



7010 W. Hwy. 71,
Suite 340 PMB 386
Austin TX 78735-8331
www.igillottresearch.com

White Paper

Wireless Access to Email Attachments and Documents

Introduction

Mobility suggests that a user can take whatever they want with them wherever they go. By extension, this would suggest that the business professional would therefore be able to access their business desktop environment, as well as corporate email and data sources, from their personal mobile device, no matter the type of device they are using or their location. While email has been available to wireless devices for some time, email attachments and corporate documents have presented something of a problem, due to their size and various formats, to mobile solutions developers and vendors. But to be of true value to the corporation or organization while mobile, the vendor's mobility solution must enable to access, and action, email attachments and documents.

In the past, a variety of problems have made integrating email attachment and corporate document access difficult for developers. This situation is rapidly changing, however, due to the use of Internet technologies and standards, browser technology in mobile devices and new methodologies and approaches to accessing and displaying the information.

The goal of this paper is to highlight three main areas:

1. The growth in the wireless market for email attachment and corporate document access from mobile devices and the opportunity this represents for the mobile solutions developers and vendors
2. The strengths and weaknesses of the main methods used to provide this capability
3. The benefits, and need for, wireless solution developers and vendors to obtain this capability through an OEM arrangement.

Methodology

Information for this white paper was collected from:

- Forecasts were prepared by *iGillott*Research using baseline information from the CTIA
- Network evolution information is from an analysis by *iGillott*Research of information from the world's major wireless infrastructure vendors, wireless device manufacturers and mobile operators
- Case study interviews with companies in the U.S. who have implemented wireless email and document access applications for use by remote or mobile workforces.

Disclaimer

The opinions expressed in this white paper are those of *iGillott*Research and do not reflect the opinions of the companies or organizations referenced in this paper. All research was conducted exclusively and independently by *iGillott*Research.

Wireless Market Opportunities

The world's wireless markets are about to undergo a fundamental shift from a predominantly voice-centered industry to one incorporating content and multimedia. While this is happening already in some markets, notably Japan and Korea, the majority of the world's subscribers are using voice services with some messaging. As a result, the majority of the wireless solution vendors (both software and hardware) have in the past catered to the voice and SMS opportunity.

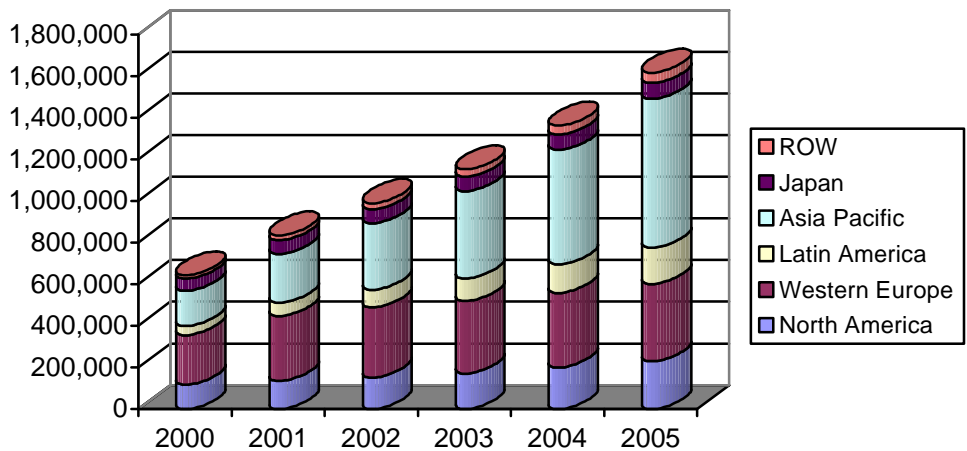
As wireless and mobile Internet access services become more prevalent, and more usable, so the mobile vendor's solutions will change to incorporate applications of greater functionality and value. Traditional market segmentations between business and consumer users will disappear, as services and devices allow users to mobilize all aspects of their life, from personal to professional. Rather than using a mobile handset for business or for personal use, the populace will have a personal mobile device that will use to access content interesting to them as an individual and content and applications required for their professional lives. Consequently, the competitive landscape for the mobile software and hardware vendors will shift to incorporate these capabilities.

Mobility suggests that the user can take whatever they want with them. By extension, this would suggest that the professional would therefore be able to access their business desktop environment, as well as corporate email and data sources, from their personal mobile device. While email has been available to wireless devices for some time, email attachments and corporate documents have presented something of a problem, due to their size and various formats, to mobile solutions developers and vendors. But to be of true value to the organization while mobile, the subscriber must be able to access, and action, email attachments and documents.

Figure 1 shows the forecasted growth for the worldwide wireless and mobile subscriber base, and therefore the size of the ultimate opportunity for the mobile vendors, through 2005, split by region. In 2000, the largest region is Western Europe, but by 2005, the Asia Pacific region claims the top honors.

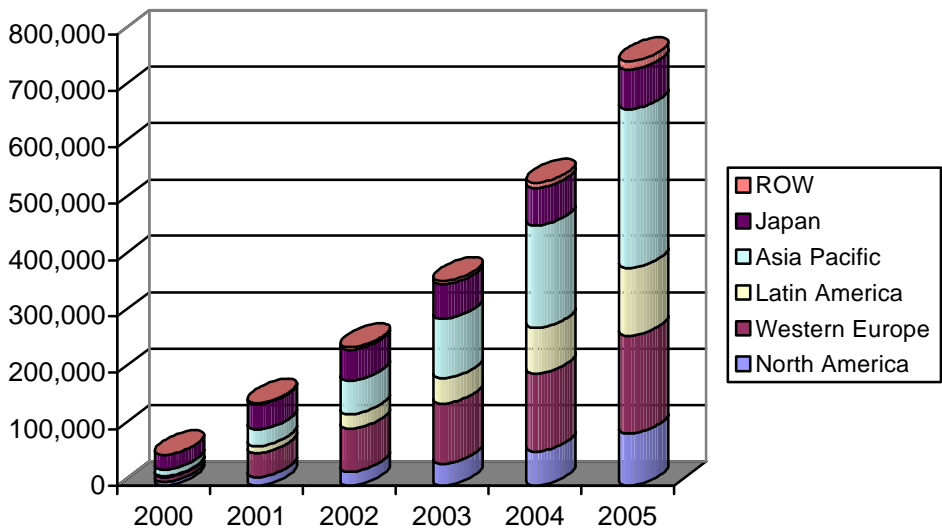
Derived from this forecast is the model in figure 2, showing the number of subscribers who will have the capability of accessing the Internet from their wireless device. By 2005, out of a total wireless population of 1.62 billion subscribers, nearly 752 million (over 46 percent) will be capable of Internet access. Or put another way, approximately 11 percent of the world's population will be able to access the Internet from their personal wireless devices (the total wireless penetration in 2005 will be approximately 25 percent). For vendors offering wireless and mobile solutions that address this market, this growth represents a considerable opportunity.

Figure 1: Worldwide Wireless & Mobile Subscribers, 2000 – 2005 (000s)



Source: *iGillottResearch*, 2001

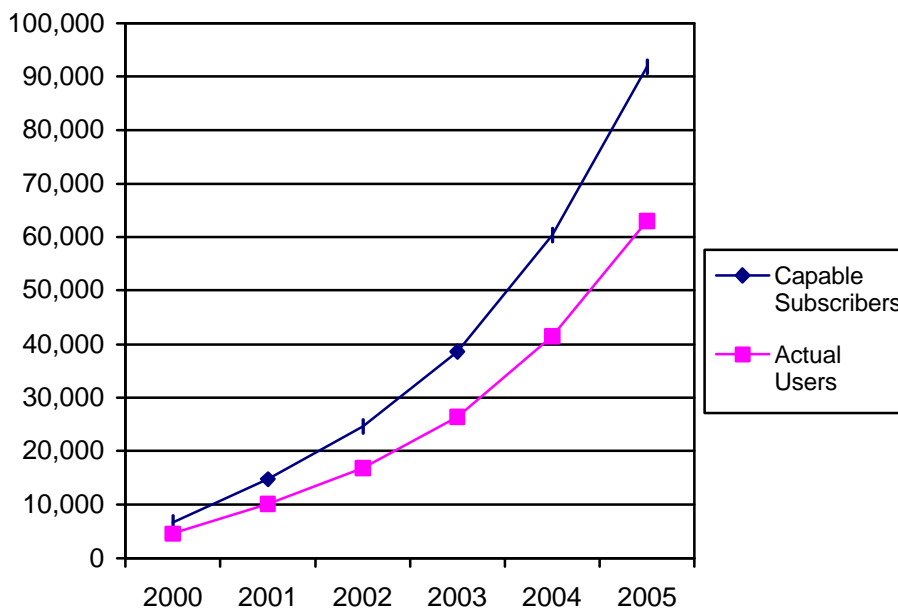
Figure 2: Worldwide Wireless & Mobile Internet Subscribers, 2000 – 2005 (000s)



Source: *iGillottResearch*, 2001

Of course, we cannot expect all of the subscribers who are capable of accessing the Internet to actually do so on a regular basis. While some will be regular users, downloading content and applications frequently throughout the day, others will use little or none at all. Figure 3 shows the expected number of actual mobile Internet subscribers for North America compared to those that are capable. This model shows that by 2005, 68 percent of Internet-capable mobile subscribers (nearly 63 million) will use the service on a regular basis.

Figure 3: North American Wireless & Mobile Internet Subscribers, 2000 – 2005 (000s)



Source: *iGillottResearch*, 2001

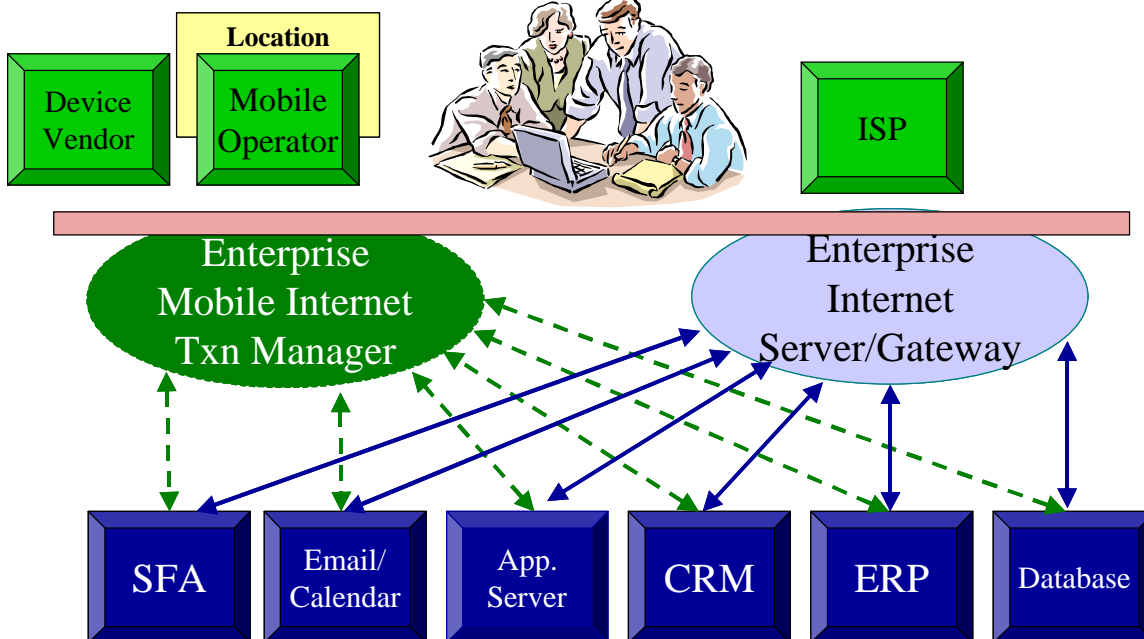
For many of these 63 million subscribers, and about 380 million more worldwide, solutions that allow access to documents on the corporate desktop or server will be critical. Information will need to be viewed, actioned, forwarded, or deleted as required, no matter where the user is located or what device they happen to be using. Just as email changed the way the business world communicates, so mobile solutions will again revolutionize the way information flows around, and between, organizations.

iGillottResearch believes that any corporate IT department would be ill-advised to implement any new enterprise IT solutions without first considering the implications of wireless technology on that application or environment. In 18 months time, all new enterprise applications and environments will have to incorporate, or account for the effects of, wireless and mobility in some fashion. Global competition, and the ability to move information, content, and documents around an organization, will depend on mobility solutions.

This scenario presents several challenges for the wireless and mobile solutions vendor today. As we have already shown, the number of potential users is set to explode. Hence the vendor's mobility solution must be able to scale as the number of subscribers and departments supported grows both regionally and worldwide.

Figure 4 shows a typical structure for a vendor-sourced mobility server (depicted as the mobile Internet Transaction Manager) in the enterprise. The users access corporate information, documents and applications through the mobile operators who connect to the transaction manager located behind the corporate firewall – this model assumes that the corporation has licensed the necessary software from the mobile solution vendor and has had the application installed on hardware in the corporation's own data center. For added security, the link between the transaction manager and the operators may be via VPN.

Figure 4: Enterprise Wireless Implementations



Source: iGillottResearch, 2001

As the green dashed lines in this diagram show, the transaction manager will pull information from various places in the corporate IT infrastructure to provide the mobile user with the information their need. Whereas a desktop top user may see a wide variety of information on a single screen, or can quickly move between application screens with the swipe of a mouse, the mobile subscriber is limited by the memory on the device and the size of the screen. Mobile applications therefore tend to be more concise and focused in the information they access, store, process and display – this presents an added challenge to the mobile solution vendor who must develop an application flexible enough to handle a wide variety of needs. While small amounts of data can easily be accessed, the user will also need access to larger corporate documents and files, such as spreadsheets and presentations.

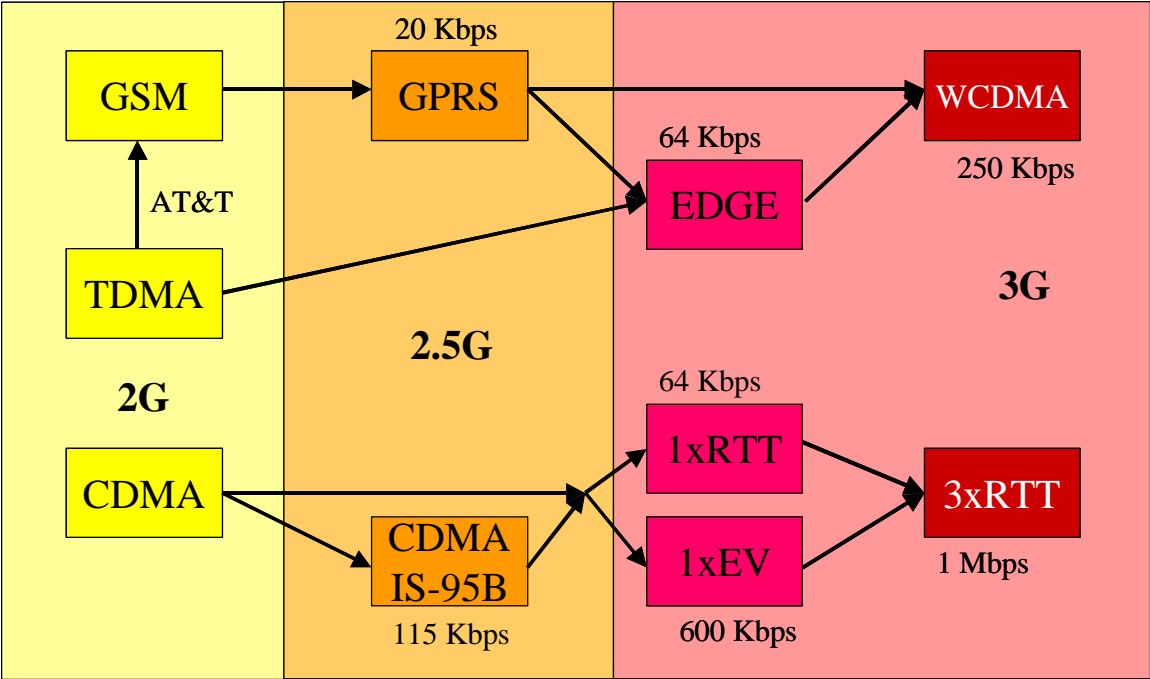
The situation is further complicated by the fact that some of the corporate applications may be brand new, using the latest technologies, while others may be legacy systems that have been maintained and modified for many years. Thus, the vendor must integrate their solution into both old and new architectures.

As well as documents of varying size, multiple formats must also be accommodated by the vendor's mobile solution. The proliferation of Internet-based content has resulted in an equal growth in the number of file formats. Consider that the mobile user will need to access many of the following: .xls, .doc, .pdf, .wav, .ppt, .htm, .xml, .dba, .jpeg, .mpeg, .mp3, .gif, .bmp.

The final complicating factor for the mobile solution vendors is shown in figure 5 – the migration of current second generation digital wireless networks through 2.5G systems to 3G networks, which promise increased voice capacity for the operator and multimedia capabilities for the subscriber. While the purpose of this paper is not to debate the migration strategies of the wireless industry, it is important to understand that all of the technologies shown in this diagram may exist in a single market. For example, Japan

already supports PDC (a version of GSM), CDMA IS-95B and will soon launch WCDMA (Wideband CDMA). Western Europe already supports GSM and GPRS and will soon have WCDMA – EDGE is also a possibility. North American operators have announced plans to deploy all of these technologies at various stages throughout the next five years.

Figure 5: Wireless network Evolution from 2G through 2.5G to 3G



Source: *iGillottResearch*, 2001

The mobile Internet transaction manager in the enterprise will be physically insulated from the individual characteristics of each operator’s network system. But the vendor’s solution must also understand, and account for, the range in bandwidths the variety of networks will offer.

For example, a subscriber in London may have access to a high bandwidth service using WCDMA and then take a train to Paris. While on the train, he only has access to GPRS, with much reduced bandwidth – the transaction manager formatting the documents and information must be able to accommodate the decrease in available bandwidth while on the train.

Current Approaches

Obviously, there are many different ways to address the problem of wireless document access. Since the early days of the wireless data industry, many have tried to tackle this problem. Three common methods used by vendors and developers to provide access to attachments and corporate documents are to forward the document to another email address (one on a device capable of viewing the attachment), fax machine or server, to extract the required information from the document (called parsing), or simply to build a custom application to present the required information to a limited set of users. Of course, these methods have limitations.

A fourth option, as we will discuss, is to use file filtering and interpretation technology to transform, or render, the required document into a format the requesting device can display and process.

Forward to another email address, fax machine, server

The simplest method for accessing email attachments and corporate documents is simply to forward the document to a local fax machine, in a hotel, a client location or a local business services store. This capability has been available for some time, but has not been a success, due to the obvious reasons of security and convenience.

An extension of this methodology is to request the document or attachment be forwarded to another email address, one that can be accessed from a desktop. The user can then view and edit the document as required. But this, of course, assumes that a desktop is available. And begs the question as to why the user would choose a mobile delivery solution if they then had to go to a fixed desktop to access the attachments or critical documents.

The additional expense that may be incurred in forwarding the email to a fax machine or a PC should also not be overlooked. And obviously, this solution does not scale well if the user receives multiple email attachments per day or needs to access documents on corporate servers on a frequent basis. These solutions also tend to be unreliable – think of the number of times a client or customer has said they sent a fax but it was never received. Now imagine that scenario with critical business documents!

Another limitation is the limited number of document formats that can be supported. As already discussed, the number of file format types used in the IT environment is proliferating. Some of these formats cannot be interpreted by a fax machine and so therefore cannot be forwarded to a local fax machine or fax server. Also, if the user is required to forward the document to another email address and then access from a convenient PC, they are reliant on the fact that that PC has the required software loaded to access and edit that document.

A further problem is presented if the document or email attachment contains color graphics or multimedia – again the fax machine will fail to interpret this content correctly. This may be a critical issue if the color diagrams or multimedia items are critical part of the document's information and meaning.

The final limitation of this method accessing email attachments and corporate documents is perhaps the most serious: the fact that the user experience in the mobile environment differs considerably from the desktop experience and requires a change in behavior.

Since the start of the wireless data industry in the early 1990's, the failure of many products, services and devices have proven that the mobile experience must match the desktop experience as closely as possible. When the user is required to significantly change their behavior to use a service or device, that product fails. Since the desktop PC experience has set the standard for the 'normal' business environment, the mobile environment must match this as closely as possible.

Custom-built solution to take a particular file type or application

The second option for accessing email attachments or corporate documents from the mobile device is simply to build a custom application capable of displaying and/or accessing the document on the required mobile device. While this may seem cumbersome and unworkable today, in fact this was the route taken by many corporations as they struggled to implement wireless data solutions over the past decade. Two examples of this approach are Federal Express and UPS, both of whom developed bespoke hardware and software just to input, confirm and transmit package delivery information. If they were implementing these solutions today, they would probably not have chosen the custom option.

Aside from the expense of developing custom solutions, there are other limitations presented by this methodology:

- Additional or new file formats must be incorporated into the custom application by the IT department. This contrasts with an off-the-shelf application where the file format updates would be supplied by the vendor
- Custom solutions are difficult to scale, unless the application was designed from the beginning to support all of the anticipated users. However, custom wireless applications have in the past usually been designed for a specific purpose, with little anticipation being given to the fact that the usability will increase or that other employees would require access. Thus, the scalability of custom wireless applications has been very difficult to manage
- Perhaps the biggest issue with custom wireless applications is that they are designed for a limited set of mobile devices. In the early to mid-1990s this was not much of a problem, since there were few devices capable of wireless access. But today, there is a wide choice for the end user. And nearly all of the mobile workers who need a mobile phone or PDA have one. Thus the custom application will today have to support the devices that the employees use and own, as opposed to telling them what to buy. This problem is especially acute for email attachments and corporate documents, since the device must be capable of displaying all of the information required.

Parsing to summarize the document

Another approach for accessing corporate documents and email attachments is to remove, or parse, the relevant information from the document, using intelligent routines, and present this reduced content to the user for action. It is important to understand that parsing does not present the whole document, just the information the parsing routine thinks is relevant based on a set of predetermined rules.

Of course, the problem with displaying part of the document is that the user may need to view the whole document. And the parsing routine is determining what content to display

and what to discard. This approach tends to work well with content that is usually presented in a standard format, such as a press release or a financial statement – in these examples, the parsing routines can fit the content to the predetermined format and give a high degree of accuracy. Parsing therefore works well when the application is required to present information that is formatted in a similar way multiple times per day.

But larger documents or content that does not follow a standard format (such as company reports, sales documents, or marketing literature) present a problem. As the information, format and layout of each document are unique, the parsing routines must be flexible enough to recognize and extract the valuable content. This is difficult since each document is unique and the true value of the content may be contained in a chart, table or diagram. Variations due to language or dialect and unusual file formats are also difficult to manage using this approach.

As with the custom approach, the mobile user experience differs considerably from the desktop environment. For example, the document the user may have been editing on their desktop will be parsed and reformatted for access in the mobile environment – the document will therefore appear considerably different from the version the user had been working with previously. This is a major problem.

File filtering and interpretation technology

The latest approach to displaying corporate documents and email attachments, on the wide variety of wireless devices that are used by mobile employees, is to use filtering and interpretation technology, as typified by Stellent's Outside In Wireless Attachment Server.

This approach leverages the power of the Web and the fact that browsers, both desktop and mobile, can display content originating in multiple formats. The steps taken to display a document are as follows:

- The user requests access to the document from their mobile device, usually by selecting the appropriate link. For example, in the case of an email attachment, there will be a link to the attachment at the bottom of the email message body. The request is sent from the mobile device to the application on the corporate server or email server
- The document, and the document type, is then identified by the application (residing on a server, not on the mobile device) and passed through the filtering routines. Filtering simply interprets and normalizes the content – this is known as rendering
- The text, graphics and other multimedia are then tagged appropriately for the mobile device, so that user will be able to view the entire document. Note that no content is dropped or summarized – all of the diagrams, charts and content can be displayed
- Next, the content is merged with a predetermined template (for that type of mobile device) to support navigation and breaks at the appropriate place in the document for that device. For example, a PDA will be able to display a larger amount of information in one screen than a smart phone or WAP handset
- Finally, the rendered document is delivered to the mobile device via the wireless network.

This method of accessing documents has several inherent advantages compared to the other solutions discussed previously:

- Since the solution uses Internet standards and technologies, common file and media formats are supported by both the server-based application and the mobile device. And as new file formats are defined, they need only be added to the application and the filtering routines.
- The same applies to new device types and browsers – the characteristics of the devices and/or browser need only be added to the application by adding a new template. No changes are required to the browser or the device itself. For example, if a new employee has a WAP-enabled smart phone supporting WML, the application will return the document converted to WML in linked 1,300 byte decks, based on the template for that device. Graphics may be deleted (optional) to save on airtime and speed the delivery time over the network. Another employee may require access to the same document but since they are using a Pocket PC PDA, they receive the document in HTML with full color graphics. The use of templates greatly eases the manageability of the mobile application and scalability
- Rendering also allows the document, displayed on the mobile device, to retain the formatting, such as bold text and bulleted lists. This aids navigation through the document, as well as the readability
- Perhaps the biggest advantage of this approach is that the user experience is very similar between the mobile device and the desktop PC. Since the entire document is rendered on the mobile device, the user sees all of the content. Charts and diagrams appear on the mobile device as they would on the desktop. Thus, no change in behavior is required by the user to access the document or email attachment – the user just clicks the link as they would on the desktop.

Incorporating Wireless Document Access Capabilities

Email is as pervasive in business today as voice mail was ten years ago and the fax machine was a decade before that. Business simply cannot function without email today. Wireless access to email is growing fast and is set to accelerate in the next few years, as 2.5G and 3G wireless networks become available. The higher bandwidths supported by these networks will allow enterprise users to economically download email attachments and corporate documents to their mobile devices.

For wireless solutions developers and vendors, the question therefore is not whether to include support for email attachments and access to corporate documents, but when. Just as support for Instant Messaging is required by most CRM applications today for the vendor to be competitive in the marketplace, so the same will be true of wireless solutions vendors and wireless email in the next twelve months.

For the vendor, there are two main decisions to be made as to how they are going to support email attachment and corporate document access: what method should be used and should the capability to view documents be built or incorporated from another vendor? The previous section answered the first question and clearly demonstrated the advantages of filtering and interpretation technology over the other access methodologies.

*iGillott*Research believes the answer to the second question is just as simple: use an OEM solution. It makes little sense for a wireless solutions vendor to re-invent and re-develop a wireless document access application when vendors such as Stellent offer their Outside In Wireless Attachment Server capability to other vendors on an OEM basis. By partnering to gain access to the document management capability, the wireless solutions vendor is able to concentrate on their own market niche and their own product differentiation.

With the increased complexity of wireless solutions, the ability to partner to provide a complete solution has become a critical success factor for most vendors in the industry. Even established companies such as Motorola, Microsoft, Ericsson, and Qualcomm have partnered with other vendors, sometimes far smaller than themselves, in order to satisfy the needs of their customers. The fact is that no one company can do everything alone – everyone needs someone else.

Another reason to consider using an OEM solution as the best way for vendors to incorporate access to email attachments and corporate documents is the speed with which technology changes in the wireless industry. In addition to needing to support a wide variety of new 2.5G and 3G devices in the next few years, the applications must also be able to address the migration from WML to XHTML and then XML, as well as support for color and multimedia on WAP devices. The definition of content will also expand in the next few years to include not just text, graphics and multimedia, but also commerce transactions, Java applets, and intelligent agents. The document access applications must be able to easily scale to accommodate this evolution.

When considering which OEM application to incorporate, support of industry Internet standards should be critical. This allows the enterprise IT department to more easily maintain the solution, since it will be based on standards with which they are already familiar. For example, Stellent' Outside In Wireless Attachment Server is based on Internet standards in wide use today. As well as increasing the overall time to market of the solution (and hence increasing the ROI), this approach also allows changes to be made more easily.

Conclusions

This paper has presented three areas for consideration regarding wireless email attachment and corporate document access: the potential growth of the market, worldwide; the benefits and drawbacks of the main methods of accessing attachments and documents; and how wireless solution vendors can incorporate document access capabilities through an OEM arrangement. From this analysis, there are several firm conclusions to be drawn:

- The wireless email attachment/document access capability must be scalable and future-proof, in terms of the networks and devices supported and the range of file formats that can be accessed. Given the speed of innovation in the Internet industry, new file formats are inevitable. The wireless Internet access industry is quickly converging on Internet standards and will soon start to lead the development of new standards and formats. Any document access solution must therefore be able to quickly and easily incorporate support for these new formats
- Scalability also means the ability to support a rapidly increasing number of employees using a range of devices and networks. By the middle of 2002, the reality will be that a single subscriber or employee will use different wireless devices to access content from different locations at different times of the day. Internet access from the car, a laptop, a smart phone and a PDA are also possible, and in use, today. Couple the proliferation of devices and networks with the increasing number of users and the fact is that the wireless email attachment/document access application must be able to scale not just for hundreds of thousands or millions of users, but tens of millions of subscribers
- As the corporation's IT infrastructure becomes more complex, so the job of the IT department becomes harder. New applications, file formats, interfaces, communications protocols and standards mean more training and more specialization. And more complexity leads to higher costs for the internal IT expertise required. It is therefore important that mobile vendors' solutions, such as access to email attachments and corporate documents, leverage technologies and standards with which the IT department is familiar – this reduces the cost of support and increases the penetration of the application with the organization
- History has shown many times that the best technology will not be adopted unless it is intuitive and easy to use for the customer. If a solution requires a major modification in the way the user has to behave, then generally it will not succeed. The desktop PC is a good example of this – the early PCs used, as PCs do today, a standard QWERTY keyboard just like a typewriter, and the first applications were for word processing. The PC started to replace the typewriter in the office, and then became indispensable as the full computing and communications potential of the platform was realized, simply because many people can already type and were comfortable with the interface – no modification was necessary. The same must be true of wireless applications, especially where email is concerned. The vast majority of businesses use email and most employees are very comfortable with the environment. Therefore, wireless email access must duplicate the experience of the desktop as closely as possible. Requiring users to change the way they interface with their mobile email will lead to failure

- Finally, the wireless industry has been built through partnerships, such as between the mobile operators, the handset vendors and the network equipment manufacturers. New air interfaces can only be developed through successful partnerships between these three groups of companies. It makes little sense to duplicate the development of a capability that can be obtained through partnership or licensing, especially for fundamental applications such as email attachment and corporate document access. The speed at which technology changes (especially in the wireless industry), the need to provide this basic functionality in a wide range of applications, and the proliferation of software developers looking at high-value applications, mean that the OEM solution makes the most sense. Why should a vendor waste resources reinventing when they can originate or develop something new?

About *iGillott*Research

*iGillott*Research is a market strategy consultancy *focused* on the wireless and mobile communications industry. Founded by [Iain Gillott](#), one of the wireless industry's leading analysts, we research and analyze the impact new wireless and mobile technologies will have on the industry, on vendors' competitive positioning, and on our clients' strategic business plans.

Our clients typically include service providers, equipment vendors, mobile Internet software providers, wireless ASPs, mobile commerce vendors, and billing, provisioning, and back office solution providers. We offer a [range of services](#) to help companies improve their position in the marketplace, clearly define their future direction, and, ultimately, improve their bottom line.

A more complete profile of the company can be found at www.igillottresearch.com.