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## Consortium

When I arrived at MIT's Laboratory for Computer Science, I camped out in a corridor with two doors and no windows close to the offices of Michael Dertouzos and Al Vezza. Though an office of my own would have been nice, this arrangement actually worked out beautifully because it allowed us to work together very readily—and them to keep an eye on me.

I hadn't had time to get a car yet, so I was commuting by bus from our temporary home. Trudging to work in citified Cambridge was a far cry from rural France, but it was autumn, and the bus ride gave me time to revel in New England's fall colors. It also gave me time to think about my new role.

Although I knew I would be forced to introduce some structure, I wanted the consortium to operate in a way that reflected a weblike existence. The Web would not be an isolated tool used by people in their lives, or even a mirror of real life; it would be part of the very fabric of the web of life we all help weave.

The Web scene was beginning to fill with a colorful mix of different types of people, organizations, and concerns. The consortium would, too. It would be its own web, and sustain the greater Web, which would help sustain the web of life.

I wanted the consortium to run on an open process like the IETF's, but one that was quicker and more efficient, because we would have to move fast. I also wanted an atmosphere that would allow individuals, representing their companies or organizations, to voice their personal ideas and find ways to reach common understanding. There would always be people who would disagree, and they would be levers for progress. We would get ever closer to true consensus, perhaps never completely achieving it, but delighting in every advance.

This freewheeling design might create tension between my being a manager and leaving the consortium as a very flat space of peer respect and joint decision-making. It might create tension among consortium members, who would have to take leads on issues but always hew to a democratic process. It struck me that these tensions would make the consortium a proving ground for the relative merits of weblike and treelike societal structures. I was eager to start the experiment.

The WWW conferences continued half-yearly at Darmstadt, Boston, and Paris, and the academic institutes hosting them founded the International World Wide Web Conference Committee as a nonprofit organization, to continue the series, with Robert as president. On the business side, Netscape was working furiously to release the first commercial version of its browser by the end of the year. Bill Gates and Microsoft, who had shrugged off the Internet and the Web, were realizing they might be missing a good party. Gates assigned people to develop a browser. Microsoft was also investigating the development of an online service that might compete with America Online, CompuServe, and Prodigy.

The timing of who was developing which technology, and who was working with whom, would determine the course of

events for years to come. In April 1994, Gates had decided that the next version of Microsoft's operating system, Windows 95, should include software for accessing the Internet. The decision came only a few weeks after Clark and Andreessen formed Mosaic Communications. Gates wrote a memo to Microsoft employees saying the Internet would constitute a new and important part of the company's strategy. If Gates had made the decision two months earlier, would he have hired the same NCSA people that Mosaic had just grabbed?

The Web was becoming a business. Rather than develop its own Web code, Microsoft licensed browser code from a small NCSA spin-off called Spyglass. The cost was \$2 million—more money than any of us involved from the early days would ever have dreamed of.

In November the major marketing campaigns began. At Comdex, the twice-yearly computer trade show, Microsoft announced with great fanfare that its online service, the Microsoft Network (or MSN), would be launched and that software to access and use it would be part of Windows 95. At the same conference, Jim Clark announced publicly that Mosaic Communications was changing its name to Netscape. NCSA had been annoyed about Clark and Andreessen using its software name, Mosaic, as a product name, too, and when the two had hired away NCSA's people, NCSA took offense. An out-of-court settlement was reached, costing the upstart company close to \$3 million in expenses and other fees, and requiring it to find a new name. Netscape was it.

Al and I were having our own debates over a name for the nascent organization, arriving at the World Wide Web Consortium, or W3C for short. Some of the icons still have a trace of a "W3O" (Organization), which held for a while.

While I worked up a technical agenda, Al energetically signed up members. The Digital Equipment people who had surprised me with their visit at CERN were among the first on Al's

list of calls. They joined, and people at other companies—from upstart Netscape to stalwarts like Hewlett-Packard and IBM—quickly followed.

Membership was open to any organization: commercial, educational, or governmental, whether for-profit or not-for-profit. The annual fee for full membership was fifty thousand dollars; for affiliate membership it was five thousand dollars. There was no difference in benefits, but to qualify for affiliate status an organization had to be not-for-profit or governmental, or an independent company with revenues less than fifty million dollars. Netscape joined for the full fifty thousand dollars despite qualifying as an affiliate; it insisted that it join as a big company on principle. Members had to commit to a three-year term of membership, after which they could renew annually. In return, members were free to attend any meeting, and sit on any working group or other ensemble we would put together. They would also get exclusive access to in-depth information on all activities under way, whether they were directly involved or not.

Though we didn't have the motto at the time, the consortium's purpose was to "lead the Web to its full potential," primarily by developing common protocols to enhance the interoperability and evolution of the Web. To do this, we would stay ahead of a significant wave of applications, services, and social changes, by fulfilling a unique combination of roles traditionally ascribed to quite different organizations.

Like the IETF, W3C would develop open technical specifications. Unlike the IETF, W3C would have a small full-time staff to help design and develop the code where necessary. Like industrial consortia, W3C would represent the power and authority of millions of developers, researchers, and users. And like its member research institutions, it would leverage the most recent advances in information technology.

The consortium would also take great pains to remain a "vendor neutral" forum for its members. A small, core staff housed at

the Laboratory for Computer Science and sites in Europe and Asia would produce specifications and sample code, which members—and anyone else, for that matter—could pick up and use for any purpose, including commercial products, at no charge. Consortium funding from dues (and, initially, public research money) would underwrite these efforts.

There also would be the Advisory Committee, comprising one official representative from each member organization, who would serve as the primary liaison between that organization and W3C. The committee's role would be to offer advice on the overall progress and direction of the consortium. I would be the consortium's director; Al would be chairman.

Most of the organizations that were signing up were companies interested primarily in advancing the technology for their own benefit. The competitive nature of the group would drive the developments, and always bring everyone to the table for the next issue. Yet members also knew that collaboration was the most efficient way for everyone to grab a share of a rapidly growing pie.

Although the consortium was seen as primarily an industry group, the U.S. and European governments were supportive. In fact, the U.S. Defense Advanced Research Projects Agency provided seed money, in part because we would be building bridges between academic research and industry. Martin Bangemann, the European Commission commissioner, held a meeting of the European governments, which decided to support CERN's coordination of Europe's part of the consortium.

Not surprisingly, one of my first steps at MIT was to set up a Web server. I took a copy of all the existing Web documentation and specifications from the info.cern.ch server at CERN. The new web address was <http://www.w3.org>. CERN would maintain info.cern.ch as a forwarding address.

No sooner had I arrived at MIT than I was off to Edinburgh, Scotland, for the next European Conference on Hypermedia Technology.

It was run by Ian Ritchie of Owl, whom I had tried to convince four years earlier to develop a Web browser as part of Owl's hypertext product, Guide. It was here that I saw Doug Engelbart show the video of his original NLS system. Despite the Web's rise, the SGML community was still criticizing HTML as an inferior subset, and proposing that the Web rapidly adopt all of SGML. Others felt that HTML should be disconnected from the ungainly SGML world and kept clean and simple.

Dale Dougherty of O'Reilly Associates, who had gathered the early Web creators at the first Wizards workshop and other meetings, saw a third alternative. After one session at the conference, a bunch of us adjourned to a local pub. As we were sitting around on stools nursing our beer glasses, Dale started telling everyone that, in essence, the SGML community was passé and that HTML would end up stronger. He felt we didn't have to accept the SGML world wholesale, or ignore it. Quietly, with a smile, Dale began saying, "We can change it." He kept repeating the phrase, like a mantra. "We can change it."

Right then and there, fixing SGML was put on the agenda. For the HTML community, the controversy quickly became a huge turn-on. It got them going. And many in the documentation community, also fed up with aspects of SGML, sympathized.

Compared with all the drama taking place in the forming of Web companies, this controversy may have seemed like an esoteric technical point. But the Jim Clarks and Bill Gateses would have no big business decisions to make unless specific decisions like the relationship of HTML to SGML were sorted out. Businesspeople and marketers who thought they were "driving" the Web would have had nothing to drive.

In October 1994, Netscape released the first version of its browser, dubbed Mozilla. It was a "beta" or test version, released so people on the Net would try it and send suggestions for improvements. As he had with Mosaic, Andreessen pumped out messages about Mozilla over the newsgroups, and users snapped it up.

Meanwhile, Ari Luotonen, the Finnish student from the Erwise project whom Robert had brought to CERN, was producing CERN's HTTP code. He made it easy to install, with documentation on how to use it. When his term as a CERN student came to an end, he joined Netscape to work on its server software. The other student at CERN, Henrik Frystyk Nielsen, joined us at the consortium. He would be one of the people who would do the core work on the next upgrade of the hypertext protocol, HTTP 1.1.

As members signed up for the consortium, they advised us about what they wanted to address first. One of the top priorities was network security. Information, such as credit-card numbers, sent over the Web needed to be safeguarded. Netscape was particularly interested because it had a deal looming with mammoth MCI to distribute Netscape's browser on MCI's new Internet service, due to begin in January. Netscape's software, called Secure Sockets Layer (SSL), would protect credit-card purchases on MCI's planned online shopping mall. Seeing SSL as a competitive advantage and feeling that W3C was not yet really up and running, Netscape decided not to wait, and developed the software fairly independently. This was one of the first programs that allowed electronic commerce (e-commerce) to gain credibility.

With so much new, autumn passed quickly. Suddenly it was December 1994. In three short days, huge events took place that would forever alter the Web's future: The consortium members met for the first time; Netscape released the commercial version of its browser; and CERN decided after all not to be a W3C host site. That bobsled I had been pushing from the starting gate for so long was now cruising downhill.

On December 14 at LCS the World Wide Web Consortium held the first meeting of its Advisory Committee. The meeting was very friendly and quite small, with only about twenty-five people. Competitors in the marketplace, the representatives came together

with concerns over the potential fragmentation of HTML. This was seen as a huge threat to the entire community. There were so many proposed extensions for HTML that a standard really was needed. We wrestled over terms—whether the consortium should actually set a “standard” or stop just short of that by issuing a formal “recommendation.” We chose the latter to indicate that getting “rough consensus and running code”—the Internet maxim for agreeing on a workable program and getting it out there to be tried—was the level at which we would work. We also had to move fast, and didn’t want to be dragged down by the sort of long international voting process that typified the setting of an actual standard. It was becoming clear to me that running the consortium would always be a balancing act, between taking the time to stay as open as possible and advancing at the speed demanded by the onrush of the technology.

We also decided that if we were going to develop open, common protocols and stay ahead of applications, we would have to support an ongoing effort, primarily by the staff, to create a set of Web tools we could use ourselves to demonstrate new ideas and experiment with proposed specifications. Initially, that meant adopting a browser and server that were a bit ahead of their time. We agreed to use Dave Raggett’s Arena browser and the CERN server as our test beds. Certainly, we would make these and any other tools freely available for use by anyone. All people had to do was access the public part of the W3C Web site and download a program.

Indeed, the true art for the consortium would be in finding the minimum agreements, or protocols, everybody would need in order to make the Web work across the Internet. This process did not put the consortium in a position of control; it was just providing a place for people to come and reach consensus. In these early days, before we developed more formal processes, if a member didn’t want to be part of a given initiative, the member’s representative wouldn’t come to that meeting. And if people couldn’t agree after serious effort, we’d eventually drop the topic.

Whether inspired by free-market desires or humanistic ideals, we all felt that control was the wrong perspective. I made it clear that I had designed the Web so there should be no centralized place where someone would have to “register” a new server, or get approval of its contents. Anybody could build a server and put anything on it. Philosophically, if the Web was to be a universal resource, it had to be able to grow in an unlimited way. Technically, if there was any centralized point of control, it would rapidly become a bottleneck that restricted the Web’s growth, and the Web would never scale up. Its being “out of control” was very important.

The international telephone system offers a decent analogy. The reason we can plug in a telephone pretty much anywhere in the world is because industry agreed on certain standard interfaces. The voltages and signals on the wire are almost exactly the same everywhere. And given the right adapter, we can plug in a wide range of devices from different companies that send all sorts of information, from voice to fax to video. The phone system defines what it has to, but then leaves how it is used up to the devices. That’s what we needed for computers on the Web.

On December 15, the day after the first consortium meeting, Netscape released the commercial version of Mozilla, renamed Navigator 1.0. It was compatible with Microsoft’s Windows operating system, the X Windows system on Unix, and Macintosh. The browser was significant not so much for its technical features, but for the way in which Mosaic released it. Rather than shrink-wrap and ship it, Netscape released it over the Internet. And rather than charge for it, it was free. Within several months the majority of people on the Web were using it.

Andreessen was following the model by which all previous Web software had been released, except that this time the software was coming from a commercial company that was supposed to make money. People wondered where the profit was going to come from.

Andreessen and Clark had realized that browsers would rapidly become a commodity. NCSA had licensed the Mosaic code to other startups, and Microsoft was developing its own browser. Netscape couldn't hope to make its living from the browser market. What it could do was get its browser out before the others. If it was rapidly and widely accepted, then the company would have a platform from which to launch other products for which it would charge money. It would also bring millions of people to Netscape's home page—the default first screen when Navigator was opened. There, Netscape could display ads from companies that would pay to reach a large viewership. The site also would instantly notify browsers of Netscape's other services, which the company would charge for. Netscape also would charge companies for a commercial grade of the browser, which was more powerful, and for setting up and supporting a company's Web server.

In taking this position, Netscape was wisely acknowledging that on the Web, it was more profitable to be a service company than a software company. Andreessen and Clark may not have been completely clear on this at the beginning, though, because people who downloaded the browser were told that they could use it free for only three months. After that they were expected to pay, or they would be in violation of the licensing agreement. I didn't know what reaction Netscape was getting to this. I assumed that some people paid, but many did not, and simply downloaded the next version of the software, which also turned out to be free. Netscape allowed this to happen for fear of losing fans to other browsers, and as time went on its appeal for payment was minimized.

This approach set the tone for the Web companies that would follow: Release beta versions for review, which put a nascent software program in the hands of hundreds of professional and amateur users, who would (for free) send suggestions for improvements; give away basic software to get customers on

board; distribute the software fast and cheap over the Internet; then try to make money from the millions of visitors through ads or services.

On December 16, 1994, a third day in an incredible week, CERN announced major news. After negotiating for several years, the CERN Council had unanimously approved the construction of the Large Hadron Collider, a new accelerator. It would be the next leap toward investigating the even smaller scales of matter. I would soon learn, however, that to accomplish such a mammoth undertaking CERN would impose stringent budget conditions across the organization. No program that wasn't central to high-energy physics could be supported. That meant that CERN, regretfully, could not continue to support Web development, or the consortium.

In a way, it was probably in everybody's best interests for it to opt out. CERN, at its heart, had always concentrated on high-energy physics, and had never developed great experience with industry or a general policy about working with it. But I felt that CERN deserved the credit for letting me develop the Web, and for maintaining such a tremendously creative environment. Continued involvement in the consortium would have cemented its place in the Web's ongoing history. I would rather have seen the organization get a pat on the back than go quietly into the night. For his part, Robert would remain very involved with the Web community, by continuing to organize the annual WWW Conference series.

CERN's resignation left the consortium without a European base, but the solution was at hand. I had already visited the Institut National de Recherche en Informatique et en Automatique (INRIA), France's National Institute for Research in Computer Science and Control, at its site near Versailles. It had world-recognized expertise in communications: their Grenoble site had developed the hypertext browser/editor spun off as Grif that I had been so enamored with. Furthermore, I found that Jean-François