The World Wide Web, past present and future: Exploring universality

Abstract

The most important thing about the World Wide web is that it is universal. By exploring this idea along its many axes we find a framework for considering its history, its role today, and guidance for future developments.

Introduction

The concept of the Web integrated many disparate information systems, by forming an abstract imaginary space in which the differences between them did not exist. The Web had to include all information of any sort on any system. The only common idea needed to tie it all together was the Universal Resource Identifier (URI) identifying a document. From that cascaded a series of designs of protocols such as HTTP and data formats such as HTML which allowed computers to exchange information, mapping their own local formats into standards which provided global interoperability.

Device independence

That the same information should be accessible from many devices is a core rule of the Web. Once the choices were 80 character terminals or the new personal computers. Now, the number of pixels on a screen has steadily increased, but mobile devices have small screens or voice input and output. Our ability to represent information independently of the hardware we use is more important than ever.

Software Independence

Many different forms of software provide and consume Web information, and no one program was critical to the whole Web. This decentralization of software development was crucial to its unimpeded growth. It also prevents the web itself from coming under the control of a given company or government through control of the software. Communication standards give people a choice of software, but we must all learn to be aware of when their experience is being controlled by software with a bias.

Internationalization

From its beginning in a laboratory run by over a dozen collaborating countries, the Web had to be independent of any inherent bias toward one given country. XML, being firmly based on Unicode, now allows all kinds of characters. Internationalization must take into account much more: the direction in which text moves across the page, hyphenation conventions, and even cultural assumptions about the way people work and address each other, and the forms of organization they make.

Multimedia

Multimedia is not just a buzz-word, it stands for an important dimension of variety - the palette of technologies available to human creativity. Even the early demos included sounds and music. What has changed since then is that the capacity of typical computers to handle graphics and sound has increased, and for some the bandwidth allows video to be sent. Because many things can still be done with plain text, the exotic and the mundane will always coexist on the Web.

Accessibility

Just as people differ in the language, characters and cultures they are used to, so they differ in terms of their capacities for example in vision, hearing, motor or cognition. The universality which we expect of the web includes making sure that, as much as we can, we make the web a place which people can use irrespective of disabilities. There are guidelines

for web site designers to help with this now, and a site which follows them will typically be easier to use for anyone, and easier to index and search.

Rhyme and Reason

There is another axis along which information varies. At one end of the axis is the poem, at the other the database table. The poem, or for that matter the 15 second TV commercial, is designed to connect to a human brain using all its complex series of associations in clever and powerful ways which we can never fully analyze. The database is designed to be queries and processed by a machine. It has well-defined values of information regularly arranged in columns which hopefully has well-defined meaning. Databases can be joined and split, combined and repurposed. Human beings use different sides of the brain for dealing with these types of information. Most information on the web now contains both elements. The web technology must allow information intended for a human to be effectively presented, and also allow machine processable data to be conveyed. Only then can we start to use computers as tools again.

Quality

Many documentation systems used to be designed for particular collections of information, and one could assume that the information in such a system had achieved a certain quality. However, the web itself cannot enforce any single notion of quality. Such notions are very subjective, and change with time. To support this – to allow users to actually use the web even though it contains junk as well as gems – the technology must allow powerful filtering tools which, combining opinions and information about information form many sources, are completely under the control of the user.

Independence of Scale

The web is described as a global phenomenon, and it is, but we must remember that personal information systems, and family and group information systems are part of it too. There should be no information boundary which would prevent a link from my personal diary to a public meeting. Harmony on a global scale we know we need for peace, but that peace will only be stable so long as social groups of all sizes are respected. Starting at the individual, a group of one, one can think of institutions and ad-hoc groups of all sizes. The web must support all of those, allowing privacy of personal information to be negotiated, and groups to feel safe in controlling access to their spaces. Only in such a balanced environment can we develop a sufficiently complex a many-layered fractal structure which will respect the rights of every human being, and allow all the billions of us to live in peace.