



A History of Openness and the World Wide Web:
The Forces Driving America Online and Mozilla Firefox

KMDI 1002 Assignment One

cc Christopher Collins
991 783 183
Department of Computer Science, University of Toronto

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Abstract

The Internet began as a restricted military project and has become one of the most accessible information mediums in human history. Three aspects of openness have shown influence over this development: open access, open content, and open source. Driven by consumer preference, technological soundness, and political pressure, a continuous growth in openness can be traced through the early development of the Internet, to the launch of proprietary networks such as America Online, and their subsequent adoption of open World Wide Web standards. This thread is connected to the most recent development in openness through America Online's participation in the founding of the Mozilla Foundation. The rapid adoption of the open source software product, Mozilla Firefox, as the second most popular browser application for the World Wide Web is evidence of the continuing trend toward openness online. Open concepts drive not only the development of Firefox, but also its usability and marketing. The Firefox story is still developing, and the extent of its success may be a measure of the future potential for openness and the World Wide Web, where several challenges to openness are threatening to reverse the trend and entrench enclosure of information as the standard for the future.

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1 Introduction

Openness is a concept often strongly linked to open source software (OSS) ([Wikipedia, 2005](#)), a broad term encompassing software developed in a process governed by a public license (*e.g.*, the GNU Public License) which allows public access to source code and gives end-users the right to modify and redistribute the software. However, in the context of the Internet, this definition may be too narrow. The concept of openness — free/libre sharing of information in order to collectively make something better — is similar to the work ethos of the academic (and even, to an extent, the industrial research) community ([de Laat, 2001](#)). Thus openness can encompass many aspects of the Internet, including access, content, and the source code.

1.1 Openness and the Growth of the Internet

The history of the Internet is long and varied, despite its relatively short time span. Many complete histories of the development of the Internet (and of its primary applications, including the World Wide Web) have been written — ([Naughton, 1999](#); [Moschovitis *et al.*, 1999](#)) are good examples. To inform the discussions to follow, it is informative to highlight points of this history that are key moments for openness.

The Internet as we know it started as a military research application funded by the Defense Advanced Research Projects Agency (DARPA) in 1969. At that time, the technology was freely shared between DARPA research laboratories (including some universities), but those without defense funding were not permitted access. The existence of the newborn ARPAnet was announced publicly in 1970. The network continued to grow each year, using its Network Transfer Protocol (NTP) to transfer information. Adoption of Ethernet wired transfer technology created at Xerox PARC in 1973 allowed for a speedup in transfer. Still, the technology was highly guarded. Other research networks were growing at the time, including the Hawaiian ALOHAnet, which transferred data over radio signals, and SATnet, which used satellite communications ([Moschovitis *et al.*, 1999](#)). By 1977 it was becoming clear that interconnections between these diverse networks was needed,

and the Transmission Control Protocol (TCP) was created, allowing message transmission between ARPAnet, ALOHAnet, and SATnet, despite the different modalities for their communication. This point also established the power of mutually agreed upon and open standards.

The birth of the personal computer in 1975 with the Altair 8800 sparked a revolution that would give rise to the Internet as we see it today. By 1979 the first public-access network, the Computerized Bulletin Board System (CBBS) was launched by Ward Christensen and Randy Suess. Despite movement to restrict access to software as intellectual property to be used for profit (famously started by Bill Gates in a 1972 ARPAnet posting), the CBBS was shared freely and similar systems began to start around the world, giving rise to the first open (and anonymous) access to computing, and open content development through chat room discussions and code sharing [Moschovitis *et al.* \(1999\)](#).

At this point, access to the ARPAnet was still restricted to defense-funded universities and military establishments. There was a growing demand for access, and several influential alternative networks emerged, including the Usenet and BitNet. These networks publicly distributed their transfer protocols, and welcomed membership of any interested institutions. By the early 1990s, open access had helped these networks grow as large as the older ARPAnet. The vast amounts of academic knowledge gathering and sharing that was happening over Usenet and BitNet attracted the attention of ARPAnet administrators, who saw the potential of this openness to aid their information gathering mission. In 1983, the ARPAnet was split into the MILNET (for military use) and the Internet, which used the open Internet Protocol to connect diverse networks. Immediately the connection of Usenet and BitNet added to the number of institutions that formed the network.

In 1983 Tom Jennings founded the FidoNet, a network of separate BBSs “committed to free speech” ([Naughton, 1999](#)). The FidoNet permitted public local access to nodes in the network. The nodes would connect to each other for one hour per evening, transferring messages across the United States. This permitted the growth of a national network over the existing telephone infrastructure without individuals incurring long distance charges ([Naughton, 1999](#)). The FidoNet system, with 10,000 nodes, was connected to the Internet in 1991.

The open-access success of FidoNet was followed by FreeNets in 1986, which were public access nodes that allowed, for the first time, non-academics to access the Internet. By this point, the major networks – FidoNet, the Internet (with FreeNet public access) – were all based on principles of open access and unrestricted, uncensored content. The only fees charged were cost-recovery for FidoNet node operators. Open access, open standards, and open content creation were now the reality of public computer networks.

2 America Online vs. The World Wide Web

The assumption of free public access to computing resources, and the commonly held belief that no money was to be made with networks were challenged with the introduction of America Online (AOL) in 1989. AOL was the first pay-for-use BBS, offering customers promises of exclusive content and easy-to-set up access, a direct contrast to the perception that the Internet was filled with uninteresting computer-focused discussion boards and was exceedingly difficult to use. In the beginning, AOL CEO Steven Case envisioned his system as an alternative to the Internet, focused not on the research and military communities, but on the everyday consumer ([Martin-Murphy, 2002](#)).

Parallel to the initial explosive growth of AOL, openness advocate Tim Berners-Lee was inventing a standard for organizing information based on the visions of Vannevar Bush's Memex ([Bush, 1945](#)) and Ted Nelson's Xanadu hypertext system ([Nelson, 1987](#)). The launch of the Hypertext Transfer Protocol (HTTP), the related Hypertext Markup Language (HTML), and Universal Resource Locator (URL) system would lead to trouble for AOL ([Moschovitis *et al.*, 1999](#)) in the coming years. Tim Berners-Lee wrote the first graphical user interface for the Internet – the “WorldWideWeb” browser, that used his new protocols. In months, he was offered partnerships for his technology, but he refused, saying that “no one should control the web” ([Naughton, 1999](#)). He invited the worldwide community to contribute applications which used this protocol, and thus started what was the first global experiment in creative innovation. Many enthusiasts took up the

challenge. Researchers Marc Andreessen and Eric Bina at the National Centre for Supercomputing Applications (NSCA) added image capabilities to the HTML and launched a new browser, Mosaic, in 1993. By the end of the year over one million people had downloaded Mosaic, and World Wide Web traffic had jumped to one percent of all Internet bandwidth usage (Moschovitis *et al.*, 1999).

Up to this point, it seems a trend toward increased openness in computer source code, standards, access, and content was developing for the Internet. Rival network AOL was continuing to grow in popularity. In 1994 Jim Clark hired six Mosaic developers (who had previously rejected an offer from AOL and founded Netscape Communications. Later that year, Netscape Communications launched their new web browser. It was freely distributed to individuals, but the binary code was a closely held secret, and industrial users had to pay for usage licenses. Within a year, Microsoft had entered the World Wide Web delivery business with Internet Explorer, a derivative of the Mosaic code they had purchased from NSCA. A war of proprietary software broke out, with two major challengers vying for market share for delivery of content over essentially open networks, using open standards.

Despite the exponential growth of the World Wide Web (WWW), and the founding of hundreds of small Internet Service Providers (ISPs), AOL and its exclusive content remained a leading source of information for U.S. consumers through the late 1990s. However, the growth of the Internet fueled consumer demand for access to the World Wide Web. Pressure forced AOL to provide limited Internet connectivity to its members in 1995. Their policies on content and access – vastly different from the freedom of the Internet – lead to several cases of interest in the study of openness.

2.1 Access

Information rights (freedom of speech, copyright, privacy, etc.) are the traditional areas of discourse about the challenges of the Internet. McIver *et al.* (2003) raise the idea of a “human right to communicate”, and present a strategy for enshrining such a right into public policy. A right to communicate encompasses many of the information rights issues currently discussed in terms of the Internet. One of the cornerstones of satisfying this right, they argue, is providing a route to

access communication technology (open access). The business practices of AOL, in many cases, have been counter to the idea of a human right to communicate.

The AOL access model was, until 1996, based on a pay-per-view system. Content was paid for twice – corporate clients paid to provide content, and consumers paid to view it. Even after allowing access to content on the WWW, owners of websites had to pay a premium to AOL to have their content accessible to the 6.5 million AOL subscribers (Dean, 2001).

After 1996, AOL adopted a model of unlimited monthly access to content. In its advertising materials, AOL claimed, “It’s easier than ever to stay connected with friends and family on AOL” (Dean, 2001). The removal of time limits provided more freedom for subscribers to explore the wealth of information available, but also brought to light the frailty of a proprietary network – the AOL service was swamped with unexpected user demand, and subscribers were often met with breakdowns and busy signals¹. The promise of unlimited access was not deliverable; AOL had used open access as a marketing tool, and were unprepared for the enthusiastic response.

In addition to difficulties connecting to the AOL network, many subscribers complained about difficulties accessing content from the Internet’s two most popular applications: email and the WWW. Because the AOL email and browser software did not comply with open standards, popular sites such as *yahoo.com* and popular activities like sharing photos as email attachments were not possible. In addition, popular WWW features such as images on HTML pages were offered with lower quality, because of needs to save bandwidth on AOL servers.

2.2 Content

Open content, briefly, is the freedom for individuals and organizations to provide content (*e.g.*, messages, photos) that is viewable to the public. This is coupled with open access, the freedom of public to view the content. The borders between public consumption and production of information

¹These problems later resulted in a class-action lawsuit. The court-mandated settlement included \$305 million investment in technology upgrades, 2 month refunds to subscribers, and a limit of 8 million customers until service upgrades were proved to be complete (Moschovitis *et al.*, 1999).

are blurring more and more as access and content become more open (Cedergren, 2003). Until recently, AOL policies presented several challenges to the principles of open content. Because of the fees to provide content on the AOL network, I argue that the content was not open. Content hosted freely from personal computers connected to the WWW was not accessible to AOL subscribers.

In addition to fees, AOL content is also controlled by corporate censorship, driven by competitiveness (*e.g.*, subscribers could not choose to use competitors' applications, such as MSN Messenger, over the network) and, in at least one case, racial discrimination. For many years, AOL had a policy of "English only" for online postings. The policy was unevenly enforced, and, according to AOL, intended to prevent members from being insulted online in a "foreign language" (AOL did not have multilingual staff to investigate complaints). In 1996 this policy came to the fore when AOL staff members began deleting postings containing languages other than English (Abate and David, 1996). In one case, the deletion of an entire conversation enraged AOL subscribers who use the service to debate the fortunes of soccer teams from Spanish- and Portuguese-speaking countries where soccer is the national sport. Another member complained of being warned against causing another "disruption" for joking that the only Latin he could remember was "caveat nabisco mausoleum".

Language restrictions were not the only content controls on AOL. The 1995 guidelines from AOL's Gay and Lesbian Forum restricted mention of genitalia or distribution of telephone numbers. That same year, AOL banned the use of "breast" in the titles of discussion groups – including the "breast cancer support group". AOL claimed a fear of government reprisal under the U.S. Communications Decency Act. The Act was repealed in 1997 as unconstitutional, and the AOL content restrictions, due to the clamour of subscriber complaints, were soon removed as well (Moschovitis *et al.*, 1999).

By setting itself up as a provider of exclusive content, AOL made itself a target in a way that ISPs were not. Several cases were tried against ISPs for providing indecent content, including a case against CompuServe in Germany for providing access to Nazi symbols (Naughton, 1999). In each of these cases, ISPs were exonerated; ISPs were considered the portal to the information, not

responsible for the distributed content. By not embracing open content standards, such as common file format and open access, AOL had more direct responsibility for the content it provided.

2.3 Openness Wins Out

With Microsoft winning the browser war, Netscape facing financial ruin, content providers moving from AOL to the WWW (Krigel, 1998), and consumers choosing flat-rate small ISPs (Lewis, 1996), AOL had to acknowledge that openness was winning the fight for network control. Restrictive language policies, access difficulties, proprietary file formats, and pay-per-view economic models were driving customers away. AOL needed a high quality product to improve delivery of WWW content. In 1998, AOL purchased Netscape Communications. Earlier that year, Netscape had launched the Mozilla Foundation (“Mozilla” was inspired by “Mosaic Killer” — Internet Explorer was built upon NSCA Mosaic) and released its source code to the public, joining the burgeoning Open Source or Free Software movement. At the time, Jim Barksdale, Netscape CEO, predicted the power of the move:

The Mozilla Foundation will enable Netscape to harness the creative power of thousands of programmers on the Internet by incorporating their best enhancements into future versions of Netscape’s software.

Soon after the creation of the Mozilla Foundation, Netscape was purchased by AOL. Some members of the online community, given AOL’s history of proprietary content, source code, and pay-per-view access, feared this would mean the Mozilla project would end as quickly as it had begun (Cassel, 1998). However, it seemed AOL was beginning to see the power of openness for the WWW, and committed to long term support for the Foundation. Over the coming 6 years, the WWW continued to grow, and the amount of exclusive content offered on AOL continued to shrink. In late 2004, AOL adopted the common HTML open standard file format, dropping its long held “Rainman” format (Walker, 2004). At the same time, the company committed to offering its content on the WWW to non-subscribers (Davidson, 2005). It seems that AOL has become the

world's largest ISP, finally embracing openness for source, content, and access. In a somewhat ironic twist, the company sometimes called “the anti-Internet” (Dean, 2001; Cassel, 1996), is a supporter of the most recent OSS success story. Late 2004 brought the realization of Barksdale's vision of the potential of the Mozilla Foundation — the Firefox browser reached double-digit market share in just three months. The continuum of openness winning the battle for the delivery of information online can be extended with an investigation into what open source development has given to the Firefox project.

3 Open Source: The Success of Firefox

The history of the Internet, World Wide Web, and America Online shows a trend toward increasing adoption of standards of open access and open content. In the beginning of the Internet development, open source (although not yet called this) was also a driving force. Network communication standards such as TCP/IP were developed collaboratively by researchers at many institutions. Applications such as the first browser, WorldWideWeb, were placed in the public domain. The enormous financial success of software giant Microsoft, headed by Bill Gates, who, in 1972, famously complained of “software piracy” for the first time, fueled ambitions to make millions on proprietary software code. Resistance to the software monopoly and enclosure of information led to the growth of the OSS movement of the 1990s. Early contributions such as Linux have had great success. In 1998, AOL, having abandoned many of its anti-openness practices, pledged support for the Mozilla Foundation, created to develop an OSS web browser.

In 2004, amid reports of security flaws in Microsoft Internet Explorer, the world's most popular browser (Goth, 2004), the Mozilla Foundation released Firefox, a new web browser developed by thousands of contributors, using the open source model. Within three months, over 22 million copies had been downloaded, and five percent of Microsoft's market share had been eroded.

3.1 Mozilla Development Process

The development of Firefox began when 16 year old Blake Ross, in 2002, took the bold step to “fork the code”, or branch the development of the Mozilla Foundation’s Netscape browser. He was disenchanted with the creeping bugs in Netscape and desired a simpler system. Joined later by Ben Goodger, the Firefox project eventually was adopted as a major Mozilla initiative (McHugh, 2005). The freedom for anyone to branch the development and create a new project was an important enabler in the birth of the new browser. This aspect of open source software is entrenched in the public license agreements that govern the use of the source code. The Firefox development process, while open source, is not an anarchy of thousands of members writing disorganized code. Blaustein (2003) describes the structured system by which contributions to code are vetted by several levels of responsible reviewers, super-reviewers, and team leaders. Problems in the code, from critical failures to minor usability issues, are tracked using an open source tool, Bugzilla, and volunteers sign up to be responsible for fixing individual “bugs”. Reviewing online discussions of Mozilla developers (Foundation, 2005a), one can see that the motivation for contributing time and expertise includes the opportunity to further the political belief that information should be “free” (*libre*, and in some cases *gratis*). This is further fueled by a feeling of competition with the current monopoly of Microsoft (a vocal opponent of the open source work ethos). Career enhancement, although not frequently admitted as a goal, is often an outcome of open source contribution (code contributions lead to recognition, and recognition by the development community to future employment) (Olsen, 2005). Finally, some postings note a drive for personal benefit — developers spend many hours using WWW browsers, and feel their work-life would be improved if they had a product that better suited their needs.

3.2 Open Source and User Experience

The usability of open source software is often regarded as one reason for its limited distribution. However, the user experience need not be difficult for open source software. Indeed, Firefox senior contributor Blake Ross describes his inspiration to make “something Mom and Dad could use.”

(McHugh, 2005). Nichols and Twidale (2003) offer adaptations of existing human-computer interaction techniques to leverage distributed communities of developers and users to address issues of usability. Such usability studies were carried out through multi-phase alpha and beta testing of the new Firefox browser, and Mozilla-related open-source usability testing tools are available (Uzilla, 2005).

Users of the new Firefox browser can also expect fewer usability disruptions due to security concerns, when compared to the Microsoft Internet Explorer. McHugh (2005) argues that since 1999, the only “new features” of Microsoft Internet Explorer have been “pop-up ads, spyware, and viruses”. Security flaws in the Internet Explorer software have left Microsoft developing fixes rather than innovating new features. The turnaround time for OSS to react to security problems is often much faster than for proprietary software. Firefox updates (“builds”) are released nightly, and new versions each 3 months. Internet Explorer, on the other hand, has a development cycle of just over 1 year. It seems that with more individuals working on the source code, security flaws are more likely to be quickly located and repaired.

An important feature of the new Firefox browser that comes from (and supports) OSS development is its extensibility. Contributors can create “extensions” (tools to customize the behaviour and add features) and “themes” (new visual appearances). Example extensions include the ability to control one’s media player from within the browser, or the ability to block advertising content on web pages. For the non-technical user, who wishes only to use the software product, installation of these extensions is facilitated by a “1-click install” system, and a rating system which suggests the most popular and highly rated extensions for installation (Foundation, 2005c). This extensibility provides for the open source community an opportunity to make changes and additions to the software in ways that do not require approval of reviewers, and need not be suitable for all users. This opportunity for customization and open sharing of tools is not available for the Internet Explorer (Costa, 2004b,a).

3.3 Unique Open Marketing

Within four weeks of the debut of Firefox, contributors and fans had hosted launch parties in over 392 cities (McHugh, 2005). This represented the beginning of a massive volunteer marketing campaign, driven by the open source ideals that each member of the community could make a contribution. The website “Spread Firefox” was launched to coordinate the effort (Foundation, 2005d). Over ten days, 10,000 donors contributed an average of \$25 to help purchase a two page advertising supplement to the *New York Times*. Members of the community were not only willing to help develop the code, but also to promote the resulting product, both with time and money. The Spread Firefox campaign is competitive, offering peer recognition for city-based teams whose efforts have the biggest impact on the regional browser market share.

In addition to the Spread Firefox campaign, the Mozilla Foundation supports efforts to counter “Tech Evangelism” (Foundation, 2005b). As Firefox strictly supports Tim Berners-Lee’s W3C standards for HTML code (and Microsoft considers this open standard to be optional), some web pages are not viewable by Firefox. These websites advise their audience to switch to Internet Explorer. This “tech evangelism” is considered by the Firefox community to be an excuse for sloppy website source code, by designers who do not care to, or know how to support the W3C standard. As a solution, Mozilla encourages users to report these errors as “bugs” — not with the Firefox browser, but the website in question. Volunteer contributors then review the source code of websites in question, and suggest solutions to web designers that will make the site viewable by the Firefox browser. This sort of piecemeal enforcement of web standards is having an effect — over 10,000 “tech evangelism” bugs are reported as repaired (Foundation, 2005b).

4 Conclusion

Openness on the WWW has had a progressive development, from early days of restricted access and content, through the years of proprietary content and access restrictions offered by AOL, the world’s largest network service provider, to the eventual AOL adoption of open content, unlimited

flat rate access, and support of the open source software movement. These progressions, history shows, were not made willingly. In many cases consumer demand for access, uncensored content, software usability, security, and personalization drove the evolution.

Although the Firefox browser has opened a new chapter for open source, access, and content, and has reinforced the power of open standards as a way to provide these types of openness, we must be cautious not to adopt the rhetoric of the open source community as fact. Proprietary software still controls many aspects of WWW. Over 90% of all web browsers are Microsoft Internet Explorer. The world's most popular websites (Google, Yahoo, and others) run proprietary software and use closely guarded indexing methods (although their web pages may be served using the OSS server Apache). In the coming years many challenges to openness and the WWW are on the horizon. Google continues to gain additional control of content indexing ([Abram, 2005](#)), and may be moving into the browser business as they hire away developers from Mozilla ([Olsen, 2005](#)). Microsoft is working on their next operating system release, Windows Longhorn, which will make its proprietary web browser an even more integral part of the desktop interface than in previous releases ([McHugh, 2005](#)). Microsoft is also launching its own revision of the openly developed and de facto standard HTML, called XAML, which may give that company control over exclusive content offering on the WWW, akin to the failed attempts of AOL at this in the 1990s.

The progress of openness and WWW offers an interesting case study on the topic of openness in the new "information society". Despite the evidence presented herein, philosopher about technology Richard Clarke warns that the we are not making real progress toward openness or "freedom of information". Without public awareness and government attention to the legislation required to protect our "golden age of information accessibility", the Internet could in fact be the "harbinger of a new dark age" ([Clarke, 1999](#)). The progressive enclosure of information through new legal contracts, threats to access, and new encryption technologies, will, without intervention, lead to ever-increasing corporate control of information and power, he says. Whether the power of openness to drive the evolution of entities such as AOL and the development of products such as Firefox have taught any lessons about these issues remains to be seen.

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