

# Moving Toward a Predictive Maintenance Service Delivery Model in Support of Self-Service Terminal (SST) Equipment

## A Special Executive White Paper

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### 1. Executive Overview

#### A. Introduction and Background

The automated teller machine of the 21st century is much more than a cash dispenser: many of today's ATMs are multifunction devices that operate as full-fledged self-service terminals, or SSTs. As such, the SST is becoming an even more important delivery channel for financial institutions—and a way of life for their customers.

Financial institutions are increasingly relying on the SST to facilitate more transactions, foster customer loyalty and reduce costs. Consumers look to the SST for greater and more convenient access to their funds, as well as additional functionality.

As more routine transactions—as well as advanced functions—are performed at the SST, reliability and availability becomes paramount. Diebold is dedicated to assisting financial institutions

meet these metrics of success by continually advancing the delivery model for SST service and support. We believe that the next step in the evolution of SST service and support will be the adoption of a predictive maintenance model.

The purpose of this white paper is to define the predictive maintenance service delivery model and to compare it to historical

and current models used by the industry. As a result of reading this paper, it is our hope that readers will gain an understanding of the:

- predictive maintenance concept,
- benefits and success metrics of this new service delivery model,
- Diebold's new Predictive Maintenance Service Initiative.

### 2. Service Delivery Process - SST Industry

#### A. Historical Dispatch Model

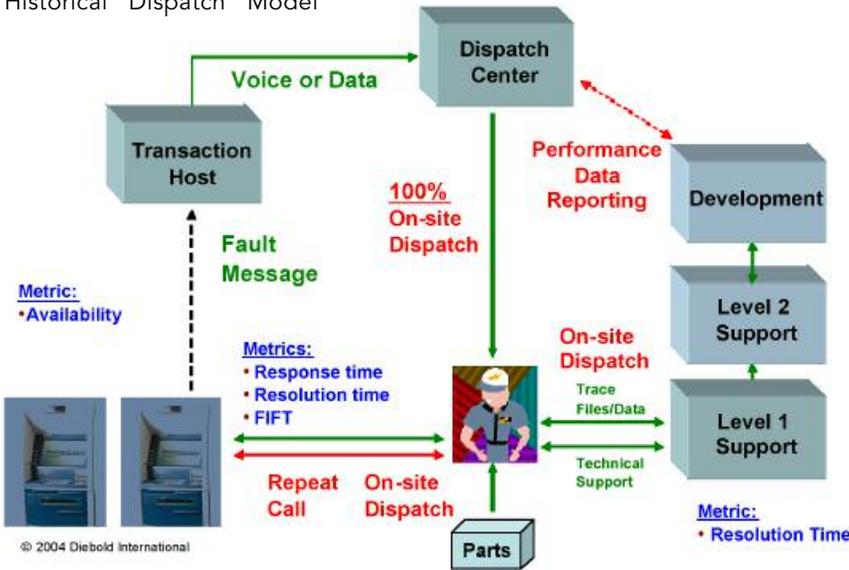
Since the advent of the ATM, a relatively simple service delivery model has been used to support SST systems and devices in the field. This historical model is built on a dispatch-driven, two-tiered process of customer support. The dispatch model (Figure 1) continues to improve ATM availability through enhanced communications, first-line service, hardware maintenance and software support.

However, ATM deployers are demanding even higher levels of availability and services, most of which come at an ever increasing cost under the dispatch model, which relies heavily on an up-to-100% on-site dispatch requirement. This two-tiered model of customer support is based on an inefficient premise—namely, that if the first level of support does not result in a fix, then the second level will. Twenty years ago—before the introduction and

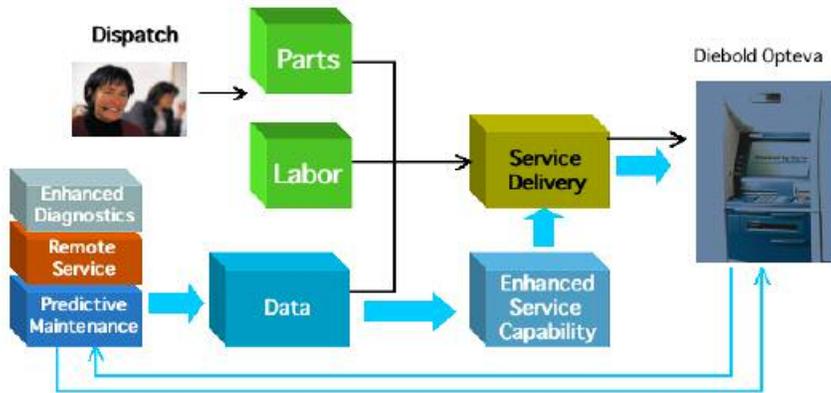
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**Figure 1**  
Service Delivery Process – SST  
Historical “Dispatch” Model



**Figure 2**  
Service Delivery Process – SST Industry  
Enhanced “Diagnosis Before Dispatch” Model



proliferation of modern call avoidance technology – this was a more tenable concept. But the demands of today’s marketplace are quickly making this model obsolete.

For the financial institution utilizing the dispatch model, the primary metric for determining customer satisfaction is a combination of response time, resolution time and FIFT (fix-it-first-time).

All too often, the on-site response time is slowed as a result of having to move

through multiple levels of call escalation (i.e. first line versus second line, hardware versus software, etc.). The need to physically perform the service on-site at the customer facility inflates resolution time. A lack of failure detail, wrong parts, and/or a lack of technical skills required to restore the system to service can jeopardize the prospects for FIFT.

The main flaws of the historical dispatch model of service delivery include:

- Equipment support is predicated on the basis of an up-to-100% on-site dispatch requirement (with only limited Level 1 support actually resulting in a fix)
- High cost of performing service (i.e., requiring a high percentage of labor-intensive on-site repair)
- The likelihood of extended, or unnecessary, downtime (i.e., as a result of the time required for the customer to make the initial call and then waiting for the service technician to arrive on-site)
- Repeat calls are often required to obtain the necessary parts, data and information to effectively troubleshoot complex problems (e.g., multi-tiered problem escalation)
- Performance data is generated from service call activity reports, rather than directly from the device (i.e., from a subjective, rather than an objective, data source).

While service providers are implementing tools and technology to increase the efficiency and effectiveness of dispatch service delivery, we believe a change in the model is necessary to achieve significant gains in performance.

**B. Diagnosis-Before-Dispatch Model**

In recent years, some SST manufacturers have turned to a diagnosis-before-dispatch model of service delivery (Figure 2) to drive out some of the inefficiencies in the traditional dispatch model.

The three components of the diagnosis-before-dispatch model are:

- **Status Analysis** – utilizes a remote monitoring system to ensure fast notification of an out-of-service condition, with enhanced failure reporting

- **Remote Service** – incorporates remote tools that enable more in-depth failure diagnosis and a remote fix capability
- **Predictive Maintenance** – provides both the customer and the manufacturer with advance notification of which components will fail, and when.

**Status Analysis**

Conducting a status analysis provides key benefits:

- Provides proactive, expert analysis of device failure prior to on-site dispatch
- Utilizes ATM monitoring tools, including a secure VPN tunnel, and supports a variety of ATM message formats
- Provides faster response with the right skills and parts on the first call
- Improves problem resolution vis á vis speed and accuracy
- Increases device uptime.

**Remote Service**

The remote service tools utilized in the diagnosis-before-delivery model include:

- Periodic retrieval of device data logs that enhance failure diagnosis at all levels of support
- Distribution of device firmware updates and performance enhancements
- Real-time product performance data that provides an engineering feedback loop to enhance product quality and performance

The diagnosis-before-dispatch model does not render any system less secure. Rather, it delivers proactive and interactive capabilities to remotely self-diagnose—without multiple layers of human call activity and escalation, on-site dispatch, subjective performance reporting and extended periods of downtime.

Recent industry trends are also creating an environment in which remote service technology can be implemented with high levels of security and efficiency, including:

- Open system architecture ATM platforms to enable best-of-breed service applications
- TCP/IP communications that deliver the required bandwidth and speed

- Implementation of security technology and practices within the network—and at the ATM—to ensure consumer privacy, network access, data security and virus protection.

These trends align with current methods of remote access including VPN, HTTPS, etc., which are already being used in the medical equipment, kiosk and other maintenance service industries.

**Predictive Maintenance**

The predictive maintenance component of the diagnosis-before-dispatch model analyzes device metric data to identify performance trends to assist in the detection and notification of pending failures.

**C. Predictive Maintenance Model**

The predictive maintenance model is the next logical step in the evolution of SST service delivery model. The culmination of years of transformation and enhancement, predictive maintenance is empowered by the technology and processes capable of eliminating virtually all of the shortcomings of previous models.

Michael V. Brown, president of New Standard Institute, Inc., defines predictive maintenance as “a means of comparing the trend of measured physical parameters against known engineering limits for the purpose of detecting, analyzing, and correcting problems before failure occurs.”

**3. Benefits and Metrics of Predictive Maintenance**

**A. Customer Benefits**

The benefits of the predictive maintenance service delivery model include:

- Increased equipment uptime, as a result of required maintenance performed in advance of equipment failure
- Scheduled rather than reactive maintenance
- Reduced operation costs
- The ability to provide maintenance during off-peak hours to ensure maximum consumer availability

- Increased focus on revenue generating services versus reacting to “emergency down” situations.

Customer satisfaction would also be expected to increase as improvements are realized in key performance areas such as:

- Call rates
- Response time versus SLA %
- Resolution time versus SLA %
- Inventory turns
- Improved fix-it-first-time rates.

For the manufacturer, the predictive maintenance model:

- Improves service technician productivity
- Eliminates the need to dispatch service technicians to the field for specific types of fixes
- Reduces the number of incidences and duration of equipment downtime
- Supports the product improvement cycle (i.e., through the incorporation of predictive maintenance tools, etc.)
- Fine-tunes service contract pricing
- Facilitates the transition from a reactive to a proactive service delivery model.

**B. Success Metrics**

The principal success metrics of the predictive maintenance service delivery model are:

- Increased system and equipment uptime (i.e., all ATM/SST devices operational, all the time)
- Improved customer satisfaction
- Increased time to focus on selling/cross-selling the institution’s financial products and services (i.e., rather than dealing with on equipment-related problems, downtime and customer site disruptions)
- Improved operational and administrative productivity (i.e., reduction/elimination of most service calls and the paperwork that accompanies them)
- Improved time-to-clear (TTC).

**4. Diebold’s New Predictive Maintenance Initiative**

Our approach to this new service delivery method is to integrate predictive maintenance capabilities into Diebold systems in two separate, sequential phases (Figure 3):

- **Phase 1** – Data gathering and data analysis
- **Phase 2** – Data analysis, correction and verification.

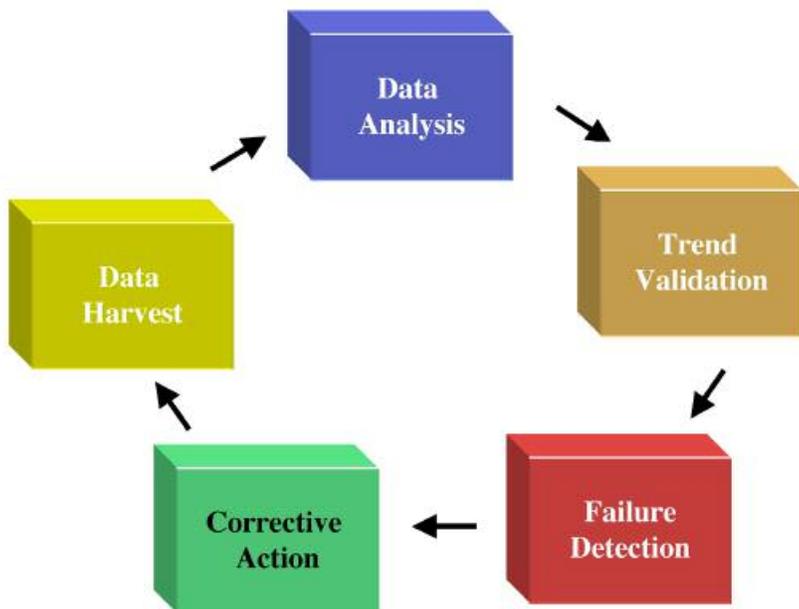
In Phase 1, the system devices focus primarily on data gathering to provide the necessary data points and trend information to support analysis. Analysis then determines cause and effect, followed by correction and verification and the establishment of a formal set of predictive rules and processes, completing Phase 2. Both phases continue indefinitely, with every iteration increasing the model’s reliability.

This data collection and analysis will enable Diebold to accurately track device performance metrics and to begin to establish predictive rules and processes, such as:

- Detection of an electronic component or sensor drifting out of range
- Early detection of physical wear that is degrading performance
- Estimated time-to-failure (ETTF)
- Recommended corrective maintenance action.

**Figure 3**  
Predictive Maintenance

Harvest predictive data from Opteva to measure and compare device performance trends against Engineering thresholds to identify and take corrective action before failure occurs



By combining remote diagnostics and predictive maintenance, the future predictive maintenance model will reduce or virtually eliminate on-site dispatch and Level 1 support. Through the use of “intelligent dispatch” and proactive support, the historical model of up-to-100% on-site dispatch will effectively be replaced.

The predictive maintenance model will be manifested in Diebold’s Opteva product line. By integrating predictive maintenance into the Opteva product line, Diebold service and support will redefine response time, resolution time and uptime benchmarks to outperform the competition.

Opteva features remote service technology to gather technical data from many devices and machines and a data repository to facilitate the analysis of device metrics as they apply to individual components including dispensers, depositors, printers, and card readers.

For Diebold, the Opteva/Agilis open systems environment greatly enables its ability to provide customers with a higher level of remote support. This results in the ability to:

- Improve system and equipment availability
- Reduce on-site labor costs
- Minimize spare parts costs
- Conduct remote Engineering data retrieval and updates.

Further, we believe the predictive maintenance service delivery model will allow Diebold SSTs to operate seamlessly on a plug and play basis within its customers’ enterprise IT environments, resulting in higher levels of reliability and support.

In the future, Diebold will leverage its proprietary predictive maintenance technology throughout its Opteva/Agilis SST product lines. Diebold expects to be able to easily achieve – at a minimum – the standard service industry rate of 32% remote resolution of hardware service calls (as cited by AFSMI in its 2000 Benchmark IV Research Study). This would also serve to significantly enhance customer loyalty, as recent in-house customer satisfaction research has verified service as a key driver of customer loyalty.

For Diebold customers, the benefits of predictive maintenance are both reciprocal and mutual. This model can be counted on to

improve service delivery at all levels, as manifested in the following three areas:

### **Status Analysis**

Diebold’s status monitoring and analysis facilitates solution validation, and provides a platform for continuous improvement of service response and diagnosis before dispatch for those failures that cannot be predicted.

### **Remote Service**

The three principal success-based outcomes associated with the integration of Diebold’s remote service technology are:

- The enabling of in-depth, remote diagnosis before dispatch through remote connectivity to the ATM/SST
- The ability to perform online data harvest, or real-time data retrieval, to support faster problem resolution
- The ability to remotely fix the ATM without on site dispatch.

### **Predictive Maintenance**

Diebold’s predictive maintenance will provide the capability for early detection and prevention of failures, generally resulting in:

- Maximum ATM availability
- Maintenance that is performed during off-peak hours
- Reduced operating costs for the customer

## **5. Summary and Path Forward**

### **A. Moving Toward Predictive Maintenance**

At Diebold, we believe that the SST delivers real value when the solution evolves beyond hardware feature/function to software and services. This goal will be realized through the use of the predictive maintenance service delivery model. Further, we believe the predictive maintenance model will achieve widespread acceptance based on these principal selling points:

- The predictive maintenance service delivery model is not aligned with any specific technology advancements and, as such, represents a significant improvement over the historical dispatch-before-diagnose,

proactive software support, and reactive vs. predictive delivery models.

- As SST product complexity continues to increase, the integration of predictive maintenance components will ensure that ongoing maintenance and support can be performed on a cost-efficient and minimally disruptive basis.
- The cost of collecting and analyzing engineering data will be significantly reduced and at the same time, appreciably upgraded in terms of speed, accuracy and efficiency.
- The replacement of the historical dispatch-before-diagnosis model with one predicated on predictive maintenance will result in reduced costs and improved service for both the manufacturer and customer.

- The use of predictive maintenance will differentiate competitors in the marketplace on the basis of improved service and support capabilities, increased system and equipment uptime and improved customer satisfaction and loyalty.
- Improved service and support is a critical factor for enhancing customer loyalty—both from the manufacturer's, and the customer's perspective.

In summary, we believe that the future predictive maintenance service delivery model represents the best path forward for the SST segment and that Diebold's initiative incorporates all of the critical elements that will allow its customers to benefit fully from its use.

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