The Mobile Web to bridge the digital divide?

Since its creation by Tim Berners-Lee, the inventor of the Web, W3C's mission has been to lead the Web to its full potential. Defining new free and open technologies for the Web, preventing fragmentation, working towards one single space of communication and exchange, accessible by everyone from every device, has been the spirit of all W3C actions for the last 12 years. During this history, each time there was a need for integrating specific communities with specific requirements, each time there was a potential for the Web to reach a new area, W3C organized and launched specific initiatives, integrating experts in technologies, but also other key players involved in the domain (government agencies, other standardization bodies, etc.). In 1997, the Web Accessibility Initiative (WAI - [6]) was launched to make the Web accessible to people with disabilities. In 2005, the Mobile Web Initiative (MWI – [7]) was set to make the Web accessible from mobile phones.

In 2007, it is time to think about the next step. While more and more people are using the Web, a significant number of people still do not have regular, effective access and ability to use digital technologies. This is known as the Digital Divide.

While there is a general agreement among specialists on the importance of bridging the Digital Divide, there is disagreement on the exact solutions. The One Laptop per Child Initiative thinks that an inexpensive laptop using mesh networks may be the way forward [4]. Microsoft thinks that the solution is to provide a Windows-based mobile phone which can transform itself in a computer by plugging in a TV set and a keyboard [3]. While each solution has its own strengths, they both suffer the same weakness, namely the need of large scale deployment, which would take years. So perhaps, there is a third way to explore, a solution which would take advantage of the 2.4+ billion mobile phones spread over the world and would provide direct Web access from them.

Starting from this observation, and driven by its Mobile Web Initiative, W3C decided to investigate this third direction by organizing an International Workshop on the Mobile Web in Developing countries (see [1]).

Broadly speaking, representatives from two communities participated in the Workshop: those inventing new technology and those with expertise in social and economic issues in developing countries. The event provided a great opportunity to bring those communities together, but it revealed that there is still a gap in terms of the potential of the technology, and the reality of needs and usage on the field. The workshop was an important step toward further cooperation between the two communities, and one of the important points is that successful ICT projects rely on the cooperation of experts from both areas, as well as the need to also integrate business developers.

It is very important not to forget the real goal of providing ICT in developing countries. The point is to use Web technologies as a mean to provide services (health, banking, government service, education, business, etc.) which would improve the life of the under-privileged populations. Using mobile phones as the support for services

is considered most likely to succeed. However, using the Web and Web technologies as the software platform for developing those services is not yet a reality.

As of today, the most widespread way to provide such e-services on mobile phones is with SMS-based applications. The reasons for that are numerous:

- Easy to use
- Low and predictable cost (no cost for receiving a message, low and known cost for sending a message)
- Availability on all phones

Of course, the limitations of SMS-based applications are widely recognized:

- Low capabilities (text-only, limited size, basic services like single query - answer, ...)
- Interoperability problems between operators

Adopting the Web as the platform for developing future services requires work on the following blocking factors:

- Problems of availability of Web browser. When there are browsing capabilities on phones, even minimal, Web browsers are indeed used ([5]). However, some older phones have just WAP 1.0 (WML-based) browsers and there is almost no WML content available. New low-end phones tend not to have any browsing capability at all.
- Problems of configuration: the difficulty to configure a phone to enable web browsing compared to the immediate accessibility of SMS is seen as a blocking point.
- User Interface: The usage of mobile Web browser is still problematic; for example entering a URL
- Cost: given the price and the unpredictability of the cost of data services, people are hesitant to use a Web browser without knowing how much they will be charged.

However, there was a general agreement at the Workshop that the Web is providing unique opportunities which may facilitate the bridging of the Digital Divide:

- a standardized platform to ease service development
- inexpensive service development and hosting
- large scope and wide audience
- easy availability and discoverability of existing services (e.g. through search engines, portals, ...)

The reasons why today the latest low-end phones, aimed at emerging markets, are not supporting Web browsing capabilities are obvious: Web content is getting richer and richer, and requires bigger and more colorful screens, more computing power and more memory to be rendered. The Web 2.0 is about video, music, and so on, and browsers being able to cope with those contents can't fit into the 30 or 40 KB limit imposed by the cheaper hardware. However, before the Web 2.0, there was the Web 0.1, the Web of textual information only, when computers had only a few Mb of

memory, a VGA screen and a 9600 Baud modem – hardware very similar to the low-end handsets of today. This is probably what we need here to bootstrap the process of bringing the power of the Web to underprivileged population. The availability of a small text-only Web browser, with a footprint near the one of the old WAP browsers, but with the ability to parse and render xhtml-basic. We believe this would bring many benefits. It would ease the task of those who are providing e-services through SMS today by offering a language with hyperlinks, enhanced interaction through forms and so on. From the user's point of view, it would connect people to the Web. Of course, as I said above, people would not have access to video, to sounds, to nice photos, but at least, they will be able to access information available on the Web.

The point is not to create a low-level Web for Developing Countries. The philosophy of W3C, since its creation, is to have one Web. If authors of Web content are following the right guidelines (eg WAI guidelines [8], MWI guidelines [9]), they can design very rich and attractive documents for users with full browsers (on PC or high-end phones), and the information embedded in those documents will still be available through the use of limited browsers. Classical examples are sites like eg Mappy or Google maps delivering driving instructions: Clearly, having a GPS plus a real-time updated map is the best way to go, but having a list of textual instructions would also allow a user to reach his destination.

Of course, what would be the exact technical requirements of such browser need further work, and would require cooperation and concerted effort between all the players of the mobile industry, as well as cooperation between existing standardization bodies, like W3C, GSMA ([10]), OMA([11]).

Then,, it would also be very important to enable local communities to develop their own applications that would fit their exact needs. Having an easy-to-use, easy-to-develop standardized platform goes a long way, but equally important is teaching people how to develop applications for this platform. Even though there are lots of mobile phones compared to the number of PCs, it is very rare to see Mobile Application Development courses in the universities of these countries. Developing such courses would be a key factor to enable local people to develop applications fitting the needs of their own country.

Finally, it is also important to cope with the problem of internationalization of content: being able to enter data and view content in local languages.

In terms of next steps, future directions were suggested at the Workshop:

- First of all, this event demonstrated the need for a public forum to share and benefit from experiences in running ICT projects in developing countries. This forum would be a place where experts in the mobile technologies and experts in ICT in developing countries could share expertise. This may lead to the creation of best practices and guidelines for providing mobile e-services in the developing world.
- It will be essential to understand the nature of the low-end devices: what are current minimal characteristics of devices we could rely on in terms of memory, SIM card, and availability of Java etc. Starting from these

characteristics, it would be possible to define the size and the capabilities of a lightweight web browser.

- The location of the event allowed participants to get more specifically feedback and information on the Indian market. It should be interesting to understand commonalities and specificities between different regions of the world in term of needs and usage (e.g. in Africa, South America ...).

Given these important results, and the number of directions to explore, it is now time to see whether W3C can gather the required critical mass of experts as the roots for a new worldwide initiative on bridging the Digital Divide, and make the Web accessible and useful for the under-privileged populations.

[1] Home page of the W3C Workshop on the Mobile Web in Developing Countries http://www.w3.org/2006/07/MWI-EC/cfp.html
[2] Participants list of the W3C Workshop on the Mobile Web in Developing Countries: http://www.w3.org/2006/07/MWI-EC/participants.html
[3] Microsoft FonePlus Project:
http://www.microsoft-watch.com/content/desktop_mobile/microsoft_hedges_its_platform_bets_with_foneplus.html
[4] One Laptop Per Child: http://www.laptop.org
[5] BBC Wap use flourishing in Africa:
 http://news.bbc.co.uk/1/hi/world/africa/4795255.stm
[6] W3C Web Accessibility Initiative : http://www.w3.org/WAI/
[7] W3C Mobile Web Initiative : http://www.w3.org/Mobile/
[8] W3C Web Content Accessibility Guidelines : http://www.w3.org/TR/WCAG20/
[9] W3C Mobile Web Best Practices : http://www.w3.org/TR/mobile-bp/
[10] GSM Association (GSMA): http://www.gsmworld.com/index.shtml
[11] Open Mobile Alliance : http://www.openmobilealliance.org/