



# Intelligence service

The use of scientific methodologies to maximise business efficiency is broad and complicated. However, transactional data and its analysis can assist a post in more ways than one

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**B**usiness intelligence, data visualization, analytics, customer relationship management and data mining are receiving a great deal of attention at a time when a sagging economy has forced organizations to focus on business retention and cost management. Across various markets, companies are finding near instantaneous analysis of their transactional data to be crucial. Facilities such as: Information on which services are the most or the least profitable, across the entire network or within a specific office; how can up-sell and cross-sell opportunities be identified and exploited? Are staff incentives effective and how can they be improved upon? What constitutes a suspicious transaction? These are a just a few questions a postal business may expect its transactional data to answer, but turning a potentially massive amount of data into practical, useful information can be challenging.

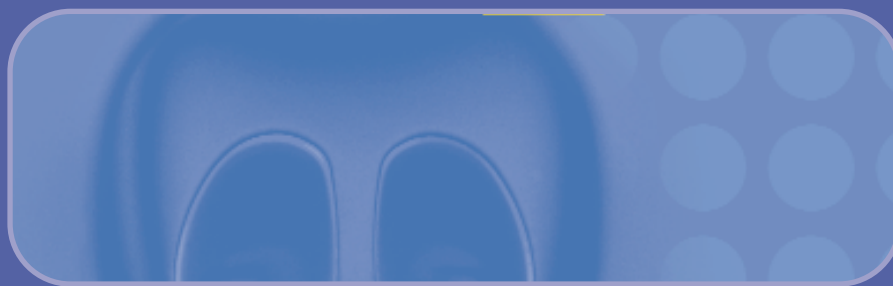
There seems to be no shortage of software packages that will slice and dice database information and show the results in an assortment of graphical representations. However, the collection of large volumes of data, the nature of salient performance indicators, the scalability and responsiveness of the analyses, and the deployment of the resulting business decisions remain among the most important aspects of business intelligence.

A proven asynchronous transaction data collection system, the continuous maintenance of elementary indicators or models and a tight coupling between analysis and control within a single environment built on industry standards are the best way to obtain sophisticated but still practical business analytics.

## Performance monitoring

Extensive reports compiled at time intervals provide a general picture concerning the performance and health of an organization, but they might fail to detect trends





Staff incentive programs can easily be developed to encourage the promotion of higher-value services, leading to improved sales campaigns and increased revenue opportunities

and identify specific problems as they develop. The close monitoring of key performance indicators with little or no lag, along with the ability to quickly interact with such indicators are more appropriate.

When a quick response to what the data trends are revealing is crucial, bulk transfer of transaction data followed by sophisticated database queries may turn out to be impractical, depending on data volume. Fortunately, an organization's key performance indicators will tend to have static definitions, derived from the aggregation of elementary indicators. For example, such elementary indicators may record volumes or revenues for specific products or services, at specific locations and during specific time periods. Rather than re-computing the requested performance indicators, Escher Group's agent technology can maintain those elementary indicators and their typical aggregates continuously. Transactions are taken into account at the rate they are produced and

the same data is never revisited twice. As a result, the desired performance indicators are always up-to-date and available through low cost queries without ever requiring bulk data transfers.

### Business modeling

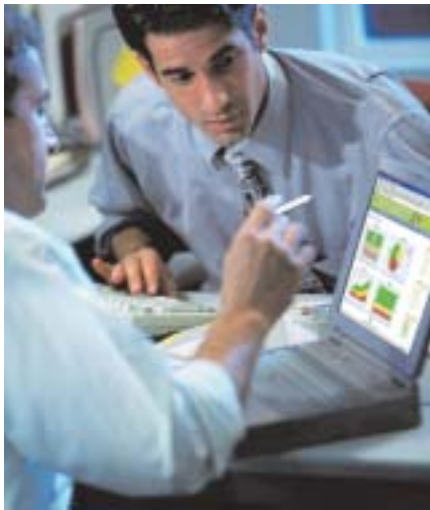
Understanding, modeling, and predicting customer behavior can further improve an organization's bottom line. To this effect, recorded transaction data can provide invaluable insights that could be too subtle for traditional market research to pick up on.

A specific example is the exploitation of a customer's predisposition to impulse purchase. Once a customer is served with a requested transaction, the clerk is faced with a list of additional services that may be of interest to that customer. To maximize the chances of an impulse purchase, this list of recommendations should be both short and targeted. Escher's software can offer such a structure for up-sell and cross-sell opportunities in post offices.

### Customer behavior

Many of the services offered by a post office exhibit a recurring nature. For transactions such as these, a customer's past activity may serve as a fair predictor for the services he or she may wish to perform at a later time. The recurring nature of a service and its typical cycle can be inferred from the transaction data recorded across all customers' profiles. This information may be used to help identify the appeal of a service to a customer on a particular visit, or equally, disqualify it as a recommendation if the customer performed this particular service too recently.

Recommendation systems have been deployed in a variety of e-commerce applications for the past decade and collaborative filtering has been the most popular approach among businesses that offer a very large number of products. The basic premise of collaborative filtering is to deploy a metric over customer profiles, leading to a customer space. In



Executives can sort and view real-time data for better decision making

this space, a customer's nearest neighbors are assumed to share the same preferences and therefore, the most popular transactions are likely to appeal to all. Scalability, computational load and lack of data are among the most common shortcomings of collaborative filtering. To overcome these, Escher's approach is based on the continuous maintenance of dynamic models that can be aggregated at will. These models can be interpreted as Bayesian networks, they have a very small footprint and their maintenance requires little computation.

### Recommendation models

Each recommendation model can be used to suggest cross-sell or up-sell items based on the services that were requested by a customer. Multiple models can be either aggregated or otherwise set to compete against one another.

Adaptive models are continuously maintained as new transactions occur. Unlike traditional collaborative filtering, such updates do not require the system to re-visit the same data twice. Alternatively, recommendation models can be tightly controlled by the organization, as a means to influence sales based on other business insights or strategies.

### Business optimization

Another class of business analytics may take the form of studies that aim to quantify the effects of business decisions.

The allocation of staff incentive on product or service offerings is a good example within this context. Escher's enterprise applications offer a means to deploy staff incentive programs. Various amounts of incentive could be offered to the clerks for a variety of services and

products. Clerks collect points in accordance with this system and redeem them later in the form of bonuses, time off, or other benefits that are made available by their employer.

From the perspective of the organization, a crucial step consists of choosing which services and products should earn clerks a reward and how much of a reward. A hypothetical study may consist of a strategic and limited deployment followed by a careful performance analysis.

### Strategic limited deployment

Transaction data recorded during such an incentive program is potentially enlightening but it is highly multidimensional and its sheer volume may appear overwhelming. It is vital to decide which data to 'listen to', and as for most data analyses, it is crucial to even out any external factor that may bias the study. In the case, of a post office it is important to gather information across a balanced sample of offices, services and products and timeframes.

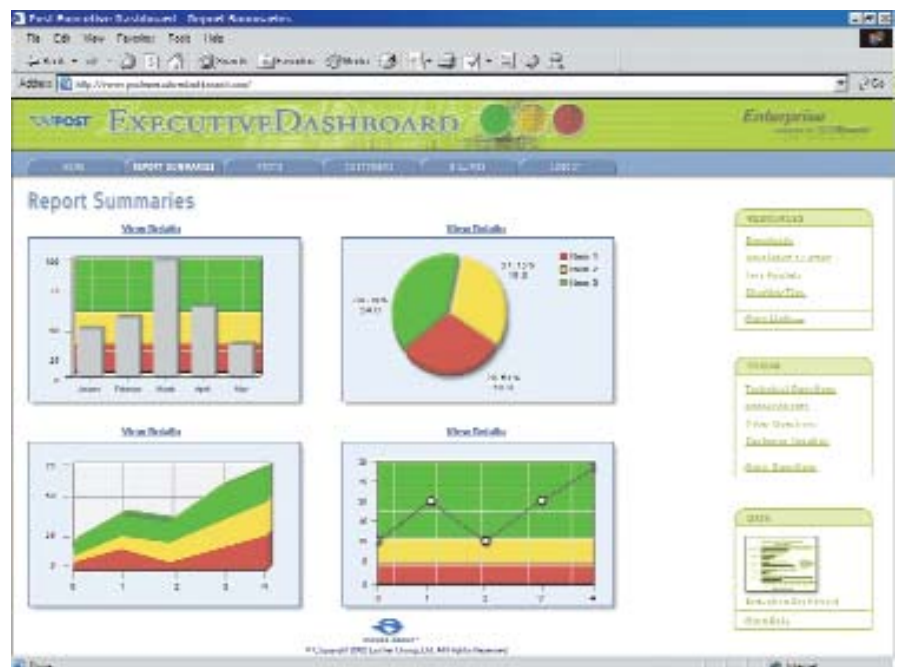
This choice may include offices of differing sizes and performance, and services and products of ranging prices. It

might also be decided to collect a balanced amount of data before and after the program's introduction, keeping seasonal concerns in mind. Indeed, holidays or potential confusion immediately following the introduction of the incentives may bias the analysis. The collected data may consist of volumes and revenues generated for each participating service and product, per office and per timeframe.

Ultimately, a deployed incentive program should maximize profit across the entire network of offices but in the context of this study, the limited deployment is primarily concerned with maximizing information. For this purpose, it may be appropriate to deploy distinct incentive programs across the participating offices or 'mix and match' incentive amounts, services and products.

The same service may earn a high incentive within one office and a low incentive within another. The resulting set of incentive programs should exhibit an even distribution of incentive per service and product across offices, and an even distribution of incentive per office across services and products.

**"A crucial step consists of choosing which services and products should earn clerks a reward and how much of a reward"**



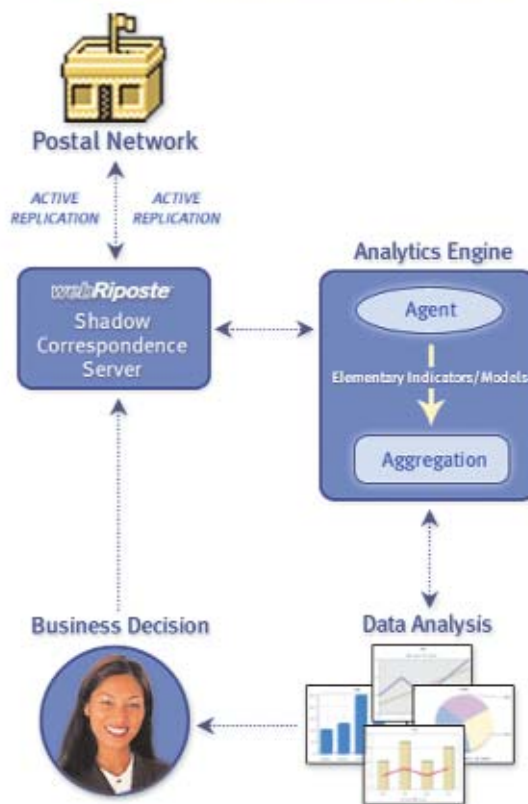
Postal administrators can track customer buying trends, analyze staff and branch performance, and perform customized business analyses of any transaction data throughout the post office network

## Analysis and optimization

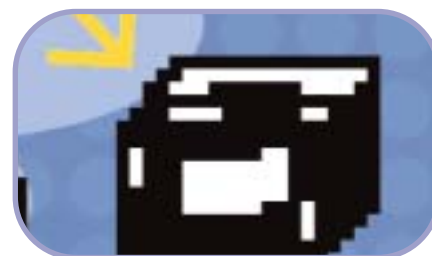
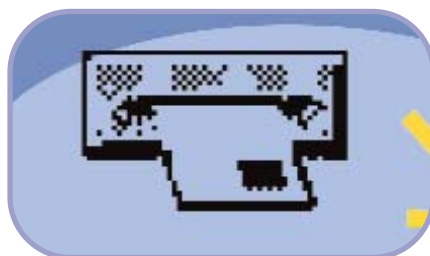
Once the chosen data is collected over the chosen timeframe, it is possible to quantify incentive efficiencies on a service, product or office basis, comparing achieved volumes or profits generated by each service within each office before and after the introduction of incentives. The even distribution of the incentive program can further quantify profits as a function of the amount of incentive offered.

Products that tend to sell themselves might exhibit a poor response to staff incentives and the additional cost associated with such incentives might outweigh the additional revenue they generate. Some other services may respond better to staff incentives and the analysis should identify the 'sweet spot' for each one. If these are sufficiently different across various types of offices, the post may decide to deploy different incentive programs across its network. It is also conceivable that even after an incentive program is rolled out, the organization may retain a pool of representative offices to experiment further with incentive programs in the hope of detecting trends as they develop.

## Escher Enterprise Analytics Engine



Escher Group's asynchronous data collection system, agent technology, and tight coupling between analysis and control are key enablers to sophisticated but still practical business analytics



## Pattern discovery

Abnormal or malicious activities may not account for a large fraction of the overall business, but they may be significant and could go undetected through traditional indicators. For example, even though the use of money orders as money laundering tools is a significant problem worldwide, dirty money accounts for no more than one per cent of total postal money order sales. The Financial Action Task Force issued 40 recommendations that aim to enforce paper trails for financial transactions and hint at a 'red flag' system for certain types of transactions.

A post must first gain a detailed insight as to what constitutes typical behavior before attempting to detect suspicious ones. Histograms of money order face values across a specific subset of offices or for a specific destination might reasonably capture such patterns. While objects such as histograms and distributions have traditional shortcomings, Escher's enterprise analytics engine can maintain those

with small footprints and low computational requirements. These objects are once again explicitly designed to aggregate as well, as to eliminate the need to re-visit the same transaction data more than once.

Distributions offer a salient basis from which to detect abnormal behaviors, even if the amount of suspicious activity is a small fraction of the total activity.

Furthermore, detecting deviations from an adaptive model of typical behavior will lead to targeted red flag rules that evolve over time. This is particularly important in the context of malicious activities that may purposely shift patterns in order to go undetected.

Once deployed to their target area these rules may flag suspicious transactions as they occur or suspicious customers based on their recorded profiles. Salient red flags can further initiate investigations and closer analyses over suspicious transaction data maintained within a central repository such as Escher Group's enterprise shadow correspondence server.

## A basic outline

Above are outlined just a few examples for which scientific methodologies can be deployed as a way to maximize business efficiency. When faced with a large amount of transaction data, the continuous maintenance of strategically designed elementary indicators or models within the environment that collects that data are key ensuring swift and practical analyses that may otherwise might be too intensive.

Within business modeling, business optimization and pattern discovery, there is an outline of some of the benefits of handling at least some business analytics, data collection and business logic within a unified environment. Finally, the ability to 'splice' data as required by each particular study (e.g. business optimization or pattern discovery) would not exist if the data had been summarized or otherwise filtered. Common sense suggests that only a small fraction of its transaction data may offer any relevance, but it is almost impossible to predict which fraction that might be. ■■■