Wireless Communications and Internet Messaging

Carrier challenges and opportunities in an evolving market

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**Introduction**

The convergence of wireless and Internet services is afoot. Already in Europe and Asia, millions of wireless customers are enjoying the benefits of advanced text messaging features on digital wireless telephones and other handheld devices. The advanced services deliver not only messaging but subscriber-specific content such as stock quotes, weather reports, and sports scores, as well as Web browsing and interaction with yellow page services.

An important part of this revolution is the Wireless Application Protocol (WAP). Defined by the WAP Forum, an industry association of more than 200 members, WAP is the key to realizing full convergence of wireless with Internet services. Current projections estimate WAP to be the dominant protocol for providing wireless information as early as 2001, with more than 500 million Internet-enabled WAP devices in use by the end of 2003.

But as WAP technology is deployed worldwide, wireless carriers will find themselves challenged to support both WAP and legacy non-WAP devices. Over 400 million legacy devices are now in use and constitute the vast majority of carriers’ customer bases. With so many non-WAP devices in use, getting a substantial portion of the subscriber base switched to WAP will inevitably take a long time.

In the interim, the great number of legacy devices, user base upgrade lag time, and simultaneous availability of WAP have the potential to create a “WAP Gap.” As the selection of WAP content and applications grow, a gap in the services available to legacy device users will result in their inability to access the additional services offered by WAP. The WAP Gap has implications for carriers as well, as the inability to extend WAP-enabled services to legacy devices translates into loss of additional revenue. Moreover, carriers risk losing the customer loyalty that WAP engenders through personalized services.

To bridge the WAP Gap, carriers must plan to enhance legacy device support while simultaneously providing WAP. To accomplish this, carriers need to implement a product mix that supports both legacy and WAP device users in a seamless, forward looking, and extensible manner.

This paper takes a look at specific problems that result from the WAP Gap and outlines methods for addressing them using BulletIN.net products. BulletIN.net is a total carrier solution provider of products and services for transmission of two-way digital e-mail and Internet content to and from wireless devices in both Short Messaging Service (SMS) and WAP environments.
The WAP Gap

While WAP is capable of extending the range of useful information accessible to wireless devices, a number of gaps need to be addressed during the transition from legacy to fully WAP-enabled devices.

WAP Customer Loyalty Gap

The widespread availability of WAP content and services has the potential to create a customer loyalty gap for wireless carriers that do not extend WAP to legacy device users. With WAP’s advanced services unavailable to them, legacy device subscribers have less incentive to remain with their carriers and are likely to migrate to competing carriers.

The customer loyalty gap is best addressed by extending WAP functionality to legacy devices and then providing a smooth transition to WAP devices when users are ready to upgrade. The bulletIN WAP Router enables carriers to meet both requirements by assuring a transparent transition from SMS legacy to WAP devices. For subscribers and carriers alike, the bulletIN WAP Router provides a painless transition in terms of WAP content, information, and e-mail services when subscribers upgrade to WAP-capable devices. The bulletIN WAP Router is described in the next section.

WAP Content Gap

The widespread availability of WAP content and applications has the potential to create a WAP content gap for the millions of subscribers whose legacy devices are unable to receive it. The content gap has financial implications for wireless carriers as well, as implementing WAP without taking legacy devices into consideration means bypassing a large revenue opportunity.

At the other end of the spectrum, WAP content developers will be faced with an initially small market and may delay service deployment until a sufficiently large number of WAP devices are in use. If content developers know that the WAP audience can include legacy device users, they are more likely to develop applications and services sooner than might otherwise occur.

To address the WAP content gap, BulletIN.net has developed the bulletIN WAP Emulator, a WAP to Short Messaging Services (SMS) translator that makes WAP content and applications suitable for legacy SMS devices. The bulletIN WAP Emulator is described in the next section.

WAP Operations Gap

The WAP operations gap refers to the gap between the well-documented functionality of a basic WAP gateway and the rich set of installation, management, and provisioning tools needed by carriers. The WAP Forum specifications for a WAP gateway do not address the majority of carrier needs to manage flexible, scalable services. The bulletIN Gateway Manager described in the next section is BulletIN.net’s long-term solution to the operations gap.
Bridging the Gap: BulletIN.net

BulletIN.net has extensive experience in implementing wireless solutions for carriers, with the goal of providing a seamless migration from SMS to WAP and beyond. BulletIN products enable wireless carriers to offer their current subscribers, via their existing legacy devices, mobile messaging services that include Internet access. Very importantly, the products also enable access to WAP-formatted Internet content by the more than 400 million legacy devices in use today.

BulletIN.net’s total carrier solution consists of four principal products: bulletIN WAP Emulator, bulletIN WAP Router, bulletIN WAP Gateway, and bulletIN Gateway Manager. Each product is detailed below.

BulletIN WAP Emulator

The bulletIN WAP Emulator provides a means for non-WAP wireless devices to access WAP content. By translating between WAP and SMS, the bulletIN WAP Emulator extends WAP to legacy wireless devices that use the bulletIN SMS Gateway (see Figure 1).

The WAP Emulator emulates a WAP microbrowser/Gateway combination when it establishes a link to a WAP content server. The WAP Emulator then converts WAP content into a format suitable for SMS wireless technologies, effectively making an SMS device look like a WAP device to selected WAP content.

Implementation of the WAP Emulator represents significant ongoing revenue benefits for wireless carriers and WAP content developers alike. The WAP Emulator allows carriers to offer an ever-expanding universe of WAP content to their existing legacy device customers and thereby extends new services that generate additional revenue.

WAP content developers can also benefit from the significantly expanded audience created by the bulletIN WAP Emulator. By extending the reach of WAP to legacy devices, WAP content will reach many more subscribers than would otherwise be possible.

BulletIN WAP Router

The WAP Router interfaces the Internet to bulletIN SMS and WAP Gateways to direct traffic between outlying applications—such as the bulletIN Desktop product line—and both WAP and non-WAP devices (see Figure 2).

The WAP Router works in conjunction with third-party WAP gateways or the bulletIN WAP Gateway (described below) to benefit wireless device manufacturers, operators, and WAP content developers.
developers. The bulletIN WAP Router allows manufacturers and wireless carriers alike to point to additional applications and services (interaction with desktop e-mail, for example) accessible through their products, while it allows software developers to extend their applications to WAP devices at lower cost.

Figure 2. The bulletIN WAP Router determines the type of device in use and channels traffic accordingly.

A key benefit of the bulletIN WAP Router lies in the operational transparency it offers to both subscribers and wireless carriers. For subscribers, the WAP Router provides a smooth upgrade transition from legacy to WAP device use. Configuration of subscriber-selected features is unaffected by the upgrade and thus eliminates the need to reconfigure or reselect services. Carriers also benefit from the WAP Router’s transparency as no operator-side intervention is required to provision upgraded subscribers’ configurations. This seamless transition from legacy SMS devices to WAP keeps clients happy and reduces churn while it minimizes the amount of carrier time required to maintain the system.

BulletIN WAP Gateway

The bulletIN WAP Gateway is compliant with the basic WAP Gateway specification developed by the WAP Forum. As defined, the WAP Gateway’s function is to translate between Internet protocols and an operator’s existing wireless infrastructure to interconnect e-mail and WAP applications and content to WAP wireless devices (see Figure 3).

Figure 3. The basic WAP Gateway translates between Internet protocols and an operator’s infrastructure.
**BulletIN Gateway Manager**

The bulletIN Gateway Manager is the core of the BulletIN.net product set. A companion product for the bulletIN SMS and WAP Gateways, the Gateway Manager picks up where the WAP Gateway definition stops.

![Diagram of Gateway Manager](image)

**Figure 4.** The Gateway Manager communicates with the bulletIN SMS Gateway and bulletIN WAP Gateway to provide individual configuration, provisioning, and system control functions.

First, the bulletIN Gateway Manager enables complete operator command and control. A rich set of administrative and management tools provide a common control point for much of the data and processes associated with WAP and SMS Gateways (see Figure 4).

Second, the Gateway Manager functions as an information “gatekeeper” that allows operators to configure the capabilities of both traditional Web and over-the-air WAP provisioning interfaces. This approach allows tremendous provisioning, management, and tiering flexibility for individual wireless device accounts, and direct control and easy modification of user-accessible functions according to carrier plan setups and depth of service desired.

Third, the bulletIN Gateway Manager maintains individual subscriber preference information. This enables the Gateway Manager to enable and track the e-mail, Internet, and application features used by each subscriber.

Finally, billing records are maintained by the Gateway Manager as well, providing control and tracking information for both SMS and WAP devices and associated services. Placing the billing functions on a centrally-located component has significant advantages, as this allows the Gateway Manager to serve multiple types of users without loss of features or services when users exchange or upgrade their devices.

Seamless transition from legacy SMS to WAP devices is another benefit of the bulletIN Gateway Manager. Individual users’ device and account configurations are maintained on the Gateway Manager, thereby making billing and preferences information easily transferable when subscribers upgrade to WAP devices.

**BulletIN SMS Gateway**

The bulletIN SMS Gateway serves as the link into an operator’s Short Message Service Center (SMSC) and enables two-way messaging through a standard wireless system. The SMS Gateway
links SMSCs and the Internet and is the only component required for all bulletIN e-mail applications to operate (see Figure 5).

The bulletIN SMS Gateway interconnects operators’ SMSCs and the Internet.

Figure 5. The bulletIN SMS Gateway interconnects operators’ SMSCs and the Internet.

The bulletIN SMS Gateway allows legacy phone users to receive, reply to, and originate standard e-mail messages. To enable useful display of standard e-mail messages on wireless phones, the smaller display must be accounted for. The SMS Gateway does this by stripping header information from the message and displaying only essential information for the user (i.e., the From, Subject, and Attachment fields in addition to the message body).

The SMS Gateway also uses the standard maximum allowable number of SMS characters per message. For messages whose content is longer than the standard, the bulletIN SMS Gateway automatically partitions the content into an appropriate number of multiple linked SMS messages that can be displayed in the appropriate sequence.

The SMS Gateway can reside at the operator’s network location or can be housed at BulletIN.net’s facilities with a dedicated data link to the operator’s SMSC.
BulletIN.net Solution Benefits

Benefits to the Provider

Subscriber reliance on wireless devices is expected to increase significantly as a result of the availability of WAP-enabled services. WAP represents new revenue-generating opportunities for carriers and offers a means to additional marketplace differentiation. Moreover, the combination of services provided by WAP and carrier-specific plans is likely to translate directly to increased customer loyalty and a subsequent decrease in customer churn.

The BulletIN.net product suite supports carriers’ existing non-WAP customer base and provides a smooth transition to WAP and future services. In summary, BulletIN.net solution benefits include:

- **Seamless integration into existing networks** – Existing SMS infrastructure can be used to offer value added services that generate revenue today while also providing a seamless migration path to WAP and future technologies.
- **Wireless interface standards independence** – BulletIN.net’s WAP Emulator, Router, and Gateway products operate in CDMA, TDMA, and GSM environments.
- **Reduced customer churn** – Extending the service and functionality of legacy devices increases customer loyalty and reduces the likelihood of losing customers to competitors.
- **Customer base expansion** – Extending WAP capability to SMS provides an increased customer service level capable of retaining legacy device subscribers while simultaneously supporting new and upgraded WAP device users.
- **Future-proofing** – BulletIN.net products are designed to ensure compatibility with new higher speed bearer services such as GPRS, EDGE, and 3G that WAP and other protocols will leverage in the future.
- **Competitive advantages** – Carrier-specific plans allow for greater product and service variety, customization, and differentiation.
- **Generation of incremental revenue** – Additional functionality tends to increase service usage by subscribers and therefore adds to the bottom line.
- **Seamless transition from legacy SMS to WAP** – Subscribers who upgrade from legacy to WAP devices are transitioned with little or no carrier-side provisioning intervention and retain feature and functionality configurations.

Benefits to the Subscriber

The timely delivery of information to an easily carried device such as a cell phone is an especially attractive quality of wireless messaging. WAP further extends these capabilities to enable personalized delivery of headlines, stock quotes, weather reports, and sports scores as well as interaction with Web pages and information sites such as yellow pages.

Subscribers enjoy additional advantages when carriers deploy products from the BulletIN.net product suite. In summary, BulletIN.net solution benefits include:

- **Immediate access to new services** – Subscribers can continue to use their standard legacy SMS-capable wireless devices to access WAP-enabled services.
- **Transparent access to Web and Internet-based information** – Easy, secure access to Internet-based information and services.
• User profile persistence – User profile configuration is automatically retained as users switch or upgrade their wireless devices.
• Flexible service tier configuration – Subscribers can choose from a suite of services and upgrade as desired.

**Conclusion**

WAP promises to deliver the next great leap forward in wireless services and applications. For wireless carriers, WAP represents tremendous challenges in deployment and in transitioning a very large installed base of non-WAP devices. The transition period will be particularly long, and carriers that implement WAP without taking legacy devices into account risk bypassing a large revenue opportunity. Moreover, such carriers risk losing customers to others that are able to supply these services. Finding a proven wireless solutions provider is the key to meeting these challenges.

BulletIN.net has extensive implementation expertise in total wireless carrier solutions and user-friendly SMS services, with routing and application support for both WAP and legacy devices. Multiple successful BulletIN.net wireless carrier solutions are implemented worldwide.

BulletIN.net is committed to providing leading edge products capable of providing a seamless transition to WAP and future services. BulletIN.net knows what it takes to get wireless done.

**About BulletIN.net**

BulletIN.net is a leading provider of two-way wireless Internet messaging products and services for wireless carriers. Currently working with wireless partners including BellSouth DCS, Vodafone UK, and Vodafone NZ, BulletIN.net has over 100,000 provisioned subscribers. With six office locations worldwide, BulletIN.net is able to provide service and support for a global market.

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