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Paper

# MOBILE NETWORKING: ALL DATA IS NOT EQUAL

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A major energy provider with nearly 700,000 customers in the northeastern U.S. issues wireless portable computers to its field technicians so they can instantly report the status of a service call to the dispatcher.

When trees topple or limbs fall during a storm, service crews dispatched to the scene can provide a detailed description of the damage in real time over a robust data communications network. They can send a message from the field instantly to the dispatcher outlining the length of time the cleanup will take, and whether additional help is needed.

This method of communication brings a high level of automation to the dispatch center, and lets the energy company provide virtually real-time power restoration information to its customers. Labor efficiency and enhanced customer satisfaction are the result for this mission critical application. Real-time data such as this provides information across the entire enterprise, information on which to base decisions and commit resources immediately.

The same crews can generate other types of data that do not require the option of wireless, and sometimes expensive, flight back to the enterprise. While dispatching, status reporting and emergencies may require wireless data exchanges, items such as proof-of-delivery signatures and parts used during the day can usually wait until the end of the day and be sent to the server over a phone dial up service or wired network connections.

### DIFFERENT DATA HAS DIFFERENT VALUES

A priority-based networking system is one where different types of data have varying values and are transmitted in ways suitable to their importance to the company. Data should be made available to backend systems as they are required, whether it is for status reports, lists of parts sold, time spent on a call or captured mileage. This is a cost versus need data model. The more urgent the need for the data, the higher its priority for being sent to the server in the quickest, and often most expensive way possible. The lower the urgency, the slower and less costly the method of transmittal.

Priority-based mobile systems normally require more than one way to collect and share information in order to provide a high level of service at an affordable price.

In the best of worlds, the mobile application and the rugged hardware work in concert to automatically determine how and when data should be handled. Such integrated software and hardware are available for implementation today.

For example, during a typical day a service technician works through several steps: start of day, work order assignments, reassignments and end of day summary activities. Each step generates data, which can be divided into one of three categories:

- **real time data**, where data will be sent as soon as possible regardless of the cost (i.e. dispatch, status updates or changes, messaging), commonly using a form of wide area wireless network,
- **daily data**, such as that required for the end-of-day process (i.e. parts used, monies collected, signature data), normally sent using a dial up method from home or a service depot network connection,
- **occasional data**, where data is sent only as it is needed (i.e. application and bios upgrades for mobile computers, new customer master or parts master files), usually sent over a network via a dock for the handheld or Ethernet connection.

## Data Shorthand for Mobile Computers

Properly configured mobile computers can send chunks of data using any of these methods. But the beauty of this scenario is that a kind of data shorthand comes into play so that only new data is transmitted and received. Since all of the data accessed by the mobile computer already resides in the enterprise database, the only data that must be sent are changes or deletions to information in a record. This form of shorthand helps ensure the integrity and security of the data sent back and forth because the data bits and the database typically are not accessible by others.

Some companies use beepers or mobile phones as standalone mobile data capture devices when data gathering moves outside the four walls of the manufacturing floor or warehouse.

While these devices have some inherent limitations based on their own proprietary infrastructures and the individual capabilities of the devices themselves, they may also require some kind of paper-based backup system to complete the solution.

Such devices may provide only a partial data collection solution, since they typically are designed to handle messages of only a few hundred characters. In most cases they do not network well or tie into a central database. Also, wireless coverage can be spotty and transmission costs can be prohibitive.

They often cannot enforce business rules to ensure that all the necessary data is collected in a specified sequence because they are free text entries.

Many browser-based mobile applications that work well inside a building often do not work well outside a building. That's because browsers depend on continuous connectivity, since each page is pulled down from the server as it is requested. Inside a building connectivity and data throughput can be controlled through the use of wireless access points. Outside the building a browser is dependent on a public network of towers, (similar to cell phone towers) with limited coverage footprints that can lead to dead spots or session drops as you pass from one tower to another. In such situations the mobile worker may have to fall back on a paper- or voice-based system to capture pieces of data.

Full function mobile computers with robust wireless data communications capabilities offer a route to complete, real-time data collection in a disconnected environment and using wireless to enable timely decision making.

Consistently capturing the same types of data at each customer location helps establish service parameters that can be measured and used to set standards or requirements for data gathering.

## The Total Solution for Priority-Based Applications

Priority-based applications that have a mobile component, where real-time data collection and sharing enterprise-wide is essential to the operation of a business and the satisfaction of its customers, require special considerations. That's especially true if those applications are regional, national or global in nature.

By definition, a priority-based application should provide mobile workers with access to company and customer records, as well as the ability to update those records from the field. Wireless capability is usually considered essential to the successful implementation of such systems.

The decision to go wireless should be based on cost vs. need: how much data do you need in real time, how much can you analyze, how quickly can you analyze it and make it beneficial, and is it necessary to stay competitive in the marketplace.

What does it take to build a true around-the-clock total solution system that captures every piece of data for decision making, product tracking, business automation and strong bottom line productivity? You need a strategy and a plan. Your business strategy will drive an integrated software and hardware, and communication plan that fits the needs of your operation and various methods of transmitting data based on its value to the organization.

## Components of a Total Solution System Include:

* A handheld mobile computer tough enough to stand up to the environment in which it will operate – rough handling, indoor and outdoor temperature extremes, and solid state memory so it doesn't lose any data if the battery dies. It must also have the ability to run the mobile application and be compatible with the applications residing on the company server.
* Mobile computer application software, designed to operate in wired or wireless environments and support all the business processes needed by the remote worker;
* A wireless radio module such as a PC card integrated into the handheld, vehicle-based, or data compatible cell phone and a wireless service provider to carry messages back and forth between the field force and the central server;
* A communication gateway that can: handle wireless data communications; initiate and accept sessions, track data to ensure it is received, monitor the entire communications effort, support dial-up service if wireless is not available, offer Ethernet capabilities and a system administration function to prioritize data messages so least cost versus data delivery need can be managed;
* An application server, which provides a central data repository for all the information moving to and from the mobile worker and provides a single point of integration into host systems such as enterprise resource planning (ERP) or customer relationship management (CRM) and for dispatching and prioritizing data;
* Integration of all hardware and software components by internal staff or an outside systems integrator familiar with the application and an implementation of this type.

While this type of system may be more costly to implement than a stand alone pager or cell phone, it offers definite benefits that can directly impact the bottom line, like enhanced productivity and decision making, and improved customer satisfaction. In this process, the mobile worker enters the data only once through a touch screen or keypad on his mobile computer. The increased revenue and decreased expenses associated with this type of installation make the total cost of ownership of a mobile computing solution less than that of a less robust manually intensive system. The flexibility of various data transmission types also means each system can be more efficient, and data costs better controlled.

A number of key factors drive business to this type of a priority-based system. Most often it is the desire to eliminate paper and the labor-intensive manual processes that surround it, particularly the typing in of information handwritten by the mobile worker. The problems with this multi-step process include additional cost and delay in data gathering, an increase in errors, lack of complete information and the selective capture of information, which makes data analysis difficult if not impossible.

The business benefit of a priority-based mobile system is further expanded by capturing and feeding data into ERP or CRM systems for analysis. Once in the systems, management can pull information to meet the specific needs of the marketing, sales, finance, purchasing and service departments. Access to timely data in areas such as inventory management and business performance provide opportunities for strategic decision making and improvements to operational efficiencies.

By enabling wireless data collection and reporting for workers in the field using mobile computers, a company gains several distinct benefits:

- the ability for management to make faster decisions to eliminate work, to reschedule a call to a different mobile worker in order to meet a time commitment to a customer, to get the mobile worker to a customer location faster than usual, thus making him more billable, and to improving productivity, and
- the ability for both the mobile workers and managers to have immediate access to data that is constantly being gathered and updated to make better decisions and improve the quality of service to the customer.

Outside a building, wireless data communication comes with a cost. While wide area wireless connectivity is essential for collecting and deploying real-time data for mobile workers, it tends to be the most expensive and least reliable method for data exchange.

Companies using paper-based data collection and reporting systems, or even standalone beepers or cell phones and personal digital assistants (PDAs), usually collect basic information needed for billing on a piece of paper: a list of materials used (or goods ordered) on a call and the hours spent at the location. In this multi-step scenario, significant data must still be manually entered, audited, edited and decoded and the mobile worker does not always have the ability to print a formal receipt for the customer.

The majority of information collected on the job by the mobile worker could be downloaded at the end of the day, because the data is not critical enough to send via wireless methods.

On the other hand, wireless enabled mobile computers for priority-based applications have the ability to:

- remain fully functional regardless of the availability of wireless coverage;
- communicate using a variety of methods, including wireless, dial-up or Ethernet;
- help to match the worker with the skills required to do the job, where wireless is used to update the status of each tech, making matches more efficient;
- improve data accuracy and reduce manual re-entry of information;
- print remotely so, for example, invoices or receipts can be issued on the spot;
- enforce business rules and add consistency to the data collected before the worker can proceed to the next job;
- control which version of application software resides on the handheld, and;
- know where mobile personnel are at any given time.

The success of mobile computing is based on the ability to accurately capture and share data electronically and to enforce a method of data collection that consistently meets the business needs of the organization. Having the ability to chose data sharing methods – based on cost and speed - ranging from real-time wireless to end-of-the-day dial up, offers a new kind of flexibility and control. In addition, data shorthand reduces data transmission times and enhances security.

When you set out to build a priority-based system for your business, look at the advantages of the various options and choose one that's right for you. It could mean a boost to your bottom line.

## ABOUT THE AUTHOR

Mr. Kelly Ungs is the Network Communications Product Manager at Intermec Technologies Corporation, specializing in communication, networking, and software system management products to support wireless and mobile computing. He has been in the mobile computing and networking field for 17 years designing, developing, implementing, and maintaining local and wide area wireless, mobile, and desktop computer applications and networks. He holds a Bachelor of Science from the University of Iowa in Education with an emphasis in Mathematics and an MBA from Keller Graduate School of Management in Kansas City, MO. Mr. Ungs can be reached at kelly.ungs@intermec.com.

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