

Integrating Wireless PDA Technology with an Enterprise Application



Table of Contents	
Executive Summary	2
Introduction	3
History	3
Technology	3
Web-Based Software	3
Wireless Technology	4
Security	7
Benefits	8
Increased Productivity & Efficiency	8
Reduced Costs	8
Higher User Acceptance	8
Increased Data Integrity	8
Example: Industrial Hygiene Sample Form	9
About Spiramid	10

Executive Summary

Until recent, the use of Personal Digital Assistants (PDAs) by EHS Professionals was neither feasible nor practical. The operating systems and software available required far too many screens for data entry and the memory available on PDAs was not sufficient to store all of the reference data required to operate an enterprise application. The use of PDAs was limited to site-specific applications and required significant IT support and replication and synchronizations processes; all of which resulted in an inefficient process and a poor return on investment (ROI).

We, at Spiramid, have combined our Internet forms with the latest wireless technology to remove these barriers, provide a good ROI and greatly increase user acceptance. These new technologies allow Corporations to use PDAs with their Enterprise applications.

Our design enables the PDA to be a 100% thin client. In other words, all of the software and database reside on servers, not the PDA. The application and database are simply accessed through a web browser.

There are many benefits of this design. First, the time consuming process of synchronizing, downloading reference data, etc. are removed, allowing the EHS Professionals to simply enter their data directly into the application. Additionally, the software upgrades are applied once to the server rather than to each PDA.

You no longer have to standardize on the PDA, operating system, or worry about the need to upgrade the PDA. Any PDA with access to a web browser will work with these technologies. This offers significant cost savings both short and long-term.

Introduction

Over the past few years, EHS professionals have begun to use Personal Digital Assistants (PDAs) to capture their data. While these devices have improved, their realistic use with an integrated enterprise application has been limited.

This paper will discuss the limitations and challenges and provide guidelines for an effective solution; simplifying the use of PDAs along the way.

History

The founders of Spiramid have been evaluating the use of PDAs with the Health & Safety Suite since 1997, when the application was originally developed by Oracle Corporation. Until recently, PDAs had significant limitations that did not make their use feasible for the enterprise application. These limitations included:

- Insufficient memory to store/access:
 - Personnel records
 - Historical/reference data
 - Pick lists/list of values
- Poor operating systems and form building software
- Limited screen size
- Required significant IT resources

The efforts to use PDAs with these limitations made its use not feasible or practical. In late 2002, Spiramid conducted research and found technologies, that when used effectively, can remove these limitations. The technologies include the use of web-based software and wireless communication to the Inter/Intranet.

Technology

Web-Based Software

In our effort to determine the new technology platform for our next generation EHS software, we discovered most web-based coding standards required software such as Java Applets or Active X Controls on the “client” or user PC.

One key requirement for our new software was to ensure the application ran completely from the Browser and did not require additional software on the client (i.e. 100% thin client). One key reason for this requirement is the standard desktop platform design that most Corporations are moving toward restrict any new software installations. Our new technology does not require any new software installations, just a web browser.

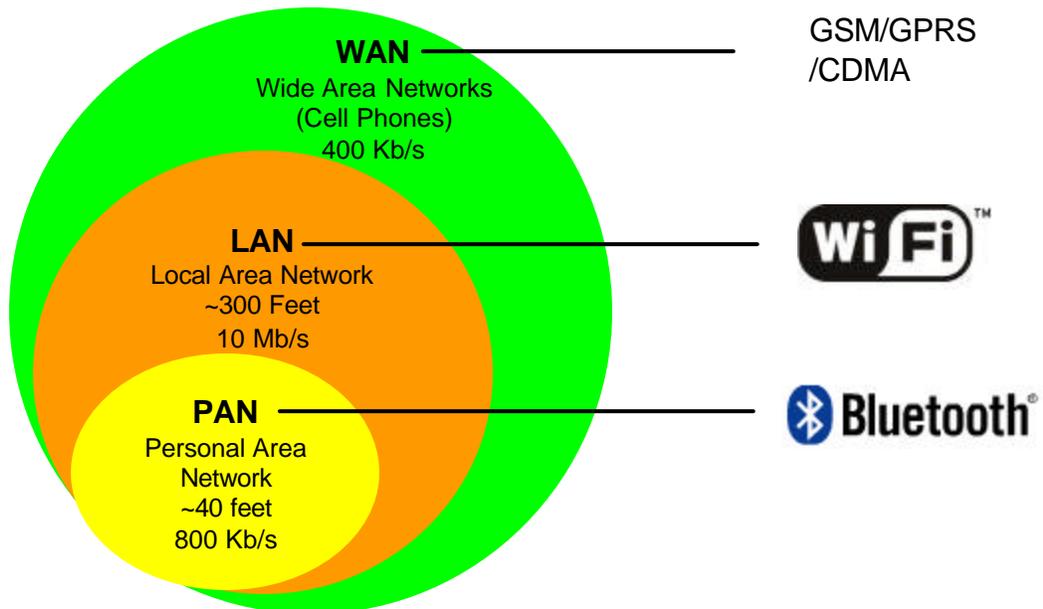
Wireless Technology

Overview

Wireless technologies enable PDAs to access web-based software in remote locations, far from your network/wired connection. These technologies are continuously evolving; improving their range and transfer speeds.

There are three major types of wireless technologies; Bluetooth, Wireless Fidelity (WiFi) and Smart Phones/Hybrids. Figure 1, below, illustrates their typical range and bandwidth.

Figure 1



Bluetooth

Bluetooth uses a radio frequency (2.4GHz) to communicate with PCs, PDAs, printers, headphones and other devices. The standards were developed by the Bluetooth Special Interest Group, which is made up with the leading technology companies around the world.

Although other devices (e.g. cordless phones) operate at 2.4 GHz, interference is unlikely due to Bluetooth's spread-spectrum frequency-hopping technology. Simply stated, Bluetooth devices randomly change frequencies over a thousand times per second.

The best benefit of Bluetooth's technology is that devices can find each other without the user's having to do anything. All Bluetooth devices depend on a set of rules, or profiles, to communicate with each other. For example, this allows a PC to know it is talking with a printer or a cell phone know it is talking with a PDA.

Bluetooth technology is ideal for short-hop communications, but is not designed for wireless networks. Bluetooth devices can only communicate 40 feet before the signal begins to deteriorate. This enables the technology to be ideal for PC components and enabling a PDA to get to the Internet through a Bluetooth cell phone.

While Bluetooth is still relatively new, it may in the near future replace the use of IR devices such as remote controls. IR devices must be used in the line of sight, while Bluetooth is able to work through walls, floors and even your kids standing in front of the TV.

WiFi

Wireless Fidelity (WiFi) are certified by the WiFi Alliance, an international trade organization that tests wireless equipment to ensure that it meets industry-specific standards for interoperability. WiFi networks usually refer to three wireless stands, or radio technologies: 802.11b, 802.11a and 802.11g.

Most common is the 802.11b, which transmits 11 Mbps (megabits per second) for up to 300 feet. As you travel away from the access point, connection speeds decrease. Range is also affected by the layout of the area (i.e. walls, floors, etc.). 802.11b and 802.11g signals penetrate obstructions better than 802.11a signals.

If interference is an issue, the 802.11a standard operates at 5GHz band, which is not as commonly used by other devices. This standard

also yields faster speeds (up to 54Mbps). The only downside is a shorter range of use (25-75 feet).

The latest standard, 802.11g, offers speeds up to 54Mbps on the 2.4 GHz radio band with the same range capabilities and are compatible with 802.11b devices.

Smart Phones/Hybrids

Cell phone and PDA manufactures have joined forces to build cell phones with integrated PDAs (commonly called Smart Phones or Hybrids). This enables the direct access to the Inter/Intranet with dialing up the Internet Service Provider (ISP) phone number.

Be careful before purchasing - these are still cell phones. Therefore, the models are limited to a wireless service provider. For example, the latest item on the market, Palm's Tungsten is only available with AT&T's network (at the time of writing this paper). Ensure the Hybrid you are purchasing has the cell phone service you want to use.

Another issue with hybrids is you have to replace both the PDA and phone when either technology becomes outdated. How often do you change your cell phone? If often, this is an issue you may want to consider before purchasing.

Another option is to purchase a Bluetooth-enabled cell phone and a Bluetooth-enabled PDA separate. The two devices will automatically talk to each other through the Bluetooth wireless technology. This offers the same direct access capability of a Hybrid, but offers the flexibility to switch your phone separate of your PDA.

Check the following websites for the latest information:

PDA Information:	www.mobileplanet.com
Wireless Information:	www.nwfusion.com
Software Downloads:	www.tucows.com

Security

Authentication

Since PDAs are portable and are open for theft or being misplaced, several authentication security measures are being utilized to answer the question: “do you have authority to use this PDA?”

1. Microsoft’s Pocket PC 2002 offers a 4-digit Pin and 8-character alphanumeric Strong Password Authentication option.
2. HP has integrated a biometric fingerprint reader on the iPAQ Pocket PC h5400 Series. The user simply authenticates themselves to the device using their fingerprint, or a combination of a PIN and/or Password and/or fingerprint.
3. Microsoft’s NTLM (NT LanMan) is an authentication process that uses a challenge/response process to prove the client’s identity without requiring that either a password or a hashed password be sent across the network (i.e. this level of authentication occurs behind the scenes, without any action from the user).

Data Security

Because the absence of a physical connection between the PDA and the database makes wireless networks vulnerable to information theft, a number of security measures can be taken to guard against unauthorized access.

1. Service Set Identification (SSID) is a methodology that enforces the use of valid ID codes for network access.
2. Industry standard 64/128/152-bit Wired Equivalent Privacy (WEP) data encryption can be utilized when the access points are configured to operate in Shared Key authentication mode.
3. MAC addresses may be utilized in your wireless network to authorize access.
4. Virtual Private Network (VPN) creates a private encrypted tunnel from the end user’s computer, through the local wireless network, through the Internet, all the way to the corporate servers and database. This is a very typical technology used in wired networks also.

Benefits

Here are just few of the many benefits of using the technologies described in this paper.

Increased Productivity & Efficiency

- Conventional PDA use required a lot of steps and time to download software updates, reference data, replication, etc. Utilizing web-based technology enables EHS Professionals to simply conduct their survey/audits and enter their data directly into the database.
- Upgrades to the application only have to be applied to the Application/Web Server, not each individual PDA.
- There is no database interface required between your PDA database and the company's main database. Upgrades with the PDA software, database or your main database/server could "break" the interface; requiring additional IT support.
- Since the data is entered directly into the company's database, real-time alerts/notifications can be initiated. Additionally, reporting of the data is available for other users that may need to access the data.

Reduced Costs

- Reduced IT resources needed to support PDA use. No separate database or interfacing required.
- No additional memory required for PDA
- No need for upgrading PDAs (any PDA with wireless access to the web will work)

Higher User Acceptance

- Improved usability
- Simplified process – no replicating, etc.
- Ability to access information from anywhere

Increased Data Integrity

- Eliminates potential for replication errors
- Only one database to store data (removes all PDA databases)
- The pick lists and other reference data is always up to date

Example: Industrial Hygiene Sample Form

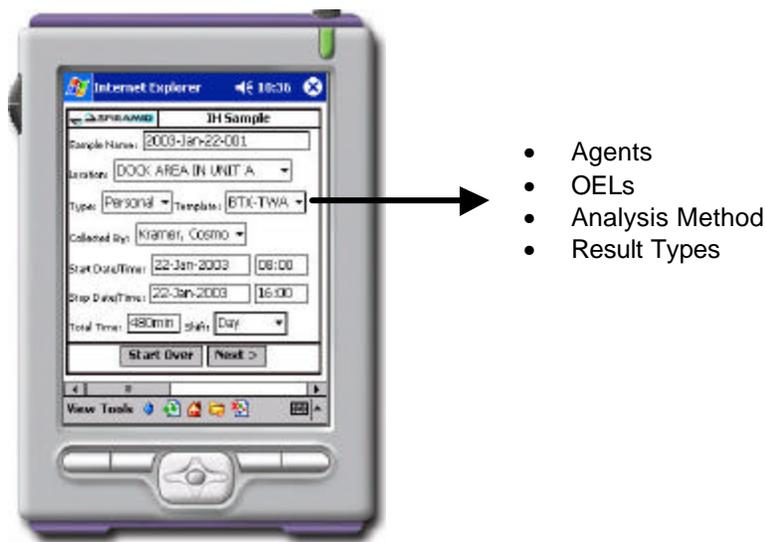
To prove this technology, we developed a web-based form for collecting Industrial Hygiene samples in the field (see figure 2). All of the data collected on this form is directly entered into our existing enterprise application (Spiramid's Health & Safety Suite). This enabled the samples entered and saved through the PDA to be directly queried and reported on from the enterprise system.

One key item when developing the form was to limit the number of screens the user would have to navigate through to enter the IH sampling data. We were able to compact the information into only 4 screens. This is a significant improvement from previous attempts using PDA form-building software; which resulted in as many as 32 different screens.

We are able to save significant space and data entry time through the use of a sample template field. Once the template field is completed, the database populates all of the agents monitored for, the occupational exposure limit, laboratory analysis methodology to be used and the result types to store the analytical findings.

For example, if monitoring welding fumes and analyzing a 32-metal scan, you would simply pick the template. If this functionality were not present, you would have to enter all 32 agents, their corresponding OELs, analysis methods and result types.

Figure 2





About Spiramid

Spiramid is a global provider of reliable and affordable EHS solutions. Global 1000 Corporations are currently using Spiramid's EHS solutions in over 40 countries around the world.

We at Spiramid believe the success of our clients is paramount. For this reason, we offer global support services to ensure a successful implementation, insuring the maximum return on our clients' investment.

For more information about Spiramid's global EHS solutions visit www.spiramid.com.

Bluetooth® is a registered trademark owned by the Bluetooth SIG, Inc.

Wi-fi® is a registered trademark of the Wi-Fi Alliance.

Copyright © 2003 Spiramid, LLC. All rights reserved. Spiramid, the Spiramid logos are trademarks of Spiramid, LLC. Other product and brand names may be trademarks or registered trademarks of their respective owners.