

Challenges in Mobile Computing Management

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PAPER ABSTRACT

Mobility and mobile computing are becoming an increasing direction for enterprises. On March 2002, mobile subscribers exceeded one billion worldwide. Forecasts expect that mobile devices shipments could reach up to 14 billion units by 2010[1].

The future computing/communication infrastructure will contain millions of mobile devices such as GSM phones, Smart Phones, PDAs, and Laptops, which will interact with other computing/communications component in this infrastructure. This new infrastructure presents challenges for existing traditional management tools and technologies. New issues such as the nature of mobile data and devices, locating mobile devices, data synchronization, broadcast and multicast support patches must all be addressed in the new infrastructure management tools. This paper focuses on main functions of the mobile computing management solution and investigates the challenges and opportunities in this evolving world of mobile and pervasive computing. Based on these challenges, the paper also lists the major selection criteria which help in identifying the right solution.

Keywords: Mobile Computing, Wireless Networks Pervasive Management, and Mobile Devices

1- OVERVIEW

The Wait-and-see time is over. Enterprises are prepared to invest more money in wireless and mobility in 2004 because of the success of the initial deployments and the promising services rising on the horizon. The era of computers started with Personal Computers (PC), then came the Network Computers (NC) era, and now it is the era of Mobile Computers (MC). Currently, mobile devices infrastructure covers about 70-80% of the working environment. Mobility and mobile computing are becoming increasingly a direction for enterprises.

End-user mobile devices like: Mobile Phones, PDAs, and Laptops, are enabling workers when they are out of the office to gain access to their emails, calendars, task

lists, address book, and access to the corporate Intranet and Internet. However, this circle of end-user mobile devices expanded to include other end-user devices like Mobile Printers, Scanners, Storage, and more.

This expansion, in the infrastructure and end-user devices, raises a dilemma of managing mobility in such mix of emerging technologies. Engineers have to study the nature of pervasive computing, compare available management tools, and consolidate integrateable management packages before deploying mobile solutions. Thus, it is expected to have the cost of mobile technology increase with about 20-30% more than the cost of non-mobile technologies. Most of this cost is a management cost.

2- WHAT IS UNIQUE ABOUT MOBILE COMPUTING MANAGEMENT

In his presentation, Gartner consultant Lars Mieritz, speculated that the two main areas of complexity in IT projects are: Management and Infrastructure. Management, with 66% of the overall complexity typically encompasses processes, operations and support [2].

The overall goal of deploying management solution is to provide a centralized method of deploying, maintaining, supporting, and monitoring mobile devices within the enterprise with a minimum cost. However, mobile computing is not only about providing other connectivity options. It is a completely new strategic technology with its own characteristics. It has its own security risks, application requirements, and management challenges, which requires special attention.

Although management tools for stationary users and computing technologies are in the market for years, they are still not widely adopted and they are facing difficult integration and consolidation requirements by administrators. However, in the case of mobile computing, mobile device management tools share the same requirements and introduce more challenges tied to mobile computing like:

- ❖ **Integration Complexity:** Currently, no existing solution can offers enough support to diverse mobile platforms and devices manufacturers, which creates a complex case to support.
- ❖ **Limited Functions:** No single vendor can provide mobile management tools that implement security policies, data synchronization, and patches updates across mobile devices platforms. If one management tool is fully functional on the Systems or Network side, it laves features on the devices and security management sides.
- ❖ **Bandwidth Limitation:** Mobile users tend to use low bandwidth connections (9.6 to 114 Kbps at most on the WWAN and 11+ Mbps on WLAN) than the wired and stationary users, which varies form 10, 100, and some times up to 1000 Mbps. This bandwidth limitation requires special considerations and puts more constrains on the management tools and the design engineers.

- ❖ **The Nature of Mobile Users:** Managing mobile devices gets more complicated when mobile clients are not connected to the network. In this case users will not receive any new configurations or patches pushed up to the mobile device by the management software.

These factors create uniqueness to mobile computing management tools and add more support costs to the management solution. Survey of Giga clients [3], at USA and Europe, indicated that fewer than 10 percent of respondents have implemented either a synchronization or management server for mobile deployments. This low percentage demonstrates how far existing enterprises assess the implementation of management tools. Most enterprises did not realize the necessity to control and manage mobile device diversity before it gets out of control.

Now days an ordinary user buys a mobile device, plugs it into his PC, and synch data and applications from enterprise network. In addition, most of the times, administrators face a resistance from users when IT deploys management tools, where they consider it as invasion of personal freedom. This case is no longer acceptable. With the existence of the management tools, IT managers and network administrators have to work on eliminating such users ignorance and raise client awareness to protect company resources.

3- SELECTION FACTORS

IT management and professionals had to consider the above mentioned challenges before any deployment of mobility solutions to protect the enterprise infrastructure and reduce management and operation costs. However, these challenges set a number of factors that represents selection criteria for the management solution.

Beside the technical selection factors that are common to all management solution, the most important factors for a management tools were mentioned by Nick Jones from Gartner in his Mobile Scenario [4].

1. **Multiple Platform Support:** The support for multiple devices and multiple back-end systems is one major element. On average, organizations usually support two to three platforms (typically: MS mobile Windows, Palm OS, and Symbian).
2. **More Functionality and Navigation Capabilities:** Administrators need to navigate across networks, systems, and client devices. The management tool has to provide administrators with functions that allow them to perform their tasks and make the necessary configuration to the networks and users devices freely.
3. **Performance over Low Bandwidth:** The speed of the wireless networks is usually below the speed of the wired networks. This means that the management solution performance is vital especially when distributing patches or synchronizes data over low bandwidth connections.

4. **Support both Wire and Wireless Options:** Management tools that provide solution to intermitted connectivity, as possible, can reduce the cost of the mobile solution and improve software management and upgrade. Administrators can determine what sort of updates are allowed, based on the connectivity status and the location of the mobile client.
5. **Security:** The security of the wireless network and mobile devices are a never-ending issue and always a questionable area. Thus, the more it provides secure measures and policies, the more it is favorable to the administrator.

4- MAJOR COMPONENTS

Management tools range from simple products with a single purpose to software suites that are designed to integrate with and extend the reach of established network and enterprise management systems. Regardless of their depth of functionality, the areas these products address can be classified to one or both of the following:

1. Device management which includes: inventory, configuration, monitoring, and asset management.
2. Data management which includes: data synchronization, application distribution, backup and restore information, and content management.

Although mobile management vendors are chasing a common market, each vendor has different strengths and weaknesses and no leaders are rising so far. Therefore, IT planners should expect multiple solutions for managing mobile-device synchronization [5].

The following table shows the major players in the market and their strength and weakness in each category [8]. These vendors offer a wide range of mobile device management capability for almost all of the available mobile platforms. Of course, Microsoft only supports its own platforms with SMS, but also integrates with vendors like Tivoli and CA to provide broader mobile platform support. The existing market is so dynamic with too many acquisitions and merges that take place every once and a while.

Management Product	Handheld	Network
Intellisync (Pumatech) Intellisync	****	N/A
Cisco	N/A	****
CA	***	**
IBM Tivoli	*****	N/A
Microsoft SMS	****	N/A
Novell ZENworks	***	N/A
HP OpenView + Altiris	***	****

Table Mobile computing management major players and their strength and weakness

5- NETWORK MANAGEMENT SYSTEMS

Most mobile devices can be connected to a host PC or a corporate network. These connections (whether wired or wireless connections) can be used for synchronization, downloading files/data backup, checking e-mail/Internet access, and so forth. The network management portion of the mobile management solution should be capable of:

- Configure, monitor, and administer different types of connectivity and with different user profile and service.
- Domain-level management and control, which includes provisioning, fault tolerance, and performance reporting.
- Rules mapping and policies implementation.
- Network scalability and deployment of mobile wire/wireless services.

Here, deploying a management tool that supports intermittent connectivity over wired and wireless connections is highly recommended. This option protects users with offline access to key information, and cuts down communication costs. Meta group estimates that doing this can reduce mobile computing cost by as much as 22% over five years. Many times, wire line does the job or plays an important role [6], but people tend to forget this and get caught up in the wireless hype.

6- ENTERPRISE AND HANDHELD MANAGEMENT SYSTEMS

As soon as the users take their new PDAs out of the boxes and set them up for the first time, operation expenses begin as well as the role of the management tools. A significant portion of devices support and management is due to the time users invest in:

- **Setting up PDA:** There are good chances that the initial setup will require some labor and administrative work. This work includes assigning user ID, WLAN SSID and WEP Key Configuration, installation of the PIM synch software, and more. It is expected to have 90% of the Getting Ready functions could be automated by the management tools to new users.
- **Devices Synchronizing:** Synchronizing mobile devices with their desktops and enterprise servers includes outlook files and office application as well as some ERP client application and files. Centrally managed mobile devices can ease the need for manual device synchronization and dramatically reducing cost component.
- **Software Updates or Patches Upgrades:** While most IT staff thinks of migration as a one-time event, it is found that the frustration of IT

professionals and end users are with frequent migrations and ongoing software and application upgrades. The management software should simplify and schedule for software upgrades and updates.

- **Downtime for lost or broken units:** End-user downtime and loss of information are some of the not-so-obvious support issues that could be solved by implementing the right synchronization and management tools.

7- CONCLUSION

Mobile devices are the new comers in the enterprise and will play a major role. They need to be looked at as part of the enterprise and as the new PC/laptop companion. With more improvements in the mobile applications, connectivity, and interfaces to corporate infrastructure, the value of the mobile devices and technologies to the enterprise will increase. Thus, further study and evaluation of management requirements is required. Mobile devices have about 20–30 % higher cost due to the immaturity and sensitivity of technologies associated with it and the lack of skilled expertise.

Standards make the mass assembly of complex things possible, and at the same time it reduces the Total Cost of Ownership in the long run. Starting from select a standard mobile infrastructure, the mobile device and operating system, and up to the development tools, standardizing on these elements has a great effect and simplifies management and support overhead.

Control device diversity before it controls you. Implementing a managed mobile solution has the possibility of saving a significant amount of support-related cost and software distribution costs. Expect multiple solutions for managing desktops, laptops and personal-device synchronization. No vendor, so far, is offering all parts of the mobile management solution [7]. However, the existing market is so dynamic with too many acquisitions and merges that take place every once and a while.

Finally, from a business perspective, it is necessary to create a mobile device policy as a framework along with a company-wide mobile and wireless management strategy. Also it is recommended that clients establish a permanent, centralized, interdepartmental planning and procurement team for mobile equipment and wireless services. These recommendations are essential to guide the future implementation of mobile management systems and tools.

REFERENCES

- [1]. Engine of Growth, Brain Kandor, Forrester and Giga researches, March 17th 2004.
- [2]. Communicating the Value of IT, Lars Mieritz, Gartner Symposium March, 14th 2004.
- [3]. Market Overview: Synchronization and Management Solutions for Mobile Platforms, Ken Smiley, Forrester and Giga researches, August 23, 2002.
- [4]. The Mobile Scenario, Nick Jones, Gartner Symposium March, 16th 2004.
- [5]. Handheld Device Management in the Enterprise: An Overview, John Girard and Ronni J. Colville, 15 March 2004.
- [6]. Key Trends in Management Technology, Corey Ferengul, Meta Groups reports, 29 January 2004.
- [7]. Mobile Management: A Slow-Motion Market Through 2005, Gartner research, John Girard and Ronni J. Colville, September, 2003.
- [8]. IT Trends 2004: Client Systems Management, Forrester and Giga researches, David Friedlander, December 4, 2003.
- [9]. Enterprises Need Help Managing Growing Mobile Demand, by Brownlee Thomas, Ph.D, with Carl Zetie, Stan Schatt, Benjamin Gray, April 7th, 2004.

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Waheed has personal interests in public speeches, which started many years ago about Performance Management, Goal Setting, and Leadership. In 2001, he joined and participated in various activities with Dhahran Toastmasters Club. In year 2002, he achieved his Competent Toast Master (CTM) certificate. Currently, Waheed is a member of the Advance Leaders Club and focus on Persuasive Speaking.

From the IT side, his present focus is Mobile Technologies and Wireless Networks. In this field, he participated in different local conferences in Saudi Arabia which covers handheld devices usages in the Enterprise, the cost of mobile technology, and Mobile Commerce: The Future Road for e-commerce.