BUSINESS Agility INSIGHTS

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AGILE BOOSTERS FOR BUSINESS

WHEN IT COMES TO OPERATIONAL EFFICIENCY—or, as some experts prefer to call it, operational effectiveness—the one thing you can say without fear of contradiction is that everybody wants it.

In mid-2011, ebizQ's first in-depth reader survey asked the business and IT professionals who make up our audience: "What are the primary drivers leading your organization to use, plan to use or consider using a BPM suite?" The top reason cited by fully 75% of respondents was improving operational efficiency.

We asked the same question about case management technology. More than 80% of respondents again cited operational efficiency as their top goal for investing in such solutions. Operational efficiency also ranked as the No. 1 driver for use of decision management technology (cited by 74%) and event-processing technology (69%).

But operational efficiency isn't alone at the top. Business and IT pros also showed across-the-board interest in boosting operational intelligence—that is, improving their ability to monitor, analyze and gain insights from ever-growing amounts of operational information. And they're also eager to improve their organizations' agility so that they can react to constantly changing internal and conditions as quickly as possible—and even begin to predict such shifts for even faster response.

In this inaugural issue of *Business Agility Insights*, co-produced by ebizQ and its sister TechTarget site SearchSOA.com, our contributors examine three key avenues to smarter, faster operations, namely building agile systems, using decision management to improve customer-facing processes and integrating event-processing technology into existing architecture.

How is your business improving agility and operational intelligence? I'd love to know. Contact me at astuart@techtarget.com. ■

Anne Stuart
Site Editor, ebizQ

FEATURE STORY

BUILDING SMARTER, FASTER SYSTEMS FOR REAL-TIME BENEFITS

By providing a right-now picture of the business environment, agile systems can provide organizations with true competitive advantage.

THE ABILITY TO RESPOND faster to market changes has always been an imperative in a competitive marketplace. Today's businesses have the advantage of technology to help deliver real-time information and automate processes—both keys to true business agility. However, IT systems themselves must also be smarter and faster, and the pressure is on IT to deliver.

BY CRYSTAL BEDELL

"Business agility is the capability to adjust how the business works in response to change in the environment, such as customer needs, competitors' actions and things that happen within the company itself," said W. Roy Schulte, a vice president and distinguished analyst for Gartner Inc.

He defines two types of agility: *process agility* and *instance agility*. "Process agility is being able to change something in a business process because the process doesn't work right," Schulte said. Instance agility means that "you can change each instance of the business process, but the process doesn't change." An example

An organization's ability to achieve the agility dividend depends in large part on the agility of its IT systems.

of instance agility is in an automobile assembly line in which each car is different from the one before it. "You want both kinds of agility," Schulte said.

Agility enables businesses to gain a competitive advantage, which translates to profitability. Agile systems architect Michael Hugos defines agility as "the ability for a company to earn the agility dividend. That dividend is to consistently earn 2% to 4% higher gross profits than the industry averages in their line of work," he said.

"My feeling about agility is that it's not about doing complex things fast," said Hugos, principal at the Center for Systems Innovation and the author of books on agility, supply chain management and other IT topics. "It's about doing simple things well. And agility isn't necessarily ramming around at supersonic speed all day either. It just means you're more responsive—and slightly more profitable—than your competitor."

THE ROLE OF SYSTEMS IN BUSINESS AGILITY

An organization's ability to achieve the agility dividend depends in large part on the agility of its IT systems. "Since the level of automation in most enterprises is only increasing, almost every business change will lead to a change in the application landscape," said Johan den Haan, CTO of Mendix, a provider of Platform as a Service (PaaS) software. "Hence, the role of IT is an important factor in enabling business agility. An enterprise needs apps that perfectly fit in the business."

Often the systems that companies view as most important for supporting agility are those that deliver real-time information. "Real-time, in a general sense, means something that happens pretty much now or immediately," Schulte said. The real definition hinges on the answer to this question: "When something changes in the environment, are you able to respond to it quickly?"

Of course, being able to access

information immediately—or at least as quickly as possible—was crucial for businesses even before computers existed.

The faster you can detect that something has changed—say, a competitor has lowered its prices or a delivery truck has

Business Agility and Transparency in the Real World

A CRUCIAL COMPONENT for agile business is transparency, said Michael Hugos, an agile systems architect and principal at the Center for Systems Innovation.

He offered an example from his own experience working for a paper-product company that, despite charging prices that were 2% above the market rate, maintained a long-term relationship with Starbucks. "It was because we were agile," said Hugos, explaining the company's success. "The notion is that in business agility, you're continuously responding to your customers. And by that, I mean on a day-to-day, week-to-week, month-to-month basis—not just once a year," he said.

Hugos said he was on a team that helped build a scorecard system measuring his company's performance in terms of the accuracy of orders delivered. "To get a perfect order rate above 85% is extremely difficult in distribution and wholesale," he said. "You have to do everything right or you just can't win." That includes sending a complete, accurate order, delivering it on time with no damaged goods and billing for it correctly, Hugos said.

The paper-goods company promised Starbucks a perfect order rate (POR) in the mid-90s level. By providing transparency into its failures and successes, the company was able to meet that service-level agreement. Managers made the POR information available to both Starbucks and the company's own business operating units to see how they stacked up against each other, Hugos said. That move generated a certain amount of peer pressure and healthy competition, which he said drove employees to work harder.

Similarly, Hugos' team put in a system that compared the customer's purchase order, the advance ship notice and the invoice. When all three elements match, you have the perfect order, said Hugos, adding "It's surprising how many times they don't match."

Hugos' team established a real-time system that constantly matched those three items, flagging any combinations that included exceptions. That approach allowed the company's employees to proactively alert Starbucks that, for instance, an incomplete shipment had been sent but that they'd already resolved the problem and arranged to send the remaining items. ■

broken down—the faster you can react and the more you can optimize your response. In other words, real-time access to information gives your business a better chance of limiting the risk of a negative change and exploiting the benefits of a positive one, Schulte said.

That need for the ability to react swiftly to business changes typically requires modifying, or transforming, the underlying systems. "To be agile, you have to adjust what people do but also what the systems do as part of those processes," Schulte said.

The availability of real-time data also drives further change in IT systems. "The fulfillment of the need for real-time data almost always results in more needs," Haan said. "As people or systems learn from this data, new data is needed to further clarify things or to fulfill new requests. This process will happen at an ever-increasing speed. Software systems will need to adapt to be able to deliver all this data," he said.

CHARACTERISTICS OF AN AGILE SYSTEM

What does an agile system look like? It's inherently flexible. "It should be reusable and have adjustments built into it so that it doesn't have to be reprogrammed for instance agility," Schulte said.

"These apps need to have a short time-to-market and have to be flexible to evolve along with the business," Haan said. "This means the full lifecycle of an application—from the initial idea to first deployment and from that first deployment to long-term evolution—needs to be as agile as possible." Among the critical components required for agility: "Short feedback cycles and close collaboration with all stakeholders within a software project," Haan said.

Agile systems are actually quite simple. "Complexity is a trap," Hugos said. "In a world that is constantly changing, [complex systems] become harder and harder to change. If you come up with these kludgy systems, you're toast. You'll never catch up. You might keep up for the first six months, but after that the system's a boat anchor," he said.

> "The fulfillment of the need for real-time data almost always results in more needs."
>
> —JOHAN DEN HAAN, CTO, Mendix

"Your goal is elegant simplicity. If the systems exhibit elegant simplicity—and to some degree that's in the eye of the beholder—then you're on the right track. It should look beautiful, almost literally, with good systems architecture and good algorithms," Hugos said.

HOW TO BUILD AGILE SYSTEMS

The next logical question is how to build these inherently flexible and elegantly simple systems. "The only way to keep

up with a fast-changing environment is to use an agile development approach. Again, this means a focus on working software, short feedback cycles, and close collaboration with all stakeholders," Haan said.

One agile development approach that Haan recommends is model-driven development. "We need to change the way we develop software to be able to be agile," he said. "Real short-feedback cycles are only possible if we can deliver more software value in a short time. In my opinion, we need to move to a model-driven development approach to software development to keep up with the pace of change requested from the business," Haan said.

Using Agile development methods alone to build a system won't make a system agile. "We need to focus on the full application lifecycle, not just the development part of it. We need a smart way to capture requirements, harvest ideas and define iterations," Haan said. "We need to involve stakeholders in this process. We need to capture their conversations, listen to their ideas and respond to their feedback," he said.

Schulte also emphasized the importance of engaging the business during the requirements-gathering process, especially when meeting the need for real-time information. When you're collecting business requirements on what a system should do, one primary consideration should be how fast the system should do what's needed. Business analysts should ask users, "In an ideal world, how fast should this happen?" Schulte said. "It's about getting the right information to the right people at the right time," Schulte said.

DESIGN CONSIDERATIONS

Certain design patterns are particularly useful for building systems that act faster, Schulte said. Straight-through processing automates all steps in the system so that users don't have to be involved, he said. In many organizations, some functions such as order entry require user involvement to complete.

For example, an online order may be captured online by a Web system, but a person may need to rekey the data into another system. Or the process may require someone to view and take action on the order. "Take people out of the loop so that you can write it into the application, or use a rule engine to implement the policies that a person would have implemented," Schulte said.

Another road to faster systems is running processes as they're needed, rather than batching them. "Continuous feeding is a basic principle in straight-through processing, and it speeds things up," Schulte said. He recommended defaulting to real-time processing unless you really need to do it in a batch—if, for example, you are waiting for information from another company. ■

DECISION MANAGEMENT ADDS AGILITY TO CUSTOMER PROCESSES

Automation, mobility and increasingly sophisticated analytics are just a few of the trends driving adoption in key areas across the enterprise.

IN TODAY'S BUSINESS ENVIRONMENT, two factors are critical for success: insight into what's happening under the hood of your business and agility for responding what's happening both in and around it. For that reason, a growing number of businesses are beginning to understand that effective decision management can serve as an expressway to improving customer-facing processes.

BY LYNN HABER

To many large enterprises, that's not news. They've long had the resources to meet the cost, time commitment and expertise required for making successful investments in decision management. For smaller organizations, though, that hasn't typically been the case.

But things are changing. Vendors now offer a wider variety of technologies enabling decision management, making the adoption of such tools more feasible for companies that until recently struggled to find affordable solutions. Options now range from decision-management solutions from the market's big guns to prepackaged, lower cost, easy-to-use tools from smaller vendors, including those offering business rules, predictive analytics and business intelligence solutions.

Increased access to such tools is especially important now that we're in what industry experts call an intelligent economy, one in which businesses rely more on insights gleaned from analytics to keep from falling behind. "There's growing evidence that links performance competitiveness with the use of analytics," said Dan Vesset, program vice president for business analytics at IDC.

BUSINESS DECISIONS, CUSTOMER-FACING PROCESSES

Success in business relies primarily on making the right business decisions, and customer-facing processes typically involve hundreds of decisions that need to be made all day long.

But many organizations neglect this type of operational decision-making because they believe or assume that individual front-line decisions have little or no impact, said James Taylor, CEO of Decision Management Solutions. "A company's brand identity is defined by thousands of these little decisions that ultimately have a cumulative impact that's huge because decisions of these types occur so often," he said.

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What exactly are customer-facing processes? The broad category encompasses a variety of processes that fall into the sales, marketing and customer service functions. Examples of marketing processes include pricing, promotions and product positioning. Customer service processes include ways that call-center representatives can provide callers with product information or resolve complaints. To consider the category another way, think in terms of internal and external activities such as customer acquisition, sales, service, support, development and retention.

Next question: What exactly is decision management, and how can it improve customer-facing processes?

Decision management is a growing practice of combining software and expertise to automate and improve decision-making in critical business systems, said Cheryl Wilson, IBM demand program manager. The approach involves both being able to make the best possible decision right now based on data and situational context and being able to use the data to discover insights that can continually improve and automate decisions over time. Examples of decision management applications include product and promotional offers, case and customer prioritizations and determination of fraudulent activity.

Such decisions may be fully automated through an online application or a self-service point-of-sale system, Wilson said. Or they may be used to provide decision support to people through a customer relationship management (CRM) system used at a call center, branch or store location, or in the back office.

Perhaps the biggest driver reshaping decision management is the ongoing shift in how customers interact with companies. They're increasingly mobile, they rely on the Internet, and they want 24/7 service. "Companies are deluding themselves if they think that their staff can handle decisions [quickly enough] as customers get more mobile and rely more on the Web," Taylor said. "And they can't always refer things up to a supervisor."

What to do? Automate those decisions. Build self-service and mobile applications

Key Characteristics of Decision Management Systems

WHEN CONSIDERING decision management systems, it's wise to keep in mind three core characteristics that together make up the yardstick by which those systems can be measured, according to James Taylor, CEO of Decision Management Solutions. The best systems are:

- **Agile:** Systems should be as agile as possible to keep up with decisions that are constantly changing in response to market shifts and other factors.
- **Analytical:** Systems need top-notch analytics to provide companies with fast, complete insights about the data they're collecting—which, in turn, can help companies become more efficient, more effective and, ultimately, more profitable.
- **Adaptive:** Systems should be highly adaptive or self-configuring, leading to continuous improvement over time. They should adapt quickly to changing circumstances such as consumer trends, competitor activities and marketplace activity. ■

enabling customers to do the things they want to do. Use business rules management to automate best practices that drive decision improvement and consistency. Use advanced analytics and data mining to improve decision quality. Trends in customer Internet usage, mobility and demand for anywhere-anytime service, combined with the explosive growth of data and the development of more systems for capturing and mining that data—all these factors are combining to help drive decision management into the mainstream.

NEW DIRECTIONS FOR DECISION MANAGEMENT

Decision management rolls up into what Hub Vandervoort, CTO for enterprise infrastructure at Progress Software, calls responsive process management—providing better visibility into data or being able to turn decisions into action in the moment. "It's the ability to be responsive operationally" whether addressing internal or external customer-facing processes, he said.

Up to this point, it's been up to IT professionals to develop decision management. But now some systems allow non-technical business users to express business rules in a cogent way. Among them is Corticon, a business rules management company that Progress purchased in December.

Predictive analytics vendors Zementis and Predixion are also reshaping decision management with cloud offerings. Zementis's Adapa Software as a Service (SaaS) solution is a standards-based decision engine that works with models created in any data-mining package that outputs the standard Predictive Model Markup Language (PMML). Predixion offers self-service predictive analytics that fully integrate with Microsoft's business intelligence platform, including SharePoint and Excel 2010.

According to user surveys from Gartner Inc., the need for better decision-making is a key driver of business intelligence (BI) purchases.

Meanwhile, BI capabilities are increasingly being embedded in business and analytic processes and packaged analytic applications. You can expect BI to become increasingly more actionable at the point of decision, which will drive both the value and adoption of BI/analytic tools.

Finally, collaborative aspects of BI tools also make them more accessible to small and midsized organizations via popular products such as Microsoft SharePoint. As a result, said Taylor, "We're seeing more companies catch up with the potential of the technology." ■

COMPLEX EVENT PROCESSING BOOSTS AGILITY TO CREATE COMPETITIVE ADVANTAGE

There's nothing complex about event processing's simple payoff: When properly integrated with other systems, it adds considerable value—and those benefits are increasingly accessible to companies of all types and all sizes.

COMPANIES TODAY HOPE to gain a competitive edge based on their ability to respond quickly to threats and opportunities. That edge can come from highly responsive, near-real-time systems based on complex event processing (CEP) techniques used for financial applications on Wall Street. Now these CEP techniques are being used more widely in enterprise applications on Main Street.

BY JACK VAUGHAN

CEP examples abound. Fraud analysts are alerted when the same credit-card number is used in several cities almost simultaneously. Power-line fault histories and locations can be quickly compared against real-time weather feeds to alert utility maintenance teams about likely trouble. A health care provider can rapidly check a type of test regimen against a patient's insurance coverage. CEP is a way to greater corporate innovation.

For many companies, the move to event processing means a shift in perspective on software architecture. Complex events have unique characteristics, and people involved in the field still argue about the definition of various terms that describe CEP. "Event-driven architecture" is sometimes used to express the way in which CEP problems are handled.

Although the inner workings of various CEP engines differ in composition, their structure may not particularly concern application development managers who will instead tend to focus more on how a CEP engine is programmed. "If you talk to users of CEP, they may well be interested primarily in what they can do with the user interface to the engine," said David Luckham, emeritus professor of electrical engineering at Stanford University and author of *Event Processing for Business: Organizing the Real-Time Enterprise* (John Wiley & Sons, 2011).

To ease programming, CEP vendors support SQL-like, visual and related programming techniques. These fit well with existing programming skill sets. Sometimes CEP products are distinguished based on whether they support query-based CEP or rule-based CEP. But tooling is where the development team meets CEP head on.

For many companies, the move to event processing means a shift in perspective on software architecture.

ISLANDS IN THE EVENT STREAMS

The varied composition of the "databases" underlying different CEP engines is in part because of their varied lineages. Some hail from the world of rules engines, some from Business Activity Monitoring (BAM) and some from other backgrounds.

Event-driven systems may show kinship to relational databases or middleware messaging systems or to hybrids that merge both schools. Sometimes underlying databases are described as "streaming databases" or "event streams." Vendors with CEP-related products include Espertech, IBM, Informatica, Microsoft, Oracle, Progress Software, RedHat, StreamBase, Sybase, Tibco and Vitria, among others.

In most CEP engines, data records are processed before they are stored. That makes it different than, say, data warehousing. CEP differs from the conventional RDBM in that a small amount of data may be matched against a large

number of queries rather than a small number of queries being run against a large amount of data.

Events—simple or complex—can be analyzed as they "stream" through operating systems. There's a special emphasis on handling time-series data and establishing time windows that show event data. Within these windows, new data are compared with known event patterns.

Complex events are collections of several simple observable events that are of interest. To cite a common example, you might want to see whether the same credit card was used simultaneously in two locations, a situation that could indicate fraud.

SQL SEMANTICS SOMETIMES IN CEP

Observers say some CEP engines tend to exhibit more affinity with conventional relational databases, while other CEP engines exhibit less such affinity. But from a programmer's point of view, the differences may be narrowing.

"Some CEP products look more like DBMSes than others. But the differences are a lot less than they used to be," said W. Roy Schulte, a vice president and distinguished analyst for Gartner Inc. "Five years ago, there was a big difference." One driver for convergence is tooling that supports SQL-like means for dealing with the unique characteristics of CEP data streams. Staying with the familiar has benefits. But the nature of event-driven architecture is such that some CTOs and development managers will consider new programming models. This can be a difficult decision point. You may not want to change your programming style, but a new class of applications may actually best be handled by a new programming style, said Curt Monash, president of the Monash Research consultancy. "There is a programming model that revolves around events, and taking action on them, which is different [than conventional data base management systems]," he said.

> There's a special emphasis on handling time-series data and establishing time windows that show event data.

SPEED AND COMPLEXITY

Where speed or complexity is the issue, interest in "how the engine works" may become more pointed. Here, most CEP engines vastly outpace general-purpose servers.

"The products are all optimized for performance in very demanding situations. In some cases, one is better than another. They also have rather different programming models," Monash said. "There are ones that are stream based that emphasize visual modeling. These and others let you write code if you insist. There are rule-based and language-based [programming models]. Each

[product] has its clear roots or emphasis. And that is often a very natural basis for choosing between them."

> "CEP is a contender. But it may not win."
>
> —CURT MONASH,
> president, Monash Research

One may create a SQL-like query language with special capabilities to handle streaming data and continuous processing. Another may provide a graphical user interface for modeling, allowing team members to drag and drop event components to compose applications. Yet another may provide a graphical event-flow language.

Meanwhile, as with other upstart technologies, CEP may ultimately have difficulty finding a steady job in the mainstream—that is, if incumbent database and business intelligence technologies keep up. "CEP is a contender," said Monash. "But it may not win." CEP is an alternative to database technology. Outside a couple of niches, it's not clear that such an alternative is needed, given how capable and varied database technology is.

SOA and EDA: It Takes Two to Tango

THERE CAN BE can be plenty of overlap between event-driven architecture (EDA), service-oriented architecture (SOA), just as there is with synchronous and asynchronous systems, according to Kim Kazmaier, a technical fellow for Bank of America.

Kazmaier has helped to lead a multiyear SOA effort at Bank of America's consumer division. The effort is now beginning to incorporate EDA and CEP. The early efforts to do EDA build off of messaging middleware expertise his group has already amassed, Kazmaier said during a presentation at a recent Gartner Inc. summit.

"Most organizations are now trying to look at capturing the value of their transactional experience," he said. "You can view it from an opportunity as well as a risk-reduction [point of view]."

Users should anticipate faster operations with CEP: "Event engines run four or five times faster than a typical SOA [engine]," he said. But that doesn't mean you automatically achieve the speed you want.

"One thing I have learned about CEP is: If you mix the workloads too much in a single engine, you might not get your [desired] throughput," Kazmaier said. As a result, he called the use of multistage design patterns a good idea. ■

HANDLING THOUSANDS OF EVENTS PER SECOND

Where do the workings of the underlying CEP data-handler truly make a difference? One place to look is especially complex event architectures requiring high-speed and high-volume processing. "Some of the problems that arise in applying CEP involve the complexity of the event patterns being used," Luckham said. "If you have to check several events and a state reference representing—say, the history of events in the past hour—then you have to both detect the pattern and see if the state is true," he said. That task becomes a bigger issue when fragments of patterns are involved, he said. "You often get partial instances of patterns. You may have several or many partially matched patterns. What do you do with that in CEP? When you get into those types of problems, at that point the structure of the [underlying event database] becomes of the interest to the application specialist," Luckham said.

Where do the workings of the underlying CEP data-handler truly make a difference? One place to look is especially complex event architectures requiring high-speed and high-volume processing.

The issue could well depend on the kind of problem you're facing, he said. For example, if you're trying to do arbitrage trading at several thousand events per second on several stock market feeds simultaneously, the way the CEP engine handles events will certainly make a difference. ■

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