

Selling Standards: The Development of an Information Age Product

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LIS 590 IS Fall 2010

## Introduction

On April 29, 2010, Steve Jobs posted a missive entitled “Thoughts on Flash” on Apple’s website, lambasting Adobe’s technology for being proprietary and slow.<sup>1</sup> He touts next-generation HTML5 web and H.264 video standards as alternative open technologies for online video, stating “we strongly believe that all standards pertaining to the web should be open.” What Jobs fails to mention in his note is that Apple is one of 29 patent holders on H.264 for which the patent pool licensing firm MPEG Licensing Authority collects fees on every H.264-capable hardware or software player, including nearly every computer, DVD player, cable or satellite set-top box, camera and smartphone; every H.264-capable video encoder, including most digital video production software suites; and every purchased H.264-based video, including some DVDs, Blu-Rays, and most on-demand videos; under threat of litigation.<sup>23</sup>

Jobs’ letter kicked off a flurry of responses. The next day, Microsoft announced that its soon-to-be-released Internet Explorer 9 would *only* support H.264 video in its next-generation video implementation, despite the existence of and support of at least three other codecs by other major web browsers.<sup>4</sup> Microsoft is, predictably, another MPEG LA patent licensor. The Mozilla Foundation has publically stated that it would not support H.264 in its open-source Firefox web browser for both legal and ethical reasons.<sup>5</sup> As of November 2010, Internet Explorer commands

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1 “Thoughts on Flash,” Steve Jobs, accessed December 8, 2010,

<http://www.apple.com/hotnews/thoughts-on-flash/>

2 “MPEG LA – The Standard for Standards – AVC Licensors,” MPEG LA, LLC, accessed December 8, 2010, <http://www.mpegla.com/main/programs/AVC/Pages/Licensors.aspx>

3 “MPEG LA – The Standard for Standards – AVC Introduction,” MPEG LA LLC,

<http://www.mpegla.com/main/programs/AVC/Pages/Intro.aspx>

4 Dean Hachamovitch, “HTML 5 Video.” *IE Blog*, April 29, 2010,

<http://blogs.msdn.com/b/ie/archive/2010/04/29/html5-video.aspx>

5 Mike Shaver, “HTML 5 Video and Codecs.” *shaver*, January 23, 2010,

<http://shaver.off.net/diary/2010/01/23/html5-video-and-codecs/>

58.41% market share in web browsers while Firefox is in second place with 22.81%.<sup>6</sup> Competing philosophies held by the two largest browsers have set the stage for a standards war of massive implications.

The stakes are high in the battle over next-generation internet video standards: if MPEG LA and its licensors win out, they gain control over the future of media distribution in a landscape that once promised democratized distribution models. While the most-publicized success stories in mass distribution of non-corporate content such as the home video of a British infant biting his older brother's finger (over 256 million views on YouTube)<sup>7</sup> or a comedian performing "the evolution of dance" (158+ million views)<sup>8</sup> might suggest democratized distribution leads to banality, several counterexamples illustrate the potential of internet video as a tool of open democracy and demassified culture.

Early on New Year's Day, 2009, BART (Bay Area Rapid Transit) police officer Johannes Mehserle shot unarmed passenger Oscar Grant in the back after detaining him for an on-train altercation.<sup>9</sup> Grant died later that day, leading to murder charges for Mehserle. The incident was captured by other passengers on cell phones and other video devices, with several published on the internet. During the trial, two of the passengers who recorded the incident said they began recording "because they believed BART officers were acting too aggressively toward Grant and his friends."<sup>10</sup> Dissemination of the videos online was crucial in publicizing the case and

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6 Christina Warren, "Chrome Approaches 10% Browser Marketshare [STATS],"

*Mashable/Tech*, <http://mashable.com/2010/12/01/browser-stats-november-2010/>

7 *Charlie bit my finger - again !* [video]. (2007). Retrieved December 8, 2010, from [http://www.youtube.com/watch?v=\\_OBlgSz8sSM](http://www.youtube.com/watch?v=_OBlgSz8sSM)

8 *Evolution of Dance - By Judson Laipply* [video]. (2006). Retrieved December 8, 2010, from <http://www.youtube.com/watch?v=dMH0bHeiRNq>

9 Demian Bulwa, "Behind murder charge against ex-BART officer," *San Francisco Chronicle*, <http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/01/15/MNJE15A6O2.DTL>

10 Paul T. Rosynsky, "Videos spur emotion in first day of hearing for BART killing," *Oakland Tribune*, [http://docs.newsbank.com/s/InfoWeb/aggdocs/AWNB/12A34740D7C97270/0D0CB57DF8A1C275?s\\_lang=en-US](http://docs.newsbank.com/s/InfoWeb/aggddocs/AWNB/12A34740D7C97270/0D0CB57DF8A1C275?s_lang=en-US)

influencing public opinion. While the ethics of publishing video of a private individual's death are debatable, the case demonstrates the potential of video distribution technology for publicizing alternative viewpoints and evidence regarding newsworthy incidents. In the pre-ubiquitous-video-capture-technology world, the only video evidence in the case would arguably have come from BART-controlled security cameras, unreleased to the public. Furthermore, the probability of public coverage of newsworthy incidents is becoming even more salient with the advent of mobile live-streaming services such as ustream.tv and qik.com: the next Rodney King incident could be broadcast live from an iPhone.

Internet video distribution has implications not only for individualized journalism but also for a demassification of culture. In 2005, Independent Magazine hailed Netflix's DVD-by-mail as a boon for independent film distribution, allowing unprecedented reach for small films outside the art house theater and extending their lifecycles.<sup>11</sup> Since then Netflix has rapidly grown its "Instant Watch" internet video business, recently launching a no-DVD subscription plan, with 378 independent films and documentaries are currently available to Netflix's more than 16 million subscribers on demand and the number of films set to grow.<sup>12</sup> Upstart indieflix.com streams a catalog of 1276 independent films to subscribers. In addition to these commercial services, a number of filmmakers have opted to do their own online distribution – for instance, the Free Software Foundation-supported *Patent Absurdity: How software patents broke the system* is available to watch or download from its own website, patentabsurdity.com. Internet distribution has the potential to remove the mass media apparatus from art and culture and allows artists to be supported directly by their audience without relinquishing control of their creations,

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11 Elizabeth Angell, "Netflix and the afterlife of indies," *The Independent*, <http://www.independent-magazine.org/node/313>

12 "instantwatcher.com – Independent", <http://instantwatcher.com/genres/179>

as exemplified by self-supporting web-based comic artists.<sup>13</sup> Seventy years ago, critical theorist Theodor Adorno correctly predicted a dark cultural future dominated by corporate profit motives leading to the illusion of choice among a flattened artistic landscape.<sup>14</sup> The democratization of distribution mechanisms through the internet represents a “critical juncture,” to borrow media scholar Robert McChesney’s term,<sup>15</sup> which could herald an era of reinvigorated culture and the dissolution of the current corporate stranglehold on it.

The future of open digital video is threatened by the expansionary and anti-competitive practices of the MPEG LA group. They claim patents on fundamental technologies and have expressed belief that their intellectual property covers all competitors, including those that have made a conscious effort to develop non-infringing alternatives. The 29 MPEG LA stakeholders are core members of standards development groups and their dominant positions at all points in the digital distribution infrastructure give them the power to dictate de facto standards in practice as well. Well-funded lawyers have allowed them to push the limits of intellectual property and antitrust laws and create a new legal archetype that is being mimicked by intellectual property concerns in biotechnology and nanotechnology.

## A Technical Overview

Video compression is comprised of two stages: encoding, or compression, by a creator and decoding, or decompression, by a consumer. Pieces of software or the mechanism hard-coded onto specialized hardware chips that perform encoding and/or decoding are called codecs.<sup>16</sup>

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13 [http://en.wikipedia.org/wiki/List\\_of\\_self-sufficient\\_webcomics](http://en.wikipedia.org/wiki/List_of_self-sufficient_webcomics)

14 Theodor Adorno, *The Culture Industry*. New York: Routledge, 2001.

15 Robert McChesney, *The Death and Life of American Journalism*. Philadelphia, PA: Nation Books, 2010

16 Many of the technical details in this section are based on my background knowledge of the field. A useful text is Iain Richardson’s “The H.264 advanced video compression standard “

Video industry encoding standards are set by the International Organization for Standardization (ISO) and the International Telecommunications Union's Telecommunication Standardization Sector (ITU-T). The H.264 (also known as MPEG-4 part 10 and Advanced Video Coding [AVC]) standard, approved in 2003, is a joint effort of the ISO's Moving Picture Experts Group (MPEG) and the ITU-T's Video Coding Experts Group (VCEG).<sup>1718</sup> H.264 and the older standards set by the group only prescribe decoding algorithms, allowing for continued improvement of encoding algorithms without necessitating changes to the standard.

The advancement of digital video compression is among the most impressive technological achievements of the past 30 years. The first commercial release of a video compression codec was Cinepak, which allowed up to 50% compression of 320 x 240 pixel video.<sup>19</sup> The H.264 codec, on the other hand, can achieve a 50:1 compression ratio at acceptable video quality – that is, the file size of a video compressed with H.264 is 2% the size of its uncompressed counterpart. One hour of uncompressed video at the highest common HD rate (1080p) would require 559.87 GB of disk space and a 1.24 Gigabits per second transmission rate. This data rate is out of reach for conventional desktop hard drives, let alone a home internet connection. Demonstrably, video compression technology has been critical to the development of a multimedia web.

With implementation of the long-awaited HTML5 standard nearly complete in all the major browsers, web video is poised to become even more prevalent. HTML 4.01, the current web language standard, is over a decade old.<sup>20</sup> While HTML5 is currently still in draft stage, the

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17 "ISO/IEC 14496-10:2005 - Information technology -- Coding of audio-visual objects -- Part 10: Advanced Video Coding," retrieved December 8, 2010

[http://www.iso.org/iso/iso\\_catalogue/catalogue\\_tc/catalogue\\_detail.htm?csnumber=43058](http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=43058)

18 *H.264 : Advanced video coding for generic audiovisual services*. International Telecommunication Union – Telecommunication Standardization Sector, 2010.

19 Anders Bylund, "From Cinepak to H.265: a brief history of video compression," *ars technica*, <http://arstechnica.com/gadgets/guides/2009/12/from-cinepak-to-h265-a-survey-of-video-compression.ars>

20 "HTML 4.01 Specification," W3C, accessed December 8, 2010,

specifications are stable enough for developers to add HTML5 support to their browsers. One of the new features in HTML5 is native support for a video tag, meaning that browsers themselves will be responsible for playing video instead of relying on plug-ins such as Flash, Quicktime or Windows Media Player to provide the capability. The specification, however, does not prescribe a codec for these browsers. Early versions of the HTML5 draft strongly advise the support of open source codecs for browsers. On December 17, 2007, that text was removed and replaced with the following:

“It would be helpful for interoperability if all browsers could support the same codecs. However, there are no known codecs that satisfy all the current players: we need a codec that is known to not require per-unit or per-distributor licensing, that is compatible with the open source development model, that is of sufficient quality as to be usable, and that is not an additional submarine patent risk for large companies. This is an ongoing issue and this section will be updated once more information is available.”<sup>21</sup>

As of now, no consensus has been reached neither in the standard nor the individual browser implementations. In fact, as noted, the Mozilla Foundation and Internet Explorer will have entirely orthogonal support which will likely lead to fragmentation with different versions of video-heavy sites being served to different browsers.

The end-user effects of this controversy are imminent: the current stable releases of Firefox, Chrome, Safari and Opera already implement parts of HTML5 and the HTML5-compliant Internet Explorer 9 is currently in public beta with a stable version expected in 2011.<sup>22</sup> Also a

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<http://www.w3.org/TR/html401/>

<sup>21</sup> “HTML5 Revision Tracker,” accessed December 8, 2010, <http://html5.org/tools/web-apps-tracker?from=1142&to=1143>

<sup>22</sup> “Browser support for CSS3 and HTML 5,” Deep Blue Sky, [http://www.deepbluesky.com/blog/-/browser-support-for-css3-and-html5\\_72/](http://www.deepbluesky.com/blog/-/browser-support-for-css3-and-html5_72/)

consideration is the growing portion of web and streaming digital video use that occurs on mobile devices: Apple's iPhone, and iPod touch and iPad products<sup>23</sup>, RIM's Blackberry devices<sup>24</sup> and Google's Android platform<sup>25</sup> only support the H.264 codec from the three viable current-generation options.

## **Brief History of Patent Pools in Video Technology**

From its birth as a viable medium, video technology has been awash in patents, license fees and litigation. In 1887, Thomas Edison entered the nascent moving picture field, inspired by the success of his phonograph.<sup>27</sup> He developed the first practical video recorder, the Kinetograph, and its video-playing counterpart, the Kinetoscope. Others continued to develop the technology until the first motion pictures were shown in 1896 using projector technology. By 1907 the industry had achieved popular and commercial success, with thousands of nickelodeons across the U.S.

The Edison Manufacturing Company commenced litigation based on its video patent portfolio in 1897, dividing the industry into two camps: those who complied with Edison's demands and those who aligned with rival corporation Biograph. In 1908, the two corporations reached an agreement, forming the Motion Picture Patents Company to pool their patents, levy license fees

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23 "iOS Technology Overview: Media Layer," Apple Inc., accessed DATE <http://developer.apple.com/library/ios/#documentation/Miscellaneous/Conceptual/iPhoneOSTechOverview/MediaLayer/MediaLayer.html>

24 "Supported Media Types on Blackberry Smartphones," Research In Motion Limited, accessed DATE [http://docs.blackberry.com/en/smartphone\\_users/deliverables/18349/711-01774-123\\_Supported\\_Media\\_Types\\_on\\_BlackBerry\\_Smartphones.pdf](http://docs.blackberry.com/en/smartphone_users/deliverables/18349/711-01774-123_Supported_Media_Types_on_BlackBerry_Smartphones.pdf)

25 "Android Supported Media Formats | Android Developers," Google Inc., accessed DATE, <http://developer.android.com/guide/appendix/media-formats.html>

26 Since Android is an open platform, hardware manufacturers using the software are free to add support for whichever codecs they see fit. Application and content developers, however, are only guaranteed the availability of H.264 support on Android devices. Google's own VP8 codec is supported in the Android 2.3 release, available to developers as of December 6 and on the first consumer phones starting December 16.

27 Ralph Cassady Jr., "Monopoly in Motion Picture Production and Distribution: 1908-1915," 32 S. Cal. L. Rev. 348 (1958-1959)



and litigate infringers. The move created an effective monopoly in the motion picture industry with the Patents Company leveraging its position to engage in anti-competitive coercive behavior, culminating in a successful anti-trust suit filed by the US Federal government in 1912. The MPPC was dissolved in 1918 after exhausting appeals.

Another significant era in video patent pools concerns the RCA broadcast TV patent pool. In 1958 a Department of Justice antitrust suit over RCA's color TV patents resulted in a consent decree in which "RCA agreed to 1) put some 100 color TV patents into a royalty-free pool, 2) make available to all comers on a royalty-free basis at least 12,000 other existing radio-TV patents, 3) license all new patents during 'the next ten years at a "reasonable" royalty rate."<sup>28</sup> Overall, the DOJ's increasingly hostile attitude toward patent pools in this era discouraged their formation until 1995, when the DOJ-FTC jointly published the Federal Antitrust Guidelines for the Licensing of Intellectual Property, which provided principles for licensors to navigate the tension between patent pools and monopoly.<sup>29</sup>

## **The Formation of MPEG LA**

Keen awareness of the Guidelines is apparent in the MPEG LA's formation process.<sup>30</sup><sup>31</sup> The MPEG group's MPEG-2 standardization process began in 1990 and finalized between 1994 and 1995 but concern about the standard's patent thicket and its potential to hamper adoption drove

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28 "Boost for Color TV," *Time*, November 10, 1958, accessed DATE, <http://www.time.com/time/magazine/article/0,9171,938051,00.html>

29 Regis C. Worley, "The MPEG LA Patent Tool: A Rule of Reason Analysis and Suggestion to Improve Procompetitiveness," 24 T. Jefferson L. Rev. 301 (2001-2002)

30 Gavin Clarkson, "Cyberinfrastructure and patent thickets: Challenges and responses" First Monday [Online], Volume 12 Number 6 (4 June 2007)

31 Steven C. Carlson, "Patent Pools and the Antitrust Dilemma," 16 Yale J. on Reg. 359 (1999)

the creation of the MPEG Intellectual Property Rights working group in 1993.<sup>32</sup> Baryn Futa<sup>33</sup>, COO of CableLabs, an R&D research consortium formed by an international group of cable operators, chaired this group. The consortium had been influential in the MPEG-2 standardization process, ensuring the outcome met the needs of its member corporations. Alternatives to a patent pool were proposed, but according to Lerner et al. “patent holders wanted to ensure that their intellectual property would be aggressively marketed” and pushed for the formation of a pool. Conflict arose during the rate-setting discussion between patent holders whose goal was widespread adoption of the standard and those desiring to maximize licensing revenue (the latter comprised of Lucent and Columbia University.) Reaching a licensing rate compromise of \$4 per unit cleared the internal hurdles and allowed the new MPEG LA corporation to concentrate on the external issue of avoiding violation of DOJ antitrust regulations.

Three efforts were crucial in MPEG LA’s bid to comply with the 1995 Guidelines: hiring an independent reviewer to determine which patents are essential to the standard, conducting a world-wide patent search for unknown patents which may be essential to the standard and constructing licensing rules in accordance with both the DOJ and ISO guidelines. The attention paid off in 1997 when the DOJ responded favorably to the corporation’s request for review. The group’s success did not go unnoticed by IP holders in other industries, leading to an increase in patent pools in disparate sectors, using MPEG LA as a model.<sup>34</sup>

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32 Josh Lerner, Marcin Storjwas, and Jean Tirole, *Cooperative Marketing Agreements Between Competitors: Evidence from Patent Pools*, National Bureau of Economic Research Working Paper Series, 2003

33 Futa went on to become CEO of MPEG LA. In 2006, MPEG LA fired and sued both Futa and COO Maria O’Reilly, alleging the two misappropriated funds and were intimately involved. They denied the claims but admitted the affair. The suit was settled confidentially (“MPEG LA Dueling Lawsuits Get Settled,” Executive Quote and Information Service, March 5, 2007.)

34 Gavin Clarkson and David DeKorte, “The Problem of Patent Thickets in Convergent Technologies,” *Annals of the New York Academy of Sciences*, 1093: 180–200. (2006) doi:

The group continued its function for the subsequent MPEG-4 and H.264 standards. The H.264 pool currently comprises of 29 entities holding a total of 1,782 patents (some of which are patents on the same technology in multiple jurisdictions.)<sup>35</sup> Table 1 lists the holders and the number of patents each claims in the pool.

## **Issues Surrounding the MPEG LA**

MPEG LA was ostensibly chartered as an organization whose goal was the widespread adoption of a technical standard by simplifying and controlling costs of licensing essential patents. In actually, licensors whose primary motive was profit from the standard itself (as opposed to profit from selling hardware, software and content by creating a sort of “corporate commons”) have worked to undermine this goal from the beginning. In recent years, MPEG LA has capitalized on its reputation as the archetypal patent pool to enter the \$500 billion per year technology patent licensing business, offering its expertise in antitrust-avoiding pool formation as service.<sup>36</sup> The

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10.1196/annals.1382.014

35 “MPEG LA - The Standard for Standards - AVC Patent List,” MPEG LA, LLC, accessed DATE <http://www.mpegla.com/main/programs/AVC/Pages/PatentList.aspx>

36 Cameron Gray, “A New Era in IP Licensing: The Unit License Right(TM) Program,” The Licensing Journal, 28(10), 27-32 (November 2008)

**Table 1. Patent Holders in the H.264/AVC pool**

**Licensors# of PatentsMarket Cap**  
**Apple, Inc4291,189,934,0**

Source: MPEG LA, LLC website and Mergent Online transformation and expansion of the MPEG LA into a direct-profit-driven enterprise has a variety of implications in several arenas.

### **80Computer Hardware & Equipment**

**Cisco Systems Canada IP Holdings Company (Market info for parent**

**Cisco)4105,700,471,340Manufacturing**

**Daewoo Electronics Corporation2Not AvailableHousehold Appliances, Electronics & Goods**

**Dolby Laboratories Licensing Corporation (Mkt info for parent Dolby**

**Labs)103,471,412,290Manufacturing**

**Electronics and Telecommunications Research Institute4Not ApplicableKorean National Laboratory**

**France Télécom, société anonyme724,634,313,200Services**

**Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung e.V.86Not ApplicablePrivate/Public German Research Laboratory**

**Fujitsu Limited1812,111,906,950Computer Hardware & Equipment**

**Hewlett-Packard Company197,580,981,290Computer Hardware & Equipment**

**Hitachi, Ltd.4Not AvailableElectronic Instruments & Related Products**

**Koninklijke Philips Electronics N.V.4138,538,500,000Household Appliances, Electronics & Goods**

**LG Electronics Inc.386Not AvailableHousehold Appliances, Electronics & Goods**

**Microsoft Corporation116231,170,231,460Internet & Software**

**Mitsubishi Electric Corporation2622,500,979,200Electrical Equipment**

**NTT DOCOMO, INC.14458,395,700Services**

**Nippon Telegraph and Telephone Corporation236,576,000,000Services**

**Panasonic Corporation5582,657,595,600Household Appliances, Electronics & Goods**

**Polycom, Inc.163,316,644,825Manufacturing**

**Robert Bosch GmbH4N/AElectrical Equipment**

**Samsung Electronics Co., Ltd.6010,158,060,000Semiconductors**

**Sedna Patent Services, LLC1Not AvailablePatent holding company formerly known as TV Gateway Group**

**Sharp Corporation8710,924,075,200 Household Appliances, Electronics & Goods**

**Siemens AG5107,238,975,000Electrical Equipment**

**Sony Corporation3433,516,677,120Household Appliances, Electronics & Goods**

**Tandberg Telecom AS1Not AvailableNow owned by Cisco**

**Telefonaktiebolaget LM Ericsson517,678,480,000Manufacturing**

**The Trustees of Columbia University in the City of New York 9Not ApplicableInstitute of Higher Education**

**Toshiba Corporation27217,318,096,260Computer Hardware & Equipment**

**Victor Company of Japan, Limited (aka JVC)5Not Available**

## **Technical Standards**

Officially, the MPEG LA and the MPEG/VCEG standard setting bodies are disparate entities

operating independently of each other. In practice, the existence and success of the MPEG LA

creates an incentive for MPEG/VCEG members who own video patents to push for their

inclusion in the standard. Paradoxically, one of the factors that has thus far protected the MPEG

LA from antitrust litigation is that it is closely tied to an international industry standard. Legally,

a standard provides a way to prove the existence of a patent thicket and demonstrate that a patent

pool is procompetitive. A one-stop licensing option is, indeed, procompetitive in the realm of

selling goods and services based on the standard. When income from licenses, however, becomes

the primary revenue model, expansionary logic as mandated by capitalist economics becomes

prevalent and the threat of monopoly capital conditions grow salient. As profit margins on

**Sector/Organization type**