When Data Sync Breaks

Creating a Foundation for a Successful Handheld Strategy

A White Paper by Joe Owen
Chief Technology Officer
XcelleNet, Inc.

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Introduction

Advances in the power of handheld mobile devices such as PDAs, smart phones and handheld computers, have opened a tempting panorama of opportunity to many organizations. Anxious to increase employee productivity, lower costs and gain a competitive advantage, many companies are moving quickly to take advantage of newly powerful mobile and wireless technologies. Without adequate planning, however, a mobile deployment can result in costly disappointment.

The purpose of this paper is to help organizations create a handheld strategy that will meet all their needs, both today and in the future. It will discuss the data synchronization issues companies should consider, as well as mobile management concerns they can't afford to ignore. The paper will also detail specific features that organizations should look for in a mobile management solution.

Planning a Handheld Strategy

There's one sure thing in the world of mobile computing—change is coming. In fact, change is already here, dramatically expanding the capabilities of handheld devices and revolutionizing the way corporations do business. No wonder implementing a mobile initiative is a daunting undertaking. Miscalculations can and do cost organizations vital resources they can ill afford, yet it's even riskier to sit on the sidelines and watch the mobile parade go by. The ability to liberate employees from their desktops, or to give field workers powerful new information tools, provides a genuine edge in competitive times. The enormous promise of a mobile implementation out-weigh the risks—especially when the potential pitfalls are recognized early and consciously avoided.

To bypass these pitfalls, three principles should guide an organization as it plans a comprehensive handheld strategy:

1. Wireless solutions and data synchronization are *complementary*, not competing, technologies.
2. Developing a vision for the future is as important as evaluating current needs.
3. A vendor's history is the best predictor of its future.

This paper explores each of these principles in detail, and describes key features that mobile management and synchronization software should include. But first, the need for data synchronization merits some discussion.

Synchronization and the Handheld Infrastructure

When employees carry around small handheld devices everywhere they go, yet need to use data stored on a central server, data synchronization quickly becomes a critical issue.

Synchronization allows two or more databases on different computers to maintain identical data. "Groupware or Personal Information Management (PIM) Synchronization" focuses on applications that store information generated by individuals. For example, an executive can maintain the same contact information between her Palm® device and Microsoft Outlook® or Lotus Domino®. "Database Synchronization" focuses on corporate applications that use a backend database. For instance, a salesperson can check on the status of a customer's order from the field, which means that information is also kept up to date on his handheld device. If the customer cancels an order, the salesperson can record it on his handheld, and the change magically appears in the corporate database. Except it's not magic. Enterprise synchronization software is able to handle incredibly complex relationships involving disparate devices, applications and databases. Without it, inaccurate data can cause serious inconvenience, or even catastrophe.

When handheld devices were the toys of technobuffs, it didn't matter much if their handheld calendar left off an appointment with the hairdresser. But it's a different story when PDAs are distributed to armies of salespeople who rely on them for mission critical applications, as well as pricing and delivery information. How will contact information be updated? How will order status be tracked both at headquarters and in the salesperson's pocket? How will critical documents remain current?

Synchronization & Wireless: Friends, Not Rivals

Some organizations have seen wireless networking as being equivalent to a "thin client" solution, thus eliminating the need for synchronization. After all, if a handheld unit is "always connected" to the central server, what's to synchronize? Given the current state of wireless technology, the answer is "plenty." That's because wireless networks are still slow, traffic fees are high, and availability is not guaranteed. While the technology will continue to improve over the next several years, efficiency and reliability is needed *now*. Otherwise mobile employees—and the entire company—may lose faith in wireless altogether.

Given the limitations of wireless, three different approaches to wireless are being used: pure "thin client" applications, pure "fat client" applications, and a hybrid. A thin client depends on the central server to perform most processing and data storage. Thin client applications are appropriate when data changes fast and accuracy is essential. In this case, having the most accurate information is more important than continuous availability of the application or wireless coverage.

A fat client handles most of its own processing and data storage requirements, while a hybrid client divides up processing and storage responsibilities between the client device and the server. "Fat" or hybrid applications are the best choice when it's more important for the application to be usable all the time than it is for information to be up-to-date in real-time. For both fat client and hybrid client applications, synchronization is a critical component because they may not maintain a constant connection with the server.

Improving Usability

With good synchronization software, mobile users may never be aware that their wireless connection is slow. Without it, they are likely to find accomplishing even the most basic tasks maddening. Imagine a fast-paced executive sending an e-mail using a thin client application running on a wireless network. Most of the application's brains, as well as the data it generates, are stored on the server. So the executive's experience goes something like this: she opens the e-mail application and waits ten seconds; clicks on "compose e-mail" and waits ten seconds; clicks on "address book" and waits ten seconds; looks up a name and waits ten seconds; types a brief message, clicks "submit" and waits ten seconds before getting a confirmation screen. How much communicating will she do via e-mail? It's easier to pick up her cell phone and make a call.

The same activity goes very differently when synchronization is effectively used with a fat or hybrid application. When the executive opens e-mail, she doesn't have to wait. She pops a name in the "To:" field and starts typing her message. When she's done, she clicks "Send," and only then does she have to wait a few seconds for confirmation. It all happens quickly because most of the processing takes place right on the device. Enough data is maintained locally that she doesn't have to wait for instructions to make a round trip to the server. When she *does* access the server, synchronization takes place automatically. This efficient use of server resources means the executive can do most of her work off-line, minimizing inconvenience as well as air fees.

Dealing with Wireless Holes

In an ideal world, a wireless mobile network would operate exactly like a wired LAN. But—setting aside the technology's current bandwidth limitations—the mobile environment itself makes that impossible. Handheld computers travel far and wide, often beyond the range of the network. Steep usage fees make it impractical to maintain a continuous connection with every employee. Even a large building can disrupt communication.

So it's not a matter of *whether* disconnections will occur, but *when, and how frequently.* The real question is, "What happens next?" Will the applications running on wireless devices simply stop working? If they continue to function, how will they get back in sync with the corporate server? Without synchronization software, getting two databases in step can be a monumental undertaking. The entire client database may need to be refreshed to ensure data integrity. When performed over a wireless connection, this process is expensive and time consuming at best. At worst, it's impossible. Devices may need to be sent to the corporate IS department for a hands-on update.

The more workers use their handhelds on the job, the more critical it becomes that they have access to current information. For this reason, some organizations decide it is better for applications to halt altogether when mobile devices are disconnected from the server, than to risk the use of inaccurate data. This paradigm is great when real-time information is paramount, as in stock trading, but for most other applications it is far more important to conduct a transaction with the last known information than it is to wait until the network is available. The second scenario is perfect for synchronization. When disruptions occur, the mobile applications keep running using local data, and are automatically synchronized with the server as soon as a connection is reestablished. It's clear, then, why wireless networks and synchronization software are allies, not adversaries, in the battle for communications efficiency.

A Vision of the Future

Many organizations have developed a handheld strategy by default. Their employees started using PDAs and BlackBerry® pagers, so the company began to support them. The problem with such "planning by default" is that it doesn't take into account future needs. When these organizations discover that field employees need access to more than contact information, or that distributing software is a nightmare, or that critical data is getting lost or corrupted, they find themselves painted into a corner. They can either rip out the existing solution and start over, or they can extend their mobile infrastructure with a patchwork of products from various new vendors. Either method takes a costly bite out of the IT budget and can leave it bleeding red ink.

Now is the time for any corporation—even those with only a handful of employees using handheld devices—to turn an eye to the future. To be successful, companies need to look beyond the current horizon, and consider 1) what applications will be used on the device and what data the applications will require, and 2) how mobile devices will be supported once they leave the office, including application updates, asset tracking, device backups and configuration.

Sizing Up Synchronization Needs

To develop a handheld strategy that will stand the test of time, organizations must do more than consider how employees are currently using mobile devices. Right now they may use only groupware applications such as Microsoft Exchange® or Lotus Domino®, but it's a sure bet that this will not always be the case. Therefore, a solution that solves every existing groupware synchronization issue may still be the wrong choice. Why? Because, guaranteed, as soon as the software is deployed new possibilities for the mobile enterprise will be discovered. The organization may want to extend a custom business application out to the mobile troops, or a traveling executive may require direct access to sales data in the backend database.

When considering what type of synchronization may be needed—now and in the future—it's important to understand the different ways *synchronization* is used:

1. **PIM (Personal Information Management) or Groupware Synchronization** keeps the e-mail, contact management and calendaring data on the handheld device in sync with data on another device or computer. There are two ways to synchronize this data. The first is to use a companion PC or some type of consumer portal. This model is mostly used for consumer PDA synchronization solutions. The second method involves a direct connection between the server and the device. This model is typically used to synchronize data with a central repository, and usually takes place via a wireless, wireline or modem connection.

2. **Relational Database Synchronization** ties the business data on the handheld device directly into an enterprise application or backend database (SQL, Oracle, Sybase, etc.), and maintains the complex relationships between data elements. This is the kind of synchronization required any time employees in the field need to view or modify corporate data such as CRM or ERP type information. It is used whenever enterprise applications or databases are extended to a handheld platform.

3. **Unstructured Data Synchronization** ensures that flat documents such as MS-Word® files or PowerPoint® presentations are maintained in exactly the same state on the handheld device and the central system. This type of "flat file" synchronization, which is beyond the scope of most synchronization software, is provided by traditional systems management software vendors (discussed in the next section).

> *"It is not possible for IT groups to simply bury their heads in the sand and say they are not going to support these [mobile] devices, especially since many of the individuals who are buying them are high-level members of the organization. There needs to be a support plan in place for these devices, regardless of whether the corporation is buying them."*
>
> *Jack Gold*
> *META Group analyst*

Again, an organization that is currently running only groupware applications on its handheld devices might still want to think hard about future possibilities. If they ever want to extend a corporate application to mobile employees, they will need a synchronization platform that is able to handle complex relational data.

Considering Mobile Management Requirements

When planning a mobile implementation, another question must be carefully thought through: *How will the mobile devices be supported and maintained in the field?* Finding an adequate answer may decide the success or failure of the entire undertaking. When a device stops working at the worst possible moment (which it will), what will happen? Will it be recalled to headquarters? Will software upgrades or antivirus updates wait until the annual sales meeting? Will a full-time support person chase field reps around the country to maintain their handhelds? Will software be downloaded to users, along with a prayer that they'll install it right?

The answer should be, "None of the above." A robust *mobile management solution* allows IT experts to control mobile devices from the central server, while a small client application runs in the background on the mobile device to handle all the heavy IT lifting. Support personnel use the management software to remotely perform almost all system maintenance tasks, such as:

- Installing and upgrading applications
- Maintaining standard device configurations
- Securing and backing up critical data
- Keeping track of mobile hardware and software assets
- Troubleshooting user difficulties

These activities can be performed with minimal involvement by the user, who may not even be aware of routine maintenance tasks taking place. Necessary downloads and uploads occur automatically, at the same time the application data is synchronized. Automated self-healing capabilities and alert notifications can reduce user down-time by solving problems before they knock a device out of commission. The security component should protect information on a lost or stolen device, encrypt data transfers, and prevent unauthorized access to the LAN. A solution should be able to automatically update files including documents such as pricing sheets, presentations and collateral.

The mobile environment is fraught with unreliable connections, slow transmittal speeds, and nontechnical users who can't dash down the hall to the IT department for help. But these conditions need not be discouraging—as long as the solution is designed with them in mind.

"The IS organization must integrate mobile systems management and synchronization efforts. Three years ago the mobile management requirements were automated software distribution and inventory autodiscovery for digital assets. Today's business drivers come from different needs— synchronization for the applications/content/ database and mobile systems management, from operations for application updates and for tracking of hardware and software."
Gartner Symposium/ITxpo 2001 Presentation "Mobile Device Management and Synchronization: Take Control or Lose Control", J. Girard, R.Colville, October 2001.

History Tells the Future

The marketplace is now aware that a robust and resilient mobile infrastructure requires both data synchronization and systems management tools. It is critical to keep mobile devices operational by actively managing them and keeping the data current. Both require moving files and database content across intermittently connected, slow, unreliable networks. Since most companies don't want to stitch together separate solutions for each type of data to be moved, many vendors are now creating a single integrated solution. This type of solution has the advantage of fewer moving parts, a single management console, a single platform to leverage, faster return on investment

and lower administrative overhead. Better yet, an integrated solution is far less onerous—and may be practically invisible—to the end user.

Many vendors are now touting these single-solution benefits—but they're not equally prepared to offer a solid bridge into the future of mobile computing. It is therefore important, when making that critical vendor choice, to consider "*where the vendor has been*" as much as "*where the vendor is going.*"

Vendors Focused on Companion PC Synchronization

One group of vendors made their names in the world of Personal Information Management. These vendors are good at synchronizing data among several devices. This capability is extremely useful, ensuring that busy users always have current contact or other personal information with them, whether they're carrying their cell phone, pager or PDA. This type of synchronization usually uses a companion PC or a consumer portal as the main repository of data. The companies who provide it have until recently focused on a consumer oriented model. Even though many of these companies are now repositioning themselves to go after the corporate market, they are still trying to build products that include direct-to-server synchronization and centralized management of handheld devices.

Unfortunately, the lack of direct-to-server synchronization will prove a major disability for these vendors as handheld devices become more robust and wireless networks more pervasive—and as companies start to produce vertical applications that don't require a companion PC. In fact, the need for an intermediary PC will soon be as welcome as a millstone around the neck, especially since most organizations want to store enterprise data in a central repository. Retrofitting a synchronization technology built for "handheld to PC" doesn't make much sense, so these vendors may have to start over from scratch. This does not bode well for trouble-free communications in the near future.

In addition, as corporations roll out and ultimately have to support hundreds or thousands of these mobile devices, IT will need a way to cost-effectively support these devices, just as they support desktop and laptops today.

Groupware Vendors

Vendors that provide synchronization for groupware products such as e-mail and contact managers are experienced in the area of "direct-to-server" connections, and their products have long been built around an enterprise framework. This group of vendors is very good at extending groupware applications to handheld devices. They typically have a strong out-of-the-box adapter for Exchange and Domino, and good graphical user interfaces for configuring the system for a company's unique needs.

However, groupware vendors also face two serious shortcomings. First, the data within Groupware applications are simple and straightforward, with no complex relationships between the data. It's therefore often difficult, if not impossible, for these products to synchronize corporate data that contains relationships. For example, if two tables that share a relationship are synchronized with a PDA—well, it can't be done. The system simply breaks down. Even writing the complex custom code these vendors require

usually doesn't produce data that tracks the relationships between data elements, thus making the technology unusable for custom corporate applications.

The second stumbling block groupware vendors face is that, until very recently, they have not focused on systems management. Their attempts to beef up their solutions in this area are still in the rudimentary stages.

In short, these vendors often provide great graphical user interfaces with simple out-of-the-box functionality for groupware applications. But the breadth of the solution doesn't meet the needs of companies that will evolve beyond groupware synchronization and require an open, extensive platform for a complete handheld strategy.

Management and Synchronization Vendors

Every software engineer knows that once the hardest problems are solved, it's not difficult to go back and solve the easier ones. This is where vendors who have focused on systems management and relational database synchronization have a leg up on competitors in the mobile space. They have already dealt with the tough issues of how to synchronize corporate data with multiple device platforms running various applications. They've already figured out how to manage farflung mobile units that are linked only intermittently to the central server over a slow connection. From that point, implementing groupware synchronization is a comparatively easy task.

This is good news for organizations looking for a vendor they can partner with over the long term. In general, vendors that are out front technologically are a better bet in this regard. Rather than scrambling to catch up with more advanced competitors, they can spend time understanding individual customer needs.

These vendors' weakness, however, is that typically they've focused on either synchronization or management—so very few offer both capabilities on a single platform.

Choosing a Vendor

When selecting a vendor to help put a handheld strategy into practice, it's important to look first at a vendor's overall stability and track record. A large customer base, a hefty reference list, and proof that the company has done a project of similar size and scope are all encouraging factors. If everything looks good up to this point, the evaluation of the vendor must become more pointed. Have they built their product around an enterprise model? Are they experienced in synchronizing relational databases? Have they developed full-featured systems management tools for the mobile environment? If the answer to all three questions is, "Yes," the next thing to consider is their track record. How long have they been around? Are they successful in the marketplace? How able are they to support an aggressive product roadmap?

What To Look For

The purpose of this paper is to help organizations understand and consider available options before deciding how their mobile handheld devices will be integrated into the enterprise. To this point, it has covered some of the high level issues that every corporation should think about. Now it's time to look at how these issues translate into actual product requirements. After extensive research, XcelleNet has put together a list of requirements that any corporation serious about a handheld strategy should consider.

I. Synchronization

The process of synchronization can be very complex. Sometimes data is shared among several devices owned by one user, or the data may be used by several people simultaneously. Sometimes changes must be tracked both in the backend system and on the mobile device. The right synchronization solution can make the most complex synchronization tasks manageable for exchanging information between mobile devices and enterprise systems such as data warehouses, ERP or CRM systems.

Core synchronization features to look for include:

ID Mapping: Provides the interface that maps the fields of one database to the fields of another database. A good mapping interface makes it much faster to create a mobile application that can be easily synchronized.

Change Detection: Allows the system to detect that a change has taken place, extract the change, and apply it to the server and/or client database according to any conflict resolution rules in place.

Conflict Resolution: When the same record has been modified by different users, this feature determines which changes are kept and which are discarded. Types of conflict resolution include: Server Wins, Client Wins, Date Time stamp, Last / First In Wins, Newest, Programmatically Extensible, and Do Not Resolve.

Database Independence: Allows a synchronization solution to work with any server and any client database. A typical corporation may have many different databases, and with few mobile standards, there are even more differing client databases. A solution should support major client databases on Palm and Pocket PC, and major server databases such as Oracle, SQL Server and Sybase.

SyncML Compliant: Supports a standard that the industry is rapidly adopting. Although SyncML is not yet a "do or die" standard, any new technology purchase should support it.

Roll-back: Protects data integrity when synchronization was not completed, by rolling the system back to the last known state. This feature is critical because in the fragile mobile environment, synchronization sessions may be terminated mid-stream.

■ **Pre**- **and Post**- **Processing**: Preserves the precious commodity of bandwidth by synchronizing information as quickly as possible, then performing the processing on the device itself. In other words, the process of applying the changes to data is done off-line to preserve bandwidth resources.

The mobile solution also should have specific support for both Groupware Synchronization and Database Synchronization.

Groupware/PIM Synchronization

With Groupware Sync, users can keep e-mail, contacts, calendar, to-do list and journal data current at all times, regardless of how many devices they use or where the information is changed. A worthwhile solution offers out-of-the box support for Lotus Domino and Microsoft Exchange. Support for Palm and Pocket PC clients should also be built in, and support for additional device types should be easily added. PIM synchronization gives users:

■ Lower cost access to personal information;
■ A direct connection to the server, with no need for a companion PC;
■ A no-hassle way to keep track of priorities and people.

Database Synchronization

Synchronization's benefits shouldn't end with Groupware Sync, but should extend to more complex backend or relational database synchronization as well. When a corporation is ready to build custom applications, it can integrate mobile devices with an ERP system, CRM system or data warehouse.

Many solutions can't synchronize complex relational data for enterprise applications. A solution should be able to integrate into backend systems using XML, a COM object or a direct database connection using ODBC. (XcelleNet recommends the XML or COM method as the best way to safeguard database integrity.)

Database synchronization gives organizations:

■ A lower cost method of synchronizing data between a mobile client database and a central server database;
■ The ability to perform conflict resolution and flexible field mapping, which minimizes the need for modifying an application or database;
■ The ability to work with popular handheld application development tools;
■ Easy-to-use interfaces.

II. Systems Management

Well-tuned synchronization combined with good systems management gives companies the best possible combination of productivity and cost-efficiency. The cost of supporting mobile devices skyrockets when companies don't automate support and maintenance procedures. That's why a system that handles the systems management is a critical feature in any synchronization purchase. Key features to look for in any systems management solution include:

Software Distribution

By automating the software deployment process, organizations don't need to call in handheld devices for periodic upgrades. A solution worth its salt should allow application downloads to be scheduled for low traffic periods, and should not require user intervention. It should be possible to segment software delivery over a period of time, so that transmission continues whenever the device is connected to the central server. Much of the processing can therefore be done off-line to minimize connect time. When software deployment is simplified to this extent, handheld devices can be better equipped with the latest upgrades, and better protected with regular anti-virus updates.

Asset or Inventory Management

Before software distribution can be automated, a company needs to know which types of devices are being used and what kind of applications they are running. A good asset management feature gives systems administrators the ability to capture detailed hardware and software information. This data makes it possible for administrators to:

- Get a detailed picture of their entire mobile systems implementation;
- Plan thoroughly for mobile upgrades;
- Determine which user groups need different types of applications, and distribute software via predefined rules;
- Ensure that all applications are up-to-date and compatible;
- Detect unauthorized or accidental changes in the applications running on enterprise handhelds.

Configuration Management

When handheld devices are left unmanaged, it's all too easy for configuration options to get "messed up," and frustratingly hard to find and fix the problem. A strong configuration management feature enables the IT department to centrally control and maintain preferences, settings and options for:

- Connections (modem type, user name, dial strings)
- Formats (date, time, currency, location, etc.)
- The network (IP address, DNS, log-in parameters)
- Owner information (name, company, address, phone)
- Hardware (power, sound, alarms, beaming, etc.)

Backup Management

The loss of data can be a nightmare for mobile users, yet they're not exactly famous for making conscientious backups. By automating the data backup process, companies can ensure "no more tears" for users, and no more frustration for administrators. With a hardy backup management feature the IT department can define files and folders that require regular archival. Once set in motion, the backup process takes place automatically, whenever a connection is available. The backup feature should include:

- File differencing, so that only changes since the last backup are transmitted to the central database;
- The ability to perform a selective or full restore from the backup console.

III. Client Server Architecture

Key things to look for in a well designed mobile solution include the ability to perform reliably even when different standards, devices and protocols are introduced. The solution should be efficient in a mobile environment with it's limited, unreliable bandwidth. It should also be secure and have good tools for IT to centrally control all the devices in the field from a single point of access.

The solution's client server architecture should offer reliability, efficiency, good security and extensibility.

Reliability and Compatibility

A solution's flexibility is a good indicator of its reliability over the long haul. In other words, it should offer:

1. *Transport Independence.*
   The IT department shouldn't have to worry about all the competing wireless standards; the product should just work over what ever network is chosen—even if multiple standards are required to reach a global audience. A few of the most common protocols that should be supported are: HTTP, CDPD, GSM, CDMA, ARDIS, MOBITEX, WLAN (802.11)

2. *Database Independence.*
   Most corporations will ultimately need to synchronize multiple applications and databases, and write unique applications. Any solution should be open enough to accommodate most backend data stores. That's why adherence to SyncML standards, open APIs, ODBC, Com and XML interfaces is so important.

3. *Device Independence.*
   While a single platform for management and synchronization is very important, it is just as valuable to have a single platform for all mobile devices. Why should an organization deploy two solutions that do the same thing just because it wants to roll out more than one kind of device, such as a Palm OS (e.g., PalmPilot, Handspring, TRG, IBM, Sony), Pocket PC/Windows CE, or RIM Blackberry? The vendor should have a good roadmap and track record of supporting new devices as they come out.

Efficiency

In an environment where transmission speeds are low and connect time is intermittent, a solution's efficiency needs to be a key consideration. Organizations should look for:

▣ *Dynamic bandwidth throttling.*
   Automatically adjusts the amount of information being transmitted if the user is in the middle of another task or if the pipe is empty. This ensures that the user doesn't get bogged down by synchronization or management processes taking place in the background.

■ *Offline processing:*
Utilizes a "Deferred Connection, Queued Event" architecture. "Online" processing time is minimized over bandwidth-limited networks. This improves network performance by reducing overhead.

■ *Checkpoint restart:*
Tracks the progress of file transfers as they occur. Broken file transfers are resumed at the point the connection was lost in challenged communication environments.

■ *Compression:*
Reduces file size to minimize the time required for transmissions between the device and server.

■ *File differencing:*
Further reduces connect time by transferring only the parts of files that have changed, instead of entire files.

■ *Intelligent file updates:*
Criteria Checking ensures that only files or data that need to be updated are transferred. This minimizes connection time and the impact of file updates on network performance.

■ *Segmented file delivery:*
Gives the network administrator greater flexibility and control over how applications and data are delivered to mobile devices.

■ *Wireless redirectors:*
Optimizes session efficiency over protocols used by wireless networks. Enhances connection stability and performance to wireless devices.

■ *Flexible packet / window size:*
Allows administrators to "tune" traffic to match network conditions. Dramatically enhances performance by reducing connection time.

■ *Opportunistic connections:*
Automatically detects available network resources. Executes sessions when communication networks are available.

Security

Since mobile devices are used outside of the protected walls of the enterprise, a solid security framework is required. This framework should include four key features:

■ *Authentication* safeguards the network from unauthorized access, usually by comparing a user name and password against a permissions list. Solutions should integrate with active directory, LDAP, or NT.

■ *Access Control* determines who can access different types of information, based on assigned security groups.

■ *Encryption* protects data as it is transmitted over the wireless or wireline connection. Features that provide this type of protection include: elliptical curve encryption, SSL or digital certificate (e.g., Certicom).

■ *Loss & Theft Protection* allows a remote administrator to erase data on the device if it is lost or stolen, preventing unauthorized access to sensitive content. The administrator can also send a message with instructions on how to return the device.

Extensibility

Inevitably, companies will want to move beyond the mobile uses they first anticipated, so it's important to look for solutions that are very extensible. Having well documented, easy-to-use APIs can help companies satisfy unique requirements such as custom log-in or non-traditional conflict resolution rules.

Additional extensibility is often possible with scripting languages that allow nonprogrammers to easily enhance the system, or create complex task and logic within the system.

Finally, using synchronization to extend an enterprise application or build new ones requires interfaces that support COM, XML, and ODBC.

IV. Administration

Organizations should also look carefully at how the mobile solution is administered.

Web-based Server Administration

The ability to access the server through a browser interface is critical, especially when the server is located in a physically inaccessible place—a data center in another city or a remote office somewhere across the globe. Even if the server is right in the home office, things have a way of breaking at 2 a.m. A Web-based interface allows troubleshooting to take place from a secure PC in the administrator's home.

Logging and Reports

When everything is running smoothly on the mobile implementation, logging capabilities are almost forgotten. But there's always that two percent of the user population who run into problems, and that's when extensive log files become a real blessing. Without automated record-keeping, it's very hard to find out where and how a problem started, and even harder to find a solution. With log files in hand, solutions can often be achieved within minutes.

Usage reports generated on the server are also invaluable when it comes to planning hardware and software upgrades—or discovering where resources are being over- or under-used.

Summary

Corporations with a sound mobile infrastructure have a decided advantage in the marketplace. Mobile computing devices can increase the productivity of employees who are away from the office, and can take service and support closer to the customer. However, those planning a mobile infrastructure must keep in mind several key points. 1) Installing a wireless network does not preclude the need for synchronization. 2) When evaluating mobile requirements, it's important to consider that an organization's needs will grow and change. The goal is to minimize at the outset the need to integrate additional applications in the future. 3) When selecting a vendor, it is important to consider that company's past area of expertise, as well as its present ability to help customers meet the demands of a fast-changing mobile environment.

XcelleNet is an example of a vendor that has developed a robust mobile management solution based on an open, scalable architecture. Its mobile management product, Afaria®, provides both the advanced synchronization and the systems management features that today's organizations require, both now and in the future.

About XcelleNet

XcelleNet, Inc. is the leading provider of enterprise solutions for managing remote systems and mobile & wireless devices. For more than 14 years, the company has been a pioneer in meeting the challenges of securely delivering and maintaining mission-critical applications and content to remote locations with its flagship product, RemoteWare®. Today companies around the world use RemoteWare to manage kiosks, retail and restaurant store systems, branch office networks, and other remote systems.

Leveraging remote expertise and award-winning technology, in May 2000 XcelleNet introduced Afaria®, a device management solution designed to address the problems enterprises face as a result of the explosive growth of the mobile & wireless economy. Afaria provides the most comprehensive management functionality available for organizations deploying large numbers of mobile devices, including laptops, PocketPCs, Palm Handhelds, RIM Blackberrys, and Symbian devices and smart phones.

XcelleNet serves some 2,500 customers worldwide in a broad range of industries such as pharmaceutical, retail, hospitality, insurance, financial services and manufacturing. The company's solutions reduce total cost of ownership of remote or mobile deployments, accelerate end-user productivity, and ensure the availability and reliability of corporate applications and information to an organization's remote and mobile workforce. More information is available at http://www.XcelleNet.com.

For more information about Afaria, contact XcelleNet at:

United States
XcelleNet Inc.
3820 Mansell Road
Alpharetta,Georgia 30022
USA
Tel:800.322.3366 or
678.585.7000
Fax:678.585.7301
E-mail:info@xcellenet.com

United Kingdom
XcelleNet (UK)Ltd.
125-135 Staines Road
Hounslow
Middlesex TW3 3JF
UK
Tel:+44 (0)20 8538 5800
Fax:+44 (0)20 8538 5801
E-mail:euroinfo@xcellenet.com

France
XcelleNet SAS
La Grande Arche
Paroi Nord
15 ème Etage
92044 Paris La Défense
FRANCE
Tel:+33 (0)1 55 23 60 06
Fax:+33 (0)1 40 90 31 62
E-mail:info.fr@xcellenet.com

Germany
XcelleNet GmbH
Vahrenwalder Str.269A
D-30179 Hannover
GERMANY
Tel:+49 (0)511 9 66 69 40
Fax:+49 (0)511 9 66 67 01
E-mail:info.de@xcellenet.com

To access information via the World Wide Web, visit http://www.xcellenet.com

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