

How Teletronikk changed the Web

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Transferring *Teletronikk* onto the Web was not a straightforward task in 1993. The Mosaic browser had been released just months earlier, and procedures for preparing documents for the Web were not established. The problems experienced from this early work were directly used to propose better methods in CERN's Web project. Since then, the Web has firmly established itself as the electronic publishing platform of choice, and we should expect that the web version of *Teletronikk's* Cyberspace edition from 1993 also will be readable in 2043.

Introduction

In 1993 I was asked to be the guest editor of an issue of *Teletronikk*. A few months earlier, the Mosaic web browser had been released and it suddenly became possible to demonstrate the concepts that the articles would describe: how to publish information in Cyberspace. My editing job, which in the beginning mostly consisted of nagging human authors (as other guest editors of *Teletronikk* will have experienced), suddenly became a very practical challenge of getting all the bits in the right order for the Web. I am proud of the fact that *Teletronikk* 4.93 was one of the first paper publications to become available on the Web¹⁾, and our publishing efforts received an 'Honorable Mention' at the first Web conference at CERN in 1994²⁾. Also, as I will recount below, the challenges facing us in 1993 had some long-term implications for the Web.

The challenges in 1993

Preparing a document for publication on the Web in 1994 was very similar to what it is today. You convert the textual content to HTML, adorn the text with images, add hyperlinks to other documents, and finally the document is served to browsers across the world over the Web. However, in 1993 these procedures were not established and much of our efforts (I received help from Norwegian Telecom's MultiTorg research group) were spent experimenting with different kinds of HTML markup, how to use images, and how to link the documents together.

In particular we were faced with two challenges. First, network connections at the time were much slower than they are now and browsers did not support progressive rendering as they do today. So, when we added images to the articles, they suddenly became slow to load and the user experience suffered accordingly. Second, there was no established way to convey the graphics design of *Teletronikk* from paper to Web.

The first challenge was solved by making small versions of the large images. By placing a thumbnail graphics (as they would later be referred to) on the page instead of the large image, the page would load quickly. By clicking on the small images, the larger version would be downloaded and shown. This technique is one of the standard tricks of the trade today, and *Teletronikk* was – to the best of my knowledge – the first to use it.

The second problem turned out to have no good solution at the time. The paper version of *Teletronikk* was professionally styled and we wanted to use the same graphics design on the Web. However, HTML was designed to represent the *content* of the document and not its *style*. HTML was developed in a scientific environment where the content is more important than its presentation, and authors are encouraged to declare that some text is, say, a heading rather than what font to use. Therefore, in order to capture the fonts and colors used in the paper version, the web version resorted to using an image. That is, instead of sending browsers the title "Teletronikk 4.93 Cyberspace" as text, an image of the text was sent instead. This is similar to how fax machines work, but on the Web this practice is frowned upon. There are several reasons for this. Text in images is only accessible to those of us who can see, and not to speech synthesizers. Also, it is impossible to search for text in images, and images generally take up more capacity than text.

Solutions

In 1994, I joined Tim Berners-Lee's web project at CERN. Berners-Lee had written three of the specifications that formed the columns of the Web: HTML, URL and HTTP. They describe, respectively, the content of the document, how to link one document to another, and how to transfer the document from the server to the client. What was lacking from the Web

1) See: <http://people.opera.com/howcome/1993/teletronikk-4-93>

2) See: <http://botw.org/1994/awards/design.html>

in 1993 was a way to describe the presentation style of documents – fonts, colors and layout. Could we design a solution that would solve the problem for *Teletronikk* and other web publications? In October 1994 I proposed a solution: Cascading Style Sheets (CSS). Using CSS, authors could describe the presentation of their documents. The style sheet could be placed in a separate file and many documents could refer to it. For example, one style sheet could describe the look and feel of a web site, or perhaps all electronic editions of *Teletronikk*.

CSS was not an immediate success. Even if authors liked the idea of using style sheets, the popular browsers at the time did not support style sheets. Three days after CSS had been published, a company called Netscape Communications announced their first browser. The new program was a significant improvement over Mosaic and users flocked to it. Naturally, the new browser did not support CSS. I spent the next few years of my life trying to convince browser vendors to add support for CSS. Netscape finally added support in version 4. Microsoft showed eagerness when they started competing with Netscape, but the quality of their work was – to use a polite term – uneven. Only consistent pressure from web authors and users forced the big software makers to fix problems and make CSS usable.

Meanwhile, a small Norwegian browser company had started to make headlines on the web. Opera Software. Two other members of the MultiTorg group, Geir Ivarsøy and Jon S von Tetzchner, had seen the opportunity for a better browser and founded a company to turn ideas into products. I admit to not having much faith in the venture in the beginning. Competing with Mosaic, Netscape and Microsoft – or Americans in general – is a challenge. Thankfully, they did not listen to me and went ahead with their ambitious plans. In 1998 it was time for Opera to add support for CSS. In three months, Geir Ivarsøy had implemented better support for CSS than Microsoft and Netscape had spent three years on. At that point I was convinced that Opera would make it and joined the company.

Håkon Wium Lie (39) is a Web pioneer, having worked on the WWW project at CERN, the cradle of the Web. He first suggested the concept of Cascading Style Sheets in 1994 and he later joined W3C (the World Wide Web Consortium) to further strengthen the standards. In 1999, he was listed among Technology Review's Top 100 Innovators of the Next Century and has also been invited to the World Economic Forum as a Technology Pioneer. He is currently a member of the W3C's Advisory Board, Technology Review's "TR 100", and World Economic Forum's "Technology Pioneers".

Wium Lie holds a master's degree in visual studies from MIT's Media Laboratory, as well as undergraduate degrees in computer science from West Georgia College and Østfold College, Norway.

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Web future

More than a decade has passed since *Teletronikk* 4.93 was published. In that time, the Web has changed the way humans access information. URLs are printed on all kinds of products and “google” has become a verb, much like “xerox” did in a paper-based world. The browser has become the window to a world of electronic information where electronic equivalents of newspapers, brochures, dictionaries, laws, application forms, and bulletin boards abound.

At a technical level, however, the Web has not changed that much in ten years. *Teletronikk* 4.93 was written in HTML and the web version is still readable in browsers of today. HTML, along with HTTP and URLs, are still basic building blocks of the Web. CSS, JavaScript and a few other specifications have been added to the list, but today the Web has stabilized as a platform for publishing.

There are several reasons why the technical foundation of the Web is not developing quickly any more. First, there are hundreds of millions of browsers out there that use the basic building blocks. Adding support for a new specification requires that browsers are replaced and this is a major undertaking in 2004, much more so than in 1994. Second, the Web has a solid foundation which does not necessarily need much more functionality and which has performed remarkably well under the pressure of growth.

As a rule of thumb, in order for a technology to replace an existing one it has to offer something better by an order of magnitude. I do not foresee any new publishing technology stepping forward to replace the Web in the foreseeable future. How long is the foreseeable future? I bet that the web version of *Teletronikk* 4.93 will live for at least 50 years. That is, common computers in the year 2043 will still be able to read those web pages we authored in 2003. Anyone against?

The cover

In 1993 it was not possible to represent *Teletronikk*'s cover (seen on the right) without resorting to an image. Today, with the addition of CSS, it is possible. The code fragment below encodes the *Teletronikk* cover from 4.93 and works in common browsers:



```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 3.2//EN">
<html>
<head>
<title>Teletronikk</title>
<style type="text/css">
BODY {
  background: rgb(87, 116, 139);
  font-family: "Arial", "Helvetica", sans-serif;
}

div, h1, h2, h3 {
  margin: 0;
  padding: 0;
}

div {
  width: 20em;
  text-align: right;
  float: left;
}

div h1 {
  color: rgb(200, 200, 230);
  float: right;
  background: black;
  padding: 0.3em 0.3em 0.7em;
}

div h1 span {
  color: rgb(255, 250, 255);
  background: black;
  padding: 0 0 0.1em 0;
  font-size: 1.3em;
  border-bottom: 0.15em solid rgb(200, 200, 230);
}

h1 {
  float: left;
  padding: 0.6em 0.3em 0.7em;
  font-size: 2em;
}

h1 span {
  color: rgb(200, 200, 230);
}

h2 {
  color: rgb(186, 255, 201);
  margin-right: 0.4em;
  font-size: 1.5em;
}
</style>
</head>
<body>
<div>
<h1><span>Teletronikk</span></h1>
<h2>Cyberspace</h2>
</div>
<h1><span>4.93</span></h1>
</body>
</html>
```