

**Venture Development Corporation
Mobile and Wireless Practice**



A White Paper On:

***MOBILE DEVICES, WLAN INFRASTRUCTURE,
SOFTWARE AND SERVICES***

***Offering Segment Data Books
Summary of Research Findings***

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INTRODUCTION

VDC's *Enterprise Mobility Solutions: Mobile Devices, WLAN Infrastructure, Software and Services* intelligence program consists of eight Vertical Market Analysis volumes and four Offering Segment Data Books. This paper provides a summary of research findings extracted from the Offering Segment Data Books published between June and September 2004.

The Offering Segment Data Books are comprised of the following:

- The Mobile Device Platform Data Book
 - Rugged and commercial grade mobile computers, including: notebooks, PDCTs, PDAs, other form factors
 - Smart phones and other mobile computing and communications devices
 - Integrated input/output technologies – bar code, RFID, printing, etc.
- The WLAN Infrastructure Data Book
 - Wireless LAN access points, base stations/host controllers, gateways and switches
- The Enterprise Mobility Software Data Book
 - Mobile device platform operating systems
 - Middleware – including device management, security, OTA, synchronization
 - Mobile databases
 - Application software
- The Enterprise Mobility Services Data Book
 - System design/engineering
 - Application development
 - On-site installation/integration
 - Post-installation service and support
 - Remote monitoring and maintenance
 - Wireless services

MARKET OVERVIEW

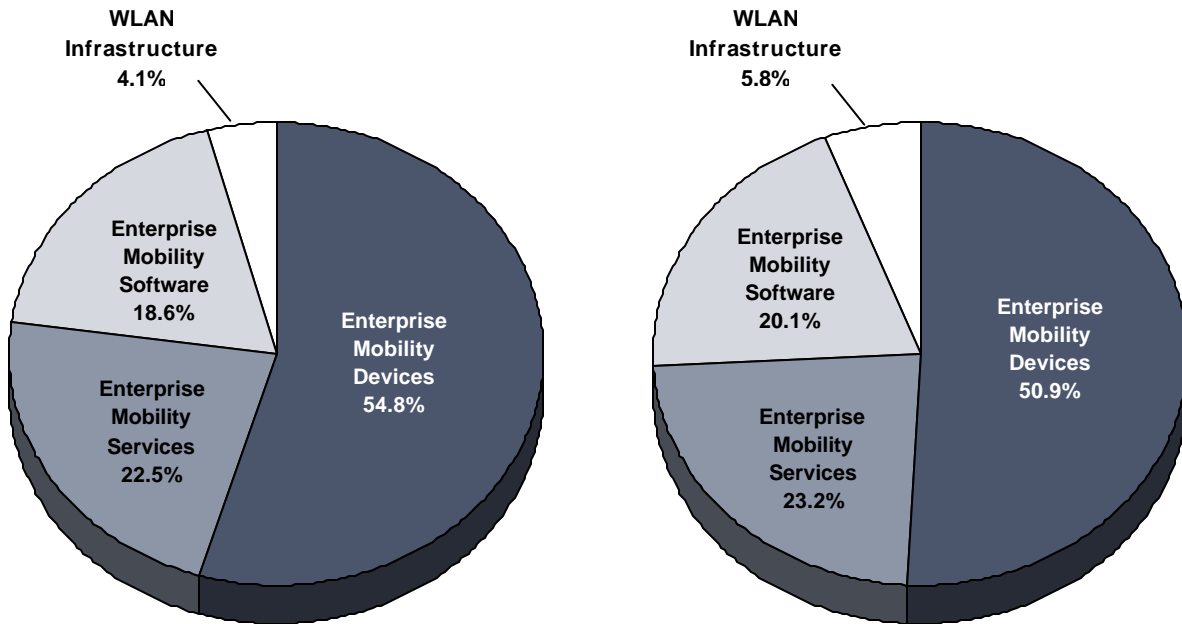
VDC defines enterprise mobility solutions as mobile computing platforms that support real-time distributed transaction-processing applications throughout an enterprise. Systems include mobile computing devices, application software, connectivity solutions (wireless and wired) and connectivity infrastructure. That enterprise could be a retail store, manufacturing plant, distribution facility, hospital or public sector installation. The transactions processed could be the purchase of a sandwich, calibration of a machine tool, sortation of urgent packages, submission of a prescription, or issuance of a moving violation.

Enterprise mobility is one of the fastest-growing segments within the overall IT market. System profiles are shifting from discrete, stand-alone data repositories for less critical item-tracking applications to more tightly integrated extensions of core enterprise data networks and applications. VDC estimates the global enterprise mobility market at \$16.5 billion in 2004 and forecasts the market to reach \$24.1 billion by 2008, growing by 10% compounded annually.

Worldwide Shipment Forecasts for Enterprise Mobility Solutions
(Dollar Volume in Millions)

2004 Total: \$16.5 Billion

2008 Total: \$24.1 Billion



2004 – 2008 Compound Annual Growth Rates (CAGRs):

- Enterprise Mobility Devices – 7.7%
- Enterprise Mobility Services – 12.0%
- Enterprise Mobility Software – 12.4%
- Wireless LAN Infrastructure – 20.6%

KEY DEVELOPMENTS

Vertical market and application opportunities for enterprise mobility solutions and the technology vendors supporting them are highly diverse. Leading vertical and application market opportunities and key participants for each enterprise mobility offering segment are described below:

RUGGED MOBILE DEVICES		
<u>Product</u>	<u>Leading Vertical Markets</u>	<u>Key Players</u>
<i>Rugged Notebooks</i>	Field services, military, public safety, and government. Strongest growth opportunities in health care, construction and finance/ insurance sectors.	Panasonic Itronix Siemens Getac (Mitac Group) Miltope Group
<i>Rugged On-Board/Fixed Vehicle Computers</i>	Transportation/distribution, public safety, military, and manufacturing. Market to remain concentrated in those sectors with potential competition from hand held solutions.	Qualcomm Motorola Psion Teklogix Symbol Technologies Panasonic
<i>Rugged Tablet Computers</i>	Transportation/distribution, military, field services, public safety and utilities. Emerging opportunities in health care and professional service markets. Aggressive price position driving growth.	Xplore Technologies WalkAbout Computers Panasonic Fujitsu L-3 Communications
<i>Rugged Luggable/Lunchboxes</i>	Military, manufacturing, and test & measurement. Highly mature segment. No significant change expected over forecast period.	Dolch DRS Tactical Systems L-3 Communications Siemens Acme Portable
<i>Rugged Hand Held Computers</i>	Transportation/distribution, manufacturing, retail (in-store), utilities, and DSD/route accounting. Mature segment. Cannibalization from smaller form factor rugged PDAs.	Symbol Technologies Psion Teklogix Intermec DENSO Wave Motorola
<i>Rugged PDAs</i>	Transportation/distribution, manufacturing, retail, utilities, and DSD/route accounting. Highly competitive segment with increased competitive pressures from commercial grade devices.	Symbol Technologies Intermec Casio TouchStar Unitech
<i>Rugged Wearable Computers</i>	Leading vertical market is transportation/ distribution, specifically warehouse/distribution centers. Technology and applications maturing with increased adoption in field service environments.	Vocollect Symbol Technologies Voxware Xybernaut Antelope Technologies

COMMERCIAL MOBILE DEVICES		
<u>Product</u>	<u>Leading Vertical Markets</u>	<u>Key Players</u>
<i>Commercial-Grade Notebooks</i>	Field sales and increasingly field service (in less harsh environments). Growing opportunities in health care service environments.	Dell HP/Compaq IBM Toshiba Acer
<i>Commercial-Grade Tablets</i>	Health care remains primary market. Increasing adoption in among white/gray collar professionals in retail, transportation and field sales environments. Price remains a significant barrier.	Fujitsu/Fujitsu Siemens HP/Compaq Acer Toshiba Samsung
<i>Commercial-Grade PDAs</i>	Field service, health care, professional service and DSD/route accounting. Low price point driving adoption in traditional semi-rugged environments.	HP/Compaq Dell RIM PalmOne Acer
<i>Commercial-Grade Smart Phones</i>	Adoption in variety of vertical markets including field service/sales, transportation/distribution and professional service. Split between voice centric and data-centric devices.	Motorola Nextel RIM Kyocera Nokia
Wireless LAN Infrastructure Products		
<u>Product</u>	<u>Leading Vertical Markets</u>	<u>Key Players</u>
<i>Access Points</i>	Retail (in-store), transportation/distribution, and health care service. Growing adoption in enterprise (carpeted) environments.	Cisco Symbol Technologies Intermec 3COM Proxim
<i>Wireless Switches</i>	Strongest adoption in vertical markets: health care, transportation/ distribution and professional services. Growing adoption in enterprise (carpeted) environments.	Symbol Technologies Vivato Aruba Airespace

ENTERPRISE MOBILITY SOFTWARE		
Product	Leading Vertical Markets	Key Players
Application Software	Field sales/service, transportation/distribution, government and retail (in-store). Emerging opportunities in health care services and professional services.	Fragmented by vertical market. MDSI SAP Manhattan Associates Siebel
Mobile Middleware	Strong demand for mobile middleware applications including device management, OTA, synchronization and security.	Sybase Extended Intellisynch BEA IBM
Mobile Operating Systems	Trends towards standard OS. Microsoft dominant on data-centric devices. Mix of application OS (MS; Linux; Symbian) and RTOS on voice-centric smartphones.	Microsoft Symbian Linux RTOS (Nucleus, OSE, VxWorks)
ENTERPRISE MOBILITY SERVICES		
Product	Leading Vertical Markets	Key Players
System Design & Business Process Optimization	Strong demand across all major enterprise mobility segments. Strongest growth for remote monitoring/maintenance, wireless services and systems design services. Professional service providers have increasing influence over enterprise mobility HW specification.	Mix of horizontal IT service providers and vertical specialists IBM Global Services HP Services EDS Northrup Grumman Lockheed Martin Cap Gemini Accenture
System Integration & Deployment		
Wireless Network Services		
Mobile System Maintenance and Break/Fix		
Training		

COMPETITIVE ANALYSIS OVERVIEW

Mobile Devices

Although the Microsoft OS platform and wireless standards developments have normalized much of the device look and feel, there remains much opportunity for device differentiation and value-add. Areas such as power management, radio integration design ergonomics and I/O will be critical, especially as commercial grade and rugged devices are evaluated for similar applications. End users are generally not looking toward device vendors for software and professional service solutions, therefore partnership management with leading ISVs and integrators will become increasingly important. Some rugged device vendors are providing their own mobile device management solutions. While device management is an extremely important requirement, it will ultimately be handled from an enterprise perspective.

Some of the key competitive developments to impact the mobile device market included:

- Arguably the most dramatic occurrence in the rugged market transpired when Hewlett Packard released its rugged notebook (nr3600) and rugged tablet product (tr3000), which it is private labeling from Itronix. The ability of HP to provide competitive pricing and world-class level service – as well as tap its large sales force and channel network - makes it a truly formidable player.
- Symbol Technologies recently acquired Matrics, providing it with instant credibility in the fast-emerging RFID market.
- Motorola was awarded the most recent 300,000 unit USPS mobile device contract. This may provide the scale to more actively compete in the small form factor market.
- Vision Kinetics Technologies Kinetics, Inc., which is part of the US arm of Singapore Engineering Limited, acquired Miltope Corporation during the 4th Q of 2003. This acquisition was primarily intended to enable the parent company to gain a beachhead position in the US military market; in addition it enabled them to gain access to new form factor products and access to DoD programs.
- Intermec signed a reseller agreement with WalkAbout Computer in 1st quarter of 2003, which enables Intermec to resell WalkAbout's tablet computers in exclusive vertical markets such as manufacturing, transportation/distribution/supply chain, and field services on a worldwide basis.
- Psion Teklogix signed a value-added Systems Integration agreement with Xplore Technologies in April of 2004. Psion will sell Xplore's iX104 family of wireless tablets to customer applications found in transportation – airports, port authorities, and supply chain; field service; government; manufacturing.
- MicroSlate's acquisition of Melard Technologies on January 21, 2003 revealed that it is often difficult for small suppliers to try and compete against both rugged and commercial-grade hand held suppliers.
- Nokia's recent reorganization places renewed emphasis on enterprise solutions. Expansion of its I/O capabilities (to include RFID) developments with IBM WebSphere and strengthening application portfolio, provide the company with a strong solutions infrastructure to target this opportunity.

WLAN Infrastructure

The WLAN competitive environment continues to be highly dynamic, supported by a steady stream of investment, significant R&D activity and strong end-user demand.

WLAN Access Points:

- Buoyed by its large footprint in the enterprise networking market, Cisco has established itself as the clear leader of enterprise-class WLAN access points with a commanding 44% market share. With the recent wave of 'thin' access point development, Cisco has been the strongest proponent of maintaining established levels of functionality, especially concerning security, in the AP.

Wireless Switch Solutions:

- In terms of Market Overview share, Symbol Technologies clearly leads the WLAN switch market, however, most suppliers were not shipping solutions for the entire 2003 calendar year. The market is perhaps overpopulated with start-ups, each looking to establish a unique position. A shakeout is definitely in the cards the question is how long the start-ups can sustain their early mover position.

Enterprise Mobility Software

Application Software:

- Based on the unique application requirements for specific vertical markets – such as mobile POS or health care services – the application software competitive landscape is highly fragmented supported by literally thousands of ISVs, device vendors, system integrators and other organizations.

Mobile Middleware

- The overall mobile middleware market has been extremely active in terms of M&A activity and also divestitures. With development and acceptance of more standard approaches and platforms, there appears to be a splitting between the haves and the have-nots. Smaller specialized players are especially feeling the heat as their pure-play peers are merging or device vendors or larger software vendors enter the market. Critical success requirements for pure-play vendors will include: solution scalability, partnerships with carriers and system integrators and vertical market or application-specific focus.

Mobile Operating Systems

- Microsoft has established itself as the leading OS supplier on data-centric mobile devices, including notebooks, tablets, PDAs and hand helds. Microsoft's OS position also has tight control over the hardware for smaller form factor solutions, specifying processing power, screen resolution and memory.

Enterprise Mobility Professional Services

- Despite increased efforts among some of the larger hardware suppliers to leverage their size, direct sales forces, and technical resources to provide complete solutions for Tier 1 customers, VDC projects overall revenues for supplier-provided integration services to be slightly slower than that of 3rd party systems integrators. We believe that the largest share of the future market will be comprised of educating Tier 2 and Tier 3 customers on the benefits of mobile and wireless computing, as well as an increase in the penetration rate of Tier 1 customers that are still “behind the times.”
- VDC sees an increased amount of either acquisitions and/or increased partnerships among 3rd-party systems integrators and applications software providers as they try to weather the adverse economic environment and develop a more comprehensive portfolio of products and/or services. Some examples include MAPIC's acquisition of Frontstep, Inc., Applied Digital Solutions' acquisition of PDSC, Bradley Corporation's acquisition of Tiscor, Neometrix Technology's acquisition of Zeosoft and Sybase's acquisition of Xcellenet and iAnywhere.

SUMMARY OBSERVATIONS

The full potential provided for by enterprise mobility solutions is only in the early phases of market awareness and development. While mobility solutions have been deployed for several decades in specific vertical markets, most were installed as disconnected point solutions. Only now, with standardization in device platforms, maturation of wireless communication technology and true scalability of mobility solutions are enterprises beginning to take full advantage of mobile solutions. However, the next 12-18 months will be a critical period for enterprise mobility market participants as the various parties involved – including device vendors, application providers, integrators, OS vendors, mobile middleware and database vendors, and wireless carriers – converge to stake their position in this highly intricate value-chain.

ABOUT THE STUDY

VDC's **ENTERPRISE MOBILITY SOLUTIONS: MOBILE DEVICES, WLAN INFRASTRUCTURE, SOFTWARE AND SERVICES** research report is comprised of eight vertical market reports and four offering segment data books.

- Vertical Market Reports:
 - DSD/Route Accounting
 - Field Service/Sales
 - Government
 - Healthcare Services
 - Manufacturing/Assembly
 - Professional Services NEC
 - Retail In-Store
 - Transportation/Logistics/Supply Chain
- Offering Segment Data Books
 - Mobile Device Platforms
 - Professional Services
 - Software
 - Wireless Network Infrastructure

This market intelligence program will provide accurate, conservative, detailed assessments –including market estimates, forecasts, share analysis – of the enterprise mobility market opportunities and requirements worldwide.

ABOUT VDC

Venture Development Corporation (VDC) is an independent technology market research and strategy consulting firm that specializes in a number of embedded, industrial, defense and niche enterprise IT markets. VDC has been operating since 1971, when the firm was founded by graduates of the Harvard Business School and Massachusetts Institute of Technology. Today, we employ a talented collection of analysts and consultants who offer a rare combination of expertise in the market research process; experience in technology product and program management, and formal training in engineering and marketing. VDC's clients include thousands of the largest and fastest growing tech suppliers in the world and the most successful investors participating in the markets we cover.

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