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Analysis of Interoperability Services of Various DRM Schemes and Associations with Marlin Scheme

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Abstract

Objectives: The flaws in software create hackers to cross the security thread. The security can be provided with different schemes of DRM. In this paper numerous DRM schemes are discussed at different applications. While discussing traditional schemes the merits of merlin DRM are discussed to overcome the flaws in conventional DRM schemes. The main objective of this paper is to stress the importance of merlin DRM. **Methods and Analysis:** In the present paper different DRM schemes like Content Scrambling System, Certification, Code Mystification and their flaws are discussed to support and analysis present interoperability technique. To achieve interoperability Marlin DRM is discussed. Marlin DRM is also helpful in continuous stream of audio and video file. Along with other DRM schemes Marlin DRM are also discussed. **Findings**: The current DRM has debate with existing techniques. The Digital Rights management service providers are in high demand in digital media communication to protect the owner's copyright. But, still in many countries the DRM is under controversy to use or not in digital media. Apart from controversy, DRM is highly required to protect the owners respect and their intellectual property. The DRM also protects the knowledge and restrict anti-social elements to cross their limits in accessing the licenced file. **Applications**: Now a days many organizations especially movie industries and music fields are facing a big piracy problem. DRM can help in restricting others or hackers to access the licenced media file illegally.

Keywords: Access Rights, Copyrights, DRM, Interoperability, Marlin DRM, Media Streaming

1. Introduction

A Digital Rights Management (DRM) scheme provides various access rights and authorization control through different technologies. It protects proprietary rights and copyrights to any original work[1]. DRM restricts the users to access the locked content. It protects the business innovations, research methodologies, multi-media data like songs, videos, movies from copyright infringement. DRM strictly restricts the copy right holders also to access another copy such as getting another copy of copyrighted document. Some people also say there are few conflicts need to be considered for allowing medical research and education institution to access the documents with free of cost[2-3]. Viewing these conflicts documents may be allowed to partial group access and simultaneously restrict the access for other groups.

The copyright protection strictly implemented with DRM schemes. If anyone breaks DRM laws the DRM scheme will lock the access or modify the access rights[4-5].

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Among all these cases, the DRM is highly required in music and movie industry. But, DRM mostly got failed in protecting copyrights of music and movie industries. Recent days lots of new is observed particularly on movie copyright infringement. So, it is a big deal in providing intellectual property rights or copy rights for a particular in different sectors like story, music, and movie clips etc. This is happening due to the lack of knowledge in society. If the advantages of DRM schemes are properly taken into the public, the copyright infringement can be reduced up to some extent. With original data copy user get quality audio, video and high definition data. Where, in the case of pirated CDs the data may not come with good quality. Sometimes, there is a chance of intrusion of virus files in to the personal computer. The copyright protection plays very important role in economic growth of any business.

There are many reasons why DRM is failed. Sometimes the company provides licence to few months. This makes users sometimes upset. Companies also release their versions with restrictions like usage of their product on limited and specific hardware. This may also upset the client in purchasing the licence. This leads the user to select an unfaithful and unauthorised free ware. Many unauthorised free wares in the market attracting the clients and chance of inject malware into client systems. This may also one of the reasons for many times it is heard that people are using unauthorised material and multimedia files like songs and movies. Beyond all these it is very important to protect intellectual properties and one's fiscal state of business organizations. Hence it is very important to provide DRM services to the companies. In the following paragraph a brief history of DRM schemes since past decade for music are discussed.

In May 2002, 'Shuman Ghosemajumder' proposed that open file sharing, open member ship, and open competition. This scheme states that free subscription and registration is only a successful method to respect DRM and further once intellectual property. In April 21, 2003 Real Networks offers streaming downloads with monthly publication. In January 2004, DRM restricted the music to play in the RealPlayer Music Store only. In April 28, 2003, iTunes releases a DRM that only three computers can download the songs, and restricted to copy in 10 CDs, and later it is increased. In August 2004, Microsoft begins certifying providers and tested for compatibility with windows media DRM. After that, many music companies requested to DRM implementation in apple, iTunes, MSN music tones, Wal-mart, Nokia, and yahoo music stores[2].

2. DRM System Scheme

In early days the DRM be contingent on Content Scrambling System (CSS). The CSS fundamentally works on the principle of DVD content encryption. The DVD manufacturers need to be licenced to use the encrypted algorithm, decryption can be done to play the content of DVD. CSS licence agreement also decides how much content to be released per day and it also limits the usage of DVD on number of devices[5-8]. Later DeCSS is developed where encrypted DVD is played on Linux operating system, at time when no DVD player application licence is registered[9]. Later Microsoft released a new version of DRM called windows media DRM, which reads the instruction given in the media file. These instructions in the media file will give clear idea about how many times the respective media file will be played, transfer media files to other devices or not, whether or not it can be burn into DVD or any other external drives, and sometime locks the media file for a particular file[10-13]. Later Microsoft developed and integrated its operating system, the DRM with protected media path which contain protected video Path (PVP). The PVP checks the DRM content in media file and restrict to play in unsigned applications. PVP also succeeds to control the monitor for recording, while playing DRM content like movies and music[14]. Advanced Access content System developed a licence system to control HD DVD, Blu-ray Disks[15-16]. Open Mobile Alliance DRM is developed for mobile companies consortium for protecting their licence agreement. Marlin DRM is developed by marlin group of industries and licenced by Marlin Trust Management Organization. Marlin DRM is highly required in IPTV forum and HD Forum. Marlin DRM allows the user to encrypt end-to-end Internet Protocol

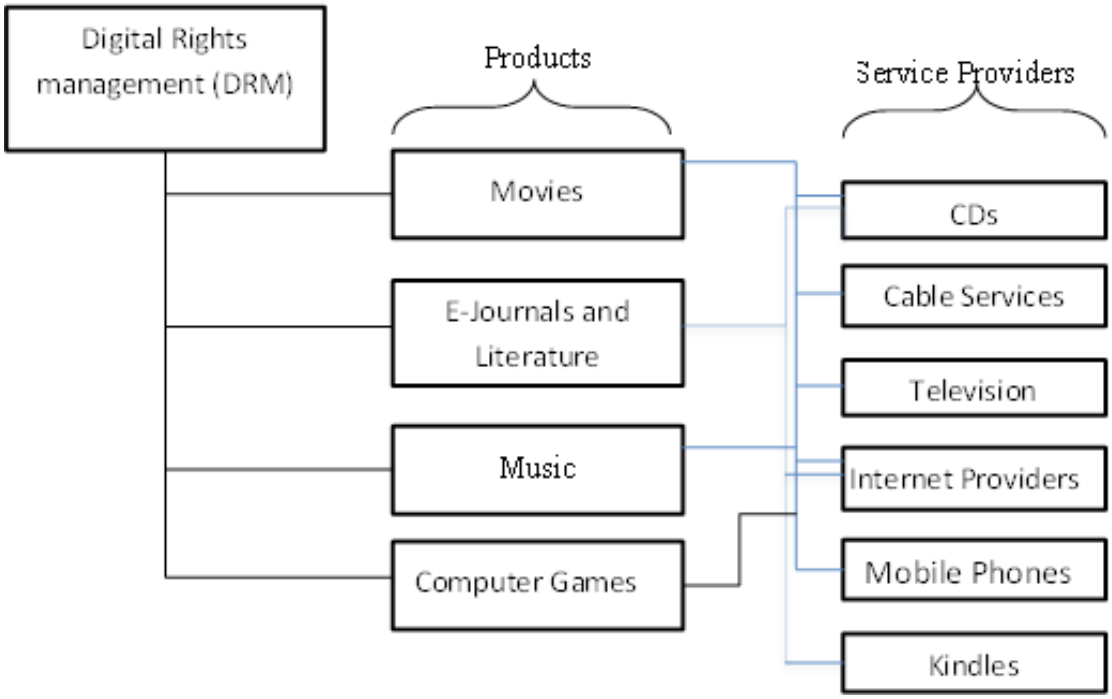

Figure 1. The Media with DRM for copyright protection through various service providers.

Television (IPTV) to stream continuously and also allows to record on DVD[17-20].

DRM schemes can be applied in different fields as shown in Figure 1. The Figure 1 describing the service providers for different media fields where DRM schemes are required to protect the copyrights. There are various media files mostly required DRM schemes to protect the owner ship of various media. For instance the movies and music are produced or played through various medium like CDs, cinema screens, cable connection, internet and mobile phones. Here the copyrights of movie and music need to be protected while playing through all these medium. Hence various DRM schemes are embedded and run while playing these media at the time of playing. Similarly e-books and computer games must be protected while they are used in different portable devices like kindle, mobile phones, and game box. Here DRM restricts the users to play copyrighted media files on other devices. The user needs to pay subscription fee or need to purchase the CD containing the media files like movies or music. The CD played only certain devices which supports unique data format.

The cable TV service providers provide all the services requested by the user. The service provider delivers only the media for which a user subscribes it. But, in this case changing the service provider may create problems and

frustration for a user. A different service provider may not give the client all services although the client subscribed the channel earlier. So the client again needs to purchase the product to compatible the hardware available at the new service provider. Similarly Computer games need DRM to avoid multiple time installation or to avoid multiple installations on different devices. After certain time period like after few years some companies release computer games freely. But, here DRM restricts further upgradation of computer games and upgradation of software. The Marlin DRM is discussed in section V.

3. DRM in Music

Most of the users faced this challenge in continuous playing of songs and their like music. Many users facing restrictions like playing music on CD on only one device and one software applications. Many palm devices does not support the songs or its format which are playable on another device. For instance in 2009 apple iTunes developed and used their own DRM in their iPhone to restrict the usage of the songs and download songs into other devices from iPhone. So, only apple Phones are able to play the music stored in their music player or music store. Later version of iTunes released with high cost and high quality but DRM free[13,21-23]. In some cases, companies offer subscription along with purchases. In this case the user need to purchase the music and able to play only if they subscribe their channel, media, or their application. Here the user need to be down load the respective companies application software and need to be register or subscribe for permanent access of the songs or media file. If the subscription time is completed they cannot access any media file. For continuous and permanent access the user need to subscribe their channel or drive or application software for the specified period. In most of the cases companies allows the users to subscribe for specific period only. After this period user may not be allowed or permanently restricted to access the music files or restricted to download on to CDs, although user has purchased for lifetime. Still some companies are releasing the music online with all the factors like DRM protected, subscription, and purchase.

In the present days, various music player services are not interoperable, although they have same DRM schemes. This will restrict the user to access music timely, geographically, and device plugin. To allow the user to play music files in all the ways continuously, sharing of timely DRM services is required[24]. More or less play stores allows the clients to share their DRM services into their existing system with affordable fare. But, in many cases it is observed that customers are more frustrated with regarding unsuited DRM services existed in developed countries[25-26]. Arguments are still going on against DRM and also in support of DRM. Some retailers they oppose DRM to satisfy and attract their clients. Their argument is there is no requirement of DRM schemes to protect the copyrights of music[27]. This is proven because of heavy complaints and day by day increasing frustration by customer. Many other groups of people discuss that DRM is required to require one's intellectual properties. Over the above it is the prime issue in providing copyright protection of owner[28]. Marlin DRM can be used for interoperable services through various electronic gadgets.

4. DRM in Television

In most of the developed countries the digitisation is already done in cable service providers. Cable service providers will distribute the video content to the users for which they are subscribed. Through the Digital communication, the governments or some consortium run under the respective country government will control the stream of production and reproduction of video to the customer. These consortiums also control how a video program will be played and whether it could be recorded or not. The consortium also stream line all different technologies under single umbrella to make the user easy to access the digital devices[29]. Countries like India now going towards digitalization in cable services. Digitalization will increase the quality in streaming and provides several other types of products like internet to the clients. Through digitaliza-

tion the cyber security will be increased and have an eye on what the user are subscribing and type of data communicating through internet[30-31]. This may lead of privacy infringement. But for a security reasons like the present world and situations like globalization digitization is very important. Hence DRM is very important now in all countries in television broad casting and internet service providing. Later the media content is available to public with rental basis using online streaming services. The cable service providers should monitor and protect the copyrights of the owners.

5. Marlin DRM

Marlin DRM offers sophisticated copyright management like smooth playing of entertainment and media content over popular digital channels. Marlin DRM schemes are developed by Marlin Development Community (MDC)[32]. MDC developed necessary technology and services to make enable interoperable of digital content between different devices or media. Hence different media files like music and movies in one format can be played in other devices which supports different format. The Marlin DRM allows to make compatible one format of file while changes its source for playing from a different a device. Marlin DRM also allows the users to play the internet TV with continuous stream and also allows to record on CDs.

Marlin DRM mostly used in IPTV. In IPTV it is very difficult for the service provider to make design of every existing technique and audio, video files for future format. The overhead like future cost, upgradation can be overcome by upgrading the software and control all limits remotely. Hence in designing digital set-top-boxes the designers need to keep all these limitations in mind. High throughput, constant data rate, valid data availability, decoder design for media compatibility, and efficient partitioning processor are required to design efficient set-top-box to meet all future requirements. Hence proper DRM configuration is required in IP network connected with set-top-box.

Most of the Marlin schemes consists the core system specification which describes the basic components, protocols, and consumer province model which enables the interoperability between Marlin-enabled devices and services. This specification is based on the Octopus and Networked Environment for Media Orchestration (NEMO)[33] reference technologies, which have been adapted for peer-to-peer device interactions. For instance Sony uses Marlin in PlayStation to allow users to down load videos continuously on purchased PS3, PS4 and PSP systems. Televisions and Blu-ray players, support the Philips Net TV[34] service. Intertrust, Panasonic, Philips, Samsung, and Sony co-founded the Marlin DRM standard in 2005. Its optimized ports licensed content distributed across devices and services in a consumer's home and supports a large and flexible set of business models including future business models[35]. Marlin technology is compatible with advanced technology and mobile friendly technology. Marlin technology is compatible with all platforms technology and runs on all operating systems. It supports all file formats, codecs, and delivery systems. Most TV networks, Blu-ray players, Home cinema sets, IPTVs, MP3/MP4 plays and many more coming in the marlin based content delivered list[35-36].

There are many alternate options available for users to develop their own content distribution model. For the clients who are interested to interoperate with Marlin Simple Secure Streaming (MS3) clients using regular web server software, the MS3 technology is free. Free packaging tools are available for the clients for encryption, formatting including MPEG. It is used for play video on demand and live show[36-37]. The reliability can be improved with many alternating method[38-41].

Marlin designed to meet following goals[35-36].

i. It accommodates peer to peer interactions.
ii. It allows continues streaming of audio and video.
iii. It permit user to record on DVD.
iv. It allows importing content from multiple independent service sources.

v. Marlin is designed based upon general purpose rights management architecture.

vi. Device services can be interoperable.

vii. DRM licencing today protects video play playback across multiple platform.

viii. It is able to deliver content on any network or physical media.

6. Conclusion

The DRM is required to protect the intellectual property of one's knowledge. Primarily the selection of Digital Rights Management depends on the platform on which it is working. Most DRMs do not offer interoperability although they have same DRM Scheme. The Marlin DRM allows end-to-end encryption and allows continuous stream and recording. In many cases clients are unable to access the content online due to DRM technology. In recent days companies like iTunes and other going towards DRM free software to enable their product to reach the client closely with high citations.

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