identify the parties to be rewarded by the clearinghouse?

The technique to implement this key enabler relies on tracking the delivery chain of the content product. Although we use superdistribution, we need to carry information about the previous possessors of the specific content product with it. This is analogous to keeping a list of owners of a book on the first page after the cover – whenever the physical copy of the book is sold to another person, the buyer will add her or his name to the list. With digital products and superdistribution the uniform content is similar for other users and this information has to be carried elsewhere – in the licenses specific to the user.

For the purpose of delivery chain tracking we separate three phases of license information during the peer-to-peer marketing process (in reversed order):
- A **license** is the final phase of a license. It enables use of the content with conditions defined using a DREL expression. **Private licenses** and **distributor licenses** are both licenses enabling use of the product on a specific hardware. Demonstration and **promotion licenses** have typically limited duration or limited functionality and are typically not fixed to a specific hardware. Several licenses can exist for a single superdistribution content corresponding to product variants, such as "rights to listen the music for a week" and "rights to listen the music for ever" as well as a promotional "rights to listen for the first 15 seconds of the music with 16 bit quality". A clearinghouse creates licenses based on license requests.
- A **license request** (an order) is a collection of data the customer uses for ordering a license. A license request has to include some identification of the customer and/or the hardware to enable fixing the license to a specific customer. A license request is generated by adding customer identification data to a license template.
- A **license request template** (an offer) is a definition of the product. It includes identification of the content and identification of the conditions for using the content. Several license request templates and several licenses can exist for a single superdistribution content corresponding to product variants.

These three phases of license information are used for implementing the peer-to-peer marketing process by handing over product owner history from license requests to license request templates. Whenever a customer orders a product, the license request made includes both the data about previous possessors of the product included in the licence request template and the customer's identity. For example, in Figure 4, the license request template that B1 uses to order the product includes a list of resellers: "Distributor -> B". The six steps of the process starting from here are presented in Figure 5.

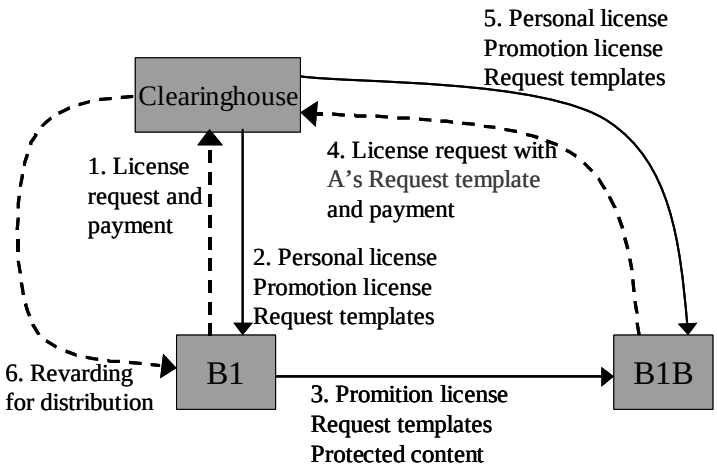

Figure 5. Implementing peer-to-peer marketing with a six phase delivery chain tracking process. Dotted arrows represent money flows while solid arrows represent other data flows.

First, B1 orders the product (arrow with label "1. Licence request and payment"). This order will now include a list of product copy possessors from the license request and identification of B1, i.e., "Distributor -> B -> B1". Next (arrow 2 in Figure 5), B1 will receive the license enabling use of the product. In addition, B1 will receive a promotion license for the product and license templates containing the updated distribution history.

In phase 3, B1 delivers the protected content and the promotion license to B1B for trial purposes, as well as license request templates personalized to B1. If B1B wishes to order a full license to the content, B1B can do it in phase 4 with B1's license request templates. Now the clearinghouse has the information needed for rewarding B1 (as well as B and Distributor) for the sales in phase 6. In phase 5 B1B will receive the license enabling use of the content as well as license request templates containing history "Distributor -> B -> B1 -> B1B" for rewarding the marketing made by B1B.

8. SUMMARY, CONCLUSIONS, AND FUTURE WORK

Digital sales and delivery of digital products, such as music, movies, documents, and software, has not gained momentum to the extent expected. Digital delivery chains of music could technically drop publishers and re-sellers reducing total costs by 16 to 64% [17]. However, this is not realistic as long as there are no good means for marketing digital products that would be integrated with digital delivery channels and content protection provided by DRM systems, as we analysed in this paper using the channel separation model.

In this paper we presented a peer-to-peer marketing model derived from the multilevel marketing model. It makes use of superdistribution for content distribution, DRM systems and clearinghouse functionality for content protection and financial transactions, and reward schemes delivered from multilevel marketing. This model is able to cover and integrate all the four channels of e-commerce: marketing, commitment, financing, and transfer.

The key technical means for implementing the peer-to-peer marketing model with a DRM system is the use of delivery channel tracking. It is based on separating the three phases of life-cycle of license information –

license request templates, license requests, and licenses – and handing over product copy possessor history in between licenses on different phases of life cycles along the preceding license granting processes.

Future research includes elaborating the technical solution to the level of schemes for packaging composite media objects combining both superdistributed content and a set of licenses in alternative phases of lice-cycle. This will have impact both on the technical simplicity and on the usability of systems implementing the model. However, the main emphasis on further research should be on evaluating customer acceptance of the various business models enabled by the peer-to-peer marketing. For example, we expect the users wishing to gain revenues for sales not to be highly concerned about privacy issues [6, 22] when giving their identity information to the clearinghouse. However, this may not prove to be the case.

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