DMID

An Introduction to Digital Media IDentification and the Revolution in Content Rights Management

Since ancient times, the entertainment business has been based upon creating some form of barrier between the consumer and the experience. The obvious purpose of this barrier is to limit the viewer's access to the entertainment until he or she pays for the privilege. When all entertainment was performed live, this barrier was a physical wall with an aperture through which the audience would gain access. Each aperture incorporated some form of turnstile to restrict traffic and collect revenue. The turnstile was where the money was made. It was the operator of the turnstile – not the artists – who controlled the business end of the entertainment business.

Over the past hundred years, as entertainment evolved from a live experience to a distributed product, the turnstile mechanism evolved to accommodate this shift toward mass entertainment. The first manifestation was sheet music, followed by the nickelodeon, the phonograph, the movie theater, live broadcasting and increasingly sophisticated forms of pre-recorded content. Each channel had its own unique approach to collecting revenue − a unique "turnstile" designed to force consumers (and, over time, the advertisers) to pay for the entertainment experience. By the end of the 20th century, media distribution reached critical mass and global complexity. For every new distribution model, new choke-points evolved to control the flow of money between the artist and his audience, each siphoning off a sizable chunk of revenue as it passed through.

This is a textbook example of an inefficient market and the pressure is most obvious at the outer edges of the supply chain: the rights holder at one extreme and the consumer at the other. In fact, the state of the entertainment business can be summed up as follows:

1) Rights holders have been forced to surrender more and more of their profit margins to the "turnstile" operators.
2) Consumers will continue to seek more cost-effective methods to purchase an ephemeral asset – entertainment– even if these methods are not legal.

Over the past decade, file sharing technology has eliminated the barriers which typically separate content from consumer – first with music downloads and now with video. In the early days of file-sharing, desperate media executives focused

their attention on building a better turnstile. The result was disastrous. With no wall surrounding the content, the turnstile became redundant. Consumers simply stepped around it. It became painfully clear that the failure of the turnstile in any distribution model destroys the value of all assets *dependent upon that model*.

Illegal file-sharing destroys the value of on-demand product because the content is stolen and then given away for free. Of course, advertisers give content away for free but they pay license fees for the privilege. It's also important to understand that ad-supported content is a risky marketplace. Advertisers have no way of accurately predicting the ROI for any specific impression they buy so they must suppress the value of the content they license as close to zero as possible. Either way – direct-pay or advertising-supported – this ongoing devaluation of billions of dollars of entertainment product is a serious problem.

At the core of this dilemma is the inability of any media distribution system to accurately quantify the elements of content it sells (whether direct to customers or indirectly, to advertisers). Before digital distribution, you simply counted the number of units sold at retail. In the old advertising model, there were statistical systems to measure households, users and impressions but there was no method to measure individual content elements with any accuracy. Until such a mechanism exists at a content level – as opposed to a platform, household or device level – the state of Content Rights Management will be mired in the twentieth century.

But imagine there was a way to identify every piece of content as a unique and proprietary asset – and then track that asset across the entire global network in real time. Imagine a Digital Rights Management (DRM) capability that was woven into every distribution platform not as a restrictive technology but as an enabling technology, one that was passive and permanently affixed to every content element at a molecular level. Now imagine that such a technology existed today and that it was inexpensive, ubiquitous and reliable.

This technology does exist. It's called **IPv6**.

IPv6 is short for Internet Protocol, Version Six. It describes a new set of operating principals proposed by many of the same folks who created the original Internet standards (IPv4) back in the 1970s – a time when the smartest people in the world assumed this new global, interconnected network would be used mostly by researchers, engineers and data managers from academe, big business and the military. These early pioneers envisioned the most successful technological system in human history – the Internet – but even they didn't anticipate YouTube.

Considering the limited capacity of mainframe computers and the phone network at that time, the Internet's founding fathers designed a basic operating system using a 32-bit addressing scheme. This meant there was a limit to the number of unique IP addresses – phone numbers, if you will – available to serve the network. That limit was 2^{32} (2X2X2…repeated thirty-two times), which comes out to about 4.3 billion. In 1975, 4.3 billion was believed more than enough destinations for a computer network expanded beyond anyone's imagination. Now, not quite forty years later, we have already run out of unique IP addresses for public use. Unlike a telephone system where we can add an area code or national prefix to create more numbers, the Internet's limitations are built into its chromosomes, specifically its 32-bit address space. We simply can't add more phone numbers using the old protocol.

IPv6, which is already part of Macintosh OSX and Microsoft Vista, is built around a 128-bit addressing standard. This means there are 2^{128} unique IP addresses or approximately 3.6×10^{38}. In plain English, that's three hundred and sixty trillion trillion trillion possibilities. What does this mean? It means that for all practical purposes, the new inventory is limitless.

But what does this have to do with Digital Rights Management today?

Imagine assigning a globally unique ID number to every frame of film on every motion picture or television show ever produced for commercial distribution. These embedded IDs would be unique and indelible, like fingerprints. And, like fingerprints, each frame could be linked to a unique rights holder such as a studio, TV network or individual artist. Like fingerprints, these unique marks would be functionally invisible and insignificant – until such time as a unique association needed to be made between the media object and its owner, at which point a secure and trusted linkage could be established. This connection could be active or passive, real-time or forensic, voluntary or mandatory depending on the permissions attached to each slice of media on an ongoing basis.

Is this possible?

Yes. We can do it today. We do not need a fully deployed IPv6 network to start the process. The key is assigning a low-cost universally recognized watermark to the media at its earliest point on the digital lifecycle. Right now, the inventory of IPv6 addresses is more than sufficient to meet that demand. In fact, if we were to attach an IPv6-based DMID to every frame of film and television in circulation as well as every second of recorded music produced over the last century, we would use less than one ten-trillionth of one percent of the available IPv6 inventory.

The adoption of DMID will provide the entertainment industry a technology advantage it has lacked since peer-to-peer collapsed the "wall" surrounding most content libraries. DMID will revolutionize media distribution the way UPC barcode revolutionized the distribution of retail products. In fact, the deployment of UPC across a broad consortium of beneficiaries is the model we will refer to going forward.

Is DMID a foolproof anti-piracy scheme? No, that will never exist. But by allowing every rights holder the ability to distribute content in a manner that is precise, passive, ubiquitous, interoperable and utterly transparent, media consumers (viewers and advertisers) will be able to spread the price of entertainment evenly across the entire audience, reducing the incremental cost of each user's experience well below the threshold where piracy becomes attractive – which, everyone agrees, is at the core of any practical DRM system.