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Handhelds: In Search of an Enterprise Class Device

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Introduction

Many enterprises are deploying handheld devices as an extension of back office systems (e.g., ERP, CRM, SFA). Mobile empowerment enables employees to take back office systems to the point of interaction with the customer, no matter where their customer might be. As a result, customers receive a higher level of service and exhibit a higher level of satisfaction and loyalty to their supplier. Employees achieve higher productivity and greater job satisfaction.

Mobile and wireless deployment is being consistently placed within the top 5 initiatives of the next 3 years in surveys of business executives. Yet despite this high level of visibility, many challenges exist in defining, building and deploying mobile solutions, and understanding which workers should be enabled with such capability. Moreover, device selection criteria have often been lacking, especially as it pertains to defining company standards and selecting optimum devices.

In many organizations where workers face customers every day (e.g., service technicians, delivery people, inspectors, public service, sales associates, health care providers, warehouse workers), the workers are being outfitted with specialized mobile devices to greatly improve their efficiency and productivity. This is often where companies take their first steps into mobility, as the need is clear and the returns easy to define. Yet increasingly, knowledge workers are deploying wireless applications as well (e.g., wireless email, collaboration services, VoIP). Within the next couple of years, mobilization of the enterprise will no longer be optional, but will become a business imperative. This paper will highlight some of the issues that must be addressed for companies to achieve a viable and cost effective enterprise mobile capability that utilizes handheld computing for business advantage.

Major General Mobility Trends

The enterprise is being overtaken by a race to mobility. Users are demanding anytime, anywhere computing capability, and anytime, anywhere access to corporate applications as well. Most companies are having great difficulty keeping up with the insatiable demands of end users. Indeed, we expect over 50% of users at enterprises to be outfitted with notebook computers within the next 3 years (increasing from approximately 35% currently), and well over 95% of these devices will be wirelessly enabled. Further, we expect that knowledge workers will be mobile 50%+ of the time within the next 2-3 years, working from a diverse location mix of office, home, travel sites, customer sites, etc. Finally, personal mobile devices such as handhelds and smart phones, most of them wirelessly enabled, are being deployed as data access devices. The majority of mobile workers (65+%) will be enabled with such capabilities within 3-4 years, adding diversity to corporate application deployments and forcing companies to deal with a wide array of client devices.

However, not all mobile deployments are driven by end users. Forward thinking enterprises are also adopting mobility to drive more effective and efficient operations,

particularly in field force operations (e.g., field service, delivery, logistics, field sales, health care delivery). Task-specific devices and applications are extending business critical systems (e.g., ERP, CRM, SFA) to automate previously manual field operations (e.g., order entry, trouble ticketing, dispatching), through deployment of data-enabled mobile devices, including ruggedized notebooks, handhelds and smart phones. This class of user generally views the mobile device as an on-the-job tool, rather than a general purpose computing device, and is likely to have access only to this one device which is a mission critical component of the person's daily duties.

We expect the overall market for handheld devices to remain competitive, with no repeat of the "Wintel" monopoly. Indeed, in the smart phone area, we expect Symbian and its derivatives (e.g., Nokia Series 60) to be the largest shareholder, with 50%-60% share, while PalmOS and Microsoft Windows Mobile each attain 10%-15%, and Linux at 10%,-15% and RIM OS at under 5% by 2007/08. However, we expect that Microsoft with its Windows Mobile OS will dominate the enterprise handheld market with 75%-85% market share (by 2007/08), with Palm OS retaining 15%-20% and Linux growing to 5%-10% of the market.

One of the greatest challenges to enterprises will be the deployment, not of the devices themselves, but of the applications powering the devices and enabling users to more effectively do their work, and thus create value for the company. Indeed, companies will spend 4-5 times as much for application infrastructure as they do for devices in a normal deployment scenario. Application selection and deployment is a critical success factor.

As a result of these trends, organizations that are not looking at mobility and wireless as a strategic initiative will be at a major competitive disadvantage. In fact, we believe enterprises must consider mobility and wireless capability as one of their three top strategic IT infrastructure initiatives for the next 3 years, and should be actively pursuing such projects.

The Enterprise Class User

One size does not fit all when dealing with enterprise users of personal devices. While its true that many business executives find a device they like (or receive as a gift) and bring it into the organization, it is also true that these "randomly acquired" devices don't always meet the needs of the enterprise worker. How many personal assistants bought at BestBuy, CompUSA, Staples or other computer retailers include a bar code or RFID scanner built in, or include Voice over IP (VoIP) capability, or can actually be dropped onto the floor without the screen shattering or the case breaking?

It is important to determine the optimum device for the worker, not simply allow random selection. Some office workers will be well served with off the shelf retail purchases, if their goal is to carry a calendar and contact list, and to keep the device relatively safe

from harm through careful use. However, we expect to see the vast majority (>90%) of office workers who desire only a contact manager and email device, move to a smart phone device (e.g., Blackberry, Palm Treo, Nokia Communicator, HP 6300) that also includes voice and data communications within the next 2 years. This will dramatically shrink the overall market for enterprise oriented stand alone personal digital assistants.

The Enterprise Digital Assistant

We expect a significant demand to emerge for a specialized class of handheld device, the Enterprise Digital Assistant (EDA). This device is targeted at industries such as retailing, field service, manufacturing, healthcare, etc., where users require more capability than a standard PDA device, but may not require a fully ruggedized device directed at special needs (e.g., warehouse operations, telecomm industries, logistics, utility workers, etc.), although some classes of users in particularly harsh environments may opt for a fully ruggedized EDA device to meet their requirements. The EDA fits much more compatibility into an enterprise environment where these devices become tools and extensions of existing ecosystems, rather than a PDA used simply as a peripheral device for a few personal requirements. Choosing an appropriate EDA is a strategic choice, since it requires finding a device that fits well into the overall ERP or CRM systems that currently run many organizations. Finding the right devices requires looking at several distinct selection criteria.

- Cost vs Durability – Off-the-shelf consumer grade PDAs are available for as little as $99. Yet most enterprise class devices with enough memory and processing power to provide application capability cost $300-$400 or more, depending on options (e.g., wireless connectivity, expanded memory, hard drive). In comparison, fully ruggedized special purpose devices can cost $2000-$3000 each. However, there is an intermediate class of Enterprise Digital Assistant devices that are built more durably than consumer or even pro-sumer off the shelf devices (i.e., hardened cases, metal frames to protect the screen, drop tested, extended battery, etc.). These devices cost $750-$1000, but are much less susceptible to breakage, leading to better life cycle management.

- Life Cycle Management – we rate the average life cycle of a typical off-the-shelf PDA as 9-12 months. However the typical EDA has a life cycle of approximately 3 years. While EDAs do break, they break far less often than standard PDAs, and present a 3 times life cycle improvement over the off-the-shelf PDA for enterprise class applications. Furthermore, this longer life helps preserve product stability for application deployment.

- Product Stability – The hodge-podge of PDAs in many organizations provides a true challenge to IT organizations that attempt to deploy, manage and support enterprise applications. Even those companies that specify a specific model of PDA from a specific vendor will only buy a brief amount of stability. The fact is, most PDA products are in production for a maximum of 6-9 months. And

although some vendors will offer a guarantee of extended availability, it usually comes at an additional cost, as most vendors will simply stockpile products at end of life for delivery to customers at a later date. Even standardizing on an operating system, like Microsoft Windows Mobile, does not guarantee long term compatibility, as the OS is itself updated periodically (every 12-18 months), and most installed devices are not upgradeable, nor are new devices downgradeable to previous OS versions. EDA class devices, on the other hand, generally have a 2-3 year production cycle, and vendors producing this class of device will guarantee compatibility, including at the OS level. This level of stability greatly aids in application deployment and management, and reduces the support burden.

- Application Deployment Capability – just as in the PC space, application deployment to handheld devices presents a challenge in compatibility. While these devices are "lighter" than most PC based solutions, they nevertheless present challenges from one generation of HW and OS to another, particularly if there are peripherals involved. Few consumer or pro-sumer PDA vendors do any level of compatibility testing from one generation to another. Even Microsoft, whose OS we expect to power 75+% of enterprise handhelds, does little to assure compatibility across HW devices (which, out of fairness, is not within their power). As more and more companies add peripherals to enterprise handheld devices this presents a daunting task.

- Options/peripherals – many organizations are adding electronically readable ID tags to products and devices to better manage the flow of inventory and information within the enterprise. It therefore is incumbent on EDAs connected to enterprise applications to be able to access these IDs by embedding the appropriate readers (e.g., barcodes, RFID). Standard PDAs do not include embedded readers, nor do they generally allow for wireless radios of more than one flavor (though a few do have WiFi and Bluetooth in the same device). These devices must have external peripherals attached (e.g., SD card connected scanners or a cellular radio modem) to enable such capabilities. Aside from the additional cost ($100-$150), an external device further detracts from reliability and adds to breakage, as external devices can often be lost or become broken from being banged against an object. Further, having a bus connection makes a convenient point for potential foreign objects (e.g., coffee, soda, water) to get inside the device through the opening in the case. And finally, adding an external peripheral requires that the appropriate drivers also be installed on the device, not always a straight forward task.

All of these criteria need to be properly assessed if the EDA is to achieve a real payback to the organization, rather than simply adding cost to the infrastructure, as many PDAs currently do (the average TCO for a PDA is $700+ per user per year for minimal

functionality – locally synched contacts, calendar and email, and as much as $1200-$1500+ with applications installed).

Extending the Ecosystem

To obtain maximum benefit, the EDA must be tied into the corporate application and connectivity ecosystem. To this end, a device must be selected that offers the ability to easily extend business critical applications (e.g., SAP, Siebel, PeopleSoft, Oracle, etc.). The operating systems and development environment become key factors, as does connectivity and ability to get through an 8 hour shift without battery recharge. Choosing a device should encompass the following criteria:

- Operating System – defining a standardized OS environment will greatly ease deployment of devices. Much like the PC desktop environment, the ability to deploy a single platform to all users means allowing a uniform distribution of SW, and a consolidated support requirement. We expect the overwhelming majority of enterprises to select Microsoft Windows Mobile as the platform of choice for it close affinity to Windows platforms already in service within most organizations.

- Deployment platform – We expect companies to deploy applications ultimately on one of two major platforms: Microsoft .Net, or Java. We expect .Net to capture 65% of enterprise applications, while Java will capture 35%. However, many organizations will deploy both. Therefore, selection of an EDA should include the ability to run either environment (e.g., running a JVM on a Windows Mobile device supporting .Net).

- Third party application availability – Many application vendors now offer mobile extensions to their application suites, providing a convenient means of extending applications to a mobile worker. However, not all vendors provide such capability, nor do they support all platforms. Third party middleware extensions (e.g., Intellisync, iAnywhere, Good, RIM) provide needed functionality when not available within the application. Nevertheless, we expect most application platform vendors to provide for mobile extensions natively within the next 2-3 years.

- Asset Management – Deploying devices to users is only part of the challenge. The greater part of the challenge is managing the deployed assets. Devices deployed in enterprise settings should provide the appropriate tools to mange the devices adequately, even when used with a third party asset management application (e.g., Tivoli, CA Unicenter, HP, iAnywhere Afaria). EDA class vendors often include management clients on their devices as a standard feature, which is generally not the case for off the shelf PDA devices.

- Connectivity – Not all workers need full time connectivity. However, increasingly, companies are relying on the notion of the “real time enterprise”

which requires up-to-date data acquisition of business activity information, as well as empowering employees with the data necessary to make the proper decisions. The expansion of WiFi deployments within companies, as well as in public places, is making it imperative that EDA devices offer connectivity, even if not immediately used. Within 2 years, we expect >75% of enterprises to deploy wireless connectivity for their mobile workers. Further, we expect a significant amount of cellular radio deployments in the next 2-3 years, as 3G networks expand and become more cost effective. Devices that allow a choice of radio connectivity options should be preferred.

- Battery Life – battery life varies greatly depending on usage factor but the bottom line for most users is, can it get the user through the work day without a recharge? Most consumer PDA devices are challenged to provide a full day's operation when using a wireless connection (WiFi). An EDA should have sufficiently powerful batteries to provide at least one day's operation, and allow full recharge overnight. Further, it should provide for a field replaceable battery, as most batteries will only withstand about 300 charge/discharge cycles. Despite the added weight and size higher capacity batteries bring to a device, this is generally preferable to most users compared to running out of power in the middle of a work day.

These criteria address enterprise needs, much the same as they do for standard PC desktop environments. Companies should not fall into the trap of buying low cost devices that, in the long run, end up costing the organization significantly more than enterprise-ready devices, or frustrate the users with inadequate battery life or connectivity options.

Cost Benefit Analysis

Most companies addressing the issue of what type of device to purchase, nearly universally first set their focus on the purchase cost. This is a very short-sighted view. Indeed, an EDA class device may initially cost substantially more than a typical PDA targeted at enterprise users (e.g., Dell Axim, HP iPaq), but the long term Total Cost of Ownership (TCO) is substantially less.

Our 3 year cost model of PDA vs EDA TCO (Appendix, Figure 1) provides insight into the cost and return on investment in deploying an EDA device. Our model shows that an EDA device has an average purchase price more than twice that of an enterprise class PDA ($1100, vs $500), but has a 3 year TCO of $1595, compared to a 3 year TCO for a PDA of $2255. In an organization with 500 users, this cost savings can amount to more than $330K over 3 years. Further, though not explicitly included in the model, the user down time associated with PDA failures (at least twice as high as with EDA devices) provides a substantial reduction in productivity through business interruptions and user frustration. Finally, with a projected life cycle of 3 years for an EDA vs 1 year for a PDA, the need to purchase and replace devices is substantially reduced, saving not only cost,

but also manpower. Overall, EDAs represent a significant savings to companies deploying handheld devices, and should be the product of choice in most situations.

Conclusions

Companies deploying handheld devices have a number of choices to make in acquiring and deploying the most appropriate devices. They must base their selection decision on a number of criteria for the devices themselves, as well as how those devices will fit into the overall ecosystem of the organization. User needs and requirements have to be weighed carefully, as well as which applications will be deployed, and how they will be delivered. The inherent value of deploying an enterprise digital assistant should be evaluated not just on purchase price, but on the overall TCO of such a device versus an enterprise class PDA. After a careful evaluation of the overall user needs, acquisition costs, and TCO, we believe nearly any organization can benefit from deploying an EDA class device rather than a standard PDA.

About the Author

Jack E. Gold is Founder and Principal Analyst at J.Gold Associates. Mr. Gold has over 35 years in the computer and electronics industries, including work in imaging, multimedia, technical computing, consumer electronics, software development and manufacturing systems. He is a leading authority on mobile, wireless and pervasive computing, advising clients on business analysis, strategic planning, architecture, product evaluation/selection and enterprise application strategies. Before founding J. Gold Associates, he spent 12 years with META Group as a Vice President in Technology Research Services. He also held positions in technical and marketing management at Digital Equipment Corp. and Xerox. Mr. Gold has a BS in Electrical Engineering from Rochester Institute of Technology and an MBA from Clark University. He can be reached at jack.gold@jgoldassociates.com.

Appendix

Figure 1

3 Year Cost Comparison of PDA vs EDA

Total devices installed	500		
Cost Per User Per Year:		**PDA**	**EDA**
Year 1			
Cost of Device		$500.00	$1,100.00
Deployment Cost		$396.00	$396.00
Cost of failures per user		$47.60	$23.80
Cost of spares		$8.33	$9.17
Year 2			
Cost of Device		$500.00	0
Deployment Cost		$96.00	0
Cost of failures per user		$47.60	$23.80
Cost of spares		$8.33	$9.17
Year 3			
Cost of Device		$500.00	0
Deployment Cost		$96.00	0
Cost of failures per user		$47.60	$23.80
Cost of spares		$8.33	$9.17
Total 3 year cost per user		$2,255.80	$1,594.90

PDA Total 3 Year cost	$1,127,900
EDA Total 3 Year Cost	$797,450

3 Year Cost Difference of EDA vs PDA Deployment	$330,450

Calculations

Cost per failure				
Help desk call		$50		
User time (1 Hour)		$72		
Shipping cost		$20		
Technician Time (.5 Hours)		$40		
Ship device to user		$20		
User set up (.5 hour)		$36		
Total		$238		
Deployent cost Year 1				
Application SW		$300		
Technician set up (.5 Hours)		$40		
Ship to end user		$20		
User set up (.5 hour)		$36		
Total		$396		
Deployent cost Year 2&3				
Application SW		$0		
Technician set up (.5 Hours)		$40		
Ship to end user		$20		
User set up (.5 hour)		$36		
Total		$96		
Repair Costs per year				
Cost per Failure		$238		
PDA	Failure rate	20%		
EDA	Failure rate	10%		
Cost per year to repair PDAs			$23,800	
Cost per year to repair EDAs			$11,900	
Cost of Spares:				
One month supply of spare machines				purchase cost of spares
	EDA-1/12th yearly failure rate		0.008333	$4,583.33
	PDA-1/12th yearly failure rate		0.016667	$4,166.67

Assumptions:

Cost of PDA includes $400 for device plus $100 for peripheral reader
Failure rate of PDAs = 20%/year, EDAs = 10%/year

Average end user knowledge worker rate (burdened) = $150K per year ($72 per hour)
Average technicain rate = $80 per hour
Average call to help desk = $50
Average devcie shipping cost = $20