Abramatic and Gilles Kahn, two INRIA directors, understood perfectly well what I needed. INRIA became cohost of the consortium. Later, in early 1996, we would arrange that Vincent Quint and Irene Vatton, who had continued to develop Grif, would join the consortium staff. They would further develop the software, renamed Amaya, replacing Arena as the consortium's flagship browser/editor.

The whirlwind of events that had taken place in a mere seventy-two hours was exciting yet daunting. The consortium had to get moving with a sense of urgency if it was going to stay ahead of the large forces that were gathering.

I had to wait only two months for confirmation that the Web had become a global juggernaut. In February 1995 the annual meeting of the G7, the world's seven wealthiest nations, was held in Brussels. The world's governments were rapidly becoming aware of the technology's influence, and Michael Dertouzos, LCS's director, was invited to join the U.S. delegation there. As Michael describes in his book *What Will Be*, the keynote speaker was Thabo Mbeki, deputy president of South Africa. Mbeki delivered a profound speech on how people should seize the new technology to empower themselves; to keep themselves informed about the truth of their own economic, political, and cultural circumstances; and to give themselves a voice that all the world could hear. I could not have written a better mission statement for the World Wide Web.

Competition
and Consensus

History often takes dramatic turns on events that, at the time, seem ordinary. Microsoft wanted to license Netscape's browser, buy a share of the company, and take a seat on Netscape's board. In return, Netscape would be the browser on Microsoft's Windows 95, an entirely new operating system, which would launch Netscape into the huge personal computer industry. But Jim Clark and Netscape's new CEO, Jim Barksdale, who had been hired to raise money and make deals, were wary. The proposal fell through, and Microsoft redoubled its efforts to offer its own browser.

Other deals, however, did go through, further shaping the competitive landscape. In April, Compaq announced that its new line of personal computers would come with Navigator—the first time a browser would be bundled directly with hardware.

In May, with little fanfare, Sun Microsystems introduced Java, a new programming language. Java was a repackaging of James Gosling's Oak language, originally designed for applications such as phones, toasters, and wristwatches. Small application programs written in Java, called *applets*, could be sent directly between computers over the Internet, and run directly inside a Web page on a browser. That was the theory. It met the need for applications in which a hypertext page was not sufficiently interactive, and some programming on the client was necessary. The excitement was that even if computer A and computer B had different operating systems, an applet written on computer A could run on computer B, because the Java language set up a virtual computer on computer B that required only minimal support from computer B's operating system. Many languages, however, had tried to achieve this goal in the past, but the effort of standardizing all the facilities they needed was often their demise.

Initially, Java worked. Suddenly, a professional or amateur programmer could create a Java application, post it on a Web site, and people everywhere could download and use it. Java opened up a wide world of potential Web applications that would be simple and inexpensive. Netscape immediately licensed Java, and incorporated it into its next version of Navigator. I was very excited because Java is an object-oriented language, a more powerful programming technique that I had used to write "World Wide Web" but had abandoned due to lack of standardization.

In theory, a computer would not need a substantial hard disk and working memory (RAM) to store and run volumes of software for various applications such as word processing, bookkeeping, and the like. Instead, a computer with minimum memory and RAM could call up a Web site and download a Java applet for writing documents or keeping books. Personal computers could therefore be made with less hardware and thus at a lower price. Some people even thought this new development could erode the

power of the large software companies, like Microsoft, since popular software programs such as word processors could be gotten in Java rather than from the shrink-wrap market. Java also meant that people with all sorts of different pocket devices, which couldn't support a lot of hardware or software, could communicate and work with each other over the Web from anywhere.

Meanwhile, great anxiety was growing among a group of technology companies that for several years had been leading the way toward the Information Age: the online service providers. Compu-Serve, Prodigy, America Online, and others that offered prepackaged content such as news, an encyclopedia, travel information, and e-mail tended to represent the Internet as some "other" network that was arcane and complex, certainly not worth hassling with. But the Web suddenly made the Internet easy. It also enlightened subscribers to the fact that these online companies were either isolated islands or just a small part of the Internet. To keep their customers, the online service providers grudgingly provided access to the Web, though they still tried to represent it as something that was part of their kingdom. As press coverage of the Web increased, the services became more careful about not misrepresenting the Web to a smarter public. They had to reverse their stance, repositioning themselves as providing organized and safe content, so that people didn't have to venture out alone onto the Web to find what they wanted.

As part of the general upheaval, America Online (AOL) bought Navisoft, the company that had developed the Navipress browser that also worked as an editor. AOL changed the product name to AOLpress. (It is the software that I used to draft early parts of this book.)

At one point, there were even rumors that AOL was trying to start a consortium like W3C, with a similar name. I sent an e-mail to AOL's chief executive, Steve Case, to try to bridge the cultural gap. They gave up on the idea, realizing that all the Web companies

were already part of W3C, and were far too big a group for them to try to control.

Realizing that Netscape had to grow fast if it was going to compete with the big guys like Microsoft, Netscape's chief executive, Jim Barksdale, decided the company should go public, to get a big cash infusion. The initial public offering (IPO) was held on August 9, only sixteen months after the company was formed. This was extremely early for an IPO, but Wall Street was paying premium prices for high-technology stocks, and Netscape needed ammunition to compete with Windows 95 and the browser that would come with it, which were due out very soon with heavy Microsoft promotion.

The stock was set to open at twenty-eight dollars a share, already a high price, but demand rapidly pushed it to seventy-one dollars. Morgan Stanley, the investment house managing the offering, could not issue shares fast enough. Scores of large institutions wanted large percentages of ownership. They kept buying more until, at the close of trading, 38 million shares were on the market. Netscape, after a single day of trading, was worth $4.4 billion. It was the largest IPO in history, and the company had yet to show a profit.

If the World Wide Web had not yet gotten the public's full attention, this remarkable story put it on center stage. It also sent an undeniable message to the commercial world: The Web was big business. The gold rush was on. The flood of cash enabled Netscape to buy small companies that had developed specialized products for the Web, create joint ventures with larger corporations, and broaden its product line to support big contracts from major corporate buyers. By the end of 1996, when it settled into its full business model, Netscape would employ more than two thousand people and report revenues of $346 million. Its inflated stock price would come down to reasonable levels over the coming years, but in one fell swoop the Web had become a major market.

After Netscape's IPO, people began to ask me whether I was upset by the Web "going commercial." They still ask today. One part of the question means: "Are you upset that people have to pay money for certain Web products, or at least for commercial support for them?" Of course I am not. The free software community was fundamental to the development of the Web, and is a source of great creativity. But it was inevitable and important that if the Web succeeded, there would be a variety of free and commercial software available.

A second meaning to the question related to the fact that for a long time Web pages were posted by individuals and not-for-profit organizations, which pointed to each other with no thought of commercial gain. Academics who had used the Internet from its early stages felt it was an open, free, pure space for their use, and they worried that the bountiful information space they had enjoyed for these righteous uses would now become unavailable, swamped by junk mail and advertising. Certain people felt that commercially motivated material polluted the Web. I had little time for this point of view. The Web was designed as a universal medium. A hypertext link must be able to point to anything. Information that is put up for commercial gain can't be excluded.

People have sometimes asked me whether I am upset that I have not made a lot of money from the Web. In fact, I made some quite conscious decisions about which way to take my life. These I would not change—though I am making no comment on what I might do in the future. What does distress me, though, is how important a question it seems to be to some. This happens mostly in America, not Europe. What is maddening is the terrible notion that a person's value depends on how important and financially successful they are, and that that is measured in terms of money. That suggests disrespect for the researchers across the globe developing ideas for the next leaps in science and technology. Core in my upbringing was a value system that put monetary gain well in its place, behind things like doing what I really

want to do. To use net worth as a criterion by which to judge people is to set our children's sights on cash rather than on things that will actually make them happy.

It can be occasionally frustrating to think about the things my family could have done with a lot of money. But in general I'm fairly happy to let other people be in the Royal Family role (as it were), as long as they don't abuse the power they have as a result. The consortium is the forum where people setting the agenda meet. It's not as if I can just make decisions that change the Web . . . but I can try to get an entire industry organization to do it. My priority is to see the Web develop in a way that will hold us in good stead for a long time. If someone tries to monopolize the Web—by, for example, pushing a proprietary variation of network protocols—they're in for a fight.

Two weeks after Netscape's IPO, Microsoft released Windows 95, and with it Microsoft's browser, Internet Explorer. Bill Gates was turning his back on his earlier strategy of creating a dial-up service, the Microsoft Network, patterned after AOL.

The first version of Internet Explorer had very little functionality. I could tell it was put together in a hurry, but it got Microsoft's toe in the water. In December 1995, Gates made what would later be seen as a famous speech to the press, in which he announced that his company was going to "embrace and extend" the Internet. To certain people in the computer industry, "embrace" meant that Microsoft's products would start off being compatible with the rest of Web software, and "extend" meant that sooner or later, once they had market share, Microsoft's products would add features to make other people's systems seem incompatible. Gates was turning the company around very rapidly and forcefully, to fully exploit the Web. The business community was impressed that Gates was getting into this so personally.

By mid-1996, millions of people were accessing the Web, thousands of companies were serving it, and the press was writ-

ing about it constantly. Internet service providers, ISPs, sprouted everywhere, offering Web access for twenty to twenty-five dollars a month. Computer jocks in small towns around the globe started putting up their own homepages, and soon enough offered to do the same for businesses, mom-and-pop stores, and individuals.

The consortium had positioned itself to help the Web move positively forward. We were holding meetings and issuing briefings packages. But our head of communications, Sally Khudairi, realized we needed more than an efficient Web site to get our message across. She rapidly set up relationships with the press and channels to all those we needed to tell about W3C work. The members suddenly found out all kinds of things about their consortium they never knew, and people who really needed to know about W3C Recommendations but had never heard of us were soon using our name as a household word.

Al Vezza was an effective chair and in essence CEO for the first years; he was succeeded by INRIA's Jean-François Abramatic, whom I had met when I first visited INRIA. Alan Kotok, who was one of the four people from Digital Equipment who had shown up at my office in Geneva, ended up being on the Advisory Committee, and is now on the staff as associate chair. Dale Dougherty, who chanted, "We can change it" in that Edinburgh bar, would later join the Advisory Board, a small group elected from the full Advisory Committee.

The consortium soon began to develop and in turn codify its process for developing future technology and recommendations. From then on the process would continously evolve and be refined. Any member could raise the idea of pursuing an issue. Members or staff would draw up a briefing package, which explained why it was important to address a certain matter. It would address what the market conditions were, the technical issues, why the consortium rather than someone else should tackle this, how we could help the situation, what the next step

would be—a workshop, a working group, a slew of working groups—and how much it would cost us to pursue.

A briefing package would be distributed to the whole membership. Members would review the package, returning comments as to their support and likely participation. If there was sufficient support and no serious problems, we would most often create a new *activity*. Activities could contain any number of working groups, coordination groups, interest groups, and staff so as to get the job done in an open, high-quality, and efficient way.

In addition to considering the core technical issue, the consortium had to consider the impact on the society being built over the Web, and political questions such as whether governments were likely to do rash things if a technology was not developed correctly. With every new activity, the mix of pressures would be different. The consortium had to be able to respond in a very flexible way to put together a structure and strategy that were appropriate.

Working groups could offer their specifications for wider and wider review by other groups, the membership, and the public. The final phase occurred when a solution became a *Proposed Recommendation*, up for formal member review. All the members then would be asked to comment within thirty days. It would either become a W3C Recommendation, be sent back for changes, or be dropped altogether. In theory, the outcome was my decision, based on the feedback (much as the monarch, in theory, rules Britain!), but in fact we would put the member review comments through an internal process of review with the domain and activity leads and working-group chair. In most cases there would be clear consensus from the membership anyway. In a few cases we would go ahead despite objections of a minority, but then only after having delivered a detailed analysis of the opinion overruled. Once a Recommendation was passed, the membership was informed, a press release would go out, and Sally's PR machine would encourage everyone everywhere to adopt it.

One day Dan Connolly arrived very disgruntled at the consortium staff's regular Tuesday meeting at LCS. I had met Dan way back at the hypertext conference in San Antonio where Robert and I had soldered together the modem so we could demonstrate the Web. A red-haired navy-cut Texan, Dan had been very active on the Internet and was an expert in many areas key to Web technology, including hypertext systems, and markup languages. He had since joined the W3C staff and was leading our Architecture domain. On this day, he came in saying the consensus process had broken down in a working group, and all hope of meeting the deadlines promised to other groups seemed lost. One company was becoming a big problem, though he couldn't tell for exactly which reasons. The specification wouldn't be able to come out, and the failure would be a blow for the consortium and the Web community.

Dan didn't really want to talk about it, but the rest of the team dragged him back to the subject. This sort of problem was the crux of the job. Technical issues might be more fun, but this was the stuff of building consensus, of making progress in an open community.

Did the problem company really not want to agree? Was there no way to arrive at consensus? Each of us interrogated Dan. We diagrammed what was happening on the whiteboard. The whole staff worked through it with him. By the end of the meeting, Dan and the team had developed a way to bring the spec forward. The companies agreed within two weeks. It was rewarding for me to see that the process worked even in times of controversy, and it meant a great deal to me that the staff could work so well together.

Of course, at times there was tension when people from different companies had different technical views on how to settle a recommendation. It was often difficult to predict which company representative might play the good guy or bad guy. But finding a technically sound, common solution was the job we were about.

Indeed, the consortium thrived on the tensions. The competitive struggles for chunks of a lucrative market now provided the financial backdrop for the technological revolution, which itself was the backdrop for a real social revolution. Everyone had a common need to see that the technology evolved.

During 1996, Netscape released Navigator 2.0, which had easy-to-use e-mail and supported Java applications. Bit by bit, the online service providers were giving up and providing gateways to the Web. Bill Gates agreed with AOL's Steve Case to provide AOL with a version of the Explorer browser so that AOL subscribers who accessed the Web through AOL's gateway could browse. An unfortunate outcome of this arrangement, however, was the death of AOLpress, one of the few commercial browsers that provided simple online editing.

The consortium's biggest social test came in response to possible government overreaction to the public's rapidly rising concern about pornography on the Web. John Patrick from IBM was the first W3C member to broach the topic. Sitting to one side of the small room at LCS at that first meeting of twenty-five people, John mentioned that there might be a problem with kids seeing indecent material on the Web. Everyone in the room turned toward him with raised eyebrows: "John, the Web is open. This is free speech. What do you want us to do, censor it?"

Underlying his concern was the fact that IBM was trying to install computers in classrooms across America, and it was meeting with resistance because parents and teachers were worried about access to inappropriate material. "Something has to be done," he maintained, "or children won't be given access to the Web."

This was a sobering and new concern for many of us. We decided to return to the topic at a later meeting, but then *Time* magazine published Marty Rimm's article alleging more or less that a large proportion of students spent a large proportion of

their time browsing the Web, and a large proportion of what they were viewing was pornography.

Exaggerated though this take on the situation may have been, a group of companies quickly came to the consortium asking to do something now, because they knew Congress had plans to draw up legislation very soon that would be harmful to the Internet. Already, Web sites acceptable to people in Finland were appalling to people in Tennessee, and the idea of Washington trying to decide what was "indecent" for everyone in the world was indeed sinister.

The consortium companies realized that as an industry they had to demonstrate that they could produce a solution. They had to show that, with simple technology, they could give parents the means to control what their children were seeing, with each parent using their own definition of what material was appropriate, not Washington's. The idea was to create a simple program that could be installed on or in any browser and would let parents block the display of sites that carried a certain rating, like the "R" or "X" rating of a movie. However, the program would allow parents to choose from any number of rating schemes that would be devised by different commercial, civic, even governmental groups. A rating service would simply be found at the group's URI.

The consortium would define the languages for writing the ratings and for serving them up on the Web. We called this work the Platform for Internet Content Selection (PICS) and released it to the public in March 1996. Member companies would incorporate the technology into their products.

The legislation everyone was terrified of surfaced as the Communications Decency Act, which rode on the big Telecommunications Act that was certain to be passed. Proposed by both the Democratic and Republican parties, it would regulate content on the Net. We rapidly promoted PICS, and a number of the companies that had members on the PICS working group funded press events. The Communications Decency Act passed, but then civil

rights groups challenged it in the courts. Ultimately, it was overthrown as unconstitutional. The existence of PICS was an important factor in helping the courts see that the act was inappropriate, that protection could be provided without regulation and in a manner more in keeping with the Bill of Rights.

Ratings schemes were subsequently devised, and a number of companies incorporated the technology. Other companies that specialized in child-protection software sprang up. But the furor calmed down, people relaxed, and industry didn't push PICS technology. Still, PICS had shown that the consortium could work very rapidly, effectively, and in a new arena—the overlapping area of technology, society, and politics.

Just after the consortium released PICS, I made the mistake of talking about it to a reporter who found the principle difficult to understand. I thought it was rather simple: W3C develops the protocols, some other party develops the rating schemes, other parties like civic groups would issue ratings, the protocols would be incorporated into commercial products, and parents would choose which rating scheme and levels they would use to block material for each child. Combining this with the conditions on W3C's sample code, the reporter translated it into the statement that W3C was producing a product for safe Web surfing that would be distributed free to all parents, and by the end of the year! The story suggested that W3C would be undermining the market for child-protection software. Although it ran in a small, local paper, that paper belonged to a syndicated news wire, and, unbeknownst to me, the story showed up all over the place, even internationally.

The next afternoon, still unaware of the article, I got a phone call from *Market Wrap*, a fast-paced daily financial program on CNBC. They asked me if I would answer a few questions for the evening's program. Acting on the mistaken believe that all publicity is good publicity, I agreed.

I went down to the basement of a local television studio, where I was going to be hooked up so I'd appear to viewers as a guest in a window on the television screen. There I sat, in this gray windowless box of a room, waiting for the slot to come on the air. There was an unmanned camera pointing at me, and a television monitor that showed the program in progress. My rising unease with the situation suddenly spiked when I heard the anchor break in and say, "We'll be back in a few minutes with Tim Berners-Lee, and his plans to control the Internet."

From there it only got worse. When the anchor came back to start the segment with me the monitor went blank. I tried to concentrate on the anchor's voice in my ear and the camera in front of me, with no visual clues as to what was going on. Suddenly, they cut me in. The anchor's first words were: "Well, Tim Berners-Lee, so you actually invented the World Wide Web. Tell us, exactly how rich are you?"

Clearly, the fine points of PICS were not what they were after. I was flummoxed. They were annoyed, then eager to hustle me off as the milliseconds fled by. My debut as a talking head was a disaster. Since then, I have not been eager to return to live television. The next day, as the botched news-wire article made ever-wider rounds, there was a large outcry from software companies that we were undercutting their market by (supposedly) releasing competitive products for free. We fought a hard rearguard action to explain how the story was totally wrong. But this was a big headache we didn't need. I had learned how difficult it is to determine what a reporter does and does not understand, and how vital it is to get one's story across in no uncertain terms. I had also learned the fundamental truth about life at W3C: We never would know when it would be a quiet day or when the phone would be ringing off the hook.

More companies from Japan and the Pacific Rim were joining the consortium, enough so that there was a need for an Asian host.

Keio University in Japan filled the bill, becoming our third host institution, with Professor Nobuo Saito as associate chair and Tatsuya Hagino as associate director for Japan. Suddenly, finding a good time for global telephone conferences became even more difficult.

The Web industry was growing. The browser companies such as Netscape were broadening into server software, and Web intranets for corporations. Hundreds of large companies, from Chrysler to Federal Express, were starting Web operations. Conventional groupware products, such as Lotus Notes, which had been taken over by IBM, were reconfigured so they could be accessed with a browser and used to create a Web site.

Through the consortium's work, HTML steadily became more robust. We built on various early work, such as Dave Raggett's handling of tables and figures in his Arena browser, Marc Andreessen's handling of images embedded in the text of Mosaic, and style sheets for different fonts and formatting that Håkon Lie had championed since the early days and taken far beyond the crude form in my original browser on the NeXT, as well as new innovations. By mid-1997 Web sites routinely carried beautiful photographs, animated graphics, tabular information, audio, and order forms. Hypertext glued them all together in a multimedia sensation. Though less visible, development of better servers was advancing just as quickly.

By autumn, Microsoft's Internet Explorer had garnered a third of the browser market. But the company turned heads when it began to promote its new operating system, Windows 98, scheduled for release in the spring of 1998. According to Microsoft, this new version would include an upgraded browser, Explorer 4.0. The browser would no longer be a program that came bundled with the system's software, but would be an integrated part of the operating system, one and the same with the program that ran the Windows desktop. This piqued the interest of the U.S. Department of Justice. The DOJ had investigated Microsoft a few years

earlier on potential antitrust violations. It had more recently issued a consent decree that forbade tight product integration. Was Explorer 4.0 truly integrated, or just another bundle?

U.S. Attorney General Janet Reno announced that the Justice Department would take Microsoft to court, on charges of violating the decree. Investigations, injunctions, and hearings would extend the case into 1999.

Whatever the merits of the Department of Justice case, integrating a browser with an operating system was connected with the consistency of user interface for local and remote information. Back at the Boston Web conference in December 1995, I had argued that it was ridiculous for a person to have two separate interfaces, one for local information (the desktop for their own computer) and one for remote information (a browser to reach other computers). Why did we need an entire desktop for our own computer but get only a window through which to view the entire rest of the planet? Why, for that matter, should we have folders on our desktop but not on the Web? The Web was supposed to be the universe of all accessible information, which included, especially, information that happened to be stored locally. I argued that the entire topic of where information was physically stored should be made invisible to the user. This did not, though, have to imply that the operating system and browser should be the same program.

The Justice Department wasn't concerned with the merits of software design. The question it raised was whether or not Microsoft was using its market dominance to destroy competition. By including the browser with Windows 98, it maintained, the company effectively eliminated any reason for anyone to purchase Netscape Navigator.

In January 1998 Netscape made a surprise move reminiscent of the original Internet ethos: Rather than just giving away the compiled code for its browser, it said it would make all the source code—the original text of the programs as written by the

programmers—completely public. This *open source* policy meant that anyone promoting a new technology could create their own version of Navigator for it. It meant that any student doing research or simply a class project could create his or her own versions of specific parts of the browser, and regenerate Navigator with his or her own ideas built in. It meant that anyone who was infuriated by a Navigator bug that Netscape didn't fix could fix it themselves, and send the fix to Netscape if they wanted, for future versions. The open release would allow thousands of people to improve Netscape's products. Microsoft was bigger than Netscape, but Netscape was hoping the Web community was bigger than Microsoft.

The Netscape and Microsoft stories made for dramatic reading, so they were the constant focus of the press. But they were only a small part of the Web story. By its nature, the work at the consortium took a much lower profile, but it stuck to the evolving technology. The Web is built on technical specifications and smooth software coordination among computers, and no marketing battle is going to advance either cause.

By the end of 1998 the consortium had produced a dozen Recommendations. W3C's technical strength was broader. There were more than three hundred commercial and academic members worldwide, including hardware and software vendors, telecommunications companies, content providers, corporate users, and government and academic entities. Advisory Committee meetings had moved from meeting rooms to a large auditorium, with questions coming from attendees standing at microphones posted in the aisles.

The consortium has learned how to let the outside world put pressure on a member that may not be acting in an open manner. We produce Recommendations—not Standards or regulations— and we have no way to require anybody to abide by them. But journalists can look at a company's statements about openness

and compliance, then check its newest product to see if the company is delivering on those promises. Vendors are driven by buyers, and buyers are largely driven by the press, which can lay into anybody it feels is playing a game. The consortium, the press, and the user community all work as part of a cycle that helps the public make reasonable judgments about how honest a company is being with them.

One of the major technical advances to come from the consortium is a simpler language to supersede SGML, called XML—the Extensible Markup Language. Like SGML, XML is a base for defining languages like HTML. Dan Connolly, a Web architect from early days, had an understanding of the SGML tradition. Jon Bosak came from a tradition of SGML in ISO committees but saw that the Web needed something cleaner. They formed the nucleus of what had seemed such a remote hope when Dale Dougherty had muttered, "We can change it," in that Edinburgh pub.

The XML revolution that followed has been greeted with great enthusiasm, even by the SGML community, since it keeps the principles of SGML in place. When Tim Bray, editor of the XML specification, waved it at the attendees at the WWW6 conference in April 1997, he was greeted with applause—because the spec was thin enough to wave. XML has gone on to become one of the most widely known of W3C's activities, and has spawned books, conferences, and a nascent XML software industry.

The consortium has also developed its own set of advanced Web tools, which we use to test proposed technology as it is brought to the group. It tries to use its limited resources to develop at the leading edge where others have not yet ventured. We can't do this all the time, but we have some pretty good minds at work, and good links with all the major companies and universities.

In 1996 we negotiated the right to the Grif code from INRIA and renamed it "Amaya." It is designed completely around the idea of interactively editing and browsing hypertext, rather than

simply processing raw incoming HTML so it can be displayed on the user's screen. Amaya can display a document, show a map of its structure, allow the viewer to edit it, and save it straight back to the Web server it came from. It is a great tool for developing new features, and for showing how features from various text-editing programs can be combined into one superior browser/editor, which will help people work together. I switched from AOLpress to Amaya.

One Web server we use is Apache. When NCSA was developing Mosaic, they called me at one point and asked if I would mind if they made a server. My policy, of course, was that I wanted as many people as possible writing Web software, so I said, "Of course, go right ahead." What they meant, but left unsaid, was that they'd be writing another server that would be competing for "market share" with the server I had written. But NCSA's subsequent development slowed down, so a bunch of people from all over the Net got together to create "patches" for NCSA's server, and the result, Apache, became a server in its own right. It was maintained by a distributed group of people on the frontier of Web development, very much in the Internet style. Apache to this day has a huge number of users, and is a powerful and flexible server system—again, a tremendous testimony to the whole idea of open-source software.

We use Apache as our main server that is accessible to the public. We use our open source "Jigsaw" server for collaborative editing of all kinds of documents, from W3C Recommendations to our meeting minutes. Jigsaw is a Java-based server, originally written for the consortium by Anselm Baird-Smith, a slight, enthusiastic French wizard who can write code at lightning speed. Anselm wrote Jigsaw initially as background exercise to help him get used to Java and HTTP. In the two months before he actually joined the consortium staff he had already rewritten it four times. Jigsaw allows members and staff to read and write documents back and forth, and to keep track of all changes

behind the scenes. Jigsaw has had great success as a development and test platform among the Java and HTTP cognoscenti, because the server is so flexible.

Written into the consortium's constitution is the stipulation that all the software it produces in support of its work be available to the public. This is a way of promoting recommendations, discussion, and experimentation. It allows anyone to join in the testing of new protocols, and allows new companies to rapidly get into the swing of Web software creation. All anyone has to do is go to the consortium's site, www.w3.org, and download these tools for themselves.

The consortium's world does sometimes fill up with politics—industrial and governmental. Companies occasionally make technical statements for commercial reasons. Marketers tamper with the facts and confuse the public as they fence with the others in the field. But underneath, the consortium's members are still pursuing exciting technological advances. Engineers move from company to company, sometimes with projects their employers are abandoning due to lack of understanding, sometimes leaving a trail of claims to their ideas made by each place where they worked. The web of life continues to grow in all this activity. And despite commercial pressures, the technical ideas, the consortium's principles, and the social motivations behind them continue to hold center stage.