



The Piksel Whitepapers  
Digital Rights Management Part 1

Piksel, Inc.  
New York, New York.  
February 2015

Welcome to our two-part guide to Digital Rights Management that aims to provide a wider market overview, technical considerations, and deep dive into the implementation and operation of an industry leading DRM platform. In this first part, we examine why DRM is of critical importance to the future of successful pay-TV and content services.



# DIGITAL RIGHTS MANAGEMENT PART 1

UNDERSTANDING KEY  
TECHNOLOGIES AND DRIVERS  
IMPACTING PREMIUM  
CONTENT DISTRIBUTORS

## THE AUTHOR



Philip Shaw is a member of the strategic innovation team at Piksel and is involved with the development of concepts that bridge the gaps between connected devices - particularly those that bring users closer to content. He has previously worked on projects for Channel 4 and RTÉ, as well as a number of Piksel's mobile products.

After stints in the US and UK working on several large-scale infrastructure projects for internet service providers, his career in the media industry began in earnest a decade ago when he moved to the BBC. He has nurtured a fascination for the convergence of broadcast and broadband technologies ever since.

You can reach Phil at [phil.shaw@piksel.com](mailto:phil.shaw@piksel.com) and follow him on Twitter @virorum

### **Phil Shaw**

Director, Software Engineering  
Piksel, Inc.



.....

# TABLE OF CONTENTS

The Author	2
Introduction	4
Market Backgrounder	5
Current DRM Issues	6
Behind The Matrix	8
Strategic Considerations and Solutions	10
Summary	13
Unrivaled Knowledge	14

.....

# INTRODUCTION

This short guide aims to demystify much of the technology and partisan vendor noise to provide an overview of the market conditions. Senior executives have important strategic decisions to make and the options are varied. Without a defacto standard and with multiple service delivery options, selection and implementation of DRM will have a lasting impact on the long-term success of any content service.



# MARKET

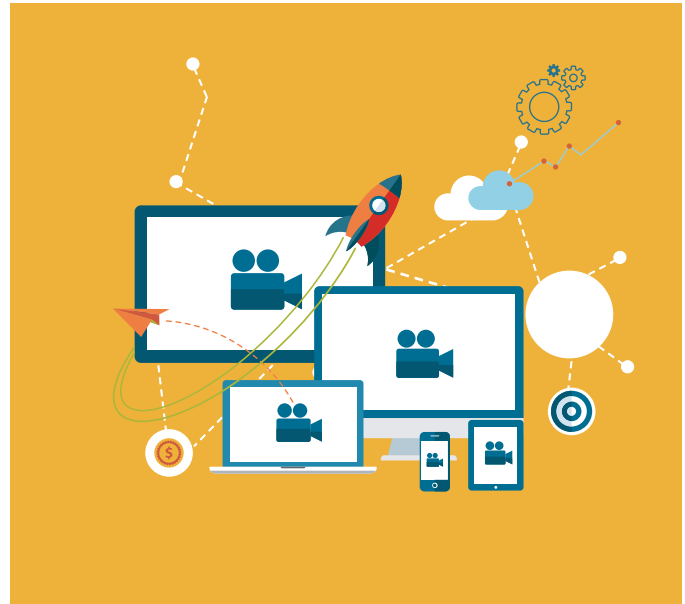
## BACKGROUND

DRM means different things depending on where you sit within the delivery cycle and the motivation behind its deployment. In its most fundamental definition, DRM protects content to ensure that it is accessible only to legitimate subscribers. The technology also helps to defeat potential piracy and is the adjunct to techniques such as watermarking that help to identify sources of pirated content, and Conditional Access to manage device access to content.

The need for DRM is clear although the actual losses incurred by the creative industries due to piracy are hard to accurately gauge. Research carried out by NetNames in 2013 claims that the piracy of digital content costs about \$80bn a year, although this includes an element of lost sales, some legal fees, or even unemployment through piracy. The research claims that 432 million Internet users frequently copy content illegally, with 327 million unique Internet users across North America, Europe, and Asia-Pacific openly infringing digital content.

In response, DRM aims to stem this tide. But it's not just about video. Although possibly the most valuable asset, the sector covers all types of content from eBooks to video games. According to analyst firm Frost and Sullivan, the DRM market in 2012 was worth US\$977.2 million and is expected to reach US\$2.96 billion by 2017. The rapid growth is in part spawned by the demand for pay-TV services and a proliferation of video capable mobile devices.

Although the number of DRM technologies within the market runs to a possible 20 active vendors, with internet connected browsers becoming the most desirable platform for video content, the actual mainstream vendor ecosystem is much smaller.



In this arena, the dominant players are Microsoft, software giant and creator of the Internet Explorer browser. And in the other corner, Google, internet giant and creator of the Chrome browser. With honourable mentions to Apple and its own FairPlay technology, and a few industry heavyweights like Disney and Sony who use their own largely bespoke schemas, it's Microsoft PlayReady and Google Widevine that are carving up the marketplace for DRM technology. Although both camps have a vested interest in protecting against digital piracy and helping users to gain seamless access to legitimate content, the vagaries of this business rivalry don't always result in harmony.

# CURRENT DRM ISSUES

A great example of this will become evident in early 2015, when Google Chrome will no longer offer support for Microsoft Silverlight, a development framework often used for secure video playback on Chrome browsers. Google says that the reason is due to the Application Programming Interfaces used by Silverlight causing serious browser performance and stability issues.

In turn, any video content served to subscribers that is protected by Microsoft's PlayReady DRM will stop working on Chrome browsers. Google's decision may well foreshadow similar moves by other browser makers such as Firefox, Safari and Opera.

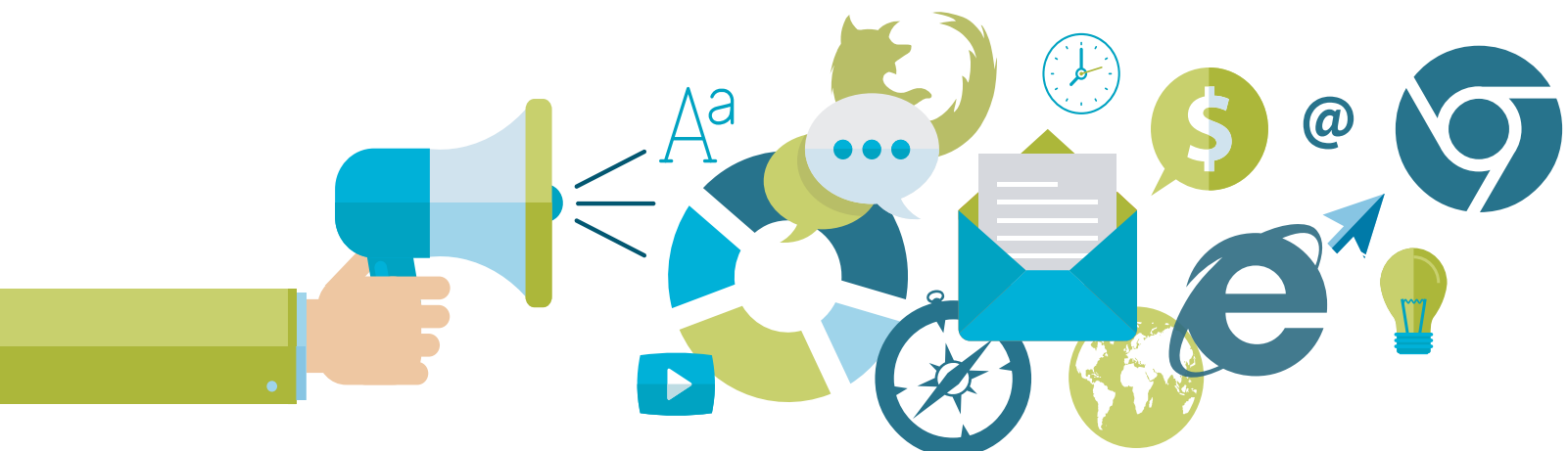
At this time, there is no compromise between the two technology vendors and OTT and pay-TV providers are getting ready to find alternative solutions. These include using HTML5 for video content or forcing Chrome users to switch to another browser such as Microsoft's own Internet Explorer. Both options are potentially a major hurdle for technical teams or an annoyance for paying customers who resent having to switch browsers just for a single awkward application.

This type of stand-off is not unique and is unlikely to be the last instance of discord in a market that has 5 different browser vendors each with significant market share, namely Internet Explorer (58%), Chrome (20%), Firefox (15%), Apple's Safari (5%) and Opera (1%)<sup>†</sup>. The market share data hides a more complex issue, which relates to the increasingly multiscreen world where video content delivered predominantly over IP networks reaches all manner of connected devices.

From traditional desktop PCs and laptops, games consoles, smartphones, tablets and smart-TV's; today more content is viewed on non-traditional devices than the old TV in the corner of the living room. For pay-TV providers with aspirations of a true multiscreen offering, a single Hollywood blockbuster film may need to be encoded into dozens of different versions each with different bit rate encodings, aspect ratios and DRM schemas to satisfy the needs of subscribers viewing on a multitude of devices.

The possible combinations are mind-boggling but with a picture worth a thousand words, the following matrix neatly sums up the broad position regarding the prevalence of DRM technologies and deployment approaches versus the types of device.

<sup>†</sup>Reference: NetMarketShare



At this time, there is no compromise between the two technology vendors and OTT and pay-TV providers are getting ready to find alternative solutions.

	SMART TV'S	GAMES CONSOLES	APPLE "i" DEVICES	ANDROID DEVICES	WINTEL PC'S AND LAPTOPS	CE OTT PLAYERS (ROKU, CHROMECAST, AMAZON FIRE TV)
<b>MICROSOFT PLAY READY</b> A well established DRM solution that also combines MPEG-DASH and CENC to provide multiplatform content protection.	Supported by many Smart TVs but with limitations on certain functions.	Native support on Xbox; also available on PS4.	Unsurprisingly, no native support for PlayReady from Apple but Microsoft has offered an extensive SDK to developers building PlayReady apps on iOS.	No native support from Google but a number of third party players and good SDK support from Microsoft.	Support across majority of Microsoft and rival browsers although waning in some.	Support by Roku, Chromecast and Amazon Fire.
<b>GOOGLE WIDEVINE 'MODULAR'</b> A DRM solution that combines MPEG-DASH and CENC to provide multiplatform content protection	Support from a few vendors but still limited. The list is however growing.	Support from a few vendors but still limiting.	Again, no native support for Widevine on Apple devices but SDK options should be available soon.	Newer devices have native support for Widevine.	Native support available in Chrome; no support yet in other browsers.	Native support in Chromecast.
<b>HLS+AES</b> HTTP Live Streaming (also known as HLS) is an HTTP-based media streaming communications protocol implemented by Apple Inc. as part of their QuickTime, Safari, OS X, and iOS software. HLS also specifies a standard encryption mechanism using AES and a method of secure key distribution using HTTPS with either a device specific realm login or HTTP cookie which together provide a simple DRM system	Good support from larger brands such as Samsung, Sony and LG on newer models. However, certain limitations between models and firmware versions.	Not natively supported on the major consoles requiring bespoke application options.	As a creator of the standard, Apple and the majority of its devices support HLS and AES.	No reliable native support in earlier devices and still poor support in newer releases but good API and improvements planned.	Support across most browsers through plugins and Javascript but still not universal or seamless.	Good supported within Chromecast, Roku and Amazon Fire TV.

# BEHIND THE MATRIX

Based on our experience, to successfully address 95% of the device audience, a single video asset might need to spawn 25 different associated file types and possibly require the use of multiple DRM technologies. Alongside complexity, cost is also a significant factor. In essence, many DRM platforms are licensed on a “per item protected” basis with further costs required to train, certify and retrain technical staff to administer the DRM processes. DRM is also not a fixed target. Schemes evolve to keep ahead of pirates and to take advantage of new and evolving device and browser technologies.





To say that the situation is fluid is an understatement. The rapid release of new browser updates, product firmware updates and third party add-ons and plugins make creating a definitive matrix akin to building on quick sand. However, there is a digestible narrative that can be derived. In essence, newer gaming and CE devices and even browsers are moving away from bespoke software and plugins and towards standards based support and service based solutions. Although a powerful option, few organisations want to become software developers or have to support software applications across multiple viewing platforms stretching from Smart TV, Games consoles, mobile devices and new OTT media playing devices.

Although still in an early stage, it is likely that HTML5 + EME will become dominant as they allow operators to avoid relying on or getting caught in the middle of a Microsoft vs. Google vs. Apple bun fight over DRM standards.

“

To say that  
the situation is  
fluid is an  
understatement.

”

.....

# STRATEGIC

## ..... CONSIDERATIONS AND SOLUTIONS

Irrespective of the technical pros and cons of each of the DRM solutions, there is a fundamental truism regarding content creation, delivery and protection – things are changing and fast! If the automobile industry with its 130 year history is now considered pretty mature, pay-TV and DRM with barely 30 years of heritage is still in its infancy. The rise of vendors like Netflix and Hulu and the expiration of DVD renter like Blockbuster span a single generation and the next decade will almost certainly see new trends that dramatically change both technical and business models. Examples abound where inflexibility of design has lead intelligent businesses into, with hindsight, poor choices.

The first generation of video-over-IP services that built secure applications for smart-TVs could not have foreseen that few unifying standards would appear amongst smart-TV manufacturers. Instead, a continual cycle of creating players for disparate vendors proved a fruitless strategy.

In the past, both Amazon Kindle and Microsoft's earlier DRM technologies have been breached by hackers, potentially leaving large amounts of content that was previously thought as secure effectively freely distributable. Although DRM hacking is a rare occurrence, any DRM strategy that lacks a "plan B", as in the upcoming end of support for PlayReady on Google browsers, should be a major strategic consideration.

The rapid pace of technological change is mostly beneficial but also demands DRM flexibility. For example, the demand for better quality video such as HD and ultimately 4k is forcing TV service operators to look at new encoding technologies. The rise of HEVC will ultimately lead to humble playback devices able to stream exceptionally high quality video and audio. With this golden age of quality comes the threat that pirates will be even keener on getting hold of these high value assets. Yet, HEVC also requires a slightly different DRM schema and workflow.



Flexibility is not just about which flavour of DRM an organisation deploys. It also extends to how DRM is built into the workflow of getting content through the production, distribution and monetisation chain. It is too simplistic to say that there is one perfect method. The reality depends on a number of variables such as the value of the content, business model, subscriber premise and mobile equipment and a longer term go-to-market strategy. The chart below provides a quick overview of the most common methods, a few pros/cons and caveats.



	COST	COMPLEXITY	FLEXIBILITY	CAVEATS
<b>IN-HOUSE DEVELOPED/MAINTAINED SECURE DEVICE APPS</b>	Each platform has its own cost as an application for a Samsung Smart TV is unlikely to work on a Roku box or Android tablet. This can lead to significant CAPEX and a long tail of OPEX to keep users on older platforms supported.	Highly variable depending on platform but in general, the more features and compatibility, the greater the complexity.	As with any software development, the ability to create a completely bespoke application is appealing for creating a differentiated product.	Not to be undertaken lightly or if working to tight go-live deadlines as overruns and complications are commonplace.
<b>IN-HOUSE DEVELOPED/MAINTAINED DRM SERVER COMPONENTS</b>	Major CAPEX even when utilising some Cloud elements. Requires major developer, licensing, training and equipment investment.	High level of complexity to create with just in-house resources.	Great deal of flexibility but still constrained by limitations of subscriber playback devices.	High risk strategy within developed markets due to difficulty in predicting market uptake.
<b>THIRD PARTY / CLOUD / SAAS / SERVICE PROVIDER</b>	Lower CAPEX with billing often on a per subscriber model which makes OPEX more predictable.	Less complexity by utilising expertise of third party. More complexity around agreeing and managing areas such as Service Level Agreements (SLAs).	Flexibility is constrained by ability of the service provider and/or cloud. Not all providers are created equally and the more innovative ones allow a level of bespoke customization.	Particularly good option for new entrants and rapid go to market drivers.









# SUMMARY

.....

If you have reached this far, then hopefully it's clear that DRM is a major consideration for any successful content delivery and monetisation strategy. If there is one compelling point to make, it is that inactivity is not an option. For the millions of users that fired up a Google browser on January 15th to watch PlayReady content that now no longer plays, it is an annoyance and maybe a call to an IT support desk. For an OTT business that discovers that its DRM strategy makes them uncompetitive against Netflix or means that its content won't play on the next generation of new Apple devices, the consequences are far more serious.

For further reading, please download part two of our guide which will outline the benefits of Pikel Guard, an industry leading DRM solution as well as some of the considerations that content providers will need to think about when deploying multiple DRM content support.

Piksel currently offers expert service around DRM to content providers across Europe, Australasia and the Americas.

For more information on how we can help, please visit [www.piksel.com](http://www.piksel.com).

.....

# UNRIVALED KNOWLEDGE

We help the world's leading brands maximize their reach and return with video.

Comprised of a global team of experts we call 'Televisionaries', Píksel has helped to design, build, and manage online video services for major media companies like AT&T, BSkyB, Mediaset, and Sky Deutschland, as well as enterprise brands like Airbus, Barnes & Noble, and Volkswagen.

Headquartered in New York City, Píksel offices can be found throughout Europe and the Americas.

Connect with us:



[piksel.com](http://piksel.com)

[facebook.com/piksel](https://facebook.com/piksel)

[twitter.com/piksel](https://twitter.com/piksel)



©2015 Piksel, Inc. All Rights Reserved.

PIKSEL.COM

