The Integrated Operator: A Mobile Perspective

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Abstract

While the mobile environment currently suffers from limitations in terms of computation, network bandwidth, fragmentation of the handset installed base and usability constraints, the mobile Web presents *true* opportunities for content providers, terminal manufacturers and operators. The rapid growth of mobile services and the ever-increasing adoption of Web services demand future solutions that seamlessly transition between the variety of communication channels. Ultimately, the best solutions will allow a single content source tailored to all available channels, however, to date this has proven difficult if not near impossible. This position paper offers an operators perspective on some of the challenges, opportunities and problems facing the Mobile Web.

Content

1.0 Introduction

Integrating multiple service delivery channels and improving consistency of end-user experiences across networks and terminal devices are increasingly critical for operators such as France Telecom. Interoperable, standard based solutions are expected to reduce the inherent complexities of multi-channel service authoring and delivery. Due to ever growing availability of web services and media rich applications, minimizing the risk of potential fragmentation of the Web is viewed as one of the key challenges for the providers of convergent communications offerings. To date the realities of accessing Web content from mobile devices still leave a lot to be desired. Mobile environment continues to be adversely impacted by a variety of constraints that include limitations on mobile device computing power, form factor, user interface, mobile network coverage and bandwidth, service access and usage and, last but not least, additional complexities of the mobile Web value chain:

- **Mobile devices** vary enormously and their proliferation bred diversity and specialization. This has implications for the consistency of user experience as the variety of user interface and service interaction design options grows. In particular, different graphic display capabilities (dimensions and color-depth) and available input/output modalities (for example stylus/pen, alphanumeric keypad and voice/audio). Adapting content to the form factor of a specific device further complicates development of multi-publication - *"author once, publish many"* - applications. Content personalization and contextualization also become very difficult tasks.

- **Mobile browsers** continue to lag behind their desktop equivalents in terms of rendering capabilities and performance. Furthermore, a promising idea of evolving a browser into THE mobile user interface of the future appears to be completely stalled due to a continued fragmentation of the browser market and persistent interoperability problems. No one mobile browser vendor yet managed to achieve a dominant market position and the ongoing standardization initiatives including those under the auspices of the Open Mobile Alliance (OMA) appear to be progressing slower than expected.

- **Content Generation** may require server-based mediation to transform content into a representation that could be used by a particular device. Alternatively, the device can shape the content itself. To date neither provide an optimal solution to *"create once, view anywhere"*.

- **Mobile network** performance remains largely unpredictable in particular, network connectivity and the available bandwidth may vary significantly depending on a number of factors, including the mobile device location. This volatility creates additional technology and operations challenges for mobile Web content and applications developers as well as service providers.

- **Mobile usage patterns** confirm the - *"anywhere, anytime, anyhow"* - integrated service proposition based on a timely and efficient delivery of the right content presented the right way at the right place and time, adapted as necessary to the network, environmental conditions, device capabilities and user preferences. In particular, using the best available input and output modalities to facilitate user interaction with an application and access to the relevant Web content in every context is critical e.g., by combining voice and visual inputs and outputs.

- **Mobile Web value chain** involves a number of actors whose roles and mutual dependencies are fairly complex. Most notably, service providers depend on multiple, non-exclusive relationships with content and application providers, handset vendors and software tool vendors including browsers to differentiate themselves in the marketplace through branded service offerings. Maintaining a consistent - *"look and feel"* - of the interface has become a key aspect of mobile service providers branding.

This position paper examines some of the above challenges, opportunities and problems from a perspective of an integrated service provider, with an understanding that the future mobile Web *"eco-system"* could create win-win opportunities for all the players involved. This position paper focuses on just a few illustrative issues impacting the mobile device, browser and usage categories outlined above.

2.0 Mobile Devices

The proliferation of mobile devices has bred a diversity of capabilities that has had a direct impact on the consistency of user experience. For example, different graphic display capabilities (x-y pixels and color-depth) makes scaling and adapting content to the constraints of a particular form factor complex. This is especially true when considering multi-publication *author once, publish many* applications.

The W3C and OMA have created recommendations to aid in determining device capabilities. The Device Independence Group (W3C) has created the Composite Capabilities/Preferences Profile (CC/PP) Recommendation. CC/PP specifies a RDF/XML language for expressing capabilities. In conjunction, OMA has created a mobile device vocabulary for CC/PP called User Agent Profiles (UAProf). The intent of CC/PP and UAProf is to provide detailed capability information about the end device.

Unfortunately CC/PP and UAProf have a number of problems preventing a complete solution to the device diversity issues. Device vendors adoption of UAProfiles has at best, been poor: Profiles have been hard to find, often invalid, or just plain incorrect.

3.0 Mobile Browsers

A significant component of any operators strategy for mobile content delivery, will involve browsing. The small form-factor of mobile devices further focuses attention of the diminutive screen real-estate therefore reconciling the needs of content branding and styling, indicate a need for flexibility well beyond what is available in recommendations embodied in [CSS].

In the beginning of the Internet, web pages were adapted to the variety of available browsers such as Netscape, Mosaic and Internet Explorer. Each browser - even each version of browser - had specific interpretations of Standard (W3C) recommendations including known bugs. As a result, the development of a service involved extensive development time, costly QA and long times to market. With the advent of the mobile Internet, things had not improved. In fact they

deteriorated with a proliferation of WML browser implementations to the point where there are nearly one per device release.

The development of the W3C [XHTML] / [CSS] recommendations for the mobile web set expectations that the problem would improve. In fact the situtation deteriorated because XHTML/CSS had yet more combinations than [WML]. From an operator perspective, the enormous permutations of browser implementations is one key limitation on mobile Internet growth. For example, experience has shown that it is extremely difficult to develop a [XHTML] portal for only twenty devices without *detailed* content adaptation solutions to fix *on the fly* a variety of browser bugs. Of course, in the long term, such a content adaptation should disappear. Subsequently, the development costs in todays mobile web are too high, with a knock-on-effect of limited services that in turn has a direct impact on poor adoption rates and ultimately, diminishing revenues.

To date there are four versions of XHTML (XHTML 1.0, XHTML 1.1, XHTML-Basic, XHTML 2.0) and OMA has worked on a mobile profile called XHTML-MP. Compatibility between versions is problematic and further amplified in the mobile space where XHTML-MP is no longer compatible with versions developed by the W3C.

4.0 Content Generation

In a ideal world, content should be agnostic to the delivery context: content created for the Web should be created once and shaped to fit any device, including both desktop device and mobile devices. To this end, the issues are the following:

- To select which content should be displayed for which device (e.g. display a full news story on a desktop and only its title on a mobile)
- To define what should be the layout and the presentation of a page for a given category of device (e.g. put the menu on the right for desktop landscape screen and on the top for portrait screen)
- To define what should be the navigation inside the service for a given category of device (e.g. access to your bank account in one step on a desktop and in three steps on a mobile)
- To adapt/transcode markup (e.g. publish in WML and XHTML)

There are numerous vendors solutions that cover part of these issues. From the standardization point of view, the W3C addresses some of these issues (see especially DIWG and CSS Media Query). However, it's still very difficult, if not impossible, to efficiently design Web pages that can be viewed on both desktop and mobile devices.

5.0 Mobility Usage

What follows are a couple of usage examples that highlight the nature of tomorrow's mobile web.

Mobile Search

Mr Mobaddict is in a restaurant with friends. They argue about the name of the painter of "The Joconde". Mr Mobaddict decides to light up his mobile phone to access his favourite search engine and gets the answer and closes the discussion."

This example is interesting for the following reasons: it's difficult to achieve when the desktop and mobile web are fragmented. In particular, a mobile adapted website dedicated to the Joconde is *"highly"* unlikely to exist. Furthermore, it is unclear how the content can be adapted for the mobile phone.

Location "push or pull?"

Location based services (LBS) can provide device location as part of network services. Many applications can be developed where location is constantly active: on-line tourist guides for mobile devices can indicate where you are on a city map, future movie advertisements in the streets (with BlueTooth/proximity detection), such that when you are close-by, notifications are triggered on your device. There are several implementations that can be envisioned:

- [LBS] in-network request based with an update frequency to 10 seconds. This provides location information on a "pull" basis (the [DOM] can be used to manage events as well as store and retrieve properties).

- [GPS] on device where the location update event reads the value and places it into an XForms data instance.

Fundamentally, there are two types of request mechanisms that cannot be resolved in the current Mobile enviroment: *pushing or pulling* on events in the network; specifically, asynchronous behavior is required to prevent blocking situations.

7.0 Proposals and Conclusion

In order to solve the problems outlined above, three interdependent sets of issues need to be addressed in a highly coordinated way:

- **Mobile devices** have a clearly defined problem because it is important that Profiles be correct to be useful. A task is to build tools to validate as well as verify Profiles. Failure will ensure a lack of industry adoption.

- **Mobile browsers** should aim to provide *"anywhere, anytime, anyhow"* solutions:

    - Mobile browsers require a unified standard with detailed implementations specifications to avoid proliferation and fragmentation of XHTML.

    - *Effective test suite development* - for browsers possibly related to a "MobileWeb" trustmark. Ultimately there should be a comprehensive test suite allowing content providers to test browsers with specific test page content.

    - *Content development guidelines* - that provide best practice and well as conformance testing tools for authors. Such solutions would be to provide any *MobileWeb* compliant web site may be viewed on any other *MobileWeb* compliant browser.

- **Content Generation**

    - Content must be: *"Write once, display anywhere"*. A sharper focus on precisely how content can be authoured and manipulated is required.

    - Check if the W3C/DIWG charter covers all the content adaptation issues, and especially in the mobile context.

    - Balance *"One ubiquitous Web"* vs. *"one Mobile Web"* and *"one Desktop Web"*. What are the solutions for short term, mid-term and long-term.

France Telecom is dedicated to the concept of an Integrated Operator. The proposals described above should be considered part of any Mobile Web Initative. A clear danger of further mobile web fragmentation is present by *not* addressing these issues.

6.0 References

[CC/PP]
"*Composite Capability/Preference Profiles (CC/PP): Structure and Vocabularies 1.0*", W3C Recommendation 15th January 2004. See: http://www.w3.org/TR/2004/REC-CCPP-struct-vocab-20040115/

[DevInd]
W3C Device Independence Activity. See: http://www.w3.org/2001/di/

[DOM]
W3C Document Object Model (DOM) Technical Reports. See: http://www.w3.org/DOM/DOMTR

[LIF]
"*Location Interoperability Forum, Mobile Location Protocol Specification Version 3.2.0*", OMA-LIF-MLP-V3.2.0 Specification, LOC, 26 November 2003. See: http://www.openmobilealliance.org/ftp/Public_documents/LOC/Permanent_documents/

[CSS]

"*Cascading Style Sheets, level 1 W3C Recommendation*", REC-CSS1-19990111, 17th Dec 1996. See:http://w3c.org/TR/CSS1

[VoiceXML]

"*Voice Extensible Markup Language (VoiceXML) Version 2.0*", W3C Recommendation 16 March 2004. See: http://w3c.org/TR/2004/REC-voicexml20-20040316/

[InkML]

"*Requirements for the Ink Markup Language* ", W3C Note 22 January 2003. See: http://w3c.org/TR/inkreqs/

[XHTML]

" *XHTML 1.0 The Extensible HyperText Markup Language (Second Edition). A Reformulation of HTML 4 in XML 1.0*", 26 January 2000, revised 1 August 2002. See:http://www.w3.org/TR/xhtml1/

[CSS Media Queries]

" *Media Queries*",W3C Candidate Recommendation 8 July 2002

[WML]

" *WAP Forum Ltd.* ", 11 June 2002 2002. See: http://www.wapforum.org/what/technical.htm

[cHTML]

" *Compact HTML for Small Information Appliances*", W3C NOTE 09-Feb-1998.

[HTML]

" *HTML 4.01 Specification*", W3C Recommendation 24 December 1999.

[SE]

"*System and Environment Framework W3C Working Draft 28 July 2004*", System and Environment Framework: GPS resolved code I &II

[XHTML Basic]

"*XHTML Basic W3C Recommendation*",W3C Recommendation 19 December 2000

[XHTML-MP]

"*OpenMobile Alliance*", BAC/MAE 2004

[XHTML 2.0]

"*XHTML 2.0* ",W3C Working Draft 22 July 2004

[RDF]

"*RDF Vocabulary Description Language 1.0: RDF Schema W3C Recommendation 10 February 2004*", System and Environment Framework W3C Working Draft 28 July 2004

[UAPROF]

"*WAP-174: UAProf User Agent Profiling Specification (1999)*", as amended by WAP-174_100 user Agent Profiling Specification Information Note (2001) Wireless Application Protocol Forum. See: http://www.wapforum.org/what/technical_1_2.htm