W3C

WORLD WIDE WEB
consortium
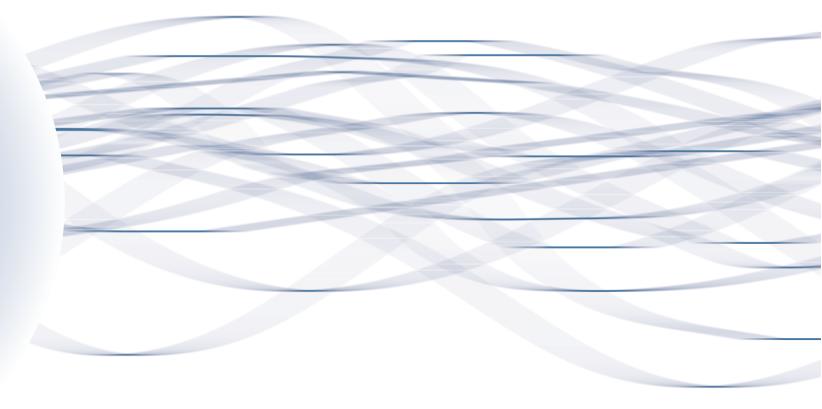
Leading the Web to its Full Potential

"*The Consortium is pivotal in ensuring that the World Wide Web advances communications and serves cultures around the globe.*"

— Nobuo Saito, Dean and Professor of Environmental Information, Keio University

W3C

THE WEB AND THE INTERNET: REVOLUTIONIZING INFORMATION SHARING AND ACCESSIBILITY

The Internet: the world's largest computer network

In 1969, the U.S. Department of Defense's Advanced Research Projects Agency (DARPA), established the Internet as a way to connect the many military, university, and defense contractors working on its projects. ARPANet was designed to use decentralized networking. This allowed the network to grow extremely quickly and to survive isolated computer failures.

In the mid-1980s, the National Science Foundation (NSF) developed its own network, NSFNet, to be used for scholarly research at colleges throughout the United States. NSFNet however, also offered students and faculty new ways to collaborate with their peers. Before long, email, newsgroups, and public file servers sprouted, computer lines became overloaded, and the Internet was flourishing. Since then, the Internet's continued growth has been phenomenal to say the least. Today it spans the globe, even Antarctica, and recent estimates place the number of users at more than 60 million people.

> *An essential power of the Web is that when you put something on it and when you make a link to it, anyone authorized can follow that — no matter what computer, network connection, or software they are using.*
> — Tim Berners-Lee, Director

The World Wide Web: simplified and universal access to the Internet

The World Wide Web, commonly referred to as the "Web," was first conceived in 1989 by Tim Berners-Lee as a project to improve collaboration between researchers at CERN (the European Laboratory for Particle Physics in Geneva, Switzerland). The Web was devised as a seamless model in which all information on the Internet could be accessed in an extremely simple and consistent manner — from any computer, in any country, by any authorized user.

Although the Web soon spread outside the halls of the CERN research laboratories, it didn't really take off until late 1992. Its sudden success was due, in part, to the popularity of Mosaic, a graphical browser created by NCSA (National Center for Supercomputing Applications). Today, the Web is the most popular and fastest growing information system deployed on the Internet, representing more than 80% of its traffic.

The World Wide Web Consortium: the leader in global Web evolution and interoperability

The rapid growth of the Web made it difficult for CERN to continue to oversee and coordinate the entire network. It became clear that the Web had outgrown its beginnings in the physics community. By October 1994, the independent World Wide Web Consortium (W3C) was founded at MIT in collaboration with CERN and with seed funding from DARPA and the European Commission. From the beginning, Director Tim Berners-Lee has been committed to developing a neutral, open forum for the evolution of Web technology, a mission reflected by today's 250-plus-Member global Consortium.

W3C: UNIQUELY POSITIONED TO LEAD THE EVOLUTION OF THE WORLD WIDE WEB

Leading the World Wide Web's evolution means staying ahead of a significant wave of applications, services, and social changes. For W3C to effectively lead such dramatic growth — at a time when a "Web Year" has shortened to a mere three months — it must demonstrate exceptional agility, focus, and diplomacy. To this end, the Consortium fulfills a unique combination of roles traditionally ascribed to quite different organizations.

Like its partner standards body, the Internet Engineering Task Force (IETF), W3C is committed to developing open, technically sound specifications backed by running sample code. Like other information technology consortia, W3C represents the power and authority of hundreds of developers, researchers, and users. Hosted by research organizations, the Consortium is able to leverage the most recent advances in information technology.

Host Institutions

W3C was formally launched in October 1994 at the Massachusetts Institute of Technology's Laboratory for Computer Science (MIT LCS). Moving beyond the Americas, the Consortium established a European presence in partnership with France's National Institute for Research in Computer Science and Control (INRIA) in April 1995. As the Web's influence continued to broaden internationally, the resulting growth in W3C Membership created the need for an Asian host. In August 1996, Keio University in Japan became the Consortium's third host institution.

Members

The Consortium's real strength lies in the broad technical expertise of its Membership. W3C currently has more than 250 commercial and academic Members worldwide, including hardware and software vendors, telecommunications companies, content providers, corporate users, and government and academic entities.

W3C provides a vendor-neutral forum for its Members to address Web-related issues. Working together with its staff and the global Web community, the Consortium aims to produce free, interoperable specifications and sample code. Funding from Membership dues, public research funds, and external contracts underwrite these efforts.

The Consortium's Advisory Committee (AC) is comprised of one official representative from each Member organization who serves as the primary liaison between the organization and W3C. The Advisory Committee's role is to offer advice on the overall progress and direction of the Consortium.

> **"** *W3C's hope is to become a truly global organization with an ever-expanding and wide-reaching membership. Our goal is to further the Web's evolution as a robust, scalable, and adaptive infrastructure; as a platform for the application of computation to knowledge; and as a human communications medium — all while preserving its universal interoperability.* **"** — Jean-François Abramatic, Chairman

Staff

W3C is led by Director Tim Berners-Lee, creator of the World Wide Web; and Chairman Jean-François Abramatic. With more than 30 years' combined expertise in a wide array of computer-related fields, including real-time communications, graphics, and text and image processing, Berners-Lee and Abramatic are well prepared to lead the Consortium's efforts in spearheading the global evolution of the Web.

The Consortium's technical staff includes full- and part-time employees, visiting engineers from Member organizations, consultants, and students from more than 13 countries worldwide. W3C staff works with the Advisory Committee, the press, and the broader Web community to promote W3C's agenda.

Recommendation Process

Specifications developed within the Consortium must be formally approved by the Membership. Consensus is reached after a specification has proceeded through the review stages of Working Draft, Proposed Recommendation, and Recommendation. As new issues arise from Members, resources are reallocated to new areas to ensure that W3C remains focused on topics most critical to the Web's interoperability and growth.

Domains

Leading the evolution of technology as dramatically in flux as the World Wide Web is a challenging task indeed. W3C is a unique organization, well adapted to today's fast-paced environment. Its mission is to lead the Web to its full potential: as an elegant machine-to-machine system, as a compelling human-to-computer interface, and as an efficient human-to-human communications medium. In order to achieve these goals, W3C's Team of experts works with its Members to advance the state of the art in each of the four Domains: Architecture, User Interface, Technology & Society and The Web Accessibility Initiative. Each Domain is responsible for investigating and leading development in several Activity areas which are critical to the Web's global evolution and interoperability.

See pages 8-15 for more information on each of the Consortium's four Domains and the Activities within each.

Tim Berners-Lee
W3C Director
Principal Research Scientist, MIT LCS

Joined W3C
September 1994

Responsibilities
Oversees all activities within the Consortium

Education
B.A. in Physics, Queen's College at Oxford University, England

Honorary degrees from the Parsons School of Design (D.F.A., 1996), Southamptom University (D.Sc. 1996) and University of Essex (D.U. Essex)

Related positions
1987-1994: Inventor of the World Wide Web (1989) while a staff member at CERN, continued to develop Web and defined HTML, HTTP, and URLs

1984 -1987: Fellowship at CERN

Awards
Distinguished Fellow of the British Computer Society

Recipient of 1997 Duddell Medal of the Institute of Physics

Recipient of 1996 ACM Kobayashi Award

Recipient of 1996 IEEE Computer Society Wallance McDowell Award

Co-recipient of 1996 Computers and Communication (C&C) Award

Co-recipient of 1995 ACM Software Systems Award

Jean-François Abramatic
W3C Chairman

Joined W3C
April 1995

Responsibilities
Spearheads the Consortium's strategic direction

Education
Ph.D. in Computer Science, University of Paris VI

M.S. in Engineering, Ecole des Mines, Nancy, France

Related positions
1992 -1996: Director of Development, INRIA

1989 -1992: Chairman and Chief Executive Officer, a start-up X Window terminal company

Other activities
General Chairman of the Fifth International World Wide Web Conference, held in Paris in May 1996

Holds two patents and has authored more than 40 papers in journals and conferences

Nobuo Saito
W3C Associate Chairman and Dean of the Faculty of Environmental Information at Keio University

Joined W3C
September 1996

Responsibilities
Associate Chairman of W3C

Education
Ph. D. in Computer Science, University of Tokyo

M. Eng. in Mathmatical Engineering and Instrumentation, University of Tokyo

Related positions
1995 - Present: Dean, Faculty of Environmental Information, Keio University

1990 -1995: Professor, Faculty of Environmental Information, Keio University

1978 -1990: Professor, Faculty of Engineering, Keio University

Other activities
ISO/IEC SC22/WG15(POSIX), the head of Japanese delegation

The Chairman of AOW (Asia Oceania Workshop)

Actively involved in several projects including development of multimedia platform, campus networks, etc.

Alan Kotok
W3C Associate Chairman and Acting Technology & Society Domain Leader

Joined W3C
May 1997

Responsibilities
Membership recruitment and relations
W3C Site Management at MIT

Education
M.B.A. Clark University, Worcester, MA

B.S. and M.S. in Electrical Engineering, MIT, Cambridge, Massachusetts

Related positions
1996 - 1997: V.P. Marketing, GC Tech, Inc.

1962 - 1997: Corporate Consulting Engineer, Digital Equipment Corp.

1994 -1996: W3C AC Representative, Digital Equipment Corp.

Other activities
Member of Science Advisory Board, Cylink Corp.

Consultant: Digital Equipment Corp.

Vincent Quint
W3C Deputy Director for Europe and User Interface Domain Leader
Research Director, INRIA

Joined W3C
February 1996

Responsibilities
Assists Director with the Consortium's European operations

Chair of Hypertext Coordination Group

Coordinates all activities within the User Interface domain

Education
Ph.D., in Computer Science, University of Grenoble, France

M.S. in Engineering, University of Grenoble, France

Related positions
1990 -1996: Leader, Project Opera, INRIA

1980 -1990: Project Manager, Structured Documents Project

Other activities
Member of several committees, including the Electronic Publishing (EP) Series of Conferences

Actively involved in the design and development of various systems, including Grif, Thot, and Tamaya

W3C Executive Man

Dan Connolly
W3C Architecture Domain Leader

Joined W3C
March 1995

Responsibilities
Coordinates all activities within the
  Architecture Domain
Chair of HTML Working Group

Education
B.S. in Computer Science,
  University of Texas, Austin

Related positions
1994 - 1995: Software Engineer,
  Hal Software Systems
1993 - 1994: Software Engineer,
  Dazel (formerly Atrium)
1990 - 1993: Software Development
  Engineer, Convex

Other activities
Editor of Issue 2 of *The World Wide
  Web Journal*
Editor of HTML 2.0 specification
Editor of *World Wide Web Journal* Vol. 2
  — XML: Principles, Tools, and
  Techniques

Judy Brewer
*Director, Web Accessibility Initiative
International Program Office*

Joined W3C
September 1997

Responsibilities
Oversees all activities within the Web
  Accessibility Initiative
Directs Web Accessibility Initiative
  International Program Office

Education
Management Certificate, Boston
  University Corporate Education Center
Graduate Certificate, Technical Writing,
  Northeastern University
M.A. in Teaching ESL, University of
  Massachusetts, Boston
B.A. Independent Concentration in
  Applied Linguistics, Princeton
  University

Related positions
1990 - 1997: Project Director,
  Massachusetts Assistive Technology
  Partnership

Other Activities
Chair of RESNA Tech Act SIG,
  1996 -1997
Co-chair of Compliance and
  Coordination Subcommittee of the US
  Telecommunications Access Advisory
  Committee, 1997
Co-chair of Steering Committee forming
  the Association of Access Engineering
  Specialists, 1997-1998

Tatsuya Hagino
*W3C Deputy Director for Asia
Associate Professor, Keio SFC*

Joined W3C
September 1997

Responsibilities
Assists Chairman and Director with the
  Consortium's Asian operations

Education
Ph.D. in Computer Science, University
  of Edinburgh, Scotland
M.S. in Mathematical Sciences, Kyoto
  University, Japan

Related positions
1993-1996: Associate Professor,
  Keio University
1990 - 1993: Lecturer, Keio University
1987 - 1990: Assistant Professor, Kyoto
  University

Other activities
Actively involved in several system
  projects, including the next generation
  micro kernel project and multimedia
  network education project
Member of SFC's steering committee

Daniel Dardailler
*Web Accessibility Initiative
Technical Activity Lead*

Joined W3C
July 1996

Responsibilities
WAI Project Manager
W3C Site Manager at INRIA
  Sophia - Antipolis

Education
Ph.D. Computer Sciences, University
  of Nice, France
Master Computer Sciences, University
  of Grenoble, France
B.S. Math Physics, University of
  Marseille, France

Related positions
1994 -1996: Software Architect,
  X-Window Consortium
1990 - 1994: Principal Engineer
  The Open Software Foundation
1986 -1990: Research Fellow, Bull
  Research Center

Other activities
Lecturer and teacher of computer
science at engineering cchools and uni-
versities internationally for more
than ten years

Sally Khudairi
Head of Communications

Joined W3C
April 1996

Responsibilities
Oversees global marketing, public
  relations and communications initiatives
Facilitates Member relations
Manages W3C Website and Webmaster
  activities

Education
B.S. in Art and Architecture,
  Northeastern University, Boston
Graduate Studies: Harvard University
Graduate School of Design, Tulane
University, Boston Architectural Center

Related positions
1989 - 1996: Consultant, multidisciplinary
  and interactive design, corporate
  imaging and branding, marketing
  communications, project management
  and global joint venture mitigation

Other activities
W3C Track Manager for the
  International World Wide Web
  Conference series
Frequent presenter on new media
  technologies, Website design and
  imaging strategy

agement

A GLOBAL PARTNERSHIP

W3C WORLD WIDE WEB *consortium*

W3C is an international industry-supported consortium, jointly hosted by three institutions: the Massachusetts Institute of Technology's Laboratory for Computer Science — MIT LCS (Americas); the National Institute for Research in Computer Science and Control — INRIA (Europe); and Keio University (Asia). All three hosts work together to provide vendor-neutral leadership in the evolution of the Web, including designing, developing, and promoting common technical standards.

MIT Laboratory for Computer Science (LCS)

Massachusetts Institute of Technology (MIT) is a major U.S. research university in Cambridge, Massachusetts. Its Laboratory for Computer Science (LCS), now in its third decade, conducts a broad research program in information science, from the development of information infrastructures like the World Wide Web to understanding the theories that underlie computer science. The LCS is dedicated to the invention, development, and understanding of information technologies expected to drive substantial technical and socio-economic change.

The National Institute for Research in Computer Science and Control (INRIA)

The National Institute for Research in Computer Science and Control (INRIA) is a French public-sector scientific institute. INRIA is made up of five Research Units located at Rocquencourt (near Paris), Rennes, Sophia Antipolis, Nancy, and Grenoble. INRIA's main assignments include transferring research results to industry and conducting both fundamental and applied research. Areas of current research include information processing, advanced high-speed networking, structured documents, and scientific computation.

Keio University

Keio University, one of Japan's oldest private universities and foremost computer science research centers, has five major campuses around Tokyo. In 1990, the University opened Shonan Fujisawa Campus and two new faculties including the Faculty of Environmental Information. At that time, Keio began to focus on next generation education, research on fundamental information technology, and global solutions in the advanced information society. Shonan Fujisawa Campus, as well as Keio's other campuses, promotes joint research projects in cooperation with industry, government, and international organizations. Keio is currently one of the world's leading research centers for network and digital media technology.

To enhance the communication between W3C and the Web community, W3C has opened W3C Offices covering specific geographical areas. W3C Offices are the first point of contact between the Consortium and its Membership, as well as the general public in their corresponding region. CLRC-RAL has been established as the first W3C Office, covering the United Kingdom. Other Offices being launched in 1998 include GMD (Forschungszentrum informationstechnik) in Germany, CWI (Centrum voor Wiskunde en Informatica) in the Netherlands, SICS (Swedish Institute of Computer Science) in Sweden, and FORTH (Foundation Of Research and Technology) in Greece.

The Central Laboratory of the Research Councils - Rutherford Appleton Laboratory (CLRC-RAL)

The facilities and expertise of the Central Laboratory of the Research Councils, one of Europe's largest multidisciplinary research support organisations, support the work of more than 12,000 scientists and engineers from around the world, both in universities and in industry. Operating from three sites - Daresbury Laboratory in Cheshire, Rutherford Appleton Laboratory in Oxfordshire, and Chilbolton Observatory in Hampshire - CLRC supports research projects in a wide range of disciplines, and actively participates in collaborative research, development and technology transfer projects. The Laboratory has some 1,800 staff and a turnover in excess of £90m.

Forschungszentrum Informationstechnik (GMD)

GMD conducts research in Informatics, Communication, and Media. Its headquarters, in Sankt Augustin near Bonn, are housed in Birlinghoven Castle. Its research institutes are in Sankt Augustin, Darmstadt, and Berlin. It is funded mainly by the Federal Republic of Germany (BMBF ministry) and the Länder Berlin, Nordrhein-Westfalen, and Hessen. GMD is a member of the Hermann von Helmholtz Association of German Research Centers (HGF).

Centrum voor Wiskunde en Informatica (CWI)

CWI is the National Research Institute for Mathematics and Computer Science in the Netherlands. The mission of CWI is twofold: to perform frontier research in mathematics and computer science; to transfer new knowledge in these fields to society in general and trade and industry in particular CWI is funded for 70 percent by NWO, the National Organisation for Scientific Research. The remaining 30 percent is obtained through national and international programmes and contract research commissioned by industry.

The Swedish Institute of Computer Science (SICS)

SICS, is a non-profit research foundation. The objects are to contribute to the competitive strength of Swedish industry by carrying out advanced research in selected areas of Computer Science on one hand, and actively promoting use of new ideas and results in industry on the other hand. SICS personnel is also engaged in education at Swedish universities. The core of the research at SICS (one third) is financed by NUTEK, the Swedish National Board for Technical and Industrial Development.

Foundation for Research and Technology (FORTH)

FORTH, the Institute of Computer Science (ICS) is one of seven research institutes constituting the Foundation for Research and Technology - Hellas, a center for research and development monitored by the Ministry of Industry, Energy and Technology of the Greek Government. Since its establishment in 1983, ICS-FORTH conducts applied research, develops applications and products, and provides services. The main objective of ICS-FORTH is to contribute to the development of the Greek Informatics industry, through the provision of services and the development of applications, and to facilitate the use of Information Technology and Telecommunications in both the private and the public sectors.

W3C Architecture

ARCHITECTURE:
ENHANCING THE
INFRASTRUCTURE
OF THE WEB AND
INCREASING ITS
AUTOMATION

The Architecture Domain is responsible for leading W3C efforts to maintain the seamless and simplified integration of the globally distributed information space known as the Web. The Domain focuses on automating information exchange so that users are insulated from the technical details of the Web's machine-to-machine communication.

DOMAIN ACTIVITIES:

Hypertext Transfer Protocol (HTTP)

As HTTP traffic has come to dominate the Internet, remedying the weaknesses of the protocol have become critical. W3C has worked with the Internet Engineering Task Force (IETF) to develop evolutionary refinements of HTTP. Work has culminated in HTTP/1.1, which is currently an IETF Proposed Standard scheduled to become an IETF Draft Standard in Spring 1998. HTTP/1.1 allows the processing of multiple outstanding requests on a single TCP connection, facilitates caching, and allows a single IP address to serve multiple Web sites, thus alleviating pressure on the dwindling pool of IP addresses.

XML

XML - the eXtensible Markup Language - is a simple and very flexible language based on SGML. Although originally conceived to meet the challenges involved in large-scale publishing, XML is set to play an increasingly important role in the markup of a wide variety of data on the Web. Not only will XML help people find the information they want, but the wealth of XML metadata on the Web - information about information - will help many Web-based applications.

Widespread support for HTML will ensure its continuing popularity, but for different kinds information - customer data, bibliographic details, cataloging, scientific data, document databases, to name a few - XML will come into its own. Designed and written by the W3C XML Working Group, the syntax of the XML language is now defined in detail. XML 1.0 became a W3C Recommendation in February 1998 and has already attracted much attention from the press.

Synchronized Multimedia

The Web is fast-evolving beyond the limits of simple pages of text and images. W3C is focussing on the design of a new language for scheduling multimedia presentations where audio, video, text and graphics are combined in real-time. Synchronized Multimedia Integration Language (SMIL), enables authors to specify what should be presented when. You can, for example, control the precise time that a sentence is spoken and make it coincide with the display of a given image.

HTTP - The Next Generation

As HTTP has developed, the request for extensions and new features has exploded;

8

> *The challenge is to find the right mix of reliability and flexibility and the right mix of tried-and-true techniques with novel but promising ideas.*
>
> — Dan Connolly, Architecture Domain Leader

stretching the initial design to its limits. The purpose of the HTTP-NG Project is to design a prototype of the new generation of the HTTP protocol by using sound engineering practices: modularity, simplicity and layering. The task of the Project is to design, implement, and test a new architecture for the HTTP protocol based on a simple, extensible distributed object-oriented model.

A key part of development work is the characterization of the Web, involving measurement and analysis of the system in real life, work that will help in designing the new protocol and an understanding of how to manage a smooth phase in.

Addressing (URLs)

The Web is "the universe of network-accessible information." Its foundation is the specification of a universal address space. The Consortium continues to facilitate consensus about the evolution of URLs and stimulate development of innovative naming and resolution techniques.

SAMPLE CODE
Jigsaw

Jigsaw is the Consortium's Java-based Web server. With a modular architecture and full HTTP/1.1 compliance, Jigsaw is a premier experimental platform for W3C and the Internet community. The server uses an object-oriented approach when it comes to the storage of files and the processing of incoming requests, making it both more efficient and easily extensible.

Libwww

W3C's libwww is a mature cross-platform software library supporting the most common Web protocols, and well-suited for building a wide variety of applications: clients, servers, robots and more. Recent work on libwww has focussed on a record breaking high performance implementation of HTTP/1.1, with persistent connections, pipelining, smart output buffering, and persistent caching. W3C is now looking for volunteers to either help with or to take over the maintenance and development of libwww and associated tools that demonstrate how to use the library.

About W3C's Architecture Team

W3C has assembled an outstanding team of technical experts to lead the evolution of Web Architecture. Dan Connolly builds upon his extensive experience in distributed information systems and formal methods to lead his seven-member team. The team uses its knowledge in protocol design and distributed systems to spearhead work in a number of key areas, including object oriented programming, real-time multimedia, and wireless communications.

9

W3C User Interface

DOMAIN ACTIVITIES:

USER INTERFACE: IMPROVING THE TECHNOLOGY THAT ALLOWS WEB USERS TO EFFICIENTLY PERCEIVE AND EXPRESS INFORMATION

The User Interface Domain seeks to improve all user/computer communications on the Web. In particular, the Domain is working on formats and languages that will present information to users with more accuracy and a higher level of control.

Hypertext Markup Language (HTML)

HTML - the Hypertext Markup Language - is the lingua franca for publishing on the World Wide Web. Having gone through several stages of evolution, today's HTML has a wide range of features reflecting the needs of a very diverse and international community wishing to make information available on the Web. HTML 4.0, created by W3C, became a Recommendation in December 1997. It has many new features, particularly in the areas of accessibility, internationalization, multimedia and support for style sheets. W3C is currently collecting information on needs for future versions of HTML.

Style Sheets

Style sheets offer precise control over the presentation of Web pages. Not only can Web designers specify the visual effects they want, but aural style sheets give control over voice, pitch and other aspects of how the text will sound when rendered to speech. W3C continues to work with its Members, evolving the Cascading Style Sheets (CSS) language to provide even richer stylistic control, and to ensure consistency of implementation world-wide. For more complex publishing tasks, such as automatically producing a table of contents, and for converting documents written in XML into HTML for publication, W3C is developing the Extensible Style Sheets Language (XSL), which builds upon experience with CSS and DSSSL. A key goal is to ensure that W3C Recommendations all use a common underlying framework for style.

Document Object Model

The HTML publishing language allows authors to structure documents into headings, paragraphs, hypertext links and other component parts. W3C's Document Object Model (DOM) is a standard internal representation of the document structure and makes it easy for programers to access components and delete, add or edit their content, attributes and style. DOM offers a consistent programming interface for manipulating a document with programming languages such as Java and ECMAScript. A companion DOM for XML applications is similarly being defined.

Graphics

Graphics are an important part of the Web. W3C continues to work with its Members to improve graphical quality, decrease download times and improve interoperability. The Portable Network Graphics (PNG) format, issued as a W3C Recommendation in 1996, gives truecolor, real transparency and faster incremental display; it is now widely implemented in browsers and authoring tools.
Growing Member interest in a scalable 2D vector graphics format for the Web is likely soon to lead to W3C activity in this area. This will provide better printing of Web documents, will speed up downloads, adapt to different size screens and will work with style sheets.

> *"One of the greatest challenges for the future, especially in User Interface, is to keep the Web as simple as possible to use, while improving its functionality."*
>
> — Vincent Quint, User Interface Domain Leader

Internationalization

The Web was originally developed to enable people throughout the world to communicate with one another. The vision has now become reality. W3C is now committed to ensuring that everybody, not just speakers of Western European languages, get the best out of a truly World Wide Web. W3C's HTML 4, CSS2 and XML specifications are based on the Unicode character set with a repertoire of thousands of characters. This means that documents can be written in Devanagari, Hebrew, Cyrillic, Arabic and any number of other scripts, and can be displayed by browsers with access to the right fonts. The HTTP protocol can now carry information about character encoding and the human language of content, assisting browsers in their selection and display of documents.

Math

W3C has brought together key players to fill an urgent need for math on the Web. Out of this work has come the Mathematical Markup Language (MathML), a format enabling authors to present mathematical expressions on the screen, as well as forming the basis for machine to machine communication of math on the Web. Written in XML, MathML provides two sets of tags, one for the visual presentation of math and the other associated with the meaning "behind" equations. MathML is not designed for people to enter by hand but anticipates that specialized tools will provide the means for typing in and editing mathematical expressions. MathML 1.0 has recently been issued as a W3C Recommendation.

Fonts

Early browsers gave authors no control over the fonts used to display Web pages. Today's authors have greater expectations - they want to control the font family, size, and boldness of different parts of their Web pages. They are also writing for an international audience; their pages may require fonts and writing systems not installed in all browsers. Cascading Style Sheets (CSS1), issued as a W3C Recommendation in 1996, provided good control over whatever fonts were installed. CSS2 builds on this and adds WebFonts, which allow improved font substitution, font synthesis, and dynamic download of fonts over the Web.

SAMPLE CODE
Amaya

Amaya is W3C's own test-bed browser/editor. With the extremely fast moving nature of Web technology, Amaya plays a central role at the Consortium. Easily extended to integrate new ideas into its design, Amaya provides developers with many specialized features including multiple views, where the internal structural model of the document can be displayed alongside the browser's view of how it should be presented on the screen.

About W3C's User Interface Team

Currently eleven members strong, W3C's User Interface team brings together some of today's most respected innovators in Web design tools. Its representatives have considerable knowledge in markup languages, style sheets, graphics, fonts, and internationalization. The team is led by Vincent Quint, whose areas of expertise include electronic documents, document models, hypertext, and document production systems. The team also solicits external advice from leading experts in the field.

W3C Technology & Society

TECHNOLOGY & SOCIETY: UNDERSTANDING THE SOCIAL IMPACT OF THE WEB AND REACHING OUT TO AFFECTED COMMUNITIES

The explosive growth of technology has forced the entire Web community to look at society's ethical and legal issues from a new international perspective. The Technology & Society Domain seeks to understand these issues in light of new technology — partly by changing the technology, and partly by educating users about the technology's benefits, costs, and limits.

Metadata
Metadata is machine-understandable description of information on the Web. W3C's strong interest in metadata has prompted development of the Resource Description Framework (RDF), a language for representing the properties of HTML documents, images, fonts, downloadable code, and the relationships between them. RDF will play an important role in enabling a whole gamut of new applications, for example, the automation of many tasks involving bibliographic records, product features and terms and conditions. Metadata will facilitate searching, helping authors to describe their documents in ways that search engines, browsers and Web crawlers can understand.

Platform for Internet Content Selection (PICS)
The World Wide Web Consortium has developed a suite of specifications called PICS (Platform for Internet Content Selection) so that people can distribute information about the content of digital material in a simple, computer-readable form. Information can be given a "label" which computers can then process in the background, filtering out undesirable material or directing users to sites that may be of special interest to them. PICS was originally designed to allow parents and teachers to screen out materials unsuitable for children using the Internet. Rather than simply censoring the information itself, as various legislative bodies have suggested, PICS gives responsibility to users to control themselves, or to delegate control, of what they receive on their browsers.

Privacy
Users want to know whether they should entrust personal information to a given Web site. How does the site manage personal information? Will it disclose any of this information to others? What will the user get in return? W3C's Platform for Privacy Preferences Project (P3P) is working on a platform that allows users to be informed of a site's practices. Users, or software operating on their behalf, can then negotiate for a different privacy policy and come to an agreement with the site which is the basis for any subsequent release of information.

Digital Signature Initiative
Digital signatures are in essence the digital equivalent of string and sealing wax: they serve to identify the origin of a document and to ensure that the information has not

> *As the Web becomes pervasive in our global society, we have a duty to address the consequent social impact. Working with our Members and the international policy community, we develop and explain technological approaches to enhance the social value and mitigate the challenges raised with this new medium.*

— Alan Kotok, Acting Technology & Society Domain Leader

been tampered with en route. A single bit change in gigabytes of data can be detected. Digital signatures allow users to check that downloaded software has come from a reputable source, especially necessary for documents implying commitments such as contracts, price lists, manifests and press releases. The first W3C Recommendation on Digital Signatures, applying to the signing of PICS Labels, has now been developed. Future work will focus on RDF Metadata.

Public Policy Role

Cutting across nations and cultures, the Web attracts the attention of public policy makers from right across the globe. Indeed the Web is now at the center of a number of policy debates. While W3C is not a lobbying organization, a good understanding of this area is vital to promote the development of a network architecture that supports a wide range of policy options, encouraging all cultures to use the Web.

Additionally W3C can provide feedback to policy makers regarding what is technically possible, how effectively the technology can meet policy requirements, and any unintended consequences of proposed policies.

Electronic Commerce

The Web may very quickly become one of the primary places where businesses operate, with billions of dollars of goods and services bought and sold every year. W3C's interest in the development of the Web extends to commercial exchange, and the Consortium aims to understand the problems and support the development of solutions. To this end the Electronic Commerce Interest Group (ECIG) was created as a forum to discuss areas such as micropayments and electronic transaction protocols and also to advise the role that W3C should play in this field.

Security

Web Security issues range from system and network security, to authentication services and personal privacy concerns. W3C is involved in the development of several protocols designed to enhance Web security including the Digital Signature Initiative, the Platform for Internet Content Selection (PICS), and the Platform for Privacy Preferences (P3P). The Security Interest Group meets to share information on the state of Web security and to advise W3C on opportunities for Consortium efforts.

About W3C's Technology & Society Team

Drawing upon more then 30 years of systems experience, Alan Kotok is well equipped to lead this four-member group. The team has expertise in a number of areas, including electronic commerce, intellectual property rights, metadata, and public policy. Furthermore, the team has considerable knowledge about project management and multilateral Member development groups.

W3C Web Accessibility Initiative

THE POWER OF THE WEB IS IN ITS UNIVERSALITY. ACCESS BY EVERYONE REGARDLESS OF DISABILITY IS AN ESSENTIAL ASPECT.

The Web Accessibility Initiative (WAI), in coordination with industry leaders, disability organizations, research institutions and governments, seeks to ensure the accessibility of the Web through a multi-pronged approach ranging from technology, to education, outreach, and research and development.

DOMAIN ACTIVITIES:

WAI TECHNICAL ACTIVITY

The WAI Technical Activity encompasses three areas of work: Technology development, Guidelines and Tools. These areas are closely coordinated with the education and outreach, and research and development activities, of the WAI International Program Office.

Technology Development

The Web Accessibility Initiative reviews all W3C technical specifications to identify accessibility issues and makes recommendations to improve accessibility to these technologies.

The WAI contributed to the design of Hypertext Markup Language (HTML 4.0), Cascading Style Sheets: level 2 (CSS2) and Synchronized Multimedia Integration Language (SMIL) specifications. Some of the biggest improvements in accessibility will come as these specifications are implemented.

The HTML 4.0 Recommendation includes a number of features to increase the accessibility of Web pages. It makes a strong distinction between structure and presentation, fully integrating the use of style sheets for Web pages, and encouraging an approach to authoring that makes it easier for browsers to render documents into speech or Braille output.

Users relying on synthesized speech will welcome aural style sheets in CSS2, allowing for example, different inflections to be used for different parts of the document, and the stereo positioning of sound.

Guidelines

The Web Accessibility Initiative is developing three sets of guidelines: page author guidelines, guidelines for user agents (including browsers), and guidelines for authoring tools. For authors, practical tips and recommendations cover every aspect of making Web pages accessible. A checklist of good Web site design includes ways to test pages for accessibility.

Browser developers will benefit from their own set of WAI guidelines. These encourage implementation of an accessi

> *"W3C realizes the critical importance of the Web for people with disabilities, and is committed to increasing the accessibility of the Web."*
> — Judy Brewer, Director of the Web Accessibility Initiative International Program Office

ble user interface and recent improvements in Web technology in the area of accessibility.

Authoring tool guidelines will promote the automation of accessible page design.

Tools

The WAI will review existing accessibility evaluation tools and approaches, and coordinate prototyping or development work in the area of accessibility validation and tool prototypes.

WAI INTERNATIONAL PROGRAM OFFICE

The WAI International Program Office (IPO) enables partnering and coordination among the many stakeholders in Web accessibility: industry, disability organizations, government, and research organizations. The WAI IPO coordinates the education and outreach, and research and development work, of t he WAI, and promotes implementation of all areas of the WAI's work including the WAI Technical Activity's technology, guidelines and tool work.

Education and Outreach

Education and outreach to all sectors of the Web community tie together the WAI's developments in technology, guidelines and tools. The WAI Education and Outreach Working Group coordinates the development of curriculum modules, demonstration packages, workshops, and related materials to increase awareness of the need for and solutions to Web accessibility.

Research and Development

The WAI IPO will monitor research and development that could affect the future accessibility of the Web. This will include giving input into technologies that hold the promise of enhancing the future accessibility of the Web, as well as technologies that could create new barriers on the Web, to ensure that developers are aware of a universal design ("design for all") approach.

About W3C's Web Accessibility Initiative Team

As Director of the WAI International Program Office, Judy Brewer leads the growing WAI team. With a wealth of experience directing accessibility initiatives, and a broad-based understanding of the business benefits that accessible Web page design brings, Judy is well qualified to lead W3C's WAI efforts. Daniel Dardailler, formerly of the X-Consortium, manages the WAI Technical Activity. The WAI team bridges extensive knowledge of accessibility issues with technical and educational skills with an international focus.

15

W3C Membership

As a World Wide Web Consortium Member, your organization can participate in the collective voice of the global Web community. Member organizations gain access to W3C's technical expertise and can lead the evolution of innovative Web technologies in a neutral forum. There are already more than 250 Members: hardware and software vendors, content providers, telecommunications companies, corporate users, and government and academic entities.

Membership benefits
- A voting seat on W3C's Advisory Committee (AC)
- Participation in working groups, workshops, and symposia
- A voice in providing strategic direction to the Consortium
- Access to Members-only Web site containing information on events, technologies, software releases, working groups, forums, mailing lists, news, and announcements
- Members-only weekly news service containing updates on W3C activities; announcements for meetings, workshops, and conferences; calendar of events; and team information

How to become a Member
Membership in the World Wide Web Consortium is open to any organization that completes a Full or Affiliate Membership agreement. As described in W3C's Prospectus, http://www.w3.org/Consortium/Prospectus. Affiliate status is reserved for non-profit organizations and commercial firms with annual revenues under $50 million.

For more information about the World Wide Web Consortium and its Members, visit W3C's home page at http://www.w3.org/ or send email to membership@w3.org.
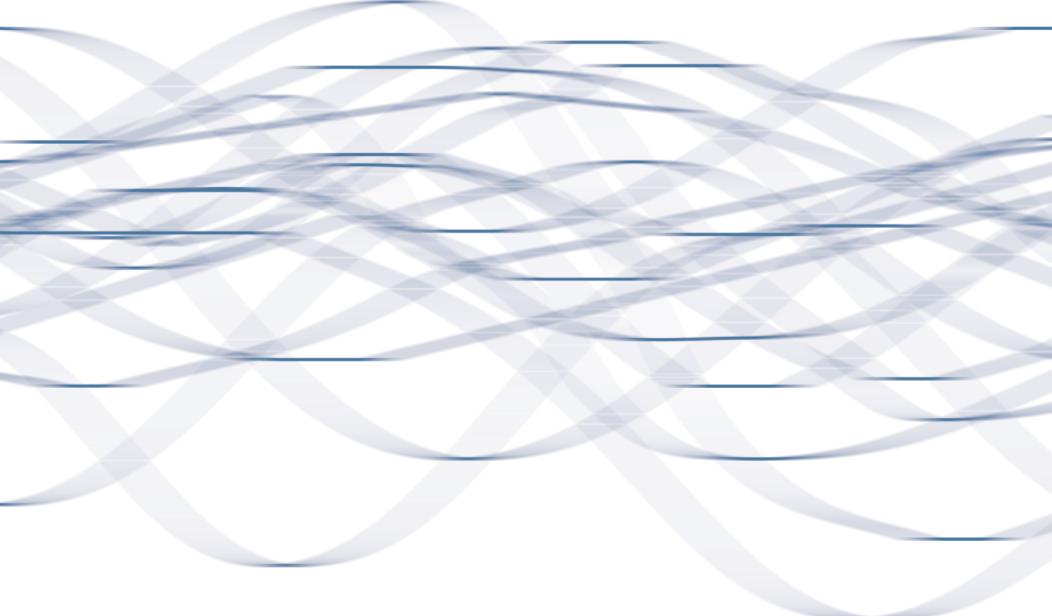
http://www.w3.org/

The Web community is made up of everyone who browses or puts information on the Web, who uses the Web as their workplace, who develops new products and services on the Web, who provides Internet access, and who has ideas about how to improve the Web... The Consortium is the neutral rock on which these parties can meet to agree on common specifications. W3C gains richness from the meeting of all these forces. — Tim Berners-Lee, Director

W3C