DIGITAL RIGHTS MANAGEMENT IN THE MOBILE ENVIRONMENT

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Abstract: Number of Internet capable mobile phones is growing with rapid space. However, the data consumption is still very low in the mobile community. The existing business models for sharing mobile multimedia have not worked properly, and new solutions are looked for. In the mobile environment Digital Rights Management (DRM) is a key enabler for novel business models like Superdistribution, a Peer-to-Peer (P2P) type of Consumer-to-Consumer (C2C) delivery chain. DRM is a concept that defines the access rights to the copyrighted digital media. It does not only include encryption technologies but the whole architecture, content formats, commerce and usage monitoring. In this paper we evaluate novel m-Commerce business models supported by the latest mobile DRM specifications, and we give recommendations how they should be applied to the mobile environment in order to create a healthy business opportunity for all players in the industry.

1 INTRODUCTION

Mobile phones are becoming more and more suitable for digital content consumption and basically mobile phones could replace the position of standalone multimedia devices. Mobile phones have the advantage that end users prefer to carry just a single device while being also all the time reachable (Eylert, 2005). The mobile service can facilitate the link between the experience and the download event, thus stimulating unplanned purchases on the move (Grech and Luukkainen, 2005).

From the mobile operators' point of view content business is extremely important because the Average Revenue per User (ARPU) figures have lately come down. There is however a contradiction in price per transferred bit between voice/SMS services and new digital media formats. That is why operators should be able to apply content based pricing schemes in their mobile Internet business (Kivisaari and Luukkainen, 2003).

Lately, the operator independent Internet service innovations have been receiving more foothold and started to disrupt incumbent operators' business models. Parallel discontinuous technological change, ignored by the incumbents,

may enable cost effective products that initially attract cost sensitive low-end customers (Christensen, 1997). For example, Amazon, Skype, eBay, Yahoo and Apple have been successful to utilize novel business models that suit for a new economy. On the other hand, most of the Internet traffic belongs to the Peer-to-Peer (P2P) category, that is outside of the business ecosystem due to lack of an appropriate copyright system. Mobile businesses can learn a lot from the Internet experiences, but it should be noticed that the Internet success stories should not be applied directly due to the different usage models and constraints in the mobile networks and terminals.

Management of the Intellectual Property is the key phrase for a successful content business. Digital Rights Management (DRM) has been the de facto solution to protect content creators' and owners' immaterial rights. DRM is a process that defines the access rights to the copyrighted digital media. It does not only include encryption technologies but the whole architecture, content formats, commerce and usage monitoring, which makes DRM an organic part of the business model.

Standards should however be introduced in an evolutionary way by starting from a simple one and building the complexity as market uncertainty

decreases thus allowing for a staged investment in creating and growing the standard (Gaynor, 2001). Typically new technology and related standards do not become common in their initial form and dominant design is not based on the leading edge of the technology. As DRM standard contains large set of optional features, the biggest challenge lies in the creation of dominant design that contains a set of features that best meet the requirements of the early majority of the markets.

On the other hand, it is essential that we should maximize the value, and not the protection. This emphasizes certain requirements of a DRM system: a very high of usability and freedom together with sufficient content control mechanisms. According to theory high price leads to low quantity. By a good business model we are however able to set the price that maximizes the revenue (Baseline case). More liberal terms and conditions increase the value of the service to the customer, which shifts the demand curve parallel when also copying and sharing increase which further also decrease quantity. A sustained business model seeks the optimal solution between these forces, as shown in Fig. 1 (Shapiro and Varian, 1999).
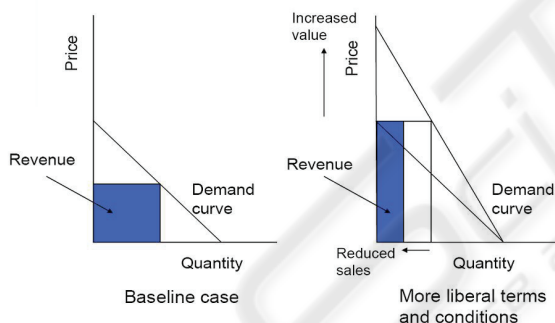

Figure 1: Demand Curve, Quantity and Price (Shapiro and Varian, 1999).

The mobile environment is most suitable for legal and reliable content distribution. Unlike P2P networks, the mobile users form an authenticated community, which enables a coherent market place and channel. More than 2 billion mobile phones, with a rapidly growing penetration of smart phones, are ideal devices for digital content consumption. In addition to the traditional client-server business models, Consumer-to-Consumer (C2C) trading is becoming realistic. This new business model is called Superdistribution. It means free C2C distribution where content is usually protected from modifications and usage requires a separate license.

The scope of this paper is in the mobile branded content. As a research method we first study the existing Internet business models and draw from these experiences the requirements for the mobile industry. Open Mobile Alliance (OMA) has specified a set of new mobile DRM specifications, and those will be reviewed. Novel m-Commerce business models suited for the mobile markets and the DRM systems are then evaluated, and we give recommendations how to apply these specifications to implementations and successful business models.

2 EXPERIENCES FROM THE INTERNET

Only a small number of e-Commerce sites in the Internet has been successful. This is not very surprising because the history of the Internet is very young and the old laws will not hold in the new economy. However, it is a worth studying what have been the factors behind those who have succeeded, and what the mobile domain might learn of those experiences. It is evident that there is no single key to the success. In the mobile history several mistakes such as WAP, Walled Garden and SMS trap have been made and we may learn a lot of those, too.

In the famous Wired magazine article (Anderson, 2005) a new term the Long Tail was presented. It highlighted the importance of the tail of the typical Zipf-like consumption distribution. The key point here is that although a rather small number of unique items receive more hits than others in average, the impact of the Long Tail in the total volume is higher. That is why it is extremely important that the content downloading service is not restricted for the most popular category but the service must allow access to the niche markets, too. Regarding to the DRM policy it can be assumed that typically the mass market must be well protected, while the Long Tail material with less downloads might benefit from a lighter protection.

Apple's iTunes will most probably follow the Zipf-distribution, too. The business model of iTunes is the most restrictive. The proprietary DRM solution, called FairPlay, protects the value chain from end-to-end allowing iTunes's Advanced Audio Coding (AAC) records to be played only by the Apple's iPod players. CDs can be burned without limits but records can be copied just to five other hard disks. Pricing is based on the pay-per-use model with a slightly lower price level than in the usual music stores. As an advantage users may just

download individual hit songs, instead of full albums.

Wippit has a different business model. They are offering a subscription based unlimited access to the record collection of 60 000 items that are continuously updated. Some of the MP3s are not protected at all and they can be freely copied, while others are protected with Windows Media DRM. A wider selection is available through a pay-per-use policy. A compensation based business model is also common. Most often the business logic is based on the advertisements, that must be received for a free content. Qtrax is an example of this business model. Weed service supports rewarding in the C2C model. In this case, both the music aggregator and the private distributors are rewarded when music is distributed through the C2C interface.

P2P traffic conquers already the major stake of the Internet trunk lines and in the access networks more than 90 percent of data traffic is from P2P applications. The success of the P2P applications has proved a few important lessons. First, consumers are willing to share content if they have a proper incentive to do so. Otherwise the Free Riding problem occurs which means that users just download content, without the sharing principle of reciprocity (Kwok et al., 2002). Second, P2P sharing technology works well without the help of the centralized servers and operators. Unfortunately for the content owners, P2P does not usually include the business possibility. In any case, the Internet P2P applications have shown that P2P is an extremely efficient content sharing method, and C2C communication channel can be used efficiently in the viral marketing. These ideas should be taken into use in the mobile networks, too.

3 MOBILE DRM

In the mobile environment Open Mobile Alliance (OMA) DRM 1.0 specification provided the basic features to protect the content, namely ring tones and MMS messages. The extended specification, OMA DRM 2.0 was approved on March 2006. It enables a large set of different distribution mechanisms. Content can be delivered through Pull, Push, Push initiated Pull, broadcast, multicast and optionally Superdistribution methods. Superdistribution is backed by the Transaction tracking feature that enables free and controlled content diffusion in a C2C manner. Delivered items can be stored for backup purposes and used later. Optionally Unconnected devices are supported meaning that

content can be transferred to devices that do not have Internet connection. Additionally, specification includes an optional Export function that enables OMA DRM protected content to be opened in non other devices. Streaming is supported both by unicast and multicast delivery methods. Finally, the Rights Object Acquisition Protocol (ROAP) takes care of the interactions between the entities in the architecture, described in Fig. 2. Watermarking is not part of the OMA DRM 2.0 specifications, but it is left for the implementation. (OMA, 2006)
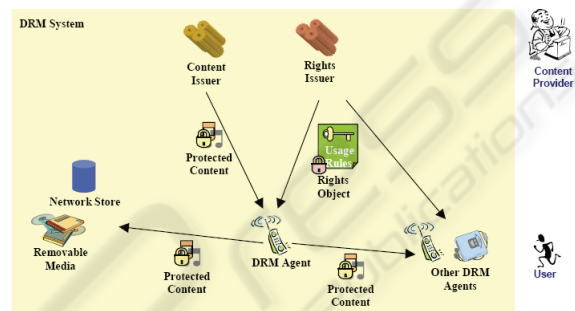

Figure 2: OMA Architecture (OMA, 2006).

4 BUSINESS MODELS

Depending on the DRM system in use, content can be offered in various ways. The most popular business models include subscription and pay-per-view, -use or -download. Subscription based model enables access to the predefined library of content. It provides a simple charging logic, both to the user and service provider. Pay-per-view, -use or -download methods charge users separately on each transaction. On frequent and small purchases this solution creates a lot of charging data and can discourage consumers to use the service.

C2C trading, such as P2P and Superdistribution, will improve the system scalability, and more importantly, it creates the community aspect. Superdistribution provides new business possibilities such as gifting and rewarding. Idea in gifting is that the user can recommend content for a certain number of her or his friends. They have a chance to use the content for a restricted time and after the expiry of the trial period they are offered a membership. Gifting acts here as a strong marketing scheme and suits well for the face to face type of cellular communities. Incentive for the Super-distribution can be enforced by rewarding. The idea is to motivate the content sharing by giving a small compensation to the distributor on each

chargeable C2C delivery. Rewarding is an important tool for the birth of the viral marketing business (Einhorn and Rosenblatt, 2005). Compensation model can be also used in the Superdistribution context. DRM protected advertisement files can be attached permanently to the original content files, and when content is played and advertisements shown, user statistics are sent to the centralized system. Distributor can charge the advertisers based on the number of hits.

OMA DRM 2.0 enables almost any business model. You may choose models that are closed or open, complicate or simple, slow or fast, more or less secure. It is up to the manufacturers, operators and content creators which of the selections maximize profits for the whole value chain. As a drawback, the high flexibility incorporates a high risk to interoperability problems. To avoid those, operators and manufacturers must clearly agree the mandatory features supported.

Based on our analysis and evidence from the fixed Internet, Superdistribution functionality, with gifting and rewarding options, is a mandatory new feature to be supported in the mobile phones and presumable dominant design. It clearly underlines the social behaviour pattern common among humans. Viral marketing and different kind of compensation based business models are becoming fascinating. Rewarding is also supported by other research results (Kwok et al., 2002). However, the system implementations should respect the privacy rules, and the tracking features should not be used for collecting personal profile information without users' permission.

The best way to avoid the piracy is to make it obsolete by providing a better, legal alternative. DRM has, however, only limited possibilities to stop piracy. The DRM solution is always a compromise of the usability and the protection level, and the small minority should not drive the decisions made for the majority. More flexible copyright licensing terms, such as Creative Commons, should be carefully considered to be utilized for certain content. Especially with niche markets belonging to the Long Tail, strict copyright rules are questionable.

5 CONCLUSIONS

This paper has discussed the issues impacting on the mobile DRM and the related business models. The scope was in the commercial content but the user created content should not be forgotten either. The Internet services give valuable background information for the successful mobile DRM solution. OMA DRM 2.0 offers a wide tool box to implement different business models. Superdistribution is an interesting possibility for the mobile phones to be utilized and studied further. Mobile DRM solutions should be optimized to meet the benefits of all players, including the non mobile users, and inter-operability among the standards should be guaranteed. Last but not least, the best results do not necessarily equal to the maximal protection level.

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