

# BATCH VS. WIRELESS

## REAL-TIME TRANSACTION PROCESSING: THE BENEFITS OF MIGRATING FROM BATCH MODE TO A WIRELESS OR BLENDED BATCH-WIRELESS ENVIRONMENT

TECHNICAL WHITE PAPER

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One of the most common forms of data management is batch data processing, where data is collected and held in a mobile device until a user synchronizes the information to a host system or server, via a serial or USB connection or a LAN (local area network). With the acceptance and subsequent proliferation of the wireless LAN (WLAN), companies now have the option to migrate from batch to real-time data processing. But if batch processing has been and still is serving the needs of your enterprise, why consider upgrading to a real-time mobility solution? This white paper explores the issues, costs and benefits of both methods of data management processing, and examines how real-time processing can impact your entire enterprise, delivering true business advantage through reduced inventory requirements, faster order fulfillment, increased accuracy of shipping and receiving information, and more.

### BATCH MODE DATA PROCESSING: DATA STORED ONBOARD THE MOBILE DEVICE

With batch processing, mobile users collect data via handheld computers and bar code scanning devices that are not connected to the LAN either physically or through a wireless connection. The collected data remains in the device memory until a user connects the device via a cable to a PC and uploads the information to a server.

Batch data processing is ideal for environments where real-time data is not mission critical. Since the data is stored 'on-board' on an offline device, batch mode offers the convenience of processing only when needed, in background mode, with a solid audit trail.

While batch processing is considered very economical, there are a number of issues and related costs:

- **Device management labor costs:** Every day, a series of beginning and end of day tasks must be performed, including: checking battery levels, checking mobile devices in and out, and making sure devices were synchronized. In addition, time must be spent initially downloading needed files onto the device prior to the start of a shift. This single administrative task often translates into a great deal of lost productivity and hidden cost associated with batch processing.
- **Labor costs:** Time is spent synchronizing information regularly throughout the day—walking to and from a PC to connect the device, synching the data, and resolving any process issues that may occur during synchronizing. In environments that require data to be synched hourly, a staff of ten employees could easily spend 10 minutes each per hour just uploading information—translating into a full workweek (40+ hours). Over the course of a year, for every 10 employees, the cost of just synching data can easily equal the cost of one full time employee.

- If a problem occurs and the stored data is lost, and all work must be repeated to recapture the information. Imagine the time—and associated cost—on an annual basis spent repeating work to recapture lost data.

#### The Cost of Time and Lost Productivity

At first glance, these costs might be seemingly benign. But what is the cost of a manager spending 10 minutes per device per day to ensure the needed files are downloaded? And what other more critical business issues might that manager handle in a day if this administrative task was eliminated with real-time processing?

To determine the cost of the time and the effect of lost productivity, let's assume that employees spend 10 minutes per upload (walking to and from the PC and uploading the data), and the data must be uploaded every hour to eliminate the risk of major re-work in the event of a device crash. In this scenario, employees would spend 70 minutes daily on this task (5.83 hours/week). The following calculations reveal the conservative cost of this time, which could be much better spent on more critical business activities. The financial effect shown on the following page for both small and larger enterprises does not factor in labor costs associated with device management, or the cost of recapturing lost information in the event of device malfunction.

### SMALL ENTERPRISE SCENARIO: 10 EMPLOYEES

Per employee-time spent uploading data:	<b>70 minutes/daily (5.83 hours/week)</b>
X 10 employees =	<b>58.30 hours/week (nearly 1.5 work weeks)</b>
X \$15 hour (not fully loaded) =	<b>\$874.50/week</b>
X 50 weeks =	<b>\$43,725.00/year</b>

### LARGE ENTERPRISE SCENARIO: 100 EMPLOYEES

Per employee-time spent uploading data:	<b>70 minutes/daily (5.83 hours/week)</b>
X 100 employees =	<b>583 hours/week (just over 14.5 work weeks/over 3 months)</b>
X \$15 hour (not fully loaded) =	<b>\$8745/week</b>
X 50 weeks =	<b>\$437,250/year</b>

From the examples above, you can see that batch mode can actually be quite costly when you consider the cost of the labor spent on a minor administrative task and the resulting productivity increase that would result from automation.

### THE COST OF "INVISIBLE" DATA

In addition to the hard costs above, the inability to see information in real time also turns into increased costs across the enterprise in many areas, such as:

- The purchase of higher levels of inventory than required, increasing capital costs and overall profitability
- The inability to see stockouts in real time impacts the business in a number of areas:
  - In the warehouse, pickers are unable to complete orders—time and cost is added to the cycle time for picking, affecting overall productivity and profitability
  - Inability to complete orders in the timeframe the customer is expecting can result in lost sales, again impacting profitability
- Slow acknowledgement and reporting of shipments received at the loading dock, resulting in incorrect invoice payments
- The speed and accuracy of order processing, which affects customer satisfaction and retention rates—and can result in lost sales

### REAL-TIME DATA PROCESSING: DATA STORED ON THE SERVER

When data is stored on a server, data is not only processed in real-time, but instantly available to other business systems. Real-time data processing is ideal for mission-critical information, and can be implemented as either “always on line” or “mixed mode store and forward.” The benefits of each are described below.

#### Always Online

Real-time processing enables instantaneous movement of data from the point of capture to the point of most impact. No longer collected and stored in mobile devices, data is instantly visible in the enterprise—the time delays associated with batch processing are completely eliminated. The result is more timely information—enabling better business decisions.

The many benefits of real-time processing include increased productivity—the need to download and upload files daily is eliminated, freeing employees to spend more time on critical business tasks. In addition, data is more resilient, since it is always immediately captured on the server and no longer vulnerable to device failures.

But the benefits of migrating from batch to real-time processing extend far beyond the productivity gained through the elimination of uploading and downloading tasks. This single process change ripples throughout the entire enterprise, enabling the re-design and improvement of current business processes that reduce costs while increasing productivity, maximize resources, increase customer satisfaction and improve overall company profitability.

Following are just a few of the benefits realized with real-time visibility of business information:

- Inventory requirements can be reduced, lowering associated capital expenditures and increasing stock turns
- Orders can be filled quickly and more accurately, increasing customer service, satisfaction and retention levels
- Correct pricing of products on the retail floor, and the ability to quickly respond to markdowns and competitive offers
- Real-time inventory enables lean and just-in-time manufacturing
- Up-to-the-minute sales information ensures an accurate picture of sales volume and margins, enabling stronger management of monthly revenues and profitability
- More accurate processing of invoices through instant visibility of shipments as they are received at the loading dock

#### **Mixed-Mode Store and Forward**

Real-time data processing can be implemented with batch processing applications, known as store-and-forward. In store-and-forward applications, mobile devices can either automatically connect and synchronize data when in range of a WLAN, or synchronize data when desired (for example, at the press of a specific key). This “mixed-mode” offers the same benefits and return on investment as the “always on-line” mode, with one powerful advantage: in “always on-line” mode, applications usually will not work if the device is off line, but with “store-and-forward” mode, applications continue to work whether they are on or off line.

This mode is ideal when WLAN coverage is spotty or will be interrupted, for example, for workers that travel out of range of your WLAN, such as drivers or repair personnel who physically leave your company campus. These workers are able to continue using applications, remaining productive and able to capture data regardless of whether the device is in range and connected to the WLAN. When workers return to the campus and are in the WLAN coverage area, mobile devices automatically connect, eliminating the cost associated with docking and uploading data—from time spent synchronizing to the need to purchase and manage additional hardware, such as cradles and cables. Store and forward is also ideal for workers who routinely travel outside your four walls and carry devices equipped with wireless wide area networking (WWAN)—such as delivery or repair personnel. In this instance, even when mobile workers are in areas with spotty or no coverage, the business-critical applications on the device remain available, and your mobile workforce remains productive.

## **ENABLING TECHNOLOGY**

### **First Generation WLAN Solutions: Issues and Obstacles**

The advent of the wireless LAN (the core technology platform) enables real-time processing on wirelessly enabled mobile devices (computers and bar code scanners). However, first-generation WLANs were not always viewed as practical for a number of reasons:

- **Cost prohibitive:** The cost for the hardware for first-generation WLANs was an order of magnitude above that of a wired LAN.
- **Incremental ongoing device management costs:** Distributed architecture required the physical management of each and every access point located throughout the enterprise.
- **Difficult to install and integrate with the wired LAN:** First-generation WLANs are an adjunct network, implemented as a standalone network along side the LAN.
- **Security:** Since batch processing takes place on the LAN and does not travel over the airwaves, the data was perceived to be more secure, eliminating the issues of wireless security. In addition, first-generation wireless security mechanisms (WPA) had a number of known weaknesses.
- **Battery power:** Since batch processing requires less energy than real-time processing, mobile device batteries often lasted up to three times longer than a device connected to a WLAN. Savings were realized as the need to swap and recharge batteries was eliminated as well as the costs to stock and maintain a larger battery pool.

The cost, complexity and risks associated with the foundation technology (a wireless LAN) required for real-time processing outweighed the benefits for many organizations. Batch processing had proven adequate in the past, and organizations had no reason to expect otherwise for the future, hence the low migration rate from batch to wireless.

### **Next Generation Switch-based WLAN Solutions: Cost-Effective Real-Time Processing**

Second-generation switch-based WLANs eliminate the issues and costs associated with first-generation WLANs, enabling cost-effective easy-to-manage real-time processing. First-generation WLANs are based on distributed technology—intelligence is contained in the access points that are distributed throughout the enterprise. The centralized intelligence of wireless switch solutions eliminates the costs of duplicating intelligence throughout the enterprise, and offers a number of benefits, including:

- **Low cost:** Switch-based WLANs are much less costly than first generation distributed WLANs. High-cost access points (which contain intelligence) are replaced with low-cost access ports (which obtain intelligence, including initial configuration, features and functionality—from the wireless switch).
- **Easy integration with wired LAN:** With a flexible overlay architecture, the switch-based wireless LAN is easily integrated into the wired network. (First-generation WLANs are completely separate networks).
- **End-to-end layered security:** Support for the latest standards (authentication and encryption) provides the most robust wireless security available.
- **Centralized management:** Greatly reduces management costs and simplifies day-to-day management.
- **Scalability:** By nature, wireless switch solutions are designed to grow as the needs of your enterprise grow and change. Adding capacity and functionality is easier and much less expensive than first generation access-point based WLANs.
- **Upgradeable:** The ability to upgrade easily to add new features and functionality, including support for new security standards, ensures that you are always able to implement the latest functionality—without a forklift upgrade.

First-generation WLANs were expensive and difficult to secure, implement and manage. By comparison, next-generation wireless switch-based WLANs are easy to integrate with the wired LAN, easy to manage and scale, are completely upgradeable, offer the most robust wireless security, and are much less expensive (about half the cost of first generation WLANs\*) offering outstanding investment protection and return on investment—an ideal platform for a real-time processing mobility solution.

\*WLAN Total Cost of Ownership: Comparing Centralized to Distributed Architectures; The Farpoint Group, January 2004

### **CHALLENGES**

When most companies consider migration from batch to real-time processing, a single process in one division is usually assessed. However, the challenge is to view the entire enterprise to understand how the solution in one area of the business can actually serve many areas of the business without a large incremental cost, providing a platform for growth into a highly competitive real-time enterprise. It is this broad view of the enterprise and the effect of real-time processing that can provide an easy justification for migrating from batch to wireless.

### **THOUGHT LEADERSHIP**

Real-time processing has become the accepted primary type of transaction processing. Companies who do not embrace this technology wherever possible in the enterprise will not be able to maintain a competitive edge.

With the exception of business functions with a very low transaction volume, it is not a matter of “if” you should move from batch to real-time processing, but “when.” And once a business function has migrated from batch to real-time processing, the same platform can be leveraged to support real-time processing throughout your organization. It is this real-time capture and movement of information throughout the enterprise that can deliver an up-to-the-minute integrated view of every aspect of the business, including your supply chain. And it is this real-time view that will enable business decisions that will continually drive costs down, productivity up and improve profitability.

Wireless networking is here to stay—it is one of the fastest growing technology industries, projected to exceed \$5.2 billion at the end of 2005. A recent In-Stat/MDR ([www.instat.com](http://www.instat.com)) survey noted that WLANs are quickly becoming more pervasive and an integral part of the infrastructure of today’s business networks. As we move rapidly towards a wireless world, those companies who embrace and integrate mobility solutions throughout the enterprise will enjoy business advantages that will deliver a true competitive edge.

## SUMMARY

The view of many corporations that employ batch processing is "if it isn't broken, don't fix it". But when it comes to real-time processing, it isn't a matter of fixing a process that isn't broken—it is a matter of maximizing productivity to outpace your competition. And while batch processing at first glance appears to be the most cost-effective solution, a deeper look reveals that lower productivity (due to time spent on the administrative task of uploading and downloading information) might be more costly than you realize.

First generation WLANs presented issues that often became barriers to adoption of real-time processing. Next-generation wireless switch-based WLANs not only resolve all the issues, but offer a value add—they are easy to implement and manage, easy to integrate with the wired LAN, easy to scale, easy to upgrade, offer the strongest available security methods—at about half the cost of first generation WLANs. No longer is cost an issue, nor is the battery life of mobile device, now greatly extended due to new power management technology.

The benefits of wireless mobility solutions are widely recognized. According to a study conducted by WLANA (Wireless LAN Alliance) to identify the cost of ownership as well as tangible and intangible benefits gained from wireless LAN technology:

- 92% of the respondents reported a definite economic and business benefit after installation of a WLAN
- 92% will continue to deploy wireless technology throughout the enterprise due to the benefits experienced
- All respondents in all industries (manufacturing, retail, financial, healthcare and education) reported a return on investment (ROI) in less than one year

With the barriers addressed and the benefits of mobility solutions widely recognized, companies should undertake a thorough analysis to carefully weigh the cost of unrealized benefits if batch processing remains in place, as well as the benefits of migrating from batch to real-time processing.

## About Symbol Technologies

Symbol Technologies, Inc., The Enterprise Mobility Company™, is a recognized worldwide leader in enterprise mobility, delivering products and solutions that capture, move and manage information in real time to and from the point of business activity. Symbol enterprise mobility solutions integrate advanced data capture products, radio frequency identification technology, mobile computing platforms, wireless infrastructure, mobility software and world-class services programs under the Symbol Enterprise Mobility Services brand. Symbol enterprise mobility products and solutions are proven to increase workforce productivity, reduce operating costs, drive operational efficiencies and realize competitive advantages for the world's leading companies. More information is available at [www.symbol.com](http://www.symbol.com)



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