
Mobility & The Net: a view from the Edge

This white paper reviews the lessons learned from V1.0 of the
Wireless Internet and examines the way a new intelligent
infrastructure could be created at the edge of both networks

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Bob has been covering wireless data since 1995 and he makes frequent trips to Finland in order to stay ahead of the curve. As a result, he has been one of the first writers in Europe to cover key developments such as Unified Messaging, IP Telephony and the WAP standard. The writer therefore knows this subject in some detail and has not jumped on board following the frenzy that resulted from the introduction of this standard and the misunderstood concept of the Wireless Internet that followed.

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Executive Summary

Wireless telephony and the Internet have changed the way we work; indeed, they have impacted on the very concept of work and the workplace. Anywhere, anytime communications is something we take for granted, as is instant access to the biggest library in the world and the ability to exchange information with colleagues and friends across time zones.

The fact that we take these services for granted indicates how easy they are to use and how important they have become. Thus, the business case for a true merger – the creation of smart Internet services and applications for mobile users – is indisputable, but the results (to date) have been disappointing. Version 1.0 of the Wireless Internet did not match the expectations of the market, which had been hyped to unrealistic levels, but the concept is still sound and the market need for wireless access has not diminished.

It is important to recall that the Internet and international roaming took around a decade to reach their current footprint; developments continue, but these services have matured. The Wireless Internet, however, is still in its infancy. Access to wireless portals via WAP gateways is only the first step; this technology is not smart. Gateways only provide baseline functionality and wireless access via a micro-browser does not replicate the Web model – in fact it does not even come close.

Wireless technology has, however, advanced on many other fronts. Phones are adding PDA-type data capabilities while PDAs are adding a voice capability. Cellular networks are adding packet-switched data overlays and migrating towards the networking model of the Internet. There will therefore be a mix of 2G, 2.5G, 3G and 4G services in future and an increased emphasis on IP networking.

To date the focus on wireless data has mainly been on these radio access technologies, the terminals employed, and the applications and services that run on the networks. The missing link, until now, has been the networking infrastructure that will tie all of these elements together.

Tahoe Networks is a new company that was formed in order to advance this concept – to take wireless networking to the next stage and beyond. This is its *raison d'être* – the company is neither Net- nor telco-centric. There is no agenda, no legacy systems to protect, but there is a very clear belief that the edge is the place where smart services should be implemented and where advanced IP functionality should reside. In addition Tahoe believes that the edge of both networks is the only place that can be truly independent.

This paper examines the challenge that Tahoe is addressing and the functionality needed to address the many complex and interrelated issues.

The Wireless Internet: V1.0

WAP was the standard that introduced the concept of a Wireless Internet, but a WAP gateway only encodes and decodes requests and responses between the Internet and wireless networks. This indicates that the system is simply a pipe and that services based on this delivery method lack important functionality. For example, there is no built-in charging mechanism.

The charging problem was initially 'solved' by the creation of service portfolios, i.e. network operators selected the content on behalf of their subscribers and charged for usage. This is the so-called 'walled garden' approach, which did enable billing, but only for the services in the portfolio. Operators obviously liked this closed model because it enabled them to 'own their subscribers', but industry observers, particularly in the US, also indicated that Net-savvy users do not want to be controlled, i.e. they want unlimited access to the Internet.

Unlimited access implies Net surfing, which is clearly impractical on mobile phones. Nevertheless this is the popular perception of the Wireless Internet. Thus, V1.0 got off to an unfortunate start and the fact that services were introduced using circuit-switched data (CSD) links did not help. CSD dial-up times are slow (30 to 40 seconds) and data rates slow (9.6 or 14.4 Kbps).

Packet-switched services

GPRS and future packet-switched services allow operators to implement various charging models for mobile services. In addition to flat rate, tariffs may be based on the amount of browsing events (transactions), the data volume (pricing bits), time, and services (pricing the content). Combinations of different models can also be employed and revenues shared with content providers.

On the subscriber side of the equation, the move to packet switching enables the wireless zone to replicate the end user experience of LANs, cable modems and DSL. Communications channels are only employed during transmission sessions but are instantly available. This means that in an optimised service environment the user can access information in a few seconds and because users are on-line via logical connections (the Internet model), staying on-line all day does not, in itself, incur any additional charges.

The semi-walled garden

The walled garden concept has also been criticised, but there is nothing wrong with the basic concept, particularly in Europe. Many subscribers will appreciate a portfolio of national services in their local language and this may be all they need. Others may want to access other national and international services, which are currently being provided by so-called wireless portals. However, access to an individual site via a phone or PDA is a clumsy process and there is no charging mechanism, which limits the quality of the content.

Thus, easy access (a lower wall) and a micro-payment mechanism are two issues that have to be addressed if the Wireless Internet is to progress to the dizzy heights that analysts once predicted.

The role of the Internet

Billing is clearly the key issue right now. Unless it is addressed in a way that satisfies subscribers, operators and content providers, then the concept of the Wireless Internet will implode. However, there are two fundamental problems: (1) the content is in the Internet where there is no charging mechanism; and (2), subscribers have rejected limited service offers. They want rich content, the wireless equivalent of Internet services, and mobile professionals and consumers alike are prepared to pay for those services. The success of i-mode in Japan proves this point.

The billing issue also indicates that the Internet is playing a secondary role in the current model, but in fact the data network should be centre stage because that is where the content resides.

Tahoe Networks have not released details of their solution, but the company has indicated that meaningful interworking between the Internet and different wireless environments can only come via a solution that is more than a hardware access pipe bundled with some networking software. This model prevents network operators from obtaining any share of the value of content carried across their networks and history tells us that its adoption led to Internet access services becoming commodities. ISPs could then only compete on price and as a result many went out of business.

That lesson has been learnt in the world of wireline data networks. Wireless operators can therefore see that the only way to provide added-value capabilities is to start with the deployment of intelligent network solutions. The functionality of these solutions must include network based security, subscriber identification and differentiation, virtual private networking and personalised network services. According to Tahoe, this is the only way to drive a long-term business case and justify the investments needed to make the transition from voice-centric networks.

Edge to the rescue

Tahoe has addressed this important issue in the simplest possible way. It puts the billing mechanism and networking intelligence at the edge of the two networks, i.e. it is an integral part of the proposed Mobile Internet Edge (MIE) solution. The application of networking intelligence into this neutral space should enable the rapid development of a 'smart' Mobile Internet, i.e. a seamless information and services environment. That is the basis of the i-mode model and it is the only way to deliver the optimal end-user experience. However, while i-mode has been a runaway success, it is important to recall that the service is based on proprietary technology. What MIE will do is to enable this successful business model to be replicated in a global IP environment – both wireline and wireless – that is network managed end to end.

“The Smart Mobile Internet”

The ability to charge for content hosted in the Net changes everything and opens up the market. Subscribers will no longer be limited to the service portfolios of their network operator. The proposed solution would overcome the restraints of walled gardens, which are not working well and are anyway set to be overtaken by Internet-driven competition. Instead it allows operators to bring the full power of the Internet to their subscribers and still derive significant revenue streams. Thus, a new open model – a world garden – is set to replace the walled garden.

This smart Mobile Internet concept also works well for content providers. Now they can promote their own brand and the commercial pressure to work with a single, large operator is eliminated. In addition it allows the smaller operators to move up the value chain and become mobile service providers.

Billing has been the historic bottleneck, but its removal is only part of the picture. MIE puts networking intelligence where it belongs, at the edge, and this is the natural place for IP-based applications such as messaging, location-based services, personal and group information management, etc. And because this is a technology neutral place, the services and applications can be accessed over any network: regular GSM, GPRS, 3G, W-LAN and the wireline PSTN. In addition, multinationals could employ solutions on their corporate network in order to get a consistent set of services and applications for their mobile workforce.

It's a very big cake

The market for mobile services is new and therefore hard to quantify, but the success of short message services in Europe indicates that it will be huge. More than 50 billion text messages were sent over GSM networks in the first three months of 2001 and the GSM Association is forecasting a total of 200 billion messages during a full year. Likewise, the number of users of NTT DoCoMo's i-mode service in Japan at the beginning of May 2001 was over 22 million and over 300,000 new subscribers are added every week.

These figures clearly indicate that when the right service concept is introduced it is taken up with considerable enthusiasm by the market and significant new revenue streams are generated very quickly. However, it is equally clear that V1.0 of the Wireless Internet was not the right concept and it fell far short of the market's expectations.

Getting the best out of both worlds

The current situation is confusing. The Old World is telephony and smart phone centric; the New World is Internet and PDA centric. And the negative publicity currently surrounding the telecoms sector in general and 3G in particular is unfortunate. Nevertheless, given the magnitude of the market for smart Internet services and applications, it is clear that real solutions are going to be found.

Realising the vision of a smart Mobile Internet is not a simple task. It involves in-depth technology knowledge and experience in both the Internet space and that of cellular telephony. And it must be technology neutral. Thus, accomplishing this task would be hard for a vendor of IP hardware or a company that is established in the cellular telephony arena. Their agendas would show through: the solution would, inevitably, be either Net- or telco-centric.

Tahoe Networks, on the other hand, is a new company that has no legacy position in either arena although it does combine data networking expertise from Silicon Valley with Finnish expertise in wireless networking and applications. Tahoe's pitch is that "only by bringing together expertise from both these very different worlds can any company hope to understand the unique challenges of each side and produce a complete solution". The idea is to enable a true mobile Internet breakthrough by tackling all the issues and adopting a technology-neutral approach, i.e. by implementing advanced networking intelligence at the edge of both networks.

Tahoe says that it will deliver a complete portfolio of intelligent networking infrastructure products plus their associated operations and support infrastructure. The company will also work to integrate a complete set of third party services and capabilities 'at the Edge', including addressing and directory servers, authentication, billing, content caching, and the middleware infrastructure for personalised and location based services. This will clearly not happen overnight and the company is talking about a rolling program that involves detailed discussions with prospects plus feedback from the market when trials start next year.

In itself this is a positive development. We have witnessed too many quick-fix 'solutions' in the last couple of years. Some sections of computing industry ship buggy products and fix them later, when they are out in the marketplace, and the WAP standard opened up the world of communications to these vendors. Unfortunately the response of some sections of the communications industry was similar, e.g. early shipments of buggy WAP phones and over-hyped claims for data rates. Let us hope that lessons are learned in the wake of the dot.com collapse and that we get a better balance in future.