WHITEPAPER

WIRELESS INTERNET USABILITY AND INTEROPERABILITY

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INTRODUCTION

The main themes throughout this paper are Interoperability and Usability; the issues surrounding these themes - and some proposed solutions.

THE CHALLENGE: PROVIDING STABLE AND USABLE APPLICATIONS

As in all media, the customer is key, and delivering compelling content and an enjoyable experience to the end-user is the main focus for all companies operating in the wireless Internet space. The new challenges with this particular medium, however, are caused by the issues of device diversity, and the challenges of usability on such small, limited devices.

To set the scene, let us look at what we mean by the Pervasive Internet. We use the term pervasive to mean the ability to access the Internet via any sort of device type: phones, PDAs, PCs, as well as everyday objects, e.g. coke machines, watches, fridges etc.

An individual will expect to access many of the same services through one or more device groups (channels) and to receive the same service through each device within each genre. In reality, this is not happening – particularly in wireless.

'DEVICIFICATION'

We all know what is meant by 'personalisation' - where an on-line service is adapted for the actual user accessing the content. For example, Amazon.co.uk recognise the user if they have visited the site before and know what products they have been interested in the past. In this way they are able to offer related products and deliver a better 'personalised' experience to the user whilst they are browsing through the site.

Our term 'Devicification' is the same principle applied to understanding the actual device used by that individual; the service is customised to the device used as well as to the users' preferences – or in other words the customer must be thought of as the person **and** the device, and requirements must be met for both.

THE MAIN AREAS OF 'DEVICIFICATION'

Many aspects of today's device vary widely from one manufacturer to another, from one model to another, and from one sub-revision to another – as well as the diversity introduced by the network configuration that the user has connected to. These aspects of variation include:

Wireless Network Protocol (WAP, i-mode etc.)

Infrastructure servers (gateways, cache etc.)

User Interface (soft keys, touch screen, voice etc.)

Content (WML, HDML, CHTML etc.)

Multimedia interface (typically micro-browser)

Application environments (JAVA, SIM Toolkit)

Air interface (CDMA, TDMA, GSM etc.)

Operating System (EPOC, CE, Palm, etc.)

Physical device types (phone, pager, watch etc.)

Some of these areas will obviously have a greater impact than others, depending on the application. For example, the constraints on a wireless game might depend greatly on the variations in screen size and network performance.

DIVERSITY WILL CONTINUE

It would be natural to expect consolidation within the industry among micro-browser and phone manufacturers. In much the same way that Microsoft now dominates the web browser industry, some might expect to see a particular vendor's browsers on all WAP phones in the coming years. But we believe that this is not about to happen, for a number of reasons:

Multiple standards will continue to exist on a regional and worldwide basis; USA, Japan, Europe - WAP, i-mode and others

There will be ongoing development within those standards (e.g. WML 1.1 to 1.2 to 2.0)

Manufacturers strive to differentiate in order to gain a competitive advantage; with:

- Varied price points
- Size & feature sets
- Market segmentation –features & functionality for the youth, market, fashion conscious etc.

Handset upgrade lag – consumers will still use phones that are 2 years old, they are not likely to upgrade each time a new phone comes onto the market

Content upgrade lag

New network services from 2.5G and 3G networks

In summary, we believe devices in the marketplace will diverge and continue to diversify – rather than to converge.

To overcome today's issues developers have often chosen the easy option – writing content to the lowest common denominator. The paradox of this is that it often makes content awkward to use on *any* devices bar one or two well-known models – and as a result, usability is the first victim of generic wireless content.

LEARNING CURVE FOR DEVELOPERS

Whenever a new standard is brought onto the market developers have to overcome a number of hurdles:

Compliance – industry standards e.g. HTTP, XML, WML

Developers have to learn new languages and a new set of standards. For example, a web developer wanting to produce WAP sites first has to learn WML. Content needs to be compliant before it is likely to **work on *any* device**

Interoperability – between devices, browsers, networks. Once a developer has understood the standard they should be working to, it is necessary to understand the devices themselves. Many developers overcome the compliancy issue and get stuck on interoperability – producing content that **works on *all* devices**

Usability – ease of navigation, an application that is pleasant to use, that meets the typical user's expectations and understanding, and that suits the scenarios under which the application is likely to be used (on the move, in a car, for example) – this is about producing content that **works *well* on all devices**

Performance – response times and the adaptation of the application to the network and its conditions. Developers should strive to produce applications which work quickly and efficiently despite vast amounts of traffic. Currently networks are not busy enough to make performance a major issue, although we are all hoping this will change over time!

All developers aim to produce content that works well & quickly on all devices, but every time a new standard comes out, or evolves, it often seems like everyone is back at the bottom of the ladder, which can be extremely frustrating.
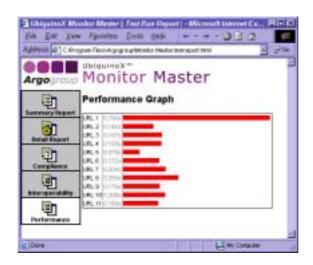
THE SOLUTION – DEVICE-AWARE CONTENT

To *proactively* deal with these issues the solution is to create device aware content, i.e. to have pages that are customised to the device either 'on the fly' or at design time. Whenever the request comes from a device for a page, the server must make decisions on how the page should be formatted. The server has to be able to:

- accurately identify the device,
- understand the class (phone, PDA) and family (make mark-up language assumptions),
- understand the make, model and revision of device (know the limitations, features and idiosyncrasies of the device).
- "device targeting" (the final fine-tuning of content, such as handling character set issues)

AUTOMATED TESTING

Tackling the issues *reactively* - testing content once it has been built – is also a valuable exercise, particularly as new devices continue to appear, long after the application's development may have ceased. Developers can use automated tools with the ability to do scripting, autobrowsing, simulating multiple devices, in order to cover a vast test surface, which can't be done manually in the same time frame, or as efficiently.

Industry realises there is a problem …and has made various steps towards a solution.

A number of initiatives attempt to solve the interoperability problems:

WAP 2.0 has been built with an appreciation of the issues and shares W3C technology (e.g. XHTML). This is a common technology with the web, which means a smaller learning curve for developers to climb.

M-Services initiative – this has been driven by the GSM Association to bring order to browser implementations. M-Services:

- brings order to device aspects outside of WAP
- indicates a growing industry understanding of the challenges

Application server space is providing support: - servers are built with an understanding of the interoperability problems, for example:

- .NET (Microsoft)
- WebSphere (IBM)
- WebLogic (BEA)

USABILITY THROUGH DESIGN

Understand the usability issues before writing live code. Leading companies in the wireless space have brought out documents to aid developers; these include recommendations and style guides, for example, those by:

- Openwave: http://developer.openwave.com/
- Nokia: http://forum.nokia.com/

It is important that developers don't simply work from existing web site designs. Users have different expectations and want to carry out different tasks on the wireless Internet to those on the web. For example, a user visiting an airline site may wish to make a full on-line booking, however, on the WAP site they are more likely to simply check flight departures or arrivals.

USABILITY DURING DEVELOPMENT

There are conversion tools available on the market, which can help developers from an educational point of view by giving them a head start and early wins, e.g. WAP Tool is a developer tool which converts HTML files to WML content and offers comments on how the WML could be enhanced (http://devzone.argogroup.com). This type of tool is useful for prototyping and can help developers to learn WML.

In-development testing is always useful; check on compliance, interoperability, usability and performance issues during the development of your wireless site or portal, e.g. Monitor Master allows for rapid testing of WML content against multiple devices via autobrowsing or scripting.

There are several emulators on the market which can be used to attempt to preview pages on multiple devices.

The key point with all of the above is to enforce usability throughout the development process.

USABILITY- AUTOMATED TESTING

Automated testing of usability may perhaps be a holy grail; there is little substitute for real people with real phones. However, any automated opportunities provide faster testing, use fewer resources, cost less and should have the ability to simulate multiple devices.

Monitor Master for example, conducts usability testing with virtual reference devices, reporting on compliancy, interoperability, usability and performance.

Manual usability testing involves such tasks as recording the number of clicks, how far the user has to scroll, number of buttons to tap, how long it takes pictures to appear, and how long it takes to configure a phone to access a WAP site. Further, there is much value to be gained from running focus groups of representative users and recording what they find frustrating or counter-intuitive

whilst using the application. However, this is a lengthy and time-consuming process, and can be expensive.

FUTURE STRATEGIES & SUMMARY

Diversity won't diminish – this highlights the necessity for content developers to re-assess their existing approach.

Pro-actively plan your understanding of devices, either within your company or with a partner with device knowledge e.g. Argogroup

Train *and retrain* your development & test teams and ensure that they stay abreast of relevant industry initiatives, which are there to help.

Usability is now more important than ever - think of the user tasks and expectations!

As a developer, there are no short cuts to resolving these issues and no replacement for….

> real users…
> real devices…
> real networks…

ABOUT ARGOGROUP

Argogroup are the leaders in device intelligence for the multi-channel Internet. By collecting information on the capabilities and limitations of all of the wireless Internet devices in the world, Argogroup is able to provide services and products that make it easier to build compelling applications. Argogroup's mission is to use knowledge of devices to make it easier to develop content and to improve the user experience.

Argogroup headquarters are near Guildford, UK, with a field office in Stockholm. Argogroup employs 20 people. Argogroup is a member of the WAP Forum and the W3C, and is part of the OpenGroup MMF, the Bluetooth(tm) Special Interest Group, Openwave Systems Alliance Program, the Ericsson, Nokia Artus and Orange developer programs.

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