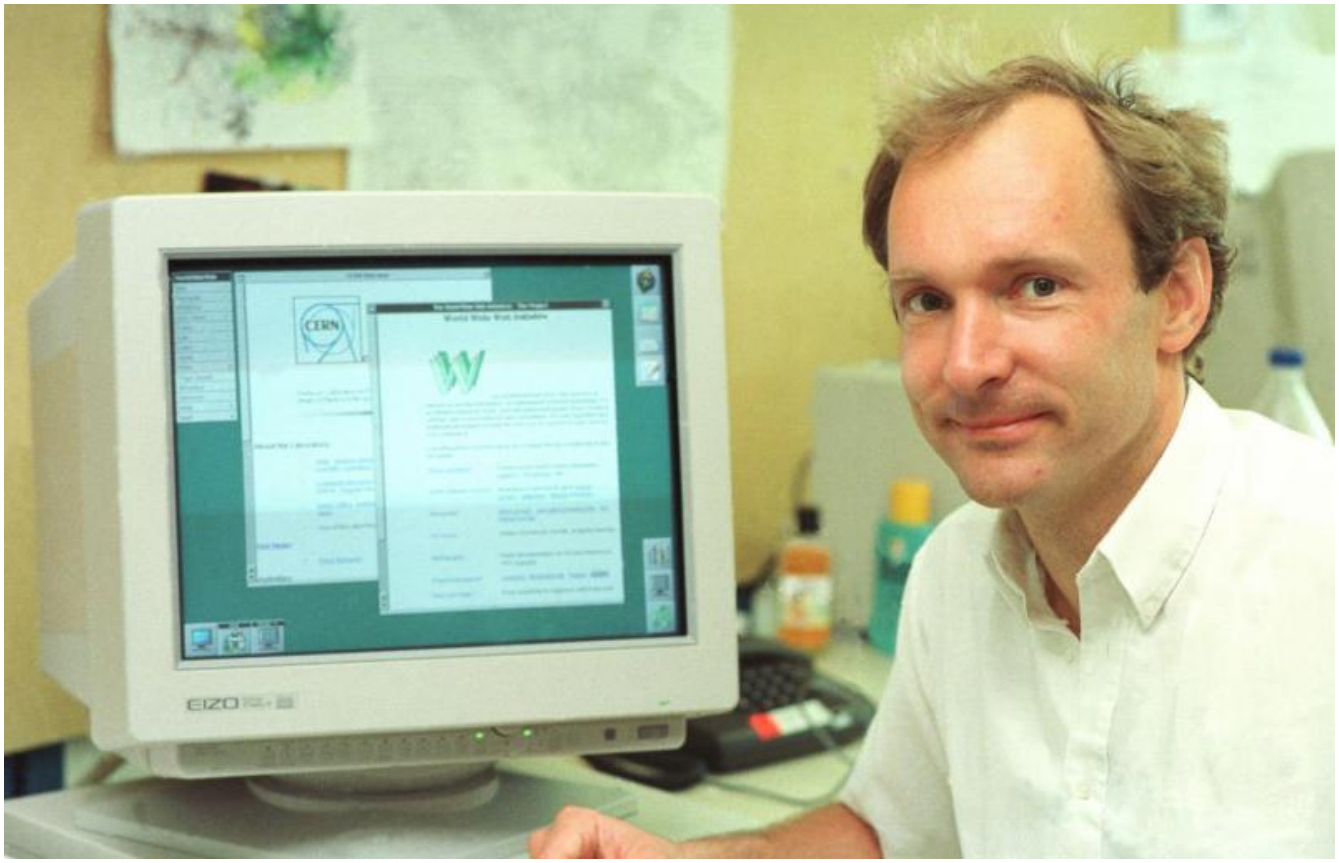
The birth of the web

The World Wide Web, invented at CERN in 1989 by British scientist Tim Berners-Lee, has grown to revolutionize communications worldwide



Where the web was born

Tim Berners-Lee, a British scientist at CERN, invented the World Wide Web (WWW) in

1989. The web was originally conceived and developed to meet the demand for automatic information-sharing between scientists in universities and institutes around the world.

CERN is not an isolated laboratory, but rather a focus for an extensive community that includes more than 10,000 scientists from over 100 countries. Although they typically spend some time on the CERN site, the scientists usually work at universities and national laboratories in their home countries. Good contact is therefore essential.

The basic idea of the WWW was to merge the technologies of personal computers, computer networking and hypertext into a powerful and easy to use global information system.

How the web began

Berners-Lee wrote the first proposal for the World Wide Web (http://www.w3.org/History/1989/proposal.html) [PDF (http://cdsweb.cern.ch/record/1405411/files/ARCH-WWW-4-010.pdf)] at CERN in 1989, further refining the proposal with Belgian systems engineer Robert Cailliau the following year. On 12 November 1990 the pair published a formal proposal outlining principal concepts and defining important terms behind the web. The document described a "hypertext project" called "WorldWideWeb" in which a "web" of "hypertext documents" could be viewed by “browsers”.

By the end of 1990, prototype software for a basic web system was already being demonstrated. An interface was provided to encourage its adoption, and applied to the CERN computer centre's documentation, its help service and Usenet newsgroups; concepts already familiar to people at CERN. The first examples (http://info.cern.ch/NextBrowser.html) of this interface were developed on NeXT computers.

Info.cern.ch (http://info.cern.ch) was the address of the world's first website and web server, running on a NeXT computer at CERN. The first web page address was

> http://info.cern.ch/hypertext/WWW/TheProject.html (http://info.cern.ch/hypertext/WWW/TheProject.html)

which centred on information regarding the WWW project. Visitors could learn more about hypertext, technical details for creating their own webpage, and even an

explanation on how to search the web for information. There are no screenshots of this original page and, in any case, changes were made daily to the information available on the page as the WWW project developed. See a later copy (http://info.cern.ch/NextBrowser1.html) (from 1993).

You can see the orginal NeXT computer at the Microcosm exhibit (http://outreach.web.cern.ch/outreach/expos_cern/microcosm.html) at CERN, still bearing the label, hand-written in red ink: "This machine is a server. DO NOT POWER IT DOWN!!"

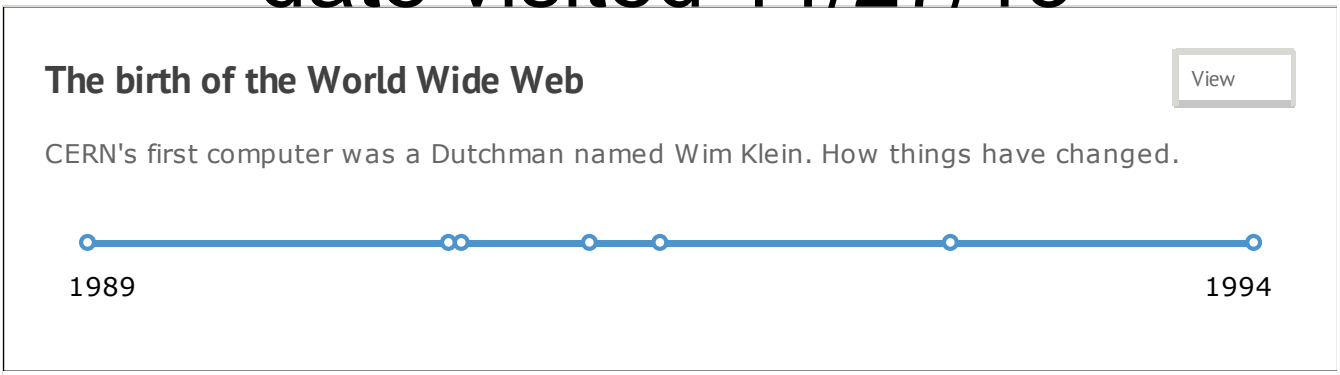
The web extends

The first web servers were all located in European physics laboratories. Only a few users had access to the NeXT computer platform on which the first browser ran, but CERN soon provided a much simpler browser, which could run on any system.

In 1991, an early WWW system was released to the high-energy-physics community via the CERN program library. It included the simple browser, web-server software and a library, and implemented the essential functions for developers to build their own software. A wide range of universities and research laboratories started to use the system. A little later it was made generally available via the internet, especially to the community of people working on hypertext systems.

Going global

The first web server in the US came online in December 1991, once again in a particle physics laboratory: the Stanford Linear Accelerator Center (http://www.slac.stanford.edu/) (SLAC) in California. At this stage, there were essentially only two kinds of browser. One was the original development version, which was sophisticated but available only on NeXT machines. The other was the “line-mode” browser, which was easy to install and run on any platform but limited in power and user-friendliness. It was clear that the small team at CERN could not do all the work needed to develop the system further, so Berners-Lee launched a plea via the internet for other developers to join in. Several individuals wrote browsers, mostly for the X-Window System. The most notable from this era are MIDAS by Tony Johnson from SLAC, Viola by Pei Wei from technical publisher O'Reilly Books, and Erwise by Finnish students from Helsinki University of Technology.



Early in 1993, the National Center for Supercomputing Applications (http://www.ncsa.illinois.edu/) (NCSA) at the University of Illinois released a first version of their Mosaic browser (http://www.ncsa.illinois.edu/Projects/mosaic.html). This software ran in the X Window System environment, popular in the research community, and offered friendly window-based interaction. Shortly afterwards the NCSA released versions also for the PC and Macintosh environments. The existence of reliable user-friendly browsers on these popular computers had an immediate impact on the spread of the WWW. The European Commission approved its first web project (WISE) at the end of the same year, with CERN as one of the partners. On 30 April 1993, CERN made the source code of WorldWideWeb available on a royalty-free basis, making it free software. By late 1993 there were over 500 known web servers, and the WWW accounted for 1% of internet traffic, which seemed a lot in those days (the rest was remote access, e-mail and file transfer). 1994 was the “Year of the Web”. The First International World Wide Web conference was held at CERN in May. It was attended by 400 users and developers, and was hailed as the “Woodstock of the Web”.

As 1994 progressed, stories about the web hit the media. A second conference, attended by 1300 people, was held in the US in October, organized by the NCSA and the International WWW Conference Committee (http://www.iw3c2.org/) (IW3C2). By the end of 1994, the web had 10,000 servers - 2000 of which were commercial - and 10 million users. Traffic was equivalent to shipping the entire collected works of Shakespeare every second. The technology was continually extended to cater for new needs. Security and tools for e-commerce were the most important features soon to be added.

Open standards

An essential point was that the web should remain an open standard for all to use and that no-one should lock it up into a proprietary system. In this spirit, CERN submitted a proposal to the Commission of the European Union under the ESPRIT programme: “WebCore”. The goal of the project was to form an international consortium, in

collaboration with the US Massachusetts Institute of Technology (MIT). Berners-Lee officially left CERN at the end of 1994 to work on the consortium from the MIT base. But with approval of the LHC project clearly in sight, CERN decided that further web development was an activity beyond the laboratory's primary mission. A new home for basic web work was needed.

The European Commission turned to the French National Institute for Research in Computer Science and Controls (INRIA), to take over CERN's role. In January 1995, the International World Wide Web Consortium (http://www.w3c.org) (W3C) was founded "to lead the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability". By 2012 W3C, run jointly by MIT/LCS in the US, INRIA in France, and Keio University in Japan, had more than 370 member organizations (http://www.w3.org/Consortium/Member/List) from around the world.

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