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If terrible events have any value at all, it may be that they act as examples that help to prevent their repetition. The occasional all-out de facto standards war reminds us that such a high risk strategy really can be MAD.

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While some standard wars are destructive, others are better seen as competitive contests in emerging network-dependent technologies. And, as in the real world, there are not only wars, but lesser conflicts and escalations as well, each of which can represent a messy, but ultimately effective way path to achieving consensus.

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Achieving "openness" is usually the result of standards development rather than legislation. Last week, however, the French legislature passed a law making the use of digital rights management (DRM) technology illegal in the music industry. The law was directed squarely at Apple's wildly successful iTunes business, but if the concept catches on, why would such laws be limited only to music files?

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The open source software development concept can seem radical and revolutionary – until one compares it to familiar processes such as academic scholarship, legislation and the court system, each of which creates intellectual property, makes it available to all for free, and encourages reuse and further innovation. Its therefore not surprising that "open IPR" concepts are spreading to areas beyond software.

News Shorts: Standards Wars (and Truces, too), ODF Proponents and Microsoft Roll Out Support Organizations; New Consortia Spring up in Power over Ethernet, Storage, Open Source Geospatial Data; Manufacturing and Process Automation; Work Begins on a New Generation of Web Services Standards; Money Flows to (and From) Linux; ISO Turns Thumbs Down on WAPI and China Responds; and, as always, much <more>

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EDITOR'S NOTE

In the last issue I wrote about a number of "unruly" areas of standards development focused on digital home technology. In this issue, I return to the same theme, in order to explore when energetic competition in standard setting is good, and when it is destructive.

This month's **Editorial** begins by examining the extreme case – the all-out effort to set a *de facto* standard in order to wrest the maximum rewards possible from a market niche. As with traditional war, the risks can be as formidable as the potential rewards are great, providing a cautionary example that leads most stakeholders to pursue the less-risky course of participating in group standard setting instead.

The **Feature Article** in this month's issue takes a more broader approach, reviewing the situations in which standards competitions can be beneficial, the ways in which skirmishes and escalations can help parties to eventually achieve consensus (albeit through clenched teeth), and the situations in which a standards war is likely to succeed or fail.

In the **Standards Blog** entry for this month, I look at a different type of conflict – between vendor rights and the public interest, as it is seen (in this case) by the French legislature, which has decided that no American company (e.g., Apple) has the right to prevent a Frenchman, through the use of digital rights management software, from deciding on what type of device he will listen to *La Marseillaise* (or Eminem, as the case may be). But if a legislature can decree that music data must be open, why stop there? And what may come next?

I continue on a similar theme in my **Consider This...** piece for March, noting several examples where the private sector is extending the open source concept to other areas of endeavor besides software development.

As usual, I follow with a selection of what struck me as the most interesting and important standards news of the past month.

Finally, a correction to the Feature Article of the January issue, in which I mistakenly referred to [ThinkFire Services USA](#) as an example of a company that has been "formed for the sole purpose of purchasing, and asserting, patents against operating companies" (often pejoratively referred to as a "troll"). That statement was based on a characterization found in a story in the *Wall Street Journal* that was misleading. In fact, ThinkFire does not purchase patents, but acts as a service provider to operating companies that patent their technology, and I apologize for the error.

As always, I hope you enjoy this issue.

Best regards,



Andrew Updegrove
Editor and Publisher
2005 ANSI President's
Award for Journalism

EDITORIAL

STANDARDS WARS AND MUTUALLY ASSURED DESTRUCTION

Andrew Updegrove

With the destruction of Hiroshima and Nagasaki by atomic bombs, the world entered a new era of uncertainty and strategic readjustment. For a few years, the West rested easy, secure in the knowledge that only the United States possessed the ability to use this new weaponry. Soon, however, not only Britain and France, but also the Soviet Union, and later, China had mastered the new technology as well.

The acquisition of nuclear devices by these nations was the first tactical reaction to the possession by the United States of a powerful new strategic weapon. Merely achieving parity in technology did not constitute a strategy, however, but only the ability to incorporate a new weapon into a strategy that needed to adapt to a world that was changing in many ways. But how could such an enormously destructive weapon be incorporated any rational strategic plan?

For all but the Soviet Union and the United States, the default decision was to manufacture and deploy a sufficient number of weapons to ensure that any invasion of the homeland would be prohibitively costly, and to augment that strategy through alliances with other nations, some of which themselves controlled nuclear weapons. But the United States and the Soviet Union were soon locked into what became known as the "nuclear arms race."

This competition, many would agree, was fueled more by fear than reason, and often by internal politics. The result was that by the end of the 1960's, each country was theoretically capable of destroying the other many times over. In point of fact, not all warheads would penetrate the defenses of the opponent, but the excess of destructive capability amply demonstrated that no amount of defensive technology could ever reliably protect the homeland from such a massive and overpowering assault.

The label given to this drastic strategy, in the emotionless parlance of the Cold War, was "mutually assured destruction," a name that yielded an appropriate acronym: MAD.

Happily, nuclear weapons were never used by the two Cold War superpowers, and any war waged directly between the two nations became impossibly risky, to the possibility of uncontrolled escalation. Unhappily, much of the world became an ideological battleground for the two adversaries instead, as each sought to spread its influence in emerging nations in order to secure allies and foster its own political ideology. The result was a series of proxy wars conducted in many nations, each with one of the two superpowers supporting one side to prevent the ally of the other from becoming victorious.

Throughout this whole mindless period, there were few, if any, winners, and many losers. Perhaps the best that could be said was that it could have been much worse – and may yet be in the future, either between these two powers, or some other pairing of rivals that have joined the nuclear club.

The lesson of Mutually Assured Destruction is instructive in many areas of life, from politics to standard setting. When rationality is retained, it usually becomes clear that the risks of losing so outweigh the benefits that can possibly be gained that another strategy ultimately prevails.

In the standards world, the phrase "standards war" is bandied about freely. In fact, only a very small percentage of standards are ever deliberately set in direct competition with each other in "winner take all" settings. Instead, many confrontations between opposing groups could more accurately be described as "standards competitions." Nor are such contests necessarily destructive, especially in the field of emerging technology, where it is often unclear which technologies will be developed successfully, or which may prove to be best suited to address market needs that are themselves still emerging.

In such a situation, standards are being developed in real time, coincident with the technologies that they are intended to enable. Typically, only some of these standards will ever become widely adopted, but the

marketplace benefits from the immediate availability of those that do, because the technologies they serve may be immediately introduced into networked settings.

Occasionally a true standards war of MAD proportions does break out, most commonly among the giants of the consumer electronics sector, which seem constitutionally committed to driving not only themselves to the brink of destruction in lemming-like cycles, but also to dragging content providers, distributors, video rental stores and end-users up to, and sometimes over, the precipice as well.

If there is any value to the phenomenon of MAD standards wars, it is their cautionary impact. Just as the horror of Hiroshima and Nagasaki created a powerful taboo against the use of nuclear weapons that has never (yet) been broken, the commercially destructive spectacle of an irrational standards war makes clear how mad a strategy is being pursued, providing incentives to those in other sectors to follow a more rational and beneficial way.

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FEATURE ARTICLE

STANDARDS WARS: SITUATIONS, STRATEGIES AND OUTCOMES

Andrew Updegrove

Abstract: *While standards wars provide the most visible example of conflict in establishing standards, there are many lesser levels of confrontation that arise from the same situations and motivations, and that may be better described as "standards skirmishes." Where such events do not lead quickly to consensus, a variety of behaviors that can be called "escalations" have evolved to signal determination without resulting in the breakdown of the standard setting process and engagement in a full standards war. It is also important to note that not all standards wars are "bad," since standardization at too early a stage may result in lock-in on an inferior technology, and greater long-term harm than the temporary disruption that may result from a "standards competition" that provides a ready standard for deployment in support of the superior technology that prevails. In this article, I examine some of the situations and strategies that illustrate these observations.*

Introduction: Standards wars have become a commonplace in today's world, even to those that do not recognize them as such. Almost anyone would immediately understand the meaning of a standards war if any of the following simple phrases was offered as an example: "VHS vs. Betamax," "Internet Explorer vs. Netscape Navigator," or "PC vs. Macintosh." While each of these examples refers to a battle between the proponents of proprietary products in order to create a "de facto" standard (i.e., a nearly universally adopted technical format, interface or architecture controlled by a single vendor or group of vendors), such conflicts represent only the more extreme and visible examples of a process that plays out in countless consortia and accredited standards development organizations (SDOs) on a constant basis.

As the modern world has become more and more dependent on information and communications technology (ICT), standards have become more essential, and therefore more valuable. With that perception of value has come a greater interest in the exact composition of such standards, since the elements, and even the timing of release, of such standards can have profound competitive effects on stakeholders, both positive and negative.

Not surprisingly, the level of attention and involvement invested by those that are most affected by the development and implementation of standards continues to increase, as does the interest of the same

players in influencing the outcome of the standards development process. This focus has led to the development of a range of strategies, each of which is appropriate to particular circumstances.

In this article, I will describe some of the principle motivations for influencing the standards development and implementation process, the strategies that have evolved over time to effect that influence, and the types of outcomes that result from this ongoing process.

Historical background: Standards, broadly construed, such as languages, alphabets and numbering systems have been created since time immemorial. These standards evolved gradually and outside of formal processes, but nonetheless had great value. Over time, it came to be recognized that the control of a standard could convey the right to be compensated for the use of that standard.

An early example of this realization gave rise to a word we still use today – "royalty." A royalty, as first conceived, referred to the share of a precious metal that was retained by the crown when the balance was turned into coinage, and the service that was being compensated was the state's guarantee (not always accurate) of the purity of the metal of which the coin was made, and therefore the intrinsic value of the coin itself.

With the advent of the industrial age, the need for standards expanded dramatically, as better systems of weights and measures became desirable for scientific purposes, expanding trade increased the need for uniformity across borders, new industrial techniques relied on interchangeable parts, and new networks – railroads, telecommunications and power transmission systems – demanded consistent measures in everything from track and wire gauges to time itself, the latter leading to the modern system of time zones.

Each of these new standard systems presented the opportunity for interested parties to win or to lose. To use railways as an example, governmentally enforced standardization of gauges avoided the costly and time consuming process of transferring cargo from the cars of one railway owner to those of the owner of the adjacent line, but also helped to erode the monopoly of each of the owners.

Standardization could also bring commoditization as well as loss of a monopoly. Not surprisingly, such a depreciation occurred first in the area of items such as bolts and nuts, where the cost of standardization was low and the benefit was high. When technology eventually made the production of interchangeable parts feasible, mass production logically followed, creating new situations where standards could be both beneficial and threatening, depending upon the stakeholder.

The automotive industry provides an interesting example of this phenomenon:

Between 1904 and 1908, more than 240 companies entered the fledgling automotive business. In 1910 there was a mini-recession, and many of these entrants went out of business. Parts suppliers realized that it would be much less risky to produce parts that they could sell to more than one manufacturer. Simultaneously, the smaller automobile manufacturers realized that they could enjoy some of the cost savings from economies of scale and competition if they also used standardized parts that were provided by a number of suppliers.¹

The authors go on to note that not all automobile manufacturers perceived standardization of parts as being in their best interest. The most powerful – Ford and General Motors – were large enough to achieve comparable benefits entirely within their own operations. In consequence, industry-wide agreement on interchangeable parts would provide them no significant benefits, while at the same time minimizing the advantages that their economies of scale would otherwise provide to them over their smaller rivals.

¹Shapiro, Carl and Varian, Hal R., *Intro for Managing in a Modular Age*. School of Information Management and Systems (SIMS), University of California, Berkeley (2000), p.1, at <http://www.sims.berkeley.edu/~hal/Papers/modular.pdf>

This differential in costs and benefits between the "incumbent" (i.e., the dominant payer in a product space) and its competitors continues to breed outright standards wars and lesser skirmishes today. But this is only one of many dynamics in the marketplace, as we shall now explore.

War and peace: The existence of standards wars may, at first blush, seem oxymoronic. After all, the reasons for having a standard (and especially a standard created to permit interoperability between products) at all is to create a marketplace for products that might not otherwise exist. This is achieved by convincing the market that it need not worry over the following issues:

- Will the standard become widely adopted by vendors? If I buy, for example, a telephone, will my friends buy one, too? If multiple vendors and service providers announce that they will provide the interoperable products and infrastructure, then I have reasonable assurance that my telephone will prove to be a wise investment.
- Will the standardized product become ubiquitous? Economists focus on the value of the "network effect," which notes that the network becomes of exponentially increasing value to each participant as the network grows. For example, the value of a telephone to its owner increases by the addition of new categories (friends, catalog companies, first responders, etc.) as well as by the number of users.²
- Will the standard remain supported over time? If a standardized product is superseded quickly by a new product generation, the user at minimum may face an upgrade cost (as when telephones converted from rotary to push button, but remained backwardly compatible), and at worst abandonment, or "stranding" (as when video stores ceased stocking Betamax titles).
- Will prices be reasonable and alternatives interesting? With wide adoption competition and economies of manufacturing scale predictably lead to price and feature competition.

Where the messaging is convincing, it becomes possible to sell new products, even to the first customers. At first, it may be necessary to make early sales at a loss, in order to build a sufficiently large network to generate sustaining momentum. Thereafter, however, it should be possible to earn back the investment through falling production costs and increasing sales at higher prices. A current example of this practice is the competition between two competing satellite radio systems, each of which has budgeted substantial, multi-year losses in order to price their initial services attractively.

Notwithstanding the obvious logic of this simple outline, it is not sufficiently sophisticated to predict actual behavior, since there is more than one way to achieve the profitable end-state described above, and the rewards (as well as the risks) for pursuing other strategies.

At one extreme, there is the "winner take all" approach, in which a single vendor (or group of vendors) succeeds not only in establishing the standard, but also (most typically) through patent protection, ensuring that no other vendor may share in the benefits, absent a license and payment of a share of the resulting profit. As a generality, the risks of expensive failure are greatest with this approach, unless the player is already dominant in the same market. When this strategy does succeed, the result is a so-called "de facto" standard. Examples of such standards include the winners in the examples given in the first paragraph of this article: the VHS video format, the Microsoft Internet Explorer (IE) Web browser, and the "WinTel" (i.e., Microsoft/Intel) personal computer system.

At the opposite end of the spectrum is the formal consensus-based standards development process, the output of which is referred to as a "de jure" standard (if developed by an SDO) or simply standards or specifications (if by a consortium). The minimum attributes of this type of standard open participation of all interested parties, and the ability of both non-participants as well as development participants to

² To be more precise, economists speak of two types of network effects: "direct network effects" (the type just noted) and "indirect network effects." An example of an indirect network effect is the wide adoption of a new format for audio or video content. Once enough consumers have upgraded their playback equipment to use the next generation of media, it becomes attractive for content owners, retail outlets and rental stores to make content available in the new format.

implement the standard on "reasonable and non-discriminatory" (or "RAND") terms. Increasingly, standards created by both SDOs and consortia are referred to simply as "open standards."³

Although these examples may appear to represent completely different realities, there is in fact ample opportunity for gamesmanship at both ends of the spectrum, and at every gradation in between. The goal of such maneuvering is to have the greatest influence on the resulting standard, while still achieving wide adoption.

Standards skirmishes, escalations, and declarations of war: The attractiveness of controlling a de facto standard is clear, since it conveys upon the individual company, or group of allied companies, the ability to command large profits either through high margins based on a monopolist vendor advantage, or through indirect means through licensing income (or, ideally, both). The motivations that sometimes lead to a standards war more often inspire more subtle and varied behaviors that might better be characterized as "standards skirmishes," as they do not result in the introduction of competing standards into the marketplace.

Skirmishes: The following are typical of the reasons that stakeholders enter into a skirmish, as compared to a war:

- **Direct licensing revenue:** The SDO world, and most consortia, do not prohibit the inclusion of intellectual property rights (IPR) in a standard, even if the result would be that an implementer would be required to pay a royalty or other fee for the privilege of implementing the standard. While many standard setting organizations (SSOs) of each type actively try to avoid this result, others are quite tolerant to the creation of standards that, if implemented, would infringe upon patents owned by members. As a result, there can be active competition among members in such an SSO to steer an evolving standard into infringement of a contestant's patent. In organizations where this result is not considered to be desirable, such conduct still can occur on a more covert basis.
- **Indirect licensing revenue:** While virtually all well-run SSOs have IPR policies that require the licensing of "necessarily infringed" patent claims (i.e., those claims in member owned or controlled patents that would be unavoidably infringed by the required portions of a standard), most do not impose the same requirements on "optional" elements of a specification (i.e., elements that are not required for a full implementation, or, in some SSOs, which represent multiple alternatives for satisfying a single required element). The result is the opportunity to steer a standard under development in a direction that does not require either disclosure or a commitment to RAND terms, but may leave implementers either very likely to seek a royalty-bearing license, or with no choice but to do so (imagine a standard for all of the basic parts of a bicycle that does not include descriptions of reflectors, multiple gearing assemblies, and other desirable but non-essential features).
- **Indirect benefits:** Many standards are based on specifications that describe existing products, or elements of products, being produced by members and submitted to an SSO. While the member must then license others to manufacture and sell the same products, the submitter may reap an almost endless variety of advantages, such as a head start in selling its own product into a wider market, undercutting the product of a competitor, increasing its own sale of a related (and patented) product, gaining credibility, steering a market in the direction of its own strategic plan, and so on.

Escalations Each of the situations described above can provide the basis for an outright war at the outset, or can result through escalation of confrontations within a standards process before that process has been completed. The latter occurs when factions within a working group become polarized and consensus becomes increasingly difficult to achieve. Given that participation is voluntary, the implied, or open, threat to withdraw and launch a competing standard carries real weight, and the

³ The statement to which this footnote is appended masks the degree of debate over what the precise definition of an "open standard" should be. Due to new developments, such as the embracing of open source by the marketplace, the range of opinions on this definition is becoming broader rather than the opposite.

methods of signaling determination have become more elaborate in some SSOs where the imprimatur of the organization is valuable and each faction still hopes to prevail within the system.

This type of behavior has become increasingly common in the IEEE working group that creates new standards within the 802 family of wireless standards. In recent years, the rival factions that have formed within some of these single working groups have created their own extrinsic organizations to marshal support for their favored specification in an increasingly rough and tumble process.

Recently, this type of skirmish resulted in the ultimate failure of the IEEE 802.15.31 task developing an Ultrawideband standard, which failed to achieve consensus and eventually disbanded in defeat. During the lifetime of the task group, 25 separate proposals had been narrowed to just two, but the patent holders of those submissions founded supporting groups – the UWB Forum and the WiMedia Alliance – that ultimately divided the membership. The result is that each of these groups is taking the products based upon their respective incompatible specifications into the marketplace. In short, a customer-confusing standards war that will slow adoption for all, and may ultimately leave some subset of the marketplace stranded.⁴

Wars. A full-fledged standards war is most likely to occur as a result of either opportunity, prevailing practice within a given market area, or the lack of alternatives for displacing an incumbent. The following are examples of each type of situation:

- **Opportunity:** New markets provide great opportunities, often to a broad range of competitors. When such an opportunity requires agreement upon a standard in order for the rewards to become real, the standards strategy that is likely to be most successful for a given market participant will depend on a variety of factors. For the largest players, an attempt to establish a de facto standard may be most attractive, while the smallest players may believe that the creation of a consensus standard may offer the only viable opportunity to participate on substantially equal terms. In the absence of a single dominant player, the result can be a hodge-podge of individual players striving for dominance as well as several competing consortia, each seeking to establish its own standard as the dominant route to new products. An example of just such a confused situation arose in the case of wireless home networks, where both WiFi (developed by the IEEE), Bluetooth (developed by Nokia) and other specifications all vied to become the dominant standard.
- **Prevailing practice:** The pot of gold that is perceived in some markets niches can be quite different than in others. For example, success in the world of Internet and Web standards is defined by achieving global adoption of fee-free, consensus-based standards. In contrast, success in the consumer electronic space is often defined by winner take all, "take no prisoners" battles to force royalty-bearing, proprietary formats upon one's rivals. The result has been a series of punishing standards wars that have always been grueling for the vendors involved, and that have sometimes resulted in great cost for everyone in the supply chain, from the losing vendor camp, to content owners, distributors, retail store owners, and confused consumers (some number of which ultimately find themselves abandoned).
- **Lack of an alternative:** Despite the difficulty of displacing an incumbent through introduction of a competing standard, this strategy has been attempted on frequent occasions. Just as an attack on an entrenched position is rarely made in broad daylight, a standards-based assault on an incumbent is also most often attempted at a time of perceived weakness on the part of the party that enjoys the monopoly position. That weakness can be the development of a technology that may be better, faster and/or cheaper, or it can be a fortuitous event.

A current example of the latter was the adoption by the Information Technology Division of the Commonwealth of Massachusetts of the OASIS OpenDocument Format (ODF) in September of 2005, but not the Open XML Reference Schema that Microsoft had developed in connection with Microsoft Office, the predominant office productivity software suite. The impact of the decision

⁴ For more on skirmishes and wars in the wireless marketplace, see Updegrove, Andrew, *Case Study: The Unruly Emergence of the Digital Home*. ConsortiumInfo.org, Consortium Standards Bulletin, Vol. V, No. 2 (February 2006).

would be the conversion of the state's c. 50,000 desktops to software that supported ODF, which Microsoft announced Office would not do. The result has been a broad push by companies such as IBM and Sun to promote and support ODF, in order to lessen Microsoft's grip on the desktop.⁵

Settings for standards wars: Economists have studied competitive strategies in standard setting for some time, generating many articles on the topic.⁶ Many detailed analysis focus on a limited number of common situations and strategies, such as displacing the incumbent⁷, or the motivations for governments to intervene to achieve specific results.⁸ In fact, the situations and responsive strategies can be quite diverse, as demonstrated by the following examples:

Exhausted market: Marketplaces that are dependent upon standards often become saturated and commoditized. In order to provide new, higher-margin sales, a next generation product is usually designed in order to boost both sales and profit margins. Often, by necessity or design, this will also require that a new standard become established in the marketplace. As earlier noted, this is particularly common in consumer electronics such as audio and video players, where each successive wave of standards-based technology leads not only to the opportunity to sell new devices, but new copies of old content as well. The long line of technologies in music in just the last thirty years includes migrations from analog to digital recording and reproduction, and from vinyl records through various types and intermediate versions of tape, CD and DVD formats. In each case, the move to a new generation of device has required common agreement upon a new standard(s), as well as the opportunity (often seized) to embark on a fresh standards war.

New technology: The advent of a new technology provides an opportunity similar to that provided by a new generation of an existing technology, but often with a greater incentive for cooperation, because the intended customers must be persuaded that they will not be stranded if the standard upon which the new product is based does not become widely adopted. However, this does not necessarily mean that the entire market will converge on a single standard. Often those that wish to exploit the new opportunity clump into two or more camps, each with its own rival solution.

Strategies for standards wars: Single situation, such as "displacing the incumbent," can have quite a few variations in factual setting as well, each of which will lead to a different strategy. Consider the following:

- Displacement of the incumbent, where the incumbent has more limited resources than the challenger: In the case of Microsoft's displacement of Netscape's Navigator, Microsoft had the economic resources to outspend and outlast its rival, since (unlike Netscape) it had other sources of revenue to underwrite and sustain its attack. Microsoft achieved victory in part not by seeking voluntary allies but by using its market power to require its PC sales partners to include Internet Explorer (IE) and not Navigator on the units that they sold.
- Displacement of the incumbent in a growing market: The IE – Navigator example demonstrates another significant situational dynamic: the fact that it is easier to displace an incumbent in a rapidly growing market than in a substantially saturated market niche. Despite the fact that Netscape enjoyed a seemingly insurmountable 90% market share among browser users in 1995

⁵ For ongoing, detailed coverage of the ODF-XML Reference Schema standards war, see the OpenDocument file of entries at the ConsortiumInfo.org Standards Blog at <http://www.consortiuminfo.org/standardsblog/index.php?topic=20051116124417686>, as well as Updegrove, Andrew, *Massachusetts and OpenDocument: a Brave New World?*. ConsortiumInfo.org, Consortium Standards Bulletin, Vol. IV, No. 9 (September 2005). <http://www.consortiuminfo.org/bulletins/sep05.php#feature>

⁶ For a representative sampling, see the results of this search request at the ConsortiumInfo.org: [Standards Metalibrary](#) (March 26, 2006).

⁷ See, for example, Windrum, Paul, *Back from the brink: Microsoft and the strategic use of standards in the Browser Wars*. Research Memorandum 005, Maastricht Economic Research Institute on Innovation and Technology (2000), at <<http://ideas.repec.org/p/dgr/umamer/2000005.html>>

⁸ E.g., Cabral, Luis M.B. and Kretschmer, Tobias, *Standards Battles and Public Policy*. Federal Reserve Bank of Chicago (April 2004), at http://www.chicagofed.org/news_and_conferences/conferences_and_events/files/cabral.pdf.

and IE had made little, if any, market penetration at that point, Microsoft's market share expanded to 39% by 1997, despite the fact that most discriminating users believed Navigator to still be the superior product. By August of 1999, the market shares of IE and Navigator had inverted, with IE claiming 76% to Navigator's 23%. The very great majority of the systems that were using IE, of course, were new systems that came with IE pre-installed.⁹

- *Displacement of the incumbent in a mature market, where the incumbent has great resources:* For decades, Intel has dominated the independent microprocessor manufacturing world, a situation that has become more pronounced as the world moved from minicomputers and mainframes running proprietary operating systems to hardware using the more similar variations of UNIX such as IBM's AIX and Hewlett-Packard's HP-UX. Faced with this situation, vendors tried various standards-based strategies over the years in attempt to regain ground.

One such effort to establish an alternative operating system in the marketplace was an attempt to convince customers that a new type of chip architecture, called "RISC" (for Reduced Instruction Set Computer), was sufficiently superior to Intel chips that switching platforms was desirable. The first effort to be launched was 88open Consortium LTD, launched by Motorola to promote its 8800 RISC chip. Data General, Encore Computers, Harris, and Omron, among other hardware companies, supported the effort. Sun Microsystems announced a similar organization, called SPARC International, to promote its own RISC architecture.

Each organization was intended to provide incentives to independent software vendors (ISVs) to port their software to the new environment, so that customers would have a rich variety of applications to run on SPARC-based systems if they made the switch. A subsequent effort, called PowerOpen, was launched by Motorola, IBM and Apple several years later, with the a similar goal and based upon the PowerPC line of chips that each of the three companies was cross-licensed to fabricate. Despite significant funding and effort, none of these efforts was successful in achieving its stated goals: the 8800 chip line never became widely used, while the PowerPC achieved success on the desktop only in the Apple Macintosh, although it was more successful in embedded systems. The SPARC processor continued to power Sun's own products (and is still used by Fujitsu), but did not become a broader threat to Intel. In all of these cases, Intel's resources, alliances (including Microsoft) and dominant installed base proved too difficult to dislodge.

This set of examples illustrates a number of things: first, that different strategies are appropriate to different fact settings, despite the fact that the categorical goal is the same. Second, as in war, a head-on assault of a powerful opponent in a well-established defensive position is apt to be both expensive in resources and unlikely to succeed, even where the attacker arguably has the superior weaponry.

The "good" standards war: It is tempting to assume that standards wars are inherently wasteful and destructive. Perhaps surprisingly, that opinion is not universally held, and the reasons are several.

The first reason is that standards (and especially very detailed standards) can limit the amount of innovation that spring up around a given product or service concept. As a result, there is an inherent tension between optimizing the desirable aspects of standardization (e.g., interoperability, ease of integration, and so on) and flexibility in implementation. If the balance tips too far in terms of rigidity, technology may stagnate, or the standard may not become adopted. On the other hand, if it is weighted too far in favor of flexibility, the specification may not be seen as being sufficiently useful, and once again it may be ignored in the marketplace. If the standard is ignored, then the only alternative is for a rival standard to be created by another SSO, or for a de facto standard to become recognized by default.

Similarly, while the concept of a standard can be good, a given standard can be "bad," either because it is poorly drafted, expensive to implement, not backwardly compatible or likely to be compatible with future products, and so on.¹⁰ A frequent criticism of the consensus process, when taken too far, is that "lowest

⁹ Windrum, *ibid*, p.1.

¹⁰ It is obligatory in standards literature to cite the QWERTY keyboard as an example of a too-quickly adopted, "bad" standard, although more recently some authors have questioned whether the "badness" of the layout has been exaggerated. See: Stango, Victor, *The Economics of Standards Wars*. Review of

common denominator" standards can be released that are too late and too poorly regarded to be taken seriously. If such an outcome becomes apparent to participants in the process in question, then better a standards war than stick with a doomed standard.

Timing and maturity of technology and marketplaces can also dictate whether a standards war is apt to be destructive or, indeed, constructive. This is because once a standard becomes broadly adopted, it is usually difficult and expensive to replace it with a better standard that would allow superior technology to be made available to users – in other words, the user becomes "locked in" to an inferior solution. As a result, when an emerging technology becomes standardized too soon, the result can be a market that has become locked in by a standard that may be "good" technically, but "bad" in the sense that an opportunity to develop and deploy a better technology was lost.

This result may sound unfortunate rather than dire, but in fact the effects of lock-in on the wrong technology can be profound. Where the investment of infrastructure that surrounds the technology upon which the standard is based is very great, the lock-in can not only last for more than a century, but can have a potentially disastrous global impact – as with the early standardization of the automotive industry on the gasoline engine, rather than the electric or steam powered alternatives that were largely abandoned, but might have resulted in far less global warming, as well as in greater choices of energy sources.¹¹

As a result, some standards "wars" should probably not be called "wars" at all, due to the pejorative implication – "competitions" would be a more appropriate term.

Judgments about when standards wars are beneficial or unjustified can therefore be both situational, as well as subjective. A frequently cited example of differing opinions on the "goodness" or "badness" of a standards war is the divergent approach to standardization of second-generation mobile telephone standards in the United States and in Europe. In Europe, a decision was made to standardize early on a single standard, while in the United States, the Federal Communications Commission (FCC) opted to allow the several competing technologies promoted by market competitors to vie for adoption. Not surprisingly, mobile telephony spread more quickly in Europe than in the U.S., and European mobile phone users could use their phones in every service area while their American counterparts achieved the same degree of coverage only gradually.¹²

Looked at objectively, early standardization is most valuable when the generation of technology in question is likely to be of short duration. As a result, the period of benefit is maximized, and the risk is minimized due to the short period of the locked-in. Conversely, where the period of lock-in can be very long (as in the automotive technology example), the extra disruption of a standards competition may be amply rewarded over time.

Lock-in can endanger innovation in other ways as well. Market needs as well as technology can evolve rapidly, and particularly so when new technologies are reaching the marketplace. For example, multiple medium range wireless standards were promoted to address the same basic needs. As those needs and the strengths and weaknesses of each technology became better understood, some (but not all) of the original standards found their own market niches, and additional standards were developed to fill in where none of the original standards excelled. Today, all of the following wireless standards could easily be found in the same home: WiFi, Bluetooth, Near Field Communications – and more are on the way.¹³

As a result, government intervention to mandate standardization through its regulatory power tends to arise most often in traditional areas of government involvement in everyday life, such as public health and safety, where the need for effective standards, as well as their enforcement, is immediate and ongoing.

Network Economics, Vol. 3, Issue 1 (March 2004), page 8, at

<www.rnejournal.com/articles/stango_mar04.pdf>.

¹¹ For an analysis of gasoline engine lock-in, see Cowan, Robin and Hulten, Staffan, *Escaping Lock-in: the Case of the Electric Vehicle*. Technological Forecasting and Social Change, Vol. 53, Issue 1. pp. 61 – 79 at <www.cgl.uwaterloo.ca/~racowan/escape.html>.

¹² Cabral and Kretschmer, *op cit.*, at pp. 9-10.

¹³ See Updegrove, *op cit.*, *Case Study: the Unruly Emergence of the Digital Home*.

Summary: For better or worse, standards skirmishes, escalations and wars are likely to be always with us. Such activity can occur at all levels and at every stage in the standards development process, and can involve both *de facto* as well as *de jure* standards. As with natural selection, a marketplace that enables the "survival of the fittest" of standards can have positive as well as negative effects, but the venue within which the conflict occurs can have a bearing on whether or not the survivor is the fittest. For this reason, a standards wars, while more destructive in the short term, may be more beneficial in the long term than a skirmish within an SSO that may be won or lost through the formation of alliances rather than in recognition of the superior quality of the victorious standard.

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STANDARDS BLOG

A NEW FRENCH REVOLUTION?

[Andrew Updegrove](#)

March 21, 2006 @ 09:34 EST

If you follow technology news or music news (or both), you will be aware that an amendment to an on-line copyright bill was adopted today in the French legislature that would make it [legal to thwart](#) the digital rights protection (DRM) software of the fabulously successful Apple iTunes/iPod system. In the run up to that vote, Apple stated that if the law passed, it might no longer offer French customers the ability to purchase music from its iTunes site.

This is pretty juicy news, and therefore most of the press reports have focused on the commercial consequences for Apple and other vendors if the law were to go into effect. In fact, the new law could have a profound impact on the world of commerce and standards, extending well beyond DRM and the control of audio content.

The underlying politics of the new law, of course, are more protectionist than profound. The French are not fond of being controlled in any way from abroad, and have passed legislation many times in the past to protect everything from local industries to the French language. In this case, they are touting what they refer to as "[economic patriotism](#)."

Notwithstanding such jingoist motivations, the actual consequences of such a shift in rights could be very wide reaching. The reason is this: the gist of the law is that music that you buy should not be held captive within any proprietary system. In short, content that should be transportable to other systems, so that the purchaser is not put to the choice of remaining the customer of a single vendor or abandoning her investment.

Of course, there is nothing unique about music, from a legal perspective. Why not movies and electronic books? And why stop with content one buys, and not also include content that one creates, including photos and documents that must be archived in software created by for-profit vendors?

While the effects of the French law could be revolutionary, the legal significance of the legislation would be merely evolutionary. The reason is that the law simply expands an existing exception to the copyright laws as they relate to software. That exception works as follows: normally, the law bars the use of a copyrighted work for any purpose other than those that are permitted by the owner of the software in the license agreement that the end-user must acknowledge. One of the purposes that is always barred in non-open source licenses is using the product in order to reverse engineer it.

But under the existing copyright exception, there is a limited right to reverse engineer solely for the purpose of achieving interoperability with other products. This right has been permitted in Europe for some time.

The new law widens this exception significantly, however, to provide the right to reverse engineer not only for the purpose of enabling interoperability at the device level, but to liberate data as well. In short, if your device is not interoperable, your content must be.

As already suggested, the intriguing question thus becomes: having made this breach in a copyright owner's rights, where does one stop? If an end user has a right to transport musical content absolutely, should they not also have the right to carry their documents from one system to another, with formatting and other useful attributes intact?

If so, imagine what this would mean for products such as Microsoft Office (or any other office productivity software). Microsoft has already submitted its XML Reference Schema to Ecma as a result of a commercial decision. But if the underlying concept behind the proposed French legislation takes hold, would Microsoft have really had any choice in the matter, in order to preempt a user's right to reverse engineer one of its most profitable products? After all, if the French government thinks that Apple should be barred from placing rap singers in bondage, should not works of literature, philosophy, and science be similarly protected by law?

If so, a more difficult question necessarily arises: who will decide how "open" (because that is what we are really talking about here) a product must be before anyone becomes entitled to reverse engineer it to make the content it creates or holds more accessible?

If the law were to take such a turn, then the decisions that proprietary vendors would make about their products might change dramatically. For example, if a vendor must surrender the right to protect its content anyway, then it might as well seek the full benefit that standards can bring and promote its openness, rather than fight a constant, rearguard action against those that would otherwise challenge its degree of legal compliance.

More cynically, a vendor might as well try and control the standards process, allying with other vendors, to create standards that would be respected by the law as meeting the minimum requirements of interoperability, but otherwise conforming as closely as possible to its commercial interests. In short, a vendor might as well follow the classic military strategy of abandoning its more vulnerable forward defenses, and fall back to rally its forces behind a more defensible, if more limited, perimeter. It will be fascinating to watch this story unfold. If the French law survives the inevitable court challenges, then there is the possibility that other countries in the EU may emulate it. This would result in a dramatic rebalancing of the rights equation between content owners and content users – and, who knows – could spread from there.

But from there to where?

Well, why stop at content owners, or even software, and not speak of end-users generally, and in favor of avoiding lock-in everywhere? Perhaps even in operating systems and microprocessor designs?

Now *that* would be a revolution.

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CONSIDER THIS

‡ ‡ ‡ **March 24, 2006**

Where (if anywhere) are the Boundaries of the Open Source Concept?

To many that have spent their careers in technology, the concept of open source software seems inside out and upside down. Create a product in order to give it away? Where's the sense in that? How could anyone even suggest such a thing.

From another perspective, it's odd that such a time-honored practice should seem so strange, as we are surrounded by open source practices that have been part of normal society for millennia.

If you greeted that contention with a blank stare, consider this...

Simply stated, the concept of open source is that something of value can be created and made available for free under certain conditions, which include the following: anyone can use it (for free), and anyone can change it without restrictions on how, or for what purpose.

It may seem unrealistically altruistic to apply such rules to commercial goods. But if we match these same open source licensing terms up with many established non-commercial systems – such as academic scholarship, the creation of legislation and the application of case law by the courts – they map rather nicely. In each case, something of value is created; that value is made freely available to all; anyone can create new academic work (or laws, or judicial opinions) based on what came before, and the new work product remains free and available. And, like open source, each example is the result of a community effort.

Let's look at knowledge in greater detail as an example. No one "owns" math, science, art history, or any other subject that is taught today. And yet millions of people are engaged in adding to our store of knowledge in these areas. True, someone can copyright the expression of an idea, but she can't copyright the idea itself. Yes, patents can prevent you from implementing a subset of useful ideas, but a patent can't stop you from knowing about those ideas, all of which are public records.

Still, the store of knowledge grows with every passing hour, added to by scientists, philosophers, journalists and others.. More and more of that knowledge is available on the Web, bypassing the need to even spend a few dollars on a book or journal.

So also with law, which resembles open source software even more closely. Under the English common law that forms the foundation for the U.S. and the commonwealth countries (as well as England), judges are required to apply the rulings in prior cases to similar factual settings in future cases, a doctrine called *stare decisis*, which roughly translates as "to abide by decided cases." As with open source, this provides economy through re-use (write up in an opinion/write code once, use many times), certainty and stability of outcome (I know how this trial should come out/ this code will operate reliably), and an expanding pool of knowledgeable practitioners (attorneys and judges/ engineers and integrators).

And yet, like open source software, the law is still allowed to evolve over time – and in real time – either incrementally, or in major releases – as when the legislature passes a new law, or an open source project issues a new release. And all laws are free to be borrowed by one state from another, or by one country from another.

In fact, then, the open source concept is not so strange after all. It just seems so, when we apply it to an area where it was not common before.

Of course, it would be naïve and misleading to deny that there is another thread to human existence, which involves hoarding ideas for personal advantage. That line of conduct stretches forward from shamans and sorcerers, through alchemists and trade guilds, and eventually to modern "intellectual property" laws. Such laws seek to balance the economic interests of those that create such property with the benefit to society that comes from sharing the same value.

In modern times, legal and political theorists have assumed that absent a protected right (i.e., a legal monopoly) to reap payment for the labor of creating an invention or a work of art that such useful items will not come into existence.

But is this necessarily so? If so, why do scientists so often publish rather than patent, and why don't courts that try cases charge litigants a fee to "use" their prior decisions? Moreover, why do hundreds of thousands of entrepreneurs launch new restaurants (most doomed to failure), stores and services each year that have no proprietary protection at all to guard their concepts against imitation?

In fact, as the open source software phenomenon demonstrates, there may be little reason besides history and convention to explain why some categories of ideas can be protected and sold, while others are happily given away. If this is so (and I think that it is), then it should not be a surprise if the open source concept begins to appear not only feasible, but even attractive in areas in addition to software, and in settings that involve not just patents, but copyrights and trade secrets as well.

Such an eventuality becomes ever more likely as more and more vendors adopt business models that are based upon selling goods and services in connection with open source software, thus demonstrating that you don't have to own something in order find opportunities to profit as a result of its being widely used.

In the last several days there have been several stories in the news that highlight this increasing tension between the ownership of intellectual property rights (IPR) and the opportunities that can become available when broader, free access to those rights is made available. In each case, they illustrate a "cross over" of another traditionally for-profit type of intellectual property to an open source model. Call it a general movement towards "open IP."

The three articles that struck me as proving this point best were:

- The announcement by Sun Microsystems that it had released the design for its new UltraSPARC processor under the popular open source, GNU General Public License ([GNU GPL](#));
- A speech by Tim Berners-Lee to an Oxford University audience in which he challenged the British government to make [Ordnance Survey mapping data](#) available at no cost for Web use; and
- The report that a Dutch court had upheld the validity of the [Creative Commons](#) license.

Each of these stories demonstrates a breach in traditional thinking about the balance of value to an IPR owner between licensing intellectual property rights (IPR) for profit, and making those same rights freely and publicly available.

In the case of the Sun announcement, that breach is the transposition of the open source methodology from software to silicon - a genetic leap, if you will, from one species of technology to another. Tim Berners-Lee's challenge, on the other hand, is an example of the increasingly popular concept that "data wants to be free," and that the greatest societal benefit may result from allowing it to be so. And the court victory of the Creative Commons license demonstrates that traditional legal concepts can be adapted to successfully accommodate such new realities.

Notably, none of these pieces of news is, at this point in time, either revolutionary or surprising. Not only did Sun announce its intention to open source its UltraSPARC architecture on [December 6](#) of last year, but IBM had taken a step partway down the same road last summer when it founded an organization that would allow other companies to influence the architecture of its [venerable PowerPC processor](#). Similarly, Google has already made a wealth of geodata available through its [Google Earth](#) project. That project is already being used in just the type of creative ways (so called "mashups" and more) to which Berners-Lee alluded in his Oxford speech. And finally, the use of the Creative Commons has been expanding logarithmically on the Web for several years now.

What this demonstrates is that the broad concept of open source is extensible into many types of situations, and may be managed in multiple ways. In the first case, the approach has moved from

software to chip designs, and the initiative is organized on an open source software project model. In the second case, raw data is involved, and the delivery mechanism is through public (the Ordinance Survey example) or private (the Google example) means, for two entirely different motivations. In the third case, it is works of authorship of all types (literary, music, art, etc.) released by the individual author/owner, who may set the boundaries of that access through the simple means of referring to a specific variation of a publicly available license.

What this shows me is that the envelope of free use and public availability of IPR will continue to be pushed in more and more directions, and managed in more and more novel and situationally appropriate ways. Crucial to this process will be the accumulating evidence in an expanding number of domains that the owners of IPR may gain (indirectly) more by giving than by selling (directly).

This is not as novel as might first be imagined. IPR can be either a means to an end, when the desired end is profit, or it can be the end itself, when the hoped-for result is increased knowledge – IPR for its own sake, if you will. Or it can be somewhere in between, as with academic scholarship which, when it is accepted to be published, benefits the author by meeting the need to "publish or perish."

Similarly, in the first article, while Sun is making its chip design publicly accessible, it will still benefit in other ways, such as lowering the cost of innovation through the efforts of non-employees, and the hoped-for increase in use of the processors it sells.

In the case of the second article, the concept is that data that has been gathered through public funds can become far more useful, and societally beneficial, if it is freely available.

In the final example of the Creative Commons license, the desired end can be indirect profit (e.g., a musician can make her downloads free to the public in order to broaden her fan base, leading to more and better paid performance engagements as well as to royalties for commercial use of the same music) to personal satisfaction, through spreading the author's ideas and reaching kindred spirits (as with this blog) to being part of a like-minded community and the gratification that can be enjoyed through achieving a common goal (e.g., the Wikipedia).

As such examples accumulate in increasingly diverse areas where IPR owners demonstrably gain by giving, it can be assumed that the owners of IPR in still other areas will give thought to how the technique may be adapted to their own IPR assets and situations. At some point, the inevitable tipping point will be reached, following which all types of IPR owners will automatically consider which world they wish their works to live in - open or closed, or in both, depending upon the specific use or user obtaining rights to use the IPR.

Is this inevitable? Personally, I think it is. This is one of those examples where the Internet really *has* "changed everything."

How? It would be too simplistic to point simply to the "network effect" (i.e., the value of the network increases exponentially with the number of users that are connected to it) as the cause. As significant, or more, are the number and types of activities that become possible, or practical, only through an affordable network of global scale, and free rights of participation.

I strongly doubt that the open source concept will be applied to every area of endeavor, or that it will predominate in every area where it is applied. But I also believe that we may be surprised at some of the areas not yet imagined where it springs up next.

It will be interesting to track the spread of the open concept into such new domains. Decades from now, researchers will certainly study this era to puzzle out how and why what happened, in fact, happened. Why did it spread to this new domain and not that, and why in that particular order? What impact did new developments, such as the implementation of the Semantic Web have? Did new developments merely accelerate the trend, or did they enable the concept of "open IPR" to enter into areas that would not otherwise have opted in, because the value proposition could not shift in that area until better tools were available?

At the end of the day, is this really all so surprising? Really, I think not. It just takes us longer to connect some dots than others.

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