Selling Standards: The Development of an Information Age Product

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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.[1] 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.[2][3]

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.[4] 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.[5] 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%.[6] 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)[7] or a comedian performing "the evolution of dance" (158+ million views)[8] 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.[9] 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

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

[8] *Evolution of Dance – By Judson Laipply* [video]. (2006). Retrieved December 8, 2010, from http://www.youtube.com/watch?v=dMH0bHeiRNg

[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

his friends."[10] Dissemination of the videos online was crucial in publicizing the case and 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.[11] 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.[12] 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

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[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

[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

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, as exemplified by self-supporting web-based comic artists.[13] 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.[14] The democratization of distribution mechanisms through the internet represents a "critical juncture," to borrow media scholar Robert McChesney's term,[15] 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

[13] 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

onto specialized hardware chips that perform encoding and/or decoding are called codecs.[16] 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).[17][18] 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.[19] 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.

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[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 **"**

[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

[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

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.[20] While HTML5 is currently still in draft stage, the 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." [21]

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.

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[20] "HTML 4.01 Specification," W3C, accessed December 8, 2010, http://www.w3.org/TR/html401/

[21] "HTML5 Revision Tracker," accessed December 8, 2010, http://html5.org/tools/web-apps-tracker?from=1142&to=1143

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.[22] Also a 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[23], RIM's Blackberry devices[24] and Google's Android platform[2526] 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.[27] 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.

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[22] "Browser support for CSS3 and HTML 5," Deep Blue Sky, http://www.deepbluesky.com/blog/-/browser-support-for-css3-and-html5_72/

[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

[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)

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 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."[28] 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.[29]

[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)

The Formation of MPEG LA

Keen awareness of the Guidelines is apparent in the MPEG LA's formation process.[3031] 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 the creation of the MPEG Intellectual Property Rights working group in 1993.[32] Baryn Futa[33], 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

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[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)

[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 Lawsuites Get Settled," Executive Quote and Information Service, March 5, 2007.)

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.[34]

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.)[35] 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.[36] The

[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: 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

Licensor	# of Patents	Market Cap	Sector/Organization type
Apple, Inc	4	291,189,934,080	Computer Hardware & Equipment
Cisco Systems Canada IP Holdings Company (Market info for parent Cisco)	4	105,700,471,340	Manufacturing
Daewoo Electronics Corporation	2	Not Available	Household Appliances, Electronics & Goods
Dolby Laboratories Licensing Corporation (Mkt info for parent Dolby Labs)	10	3,471,412,290	Manufacturing
Electronics and Telecommunications Research Institute	4	Not Applicable	Korean National Laboratory
France Télécom, société anonyme	7	24,634,313,200	Services
Fraunhofer-Gesellschaft zur Foerderung der angewandten Forschung e.V.	86	Not Applicable	Private/Public German Research Laboratory
Fujitsu Limited	18	12,111,906,950	Computer Hardware & Equipment
Hewlett-Packard Company	1	97,580,981,290	Computer Hardware & Equipment
Hitachi, Ltd.	4	Not Available	Electronic Instruments & Related Products
Koninklijke Philips Electronics N.V.	41	38,538,500,000	Household Appliances, Electronics & Goods
LG Electronics Inc.	386	Not Available	Household Appliances, Electronics & Goods
Microsoft Corporation	116	231,170,231,460	Internet & Software
Mitsubishi Electric Corporation	26	22,500,979,200	Electrical Equipment
NTT DOCOMO, INC.	14	458,395,700	Services
Nippon Telegraph and Telephone Corporation	2	36,576,000,000	Services
Panasonic Corporation	558	2,657,595,600	Household Appliances, Electronics & Goods
Polycom, Inc.	16	3,316,644,825	Manufacturing
Robert Bosch GmbH	4	N/A	Electrical Equipment
Samsung Electronics Co., Ltd.	60	10,158,060,000	Semiconductors
Sedna Patent Services, LLC	1	Not Available	Patent holding company formerly known as TV Gateway Group
Sharp Corporation	87	10,924,075,200	Household Appliances, Electronics & Goods
Siemens AG	5	107,238,975,000	Electrical Equipment
Sony Corporation	34	33,516,677,120	Household Appliances, Electronics & Goods
Tandberg Telecom AS	1	Not Available	Now owned by Cisco
Telefonaktiebolaget LM Ericsson	5	17,678,480,000	Manufacturing
The Trustees of Columbia University in the City of New York	9	Not Applicable	Institute of Higher Education
Toshiba Corporation	272	17,318,096,260	Computer Hardware & Equipment
Victor Company of Japan, Limited (aka JVC)	5	Not Available	

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.

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 consumer electronics continue to fall, this is increasingly the case for H.264 patent holders[37]. Instead of physical goods, the standard becomes the product, making patent pools unequivocally anticompetitive. The standard, the patent pool and the power leveraged by the members work in tandem to muscle out any competing standards.

The HTML5 codec controversy illustrates all three of these forces at work. Both Steve Jobs and Internet Explorer's then-General Manager (now-Corporate VP) Dean Hachamovitch cite the H.264 codec's position as an open industry standard in their respective posts in support of H.264 as the new web standard.[3839] Additionally, Hachamovitch's note touts the availability of a license

[37] Junko Yoshida. (2004, March). Codec impasse holds up designs. Electronic Engineering Times,(1311), 1,78.
[38] Steve Jobs, "Thoughts on Flash"
[39] Dean Hachamovitch, "HTML5 Video"

through MPEG LA as a positive consideration and the murky legal status of Ogg Theora and Google VP8 the two other viable current-generation codecs, as a potential liability prohibiting IE9 from supporting them[40]. Considering Microsoft and Apple's dominant positions in web browsers and mobile media devices respectively, their decisions not to support other codecs places the Theora and VP8 at a serious competitive disadvantage.

The H.264 in which the Mozilla Foundation is embroiled points to a deeper issue in the adoption of patent-laden "open" standards: the standard assumes for-profit use. Mozilla's Firefox browser is a celebrated success story in open source software and is arguably the most publically visible open source project. Under MPEG LA's H.264 licensing structure, Mozilla would owe approximately $5 million dollars a year for a browser that it gives away for free.[41] Additionally, any individual or software project that wished to use the Firefox decoder's source code would not be covered by Mozilla's license and would be liable to the MPEG LA. Mozilla VP of Engineering Mike Shaver points out in his defense of the H.264 decision that the introduction of Firefox increased innovation in the browser space (and accordingly, on the web in general) but that this would have not have been possible without a historically royalty-free web. In effect, license-encumbered standard patent pools have the potential to stifle innovation, counter to the intended effect of patents as tools to promote technical progress.

Expansionary Aspriations

The MPEG LA was incorporated as a for-profit concern and has accordingly leveraged its available resources to expand its business model. Chief among its resources is its demonstrated

[40] On a personal note, this fear of litigation is completely in line with what I experienced at Microsoft as an intern test engineer in the Internet Explorer group. Much of IE's previous lack of standards compliance and poor software quality can be attributed to its fear of litigation since "fixing" non-conformance could break sites that had implemented work-arounds, saddling it with suboptimal legacy code which caused performance and stability issues. I also met Hachmovitch during my internship with IE, where the impossibility of pronouncing his last name was a running joke.

[41] Mike Shaver, "HTML 5 video and codecs."

experience in creating antitrust-proof patent pools shielded by technical standards. In addition to patent pools covering aspects of the MPEG-2, MPEG-4 and AVC/H.264 codec standards, they currently offer licenses for the ATSC digital television broadcast standard and the VC-1 video coding standard used in Blu-Ray Discs and several other video products.[42] The most intriguing currently available license is the one covering the 1394 standard, a wired data transfer standard of which Apple's Firewire is the most well-known implementation.

The 1394 patent pool began offering licenses in 1999, just two years after receiving DOJ approval under the auspices of managing the MPEG-2 pool. The reason why MPEG LA was chosen to handle the task is readily apparent upon cursory glance at its list of licensors: all but two of the ten patent holders in the 1394 pool are also members of the MPEG-2 pool. Excluding this anomaly, MPEG LA focused on pools in its core video business until 2009, when it began work on amassing a pool based on the in-development LTE standard, a successor technology to 3G mobile data communication. The group's scope appears to be expanding quickly with its website claiming to have patent pools in progress in chemical, consumer electronics, ecommerce, education, environment, healthcare and biotechnology, manufacturing and materials, transportation and wireless technology industries.

Further evidence that selling standards is becoming a lucrative business is the challenge of rival patent pool expert Via Licensing, a Dolby Laboratories subsidiary. In June 2003, Via announced its intent to form its own patent pool for the H.264 standard.[43] As the standards group continued work on the draft, Via and MPEG LA competed to attract patent holders. MPEG LA released its

[42] "MPEG LA - The Standard for Standards," MPEG LA, LLC
[43] "Via Licensing Begins Process to Form AVC Patent Licensing Pool," Business Wire, June 9, 2003.

H.264 license in July 2004.[44] In March 2005, Via announced availability of its H.264 license with five corporations (including Dolby) in its pool.[45] At some point between 2005 and the present, Via withdrew its H.264 license and removed all mention from its website in what is arguably an act of concession. (Predictably, there is no press release counterpart to its trumpeted announcement of license availability.) Dolby Labs is now listed as a licensor in the MPEG LA H.264 pool.[46]

The LTE standard mentioned earlier has three companies lobbying patent holders to join their respective patent pools: MPEG LA, Via Licensing and Philips subsidiary Sisvel.[47] The membership tally for each project as of May 2010 stood at 15, 24 and 32 respectively. As competition for patent pools based on standards increases, the advantages of forming pools erode. If the licensing landscape for LTE remains fragmented with three "one-stop" licensors claiming essential patents on the standard after release, license costs threaten to become prohibitively expensive and risk of future litigation increases.

Anticompetitive Practices

While the competition has increased in the patent pool market, MPEG LA has leveraged its market power and well-funded legal apparatus to stamp out competing codecs. As mentioned, at least two other current-generation codec options exist. Google's acquisition of On2earlier this year brought the VP8 codec into its stable of technologies.[48] After urging by the Free Software Foundation, Google released all VP8 patents into the public domain, published the specifications

[44] "MPEG LA releases AVC patent portfolio license," *Business Wire*, July 16, 2004.
[45] "Via Licensing Announces Availability of Joint Patent License for AVC Video Compression Standard," *Wireless News*, March 28, 2005
[46] "MPEG LA - The Standard for Standards - AVC Licensors," MPEG LA, LLC.
[47] Stephen Lawson, "LTE Patent Pools Taking Shape," *PCWorld*, May 19, 2010, http://www.pcworld.com/article/196721/lte_patent_pools_taking_shape.html
[48] "Google Closes On2 Technologies Acquisition - Investor Relations – Google," Google Inc., accessed DATE http://investor.google.com/releases/2010/0219.html

under a Creative Commons Attribution license and released the source code under the non-viral BSD open-source license, setting up the WebM project to manage these assets.[49] The Xiph.org Foundation's Ogg Theora project is also based on On2 technology, seeded with a donation of the VP3 source code in 2002.[50] Subsequent development of the project has overwritten all the original VP3 code. Both projects have presented themselves as intellectual-property-free alternatives to H.264, particularly for HTML5 video.

MPEG LA's response to these competitors has been to take advantage of corporate fear of litigation to manufacture doubt about the claims that these codecs are patent-free. CEO Larry Horn stated in March of this year:

> "No one in the market should be under the misimpression that other codecs such as Theora are patent-free. Virtually all codecs are based on patented technology, and many of the essential patents may be the same as those that are essential to AVC/H.264. Therefore, users should be aware that a license and payment of applicable royalties is likely required to use these technologies developed by others, too."[51]

A month later Steve Jobs echoed Horn's sentiment (but tellingly without the qualifying "virtually") in a private email to open source activist Hugo Roy, saying, "all video codecs are covered by patents."[52] Additionally, he claimed that a patent pool was in formation to "go after" open source codecs, naming Theora specifically. In May, Horn stated in more tempered terms that the market has indicated interest in licenses for Google VP8 technology

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[49] "The WebM Project : about : Frequently Asked Questions," WebM Project, accessed DATE, http://www.webmproject.org/about/faq/

[50] "Theora.org :: FAQ - Theora, video for everyone," Xiph.Org Foundation, accessed DATE, http://www.theora.org/faq/"

[51] Jan Ozer, "Ogg, MPEG LA, and Submarine Patents," *Streaming Media*, March 4, 2010, http://www.streamingmedia.com/Articles/ReadArticle.aspx?ArticleID=65782

[52] Hugo Roy, "Open letter to Steve Jobs: Thoughts on Flash," accessed DATE, http://hugoroy.eu/jobs-os.en.html

and that it was investigating the formation of a patent pool.[53] Despite Google's probable opposition to such a pool and claims to its invalidity, the state of the patent system is such that marketing and sale of such a license is within MPEG LA's rights[54].

In response, Xiph.org and Google have both flatly denied that their technologies infringe on MPEG LA patents. Google pointed out that it performed thorough due diligence before making its $124.6 million dollar purchase and expressed confidence the technology was patent-free[55]. Xiph.org founder Monty Montgomery was adamant that the Theora project has made non-infringement one of its top priorities since its inception and MPEG LA has failed to litigate or even present a specific patent the project has allegedly infringed on despite having made these claims for a decade.[56]

Despite this evidence, MPEG LA's tactics are clearly working. Besides Job's response to Horn's seeds of doubt, the Hachamovitch blog entry also expresses uncertainty:

> "Today, intellectual property rights for H.264 are broadly available through a well-defined program managed by MPEG LA. The rights to other codecs are often less clear, as has been described in the press."[57]

Not only does Hachamovitch parrot Horn's assertion of the murkiness of IP rights regarding alternative codecs, he suggests the MPEG LA H.264 pool is comprehensive and therefore, safer. In actuality, the MPEG LA's own FAQ page states that the license does not guarantee coverage

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[53] John Paczkowski, "Google's "Royalty-Free" WebM Video May Not Be Royalty-Free for Long," *All Things Digital*, May 20, 2010, http://digitaldaily.allthingsd.com/20100520/googles-royalty-free-webm-video-may-not-be-royalty-free-for-long/

[54] At least in my understanding of the law, but then again, I am not a lawyer.

[55] Cade Metz, "Google backs open codec against patent trolls," *The Register*, May 20, 2010, http://www.theregister.co.uk/2010/05/20/google_confident_on_vp8_and_patents/

[56] Jan Ozer, "Ogg, MPEG LA, and Submarine Patents."

[57] Dean Hachmovitch, "HTML5 Video."

for all essential patents pertaining to the standard.[58] Furthermore, the withdrawal of the Via license provides strong evidence to the existence essential patents that are not covered by the MPEG LA license. Via claimed that all of the patents represented in its license were essential to the codec yet only two of the five companies who were listed as patent holders in the Via license are on the current list of MPEG LA H.264 licensors.[59]

Horn claims that "MPEG LA does not promote or advocate use of particular technology standards."[60] This statement stands in stark contradiction to the original goals of many of its charter member organizations to create a one-stop license to promote adoption of the MPEG-2 standard. Additionally, this cannot possibly be true for an organization that determines licensing policy, particularly one that responded to the HTML5 video controversy by extending its previous promise to refrain from collecting royalties on internet video streamed for free using it codec until 2015 to include all free internet video for all time.

Issues concerning software patents

Software patents in the US have been controversial since their outset and stabilization of court and US Patent and Trademark Office opinion regarding them has been a major contributing factor to the explosion in patent applications and its accompanying problems. These problems are exactly what allow an organization like the MPEG LA to thrive. The sheer number of applications have created a patent backlog that stood at 700,000 unreviewed patents applications and an average three-year wait time in August 2010.[61] Even with the wait time, the validity of many issued patents is questionable since judgment calls on novelty and non-obviousness must

[58] "MPEG LA - The Standard for Standards - AVC FAQ," MPEG LA, LLC, accessed DATE, http://www.mpegla.com/main/programs/AVC/Pages/FAQ.aspx

[59] It occurs to me on a late re-reading of the paper that it's possible the other three patent holders reassigned their essential patents. An area for further research.

[60] Jan Ozer, "Ogg, MPEG LA, and Submarine Patents."

[61] Phil Hirschkorn and Rebecca Jarvis,"Patent Backlog Frustrates Inventors - CBS Evening News - CBS News," August 8, 2010, http://www.cbsnews.com/stories/2010/08/08/eveningnews/main6755116.shtml

be made by scarce subject-matter experts, leading to a state where validation occurs through litigation. Beyond the approval process, the burden lies on the potential infringer to search for patents that may pertain to its product or activity with no restrictions on when a patent holder may commence litigation during the life of the patent. Software patents are granted the same 20-year lifespan of all other inventions despite the pace of innovation in the field probably necessitating a shorter time period to achieve the kind of scientific progress US Patents are chartered under.[62] (Consider that the time between subsequent releases of MPEG-1, MPEG-2, MPEG-4 and H.264 were three or four years.) Finally, the validity of software patents as a whole are questionable, with a 1996 poll showing 79.6% of developers believe software patents hamper rather than encourage progress.[63]

In the formation of the MPEG LA one of the steps taken to appease the DOJ, the worldwide patent search and the hiring of an independent expert to determine essentialness to the standard, is a useful marketing tool for the group and directly tied to the issues within the system. The patent search was a massive undertaking and consumed significant resources because of the volume of patents and the expertise required to determine relevance.[64] This search is key to the marketing of MPEG LA licenses, however, since the fear of litigation from unknown patent holders is a major issue for licensees. Under the current law, an unknown patent holder can intentionally wait for widespread adoption of a technology before filing suit against infringers and demanding exorbitant license fees.

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[62] "2701 Patent Term [R-2] - 2700 Patent Terms and Extensions," United States Patent and Trademark Office, accessed DATE, http://www.uspto.gov/web/offices/pac/mpep/documents/2700_2701.htm#sect2701

[63] David A. Burton, "Software Developers Want Changes in Patent and Copyright Law," 2 Mich. Telecomm. Tech. L. Rev. 87 (1996)

[64] Gavin Clarkson, "Cyberinfrastructure and patent thickets: Challenges and responses."

As MPEG LA leverages the flaws in the system to create fear, uncertainty and doubt about its patent-free competitors, the absurdity of software patents and their utter failure to encourage progress comes into laser focus. A Supreme Court decision abolishing software patents could alleviate all these problems in one sweeping motion, restoring the patent office's ability to issue patents on useful inventions and dissolving anti-competitive bodies like the MPEG LA.

Conclusion

The DOJ approval of the MPEG LA heralded a new era in modern, standard-based patent pools. As the MPEG LA has evolved since its inception, the new business model of monetizing and selling standards threatens to spread the harm organizations like MPEG LA is doing in the world of video codecs to disparate sectors of industry.