EXECUTIVE REPORT

The Benefits of Continuous Monitoring

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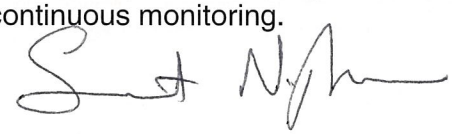
Foreword

At the very outset, let me anticipate and respond to the question, viz., why is Infogix sponsoring this research project on continuous monitoring? The obvious answer is that Infogix has been a proud strategic partner of Financial Executives International (FEI). Further, this subject is of great interest to the members of FEI as well as to Infogix and its clients. Another telling answer emerges from an anecdote from this study itself. When asked if there is value in deploying a single, automated continuous monitoring solution that can monitor financial controls, data quality controls, financial reconciliations, risks and business performance across all business areas of the organization, Pam Oberdiek, Senior Project Manager at Hallmark Cards replied, "But that would be motherhood and apple pie! Who will not want that if it exists?" Another good answer to why Infogix sponsored this research follows quite naturally – we are continuous monitoring advocates who are in the business of creating "motherhood and apple pie" continuous monitoring solutions.

In this era of ever increasing regulation, operational risk and decreasing operational margins, the one thing that most businesses agree on is the need for operational efficiency – not only cheaper ways of running business operations, but also faster, easier, more flexible and less risky. The reliance on and need for automation, standardization and centralization will continue to intensify. This research furnishes compelling examples of how companies have begun to underscore the value of continuous monitoring in meeting today's business demands.

Nevertheless, as with all promising new opportunities, the excitement must be tempered by a healthy dose of caution. Despite preliminary successes, early adopters and business leaders are asking the right questions about continuous monitoring: How do we get started? Is there a roadmap to success? How long does it take to achieve a steady state? What is the business value? Like with any initiative that challenges the *status quo* or proposes a different way of conducting business responsibilities, this one will be a journey rather than a point destination. Because I was fortunate enough to personally participate in a few of the interviews, I realized that every business has its own unique starting point, every business' journey will be unique based on the opportunities and challenges specific to their industry as well as specific context.

Infogix is pleased to sponsor this research conducted by Financial Executives Research Foundation (FERF) in the interest of furthering the industry dialog about continuous monitoring – including dealing with the tough questions. The research probably raises many new questions and nobody has all the answers. But the collective vision and wisdom of the individuals from companies that participated in this research, continuous monitoring evangelists and thought leaders such as the authors of this report, and industry leaders such as those who represent FERF's Committee on Finance and Information Technology (CFIT) can help us all innovate, explore new opportunities, and imagine new scenarios that utilize continuous monitoring to increase efficiency and reduce risk within our organizations in unprecedented ways. As for us at Infogix, we will continue to relish creating the "motherhood and apple pie" solution to better enable continuous monitoring.



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The Benefits of Continuous Monitoring

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The Benefits of Continuous Monitoring

TABLE OF CONTENTS

The Benefits of Continuous Monitoring

Executive Summary

Business executives recognize the need to continuously monitor their business operations to limit their exposure to operational and compliance risk, especially in this environment of accelerating change and complexity. They instinctively understand that better monitoring means fewer surprises (ISACA, 2010).

COSO, the Committee of Sponsoring Organizations of the Treadway Commission, included "ongoing monitoring" in its original Internal Control-Integrated Framework, first released in 1992. COSO's 1992 framework forms the basis for internal control at many companies today.

This research report examines **Continuous Monitoring (CM)**:

"Continuous monitoring enables management to continually review business processes for adherence to and deviations from their intended levels of performance and effectiveness."

CM is "an automated, ongoing process that *enables management* to:

- Assess the effectiveness of controls and detect associated risk issues;
- Improve business processes and activities while adhering to ethical and compliance standards;
- Execute more timely quantitative and qualitative risk-related decisions; and
- Increase the cost-effectiveness of controls and monitoring through IT solutions."[1]

To better understand how companies have implemented Continuous Monitoring today, the research team interviewed executives at eleven major companies, from a variety of industries:

- American Electric Power (AEP)
- Blue Cross and Blue Shield of North Carolina
- CME (Chicago Mercantile Exchange) Group
- Hallmark Cards, Inc.
- Hewlett Packard Company (HP)
- IBM
- Intel Corporation
- Microsoft Corporation
- J.C. Penney, Inc.
- United Technologies Corporation (UTC)
- Wells Fargo

[1] From "Continuous monitoring and continuous auditing: From Idea to implementation," Copyright © 2010 Deloitte Development LLC.

The research team identified a number of key findings from this research:

- CM Deployment: Leading companies recognize the importance of Monitoring, and are effectively deploying CM across functions and departments. They recognize how CM can be a precondition for achieving superior corporate performance as well as governance outcomes.
- Resourcing CM Initiatives: Continuous Monitoring programs require a company focus and a commitment of resources. Some companies mentioned the need for Return on Investment (ROI) estimates, but others look beyond monetary justifications and focus instead of operational effectiveness and risk reduction.
- Need for CM Champion: Continuous Monitoring programs need a Champion, preferably at a senior executive level, because resources will be required.
- Internal Audit as Evangelists: Although CM is a business operations issue, Internal Auditors (IAs), due to their familiarity with Continuous Auditing (CA), often become the champions of CM programs.
- CM of Payment Streams: CM is often initiated in payment-related areas, such as Accounts Payable and Claim Payments, in which, due to cash recoveries, the ROI can be estimated.
- CM Software and Tools: There are many new CM software products available that have improved capabilities and lowered the cost of using CM.
- Expanding Applications: For all of the companies that launched a CM initiative, there was a keen desire to expand the application beyond the initial sponsoring department or division, as well as move up the maturity curve.
- Benchmarking: Each company in our sample was curious to learn more about CM is deployed in other environments and industries with a view to improving their own processes. This was also a prime reason for their participation in this research.

Organization of this Report

Following an **Introduction**, which provides some background on monitoring and its motivation for adoption, we describe the **Key Findings** of this research project, which were based on the CM initiatives underway at the companies visited. A **Roadmap for Continuous Monitoring** is then provided for executives, followed by detailed discussions of the **Company Stories** and our vision for the **Future of Continuous Monitoring**.

Finally, in appendices, we discuss Continuous Monitoring in the context of today's **Business Imperatives and Corporate Governance**, and list our **Hypotheses and Conjectures** as an outcome of the project, to be subsequently tested and validated. We also provide a description of some of the **Continuous Monitoring Tools** currently available in the marketplace, and an **Annotated Bibliography**.

Introduction

The most challenging strategic issues facing business executives today include corporate performance, corporate governance and enterprise risk management. Executives are responsible for keeping their organizations out of the headlines (reputation risk), boosting profits amidst increasing global competition (superior business performance and results), navigating continuously evolving compliance imperatives (regulatory risk) and improving the overall efficiency of their business operations (operational risk). Highly automated business operations, the growth of e-commerce, large-scale mergers and acquisitions, and increased outsourcing all result in greater speed and efficiency, but simultaneously increase the likelihood of business objectives not being achieved. Additionally, as the volume of business transactions expands and disappears into the black box of automation, the introduction of errors and the potential for fraud increases. Succinctly stated, it is all about *value creation* and about *value preservation*.

Enterprises are information-driven and operate in an information-connected, global economy. Organizations receive, process, produce, store and send information to support and manage their operations, satisfy regulators and make strategic decisions. . They use sophisticated information systems and state-of-the-art information technologies. However, their information environments are inevitably subject to information integrity risk. Complex and dynamic information flows are inherently susceptible to, and frequently characterized by, the presence of information errors. Information errors, even if inadvertent, result in increasing costs, reputational and compliance risks, and operational inefficiencies. In addition, they may adversely impact an organization's ability to operate competitively. Where there are questions about behavioral and integrity risks ("people risks"), there is also the risk of fraud through asset misappropriation, corruption, or fraudulent financial reporting. The complexity and sheer abundance of information can be used to mask fraud.

In our case-study based research, we will highlight the indispensability of continuous monitoring in their respective operational environments. Consider the CME Group and Wells Fargo, both in the financial services industry. Global financial markets are so fast-paced that without continuous monitoring capabilities fully integrated into their operations, it is inconceivable how such organizations would function. The CME Group, as the world's largest derivatives marketplace, has a lot riding on perceptions of market integrity and the trust and confidence generated by their clearing house facility. This basic operational necessity drives their investment in the Global Command Center, probably the most impressive continuous monitoring implementation that the researchers came across during the course of this study. Automation of the environment—the transition from the open outcry method to computerized trading and technology-enabled monitoring mechanisms—has no alternative under such conditions. Terabytes and petabytes of data are too overwhelming for human beings to digest, absorb and respond to! Similarly, Wells

Fargo, one of the largest U.S. banks, must be at the top of its game in terms of minute-by-minute risk assessments of its portfolio. This requires continuous monitoring capabilities of a high order. Their need has been heightened after the merger with Wachovia Corporation, and in the aftermath of the Wall Street financial crisis.

HP, Microsoft, and IBM have developed in-house CM capabilities because of their technology sophistication. “Speed-with-accuracy” seems to be their mantra in recognizing, measuring, managing, and mitigating risk. They have not only internalized the fundamental importance of continuous monitoring but are now aggressively staking out their leadership positions in the global marketplace. Having continuous monitoring capabilities has become the price of admission to engage as global player.

As yet another example, consider the sophisticated point-of-sale continuous monitoring capabilities at retailer, J.C. Penney. Critically important to making rapid decisions about customer tastes and preferences, and the resulting inventory management decisions, continuous monitoring represents the difference between “stock-ins and stock-outs.” Carrying excess, slow-moving inventory on the shelves is problematic to the fast-moving items are competing for the same shelf space! Indeed, for their 1000+ stores around the country, an integrated continuous monitoring system, with sophisticated analytical capabilities is a core necessity: not to be challenged, only to be further improved.

Today, customer satisfaction is required for those companies that want to be competitive. One obvious example pertaining to customer expectations is a radio frequency toll collection system, such as EZ Pass ®. Drivers expect the system will monitor and eliminate duplicate charges before billing. The cost of adding this capability to the computer systems should be a core element of the system, and the ROI should include operational efficiency and customer satisfaction, as well as the costs incurred to implement the system or fix errors.

Over the last decade, business velocity has expanded considerably, business velocity has expanded as large volumes of digitized information are collected, stored, and processed. A classic example of this information age, and the new base level of customer expectation, is FedEx’s monitoring of packages with easy customer status access. Businesses, customers, and the general population now expect processes will be monitored and controlled using advanced automation.

A good example is a letter to the editor of ***The New York Times*** in 2010. A cell phone customer traveled to Mexico on a vacation. Her cell phone would not work there, but she used it at her departing airport in the U.S. On her return, she realized she had lost her phone. She received a bill from the cell phone company for over $2,000 in primarily fraudulent usage.

Her letter stated that she was surprised that a technology company like a cell phone provider would not be monitoring her usage, which had been in the $70 range for years. What does continuous monitoring have to do with brand image? This irate customer and her widely read letter are doing two things, one, she is confirming the customer expectation that companies should use technology to deliver better service, and two, if they don't, their reputation will suffer. Remember what Warren Buffet said: "It takes 20 years to build a reputation and five minutes to ruin it. If you think about that, you'll do things differently."

Enter Continuous Monitoring. Business executives recognize the need to continuously monitor their business operations to their exposure to operational risk in this environment of accelerating change and complexity. They instinctively understand that better monitoring means fewer surprises (ISACA, 2010). Indeed, most large organizations already spend significant resources to monitor and track one or more of the following:

- Business performance metrics
- Risk indicators
- Operational processes and data
- Controls and control violations
- Exception remediation.

COSO, the Committee of Sponsoring Organizations of the Treadway Commission, presciently included "ongoing monitoring" in its Integrated Framework, the original framework for internal control, first released in 1992. "Ongoing monitoring" was again emphasized in COSO's more recent enterprise risk management (ERM) framework in 2004. The Sarbanes Oxley Act of 2002 compelled public companies to renew their focus on internal controls over financial reporting because of the requirement for external auditor attestation of the effectiveness of financial reporting controls. Most recently, in 2009, COSO released its *Guidance on Monitoring Internal Control Systems*, and ISACA released its 2010 professional guidance on *Monitoring Internal Control Systems and IT.*

Traditionally, organizations have used either manual inspection or computer-aided audits, which typically involve after-the-fact data analysis to monitor business operations. These methods are not only costly and time-consuming, but also possess little pre-emptive value in learning about and anticipating emerging risks. As companies turn to technology to help with the task, there is more buzz in the industry around Continuous Monitoring (CM) technologies that enable automated, more scalable and efficient monitoring of everyday business operations. With CM, controls are built into every day operations, instead of requiring after-the-fact data analysis. More frequent monitoring ensures that business operations perform as designed, and issues such as data errors, missed Service Level Agreements (SLAs), security violations, business policy violations, incorrect certifications and other non-compliance and exceptions are detected instantaneously. Consequently, management can respond with corrective action that prevents revenue loss, higher costs, and compliance violations. Technology-enabled or automated monitoring

ensures data, applications and processes can be monitored as frequently as necessary and in a cost-effective manner.

CM subscribes to a “built-in” rather than a “bolt-on” philosophy. In the words of Brad Ames, Director, Internal Audit Professional Practices at the Hewlett Packard Company, “Purposeful monitoring is persuasive, focuses on risk in context, to shorten the time to management action.” If the shortest distance between two points is a straight line, then the shortest path from strategy to execution seems to be via continuous monitoring!

FEI’s Committee on Finance and Technology (CFIT) has been following the evolution of CM as a technology that can help businesses address their monitoring needs effectively and efficiently. CFIT has worked with FERF and in partnership with Infogix, Inc. to develop this research project with the intent of understanding, synthesizing and disseminating contemporary trends in CM. The primary audiences for this Executive Report are business and finance executives who are curious to learn about emerging technologies being used for continuous monitoring, and their organizational appropriateness and fitness for purpose, how effective they are from a governance/culture standpoint, what are the quick wins and successful outcomes that may be expected to demonstrate return on investment, any challenges or barriers to CM implementation, and opportunities for benchmarking CM efforts against other companies.

The objectives of this research project are to:

- Provide greater awareness of CM among financial and other business executives;
- Provide an understanding of current approaches to monitoring in businesses from multiple industries;
- Discover and propose best practices and approaches to successful CM implementations (including the CM enablers in terms of tools and technologies);
- Articulate a framework for value creation (corporate performance) and value(s) preservation (corporate governance/culture) to recognize and understand why CM initiatives are undertaken;
- Outline a ‘roadmap’ for how a successful CM initiative may be launched, and sustained; and
- Delineate, to the extent possible, the future of CM.

Site Visits and Case Studies

Starting in September 2010, the research team visited a total of 11 companies in a variety of industries, including (in alphabetical order):

- American Electric Power (AEP)
- Blue Cross and Blue Shield of North Carolina
- CME (Chicago Mercantile Exchange) Group
- Hallmark Cards, Inc.
- Hewlett Packard Company (HP)
- IBM
- Intel Corporation
- Microsoft Corporation
- J.C. Penney Company, Inc.
- United Technologies Corporation (UTC)
- Wells Fargo & Company

The individual company stories, and the executives who were interviewed, are provided in an Appendix. The internal audit departments of many of these companies, perhaps because of their exposure to continuous auditing methodologies (Cangemi, 2010; Lehman et al., 2010), appear to be well-positioned to initiate the discussion and development of continuous monitoring within their respective organizations. They are able to prototype CM development before handing it off for further customization and use in operational contexts by management executives.

The companies we visited cover the utility, insurance, financial services, technology/silicon-chips/aircraft/software, retail, banking and personal expressions/greeting cards industries. It is a diverse group of companies, including one privately-held company. Our site visits and case study documentation concluded in May 2011.

In summary, this Executive Report on Continuous Monitoring documents the fresh insights and ideas that emerged from a series of on-site interviews with senior executives and weaves them together in an innovative format that provides a multiplicity of views around major continuous monitoring themes. Our goal was to furnish a perspective on continuous monitoring, its deployment and evolution, as well as future promise and potential in some of the most progressive and innovative companies in the world. We hope that you will find these ideas and insights of interest no matter where your company stacks up on the continuous monitoring maturity curve.

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Key Findings from this Research

The research team focused on obtaining practical case studies and an update on CM projects in the business community. The key findings are significant and show great progress in the development of continuous monitoring. Many of these findings were discovered in a number of companies as well as in the literature available on CM.

Finding:

- **Leading companies recognize the importance of Monitoring, and are effectively using Continuous Monitoring (CM).**

Although CM is currently in its infancy, companies realize and agree with its potential benefits. A strong driver for CM stems from the fact that business today is more dynamic than ever before, and that digitized information is collected, stored and processed in volumes unimagined only a half century ago. However, as the volume of transactions expands and disappears into the black box of automation, the introduction or errors and potential for fraud increases too. As organizations continue to review and verify the integrity or trustworthiness of their information, they turn to automated continuous monitoring to help with the task. Indeed, it was this need to minimize "mistakes and fraud" that was instrumental in establishing the CM initiative at Intel Corporation in their Global Accounts Payable area.

Another key driver fostering the move to CM is the continued emergence of new regulatory initiatives, such as the Dodd-Frank Act of 2010, that increase the emphasis on transparency. As this new regulation gets implemented, it is expected to further increase the significance of CM in companies such as the CME and Wells Fargo. IBM's CM philosophy underscores transparency and compliance as drivers for CM, focusing on three key principles:

- To be as transparent as possible;
- To encourage businesses to make use of auditing tools; and
- To capture potential non-compliance early.

BCBS of North Carolina's CM initiative, CAMP, supports compliance with regulations, such as the National Association of Insurance Commissioners Model Audit Rule (NAIC-MAR) and the Medicare Secondary Payer Act.

Gaining cost efficiencies and maximizing revenue are other important drivers for CM. Companies such as UTC, Microsoft, and BCBS of North Carolina use CM to detect improper payments to their suppliers or customers. Their use of CM to detect issues prior to making the payments saves them from recovery costs and minimizes any revenue leakage due to erroneous or fraudulent payments.

Finding:

- **Continuous Monitoring programs require a company focus and a commitment of resources. Some companies mentioned the need for Return on Investment (ROI) estimates, but others look beyond monetary justifications and focus instead on operational effectiveness and risk reduction.**

Although many companies have made impressive strides in adopting and deriving value from their initial CM efforts, in general, current usage remains slight relative to its potential. Usage within companies who participated in this research ranged from companies where a small but forward-looking group is trying to demonstrate and evangelize benefits in a single project to companies such as the CME Group (Chicago Mercantile Exchange) and Wells Fargo, where CM has become a way of life. Not surprisingly, companies that have demonstrated executive sponsorship, focus and resource commitment have made greater progress in adoption as well as value creation. The research also revealed that the barrier to adoption is reduced in companies such as IBM, Microsoft and HP who are able to utilize their own technology products to implement their CM initiative.

Like with all technology-related improvements, CM implementations require investment. Again, like any capital investment, it is natural for executives to expect a significant return, including financial and/or core business improvements. Unlike traditional capital expenditures, computer systems are often core to business operations. The need for a business case or establishment of a ROI for a capability that is focused on ensuring strategic benefits and eliminating systemic risks has been a difficult obstacle to overcome. There may be a need to think differently about CM costs and ROIs. Perhaps the most profound answer to the question - how do you determine the ROI for the CM investment - was provided by Rajan Mehndiratta of Intel Corporation. Rajan's response was, "there was no need for of determining an upfront ROI because it was the right thing to do." Their initial implementation in Global Accounts Payable certainly proved that it was "the right thing to do". Buoyed by their success, Rajan's team is now evaluating expansion of CM in other areas of the company. There is an element of a strong corporate culture, and a desire for constant innovation that sidesteps and trumps the ROI question.

Finding:

- **Continuous Monitoring programs need a Champion, preferably at a senior executive level, because resources will be required.**

Some of the executives interviewed specifically mentioned the need for a project champion. For example:

- American Electric Power: Audit Services Department
- IBM: Audit Director
- Intel Corporation: Controller
- J.C. Penney: Senior management
- United Technologies Corporation (UTC): Director, Financial Systems, Center of Excellence

Audit and finance functions are somewhat aware of the potential benefits of CM. However, operations management may be less aware of the benefits, and sometimes believes this is a control or audit tool. One of the objectives of this research report is to provide greater awareness of CM to financial and other senior business executives.

Finding:

- **Although Continuous Monitoring is a business operations issue, Internal Auditors (IAs), due to their familiarity with Continuous Auditing (CA), often become the champions of CM programs.**

Since IAs have used computerized monitoring known as CA for many years, they are aware of the benefits of monitoring (CICA, 1999). The use of automated monitoring by auditors, internal or external, is referred to as CA. The difference between CA and CM is highlighted by Deloitte[2] in the following definitions:

Continuous Monitoring (CM) Defined

Deloitte defines Continuous Monitoring and Continuous Auditing in "Continuous monitoring and continuous auditing: From idea to implementation"

"**Continuous monitoring** enables management to continually review business processes for adherence to and deviations from their intended levels of performance and effectiveness."

"**Continuous auditing** enables *internal audit* to continually gather from processes data that supports auditing activities."

Deloitte further describes **Continuous Monitoring** as "an automated, ongoing process that enables management to:

- Assess the effectiveness of controls and detect associated risk issues
- Improve business processes and activities while adhering to ethical and compliance standards
- Execute more timely quantitative and qualitative risk-related decisions
- Increase the cost-effectiveness of controls and monitoring through IT solutions."

Cangemi (2010) has lamented, "Continuous Monitoring is a business operational issue swirling around in auditing and accounting practices!" The rationale for the statement stems from the role IA played in establishing the concept of automated monitoring and the extensive published guidance and articles on Continuous Monitoring written for auditors and accountants with an internal control and financial

[2] As used in this document, "Deloitte" means Deloitte & Touche LLP, a subsidiary of Deloitte LLP. Please see www.deloitte.com/us/about for a detailed description of the legal structure of Deloitte LLP and its subsidiaries. Certain services many not be available to attest clients under the rules and regulations of public accounting.

reporting focus. Though important, he believes “we are overly focused on internal controls and should be more focused on business operational issues!”

While CM is predominantly a business operations issue, it can also be an important component of a good internal control system and therefore affects audit coverage, through audit scope reductions (see “Guidance on Monitoring Internal Control Systems, COSO, 2009). IA should make operations management aware of these new automated continuous monitoring systems to improve efficiencies and effectiveness of the operations they will audit.

This research demonstrates many good examples of Internal Audit (IA) leading the way on initiating and recommending CM.

At Wells Fargo, the CM program was initiated by IA within the Community Banking division in 2001 with the development of Key Risk Indicators (KRIs) to monitor and evaluate the effectiveness of internal controls at the Regional Banking stores (branches). Over time, the business line management adopted the process and expanded it to include many more KRIs that now monitor business performance effectively. This is a classic example of how a CA initiative championed by IA evolved into a CM program that generates significant value for the business. IA has since moved on to monitoring the effectiveness of the overall CM process and management responses to risks and control issues.

Executives at American Electric Power (AEP) draw a clear line of distinction between Continuous Auditing and Continuous Monitoring:

> Analytics serving the Continuous Auditing program are built by the internal audit group for use in assessing audit risks and developing priorities for the annual Audit Plan. CM efforts are defined by business process owners for the purposes of evaluating process effectiveness, operational stability and compliance, and other performance metrics on a real-time basis.

AEP’s Internal Audit function is well-positioned to evangelize the benefits of CM to other departments, if necessary. They are prepared to leverage the data soon to become available through the use of Smart Grids.

The synergy between CA and CM can sometimes raise an issue of audit independence. As can be seen at AEP, as with HP, IBM and J.C. Penney, the independence issue, once recognized, can be effectively addressed and is very manageable. IA has the knowledge of controls and is aware of opportunities for efficiency and control improvement.

At IBM, the use of CM is called Continuous Event Processing (CEP) and they have designed the CM process to be related to the Enhanced Audit (EA). Together they form Internal Audit’s bi-directional approach for proactively monitoring and

independently assessing business risks with advanced analytics. In addition, Risk Compliance and Analysis Tool (RCAT) is used by IBM businesses to run their own audit analytics.

In many cases, implementing CM can change the scope of independent audits, both internal and external. This requires a proactive review and assessment of the improvements in the controls continuously monitored and built into the applications. Ideally, this exercise should result in an assessment of the impact on potential increased reliability, as well as potential reduction in audit scopes. This concept is supported in the recent COSO Monitoring guidance, which states that expanded monitoring can reduce audit scopes.

Finding:

- **CM is often initiated in payment-related areas, such as Accounts Payable and Claim Payments, in which, due to cash recoveries, the ROI can be estimated.**

Many companies use contingency firms to monitor payments and the success of these contingency firms proves the need to monitor, but is giving away 40% of the recovery really the correct approach?

Our research showed several companies, including AEP, Hallmark Cards, United Technologies and BCBS of NC, use CM to ensure the accuracy of their payments system. For example, Blue Cross and Blue Shield of North Carolina uses CM to reduce duplicate claim payments, so it is an added control and, hence, part of the expanded IC system. Others, such as Hallmark Cards, also add quality checks in systems to ensure accuracy of data. It is common for credit card processors to monitor data transactions and to catch duplicate transactions before they get too far into the systems. Even the newly automated toll systems on U.S. highways have CM to edit out duplicate transactions at the point of capture. These are all CM controls built into operational systems.

Finding:

- **There are many new CM software products available that have improved capabilities. However, not all companies are leveraging commercial solutions due to the need for upfront investment.**

Automated tools for monitoring have a long history, beginning with audit retrieval software, some of which was so valuable for extracting data that it was also implemented by operations and financial management. Financial executives understand that when there is a business case, investment money will flow into the development of technology products. The emergence of new software companies or existing software companies focusing on CM is testimonial to the "coming of age" of CM. Large investments have been made in specialized software technology by companies dedicated to making advances in CM (See Software Tools Appendix).

In addition to software vendors who focus exclusively on monitoring across multiple applications and systems, many ERP vendors such as SAP and Oracle are also augmenting their portfolio with CM type of technology offerings that focus on monitoring controls embedded within the ERP systems.

The companies that participated in this research have deployed CM solutions that fall into three categories: vendor-supplied, off-the-shelf software solutions (e.g. ACL, Infogix, and Oversight Systems), and existing IT solutions re-purposed for CM and home-grown technology solutions. Solutions of the latter two types were often deployed to minimize the need for establishing upfront ROI. CM champions in these companies envision leveraging initial successes to convince executive management of the value of investing in more robust, enterprise-level CM solutions.

CM is not easily classified as a technology solution. Many ask if CM is a Business Intelligence (BI) technology. CM could be a part of a BI program, one crucial element of which is to ensure information integrity prior to using the data in BI modules. BI has traditionally been limited to historical reporting off of data warehouses. The scope of BI in this case covers the more dynamic information residing in operational data stores and processes. Over time, CM will find its place in the evolving technology vernacular. But for now, it is more important to encourage basic CM deployment.

Finding

- **Expanding Applications: For all of the companies that launched a CM initiative, there was a keen desire to expand the application beyond the initial sponsoring department or division, as well as move up the maturity curve.**

We learned from Intel that they are constantly urging other divisions and departments to embrace CM processes, based on the successes noted in Global Accounts Payable. HP, Microsoft and IBM are ever on the lookout for more sophisticated applications of existing continuous monitoring solutions.

There is no doubt that implementing CM also enables "network effects" (i.e., economies of scale and scope), thus driving down the cost considerably.

Finding

- **Benchmarking: Each company in our sample was curious to learn more about how CM is deployed in other environments and industries with a view to improving their own processes. This was also a prime reason for their participation in this research.**

One of the best ways for a "learning organization" to succeed is to learn from others (Senge, 1990). Reinventing the wheel is not only costly, but also time consuming. Roundtables and private discussion groups share experiences in a safe, non-competitive environment. Research sponsored by professional organizations on contemporary topics is an important way not only to take stock of what is already known, but also to form the basis for follow up action. Industry-specific benchmarking may be even more focused and relevant. Most of the companies, especially Intel, Hallmark, United Technologies, J.C. Penney and Wells Fargo, seemed especially keen to utilize such a benchmarking strategy for improving their own continuous monitoring efforts.

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Roadmap for Continuous Monitoring

One thing that became apparent during our on-site interviews and company visits is that each company seemed to have its own particular motivations to adopt and implement Continuous Monitoring. As we recognized the "all roads lead to Rome" phenomenon, we agreed that one of the important insights for busy business and finance executives would be a Roadmap to embrace, launch, and sustain Continuous Monitoring initiatives successfully.

How should organizations respond to new data and information becoming available? (Consider Smart Grids for utility companies, such as AEP.) It is clear that without sophisticated CM tools and techniques, much of the data that organizations possess will not be exploited at all. There has to be a commitment to "moving CM up the value chain" (see Exhibit 1, reproduced with permission from Deloitte).

Exhibit 1 — Moving CM up the value chain

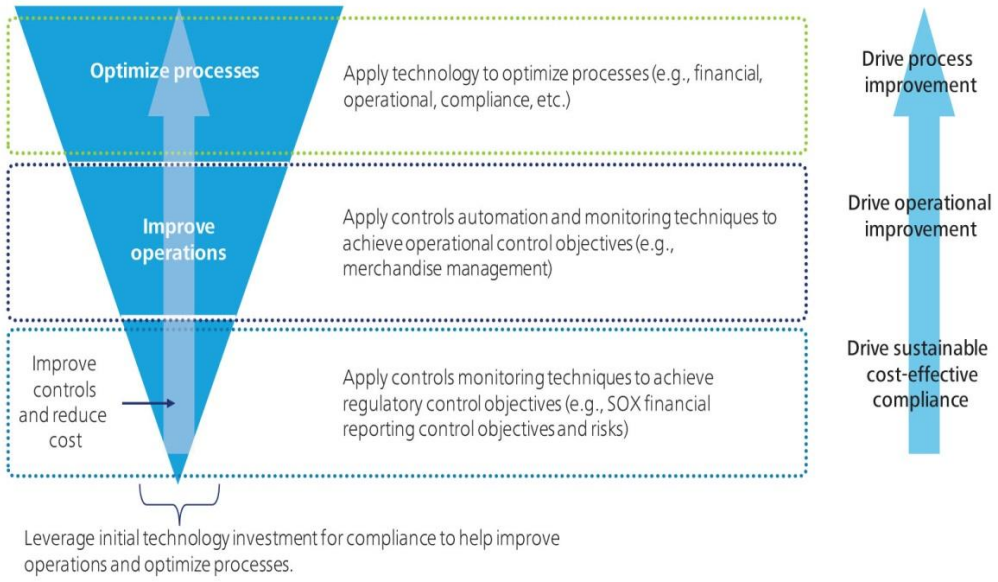

Exhibit I "Moving CM Up the Value Chain" , graphically presents how an organization may start with the objective of driving a sustainable and cost-effective approach to compliance, followed by a drive towards operational improvement, and culminating in the overall drive to achieve process improvement.

The basic idea is to leverage the regulatory compliance-driven technology investment to help improve operational efficiency and effectiveness and optimize business processes. Such an effort may also occur along a continuum from non-existent, but needed business processes, to manual implementation, to automation to eventually allow for technology-enabled monitoring of IT-based controls and processes (ISACA, 2010). Any Continuous Monitoring initiative should be presented as a "process improvement" initiative and should describe short-term, near-to-intermediate term, and long-term goals.

From our experience, here is the progression of how a member of the C-suite, whether a CFO or COO might create a conducive environment for the adoption and implementation of Continuous Monitoring. Of paramount importance is "creating a sense of urgency," the first step in a series of actions to anticipate, embrace, and adapt to change (Kotter, 2008). At any point, the need to involve the experience and expertise of an external consultant should be considered for optimal results.

1. **Assess the Pillars of the House of Value Creation and Value(s) Preservation (Corporate Performance and Governance/Culture)**—CM Drivers – and simultaneously evaluate the technologies and tools available—CM enablers. Link these to broad organizational goals and objectives, identify the costs and benefits, and demonstrate how the CM initiative would contribute to achieving superior corporate performance and corporate governance outcomes. An ROI justification should not supplant the primacy of strategic goals and objectives. Secure a critical mass of support within the organization who all feel a true sense of urgency about implementing CM and reaping its numerous benefits.

2. **Articulate an Implementation Strategy**
   It is important to detail how the CM initiative would be undertaken—what criteria would be used to prioritize its implementation? What are the vision and the strategy and have they been communicated to the relevant people to obtain their buy in? Specifying that criteria such as risk exposure, risk appetite and tolerances, timeliness of information gleaned, enterprise-level reach and visibility would be used to target application as well as setting thresholds, exception reporting parameters, and workflow processes (i.e., real-time alerts), and follow-up protocols are important considerations. As in any other change management and transformation effort, the attitudes of those affected, as well as the resources available, should be taken into account. Empowering those committed to making the vision a reality and by helping them surmount barriers and challenges are critically needed steps along the way.

3. **Organic Design and Implementation**
   As far as possible, CM initiatives should remain faithful to the core values, culture, and basic strategy of the organization. At a minimum, building CM into processes at inception is far superior to any after-the-fact, "bolt-on" strategy. This is what we mean by "organic design and implementation." Another important consideration is scalability—do the CM capabilities scale up as the organization grows? Balancing effectiveness and efficiency considerations is a prudent, realistic approach. A shared sense of project ownership and positive outcomes should be communicated at all times, as this strengthens the "people and culture" element in promoting change and innovation. Set attainable and realistic goals when measuring the progress of CM implementation timeline. High-urgency teams act in a way that "quick wins" can be demonstrated to keep the momentum of the overall effort going. There should be an intent to make CM initiatives get adopted in an "enterprise-wide" fashion, and "institutionalizing it into the structure systems, and culture of the organization." (Kotter, 2008).

4. **Review Progress until on Autopilot**
   Once the CM implementation appears viable and operational, it is important to broadly communicate the results of the effort to management and all key stakeholders. Monitor performance of the CM system and ensure it is integrated well with the rest of the organization. Review findings and validate their currency and reliability. Evaluate how the human interface is occurring, and tweak monitoring frequency or exception reporting thresholds to make them relevant and meaningful. This process requires a "feedback loop" as part of any organization's continuous improvement mandate.

Where CM initiatives have been launched, it is imperative that the organization simultaneously implements a Six Sigma/Capability Maturity Model "evaluative benchmarking" effort to ensure that the CM processes are getting commensurately sophisticated over time (cf. Ramamoorti, Watson & Zabel, 2008). In this regard, a white paper from Infogix, Inc. is instructive. This whitepaper, "Infogix Controls Enterprise Maturity Model" (Infogix, 2010) describes a framework (ICEMM) explaining the progression of stages through which an organization evolves.[3] (See page 20.)

Recent trends, including an expanding array of compliance requirements, a shifting technology landscape, renewed emphasis on operational excellence and corporate governance are forcing organizations to adopt a structured approach for optimizing the launch and deployment of CM programs and initiatives. The maturity stages are defined as proceeding from Initiation to Propagation to Expansion to Standardization to Mandate (at the most advanced stage).

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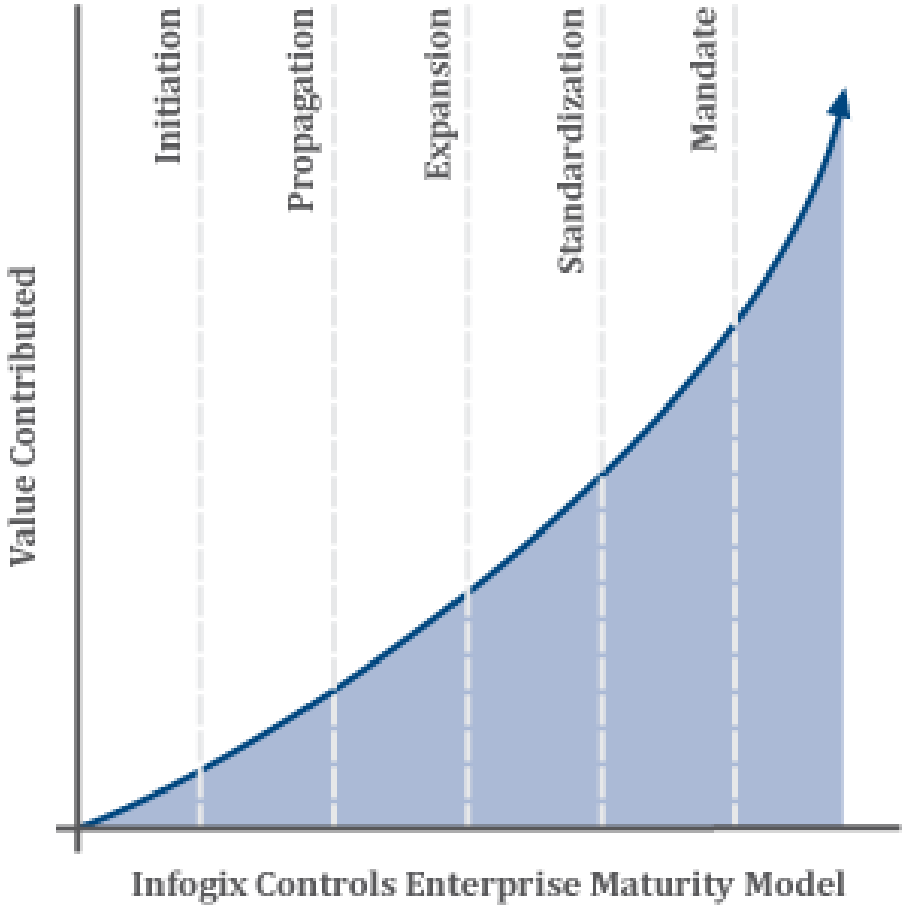

From *Infogix Controls Enterprise Maturity Model: A Framework for Improving the Value of Infogix Controls*. A White Paper by Ramon Nayar, Infogix, Inc. Naperville, IL: (2010, Infogix, Inc.) Copyright held by Infogix, Inc. Permission to reproduce granted by Infogix, Inc.

Stages of ICEMM and Value Progression[4]

Maturity Stage	Description	Value Driver
Initiation	Enterprise successfully implements monitoring for the first time	Prevention of information risk
Propagation	Enterprise recognizes the benefits of monitoring and implements it throughout a business process	Expansion of scope
Expansion	Enterprise establishes monitoring in multiple business processes	Expansion of scope Lower operating costs
Standardization	Enterprise establishes policies and standards for monitoring within a business unit	Expansion of scope Lower operating costs Lower management costs
Mandate	Enterprise mandates monitoring throughout the enterprise	Expansion of scope Lower operating costs Lower management costs Cost savings through prevention

References

Kotter, J.P. (2008). *A Sense of Urgency.* Boston, MA: Harvard Business Review Press.

Infogix (2010). *Infogix Controls Enterprise Maturity Model (ICEMM): A Framework for Improving the Value of Infogix Controls*. Naperville, IL: Infogix, Inc.

[4] Adapted from "*Infogix Controls Enterprise Maturity Model*" whitepaper. Copyright held by Infogix, Inc. Permission granted by Infogix, Inc.

Company Stories

Starting in September 2010, the research team visited a total of 11 companies in a variety of industries, including (in alphabetical order):

- American Electric Power (AEP)
- Blue Cross and Blue Shield of North Carolina
- CME (Chicago Mercantile Exchange) Group
- Hallmark Cards, Inc.
- Hewlett Packard Company (HP)
- IBM
- Intel Corporation
- Microsoft Corporation
- J.C. Penney, Inc.
- United Technologies Corporation (UTC)
- Wells Fargo

These companies cover the utility, insurance, financial services, technology/silicon-chips/aircraft/software, retail, banking and personal expressions/greeting cards industries. It is a diverse group of companies, including one privately-held company. Our site visits and case study documentation concluded in May 2011.

Before presenting each company's story, we describe its CM initiatives as themes, the tools and technologies that it currently uses, and the executives that we interviewed.

American Electric Power

Themes

AEP recognizes the importance of both Continuous Monitoring (CM) and Continuous Auditing (CA), and has evaluated several automated monitoring tools to manage operations and risks. Business process owners have adopted decentralized tools and methodologies to meet their own respective CM needs. The internal audit group has established a mature CA program to optimize risk assessment activities. AEP needs specific justification for any potential costs associated with implementing more ubiquitous tools and methodologies, as well as a champion who can bring together the different operating segments for a collaborative CM endeavor.

Current Tools and Technology

AEP's Audit Services Department currently uses ACL as its primary data analysis and CA tool.

Other monitoring, reporting, and query-based tools are also in use throughout the organization to suit specific analytical needs. For example, Oversight Systems are used within the accounts payables organization to continuously monitor for duplicate invoices.

Persons interviewed

Richard Mueller, Vice President of Audit Services
Jay Hoffman, Director of IT Audit Services

Discussion

American Electric Power (AEP), headquartered in Columbus, Ohio, ranks among the nation's largest generators of electricity, owning nearly 38,000 megawatts of generating capacity in the U.S. AEP also owns the nation's largest electricity transmission system, a nearly 39,000-mile network that includes more 765 kilovolt extra-high voltage transmission lines than all other U.S. transmission systems combined. AEP's transmission system directly or indirectly serves about 10-percent of the electricity demand in the Eastern interconnection, the interconnected transmission system that covers 38 eastern and central U.S. states and eastern Canada, and approximately 11-percent of the electricity demand in ERCOT, the transmission system that covers much of Texas.

AEP has over 18,000 employees in 11 states, and its 2010 revenues were over $14 billion.

AEP has drawn a clear line of distinction between CA and CM. Analytics serving the Continuous Auditing program are built by the internal audit group for use in assessing audit risks and developing priorities for the annual Audit Plan. CM efforts are defined by business process owners for purposes of evaluating process

effectiveness, operational stability and compliance, and other performance metrics on a real-time (or near-real-time) basis.

Although monitoring exists in several forms and at varying degrees of automation across the organization, CM is mostly manual with modest technology intensiveness and even less uniformity. AEP is deciding how best to utilize purported advances in CM technologies to serve multi-faceted monitoring needs, ranging from compliance requirements to operating efficiencies.

AEP's Audit Services Department has been aggressive in establishing a CA program that automatically analyzes business process data on predetermined frequencies (monthly, quarterly, etc.). The output from CA routines (built as ACL scripts) is reviewed by subject matter experts to determine if the volume of exception conditions reported by ACL warrants further manual investigation. In general, sufficient comfort of reasonably controlled risks can be gained from a small number of reported exception conditions. This CA approach enables the optimized utilization of resources and allows for greater risk sensitivity and responsiveness.

One such success case came from the automated testing of controls effectiveness for Sarbanes-Oxley 404 testing. Where electronic data is available, ACL scripts are used to quickly demonstrate control effectiveness (e.g., account reconciliations). This approach reduces manual testing effort while simultaneously providing more thorough coverage of the transaction population.

AEP recognizes that more controls need to be automated for both CA and CM to have a more significant impact. Furthermore, CM solution providers need to craft a compelling value proposition that better suits utility industry needs. Definition of justifiable need and the identification of business process owners who could become advocates are critical success factors for wider CM acceptance.

Smart grids will provide a huge opportunity to collect data and apply advanced analytics, but AEP is still in the nascent stages. A compelling business case has not yet been presented to AEP. Once a business case can be fleshed out there are good prospects for executive sponsorship and investment. In light of the terabytes of data associated with smart grid deployments, CM tools will be a logical next steps to analyze the data, extract patterns and trends, and gather insight to optimize business performance as well as manage existing and emerging risks. AEP needs a champion who can bring together different operating segments for a collaborative endeavor that embraces CM as an indispensable part of doing business.

Blue Cross and Blue Shield of North Carolina

Themes

The Audit & Risk Management Department (ARM) at Blue Cross and Blue Shield of North Carolina wants to increase audit coverage and quality through the use of technology tools such as Audit Command Language (ACL) and SAS without acquiring additional people or technology tools. ARM also wants to increase partnering and collaboration with business areas and to enhance its image of being a business partner. To help achieve those objectives, ARM has developed a Continuous Auditing and Monitoring Program (CAMP).

So far, ARM has successfully established CAMP in four business areas with existing resources and tools. However, to expand the approach into new areas, more sophisticated tools will be needed. In order to fund those tools in the future, ARM may need to develop a better ROI justification to get senior management approval for more funds.

Current Tools and Technology

Business areas use "ENVISION" to document risks and controls over financial reporting in order to comply with the Model Audit Rule (an insurance company regulatory requirement similar to The Sarbanes-Oxley Act). Audit uses this tool to monitor the results of the self test and adequacy of the controls. CAMP activities are used to help business areas meet their self-testing requirements and reduce the need for traditional periodic internal audits.

ACL and SAS are used to capture and analyze relevant data and do calculations. ARM has developed a dashboard that captures data from spreadsheets and displays results and trends in an easy-to-read visual format through a web browser.

Persons Interviewed

Richard Supinski, Director, Financial & Operational Audit
Pam Estes, Manager, Accounts Payable
Susan Menendez, Director, Corporate Provider Services
Jeff Henion, Senior Data Analyst, Audit and Risk Management (ARM)
Kathy Abbott, Senior Data Analyst
Randy Mirador, Business Solutions Architect in ARM
Tanya Bullock, Manager, Financial and Operational Audit
Brian Arnold, Senior Auditor ARM
Esther Bredell, Senior Financial Auditor
JoAnn Stone, Senior Performance Auditor

Discussion
Blue Cross and Blue Shield of North Carolina (BCBSNC) is a not-for-profit, fully taxed company with headquarters in Chapel Hill and major operations centers in Durham and Winston-Salem. BCBSNC is the largest health insurer in the state, with 4,300 employees serving more than 3.7 million customers and over $5 billion in annual revenues.

Continuous Auditing & Monitoring Program (CAMP) has been in place for six months. It was developed and is driven by ARM. Its goal is to increase audit coverage and quality while reducing the cost of doing business in several ways:

- Monitoring the effectiveness of edits and controls over transactions, such as duplicate payments, which should reduce costs;
- Automation of controls monitoring in order to reduce reliance on manual processes;
- Support compliance with regulations, such as the National Association of Insurance Commissioners Model Audit Rule (NAIC-MAR) and the Medicare Secondary Payer Act; and
- Reduction of traditional full scope audits and external audit testing to reduce overall audit costs.

The scope of CAMP covers four business areas:

- Claims monitoring;
- Coordination of benefits with Medicare;
- Accounts payable; and
- Senior Market performance indicators.

Internal audit works with its business partners to show the value of CAMP. Executives are aware of and support the process, but may need to provide additional funding to expand the program across the enterprise.

Audit's key challenges in implementing CAMP enterprise-wide include:

- Priority determination;
- Value perception (Changing the perception of control and audit from policeman to value addition);
- Resources for analyzing CAMP needs;
- Technology for analyzing CAMP;
- Capabilities of the existing tools;
- Data access due to IT restrictions;
- Changes in the rules;
- Maturity of the process; and
- Funding for future expansion.

Audit's vision for the future of CAMP:

- More automated, with real time information;
- Less manual intervention required;
- Transition the monitoring to the business areas;
- Control and monitoring are scheduled; and
- Results are formatted and presented in a meaningful way.

CME Group

Themes

CME Group (CME) is the world's leading and most diverse derivatives marketplace. CME Group's mandate is to keep the most sophisticated business leaders, investors, and other customers manage risk, fulfill their investment needs, and navigate economic uncertainty by offering diverse product lines, deep liquidity, safety and soundness of world-class clearing and keeping the market operating smoothly. CME Group revenues in 2010 increased to $3 billion, and net income to $951 million, while volume grew to 3.1 billion contracts.

CME Group recognizes only too well how critical it is to develop, implement, maintain electronic trading systems that have the functionality, performance, reliability, and speed required by its customers. Accordingly, the creation of interactive electronic marketplaces in a wide range of derivatives products—for instance, the CME Globex electronic platform—has led to significant overall trading volume, and has been instrumental in attracting and retaining customers. To preserve market integrity, and maintain the confidence of customers in the safety and soundness of clearing services, the Global Command Center, a multi-million dollar facility allows for the continuous monitoring and real-time analysis and resolution of any noted market anomalies. This is an extremely sophisticated and advanced continuous monitoring application in the area of core operations.

Regulatory compliance is another major issue in the financial services industry. The CME Group futures exchanges are extensively regulated by the Commodities and Futures Trading Commission (CFTC) consistent with the core principles relating to the operation and oversight of markets and the clearing house. In addition, the Financial Services Authority of the United Kingdom (FSA) has jurisdiction over CME Clearing Europe, and the U.S. SEC oversees the offering of clearing services for security-based swaps. The passage of the Dodd-Frank Act of 2010, a comprehensive banking and financial services reform legislation, will likely lead to significant changes to the oversight of derivatives markets in requiring price transparency, liquid markets to minimize transaction costs, market integrity, customer protection, and the safety and soundness of central counterparty clearing services. CME Group is actively engaged in the rulemaking process, and supports the intent of public-interest legislation designed to reduce systemic risk through central counterparty clearing and exchange trading of derivatives, increasing data transparency and price discovery, and preventing fraud and market manipulation.

Current Tools and Technology
CME has thousands of servers monitoring orders in Globex for both trades and operations. Huge investments have been made to establish the Global Command Center (GCC) where market trade anomalies can be diagnosed, analyzed, and resolved on the spot by experts with diverse experience. Trade data can be viewed with a tool called a History Replay Injector (HRI), which can be used for all testing. Also, a Trintech tool is used to do certifications at the control level and to do account reconciliations.

Persons Interviewed
Rick Kokoszka, Managing Director – Internal Audit
Adi Agrawal, Director – Internal Audit
Bob Padilla, Director – Technology Operations Command Center

Discussion
CME Group is the world's leading and most diverse derivatives marketplace. The company is comprised of four Designated Contract Markets (DCMs):

- CME
- CBOT
- NYMEX and
- COMEX

Headquartered in Chicago, Illinois, CME Group has offices in New York City, Houston, Texas; Washington, D.C.; London, UK; Singapore; Tokyo, Japan; Sao Paolo, Brazil; and Calgary, Canada.

Building on the heritage of CME, CBOT, NYMEX and COMEX, CME Group serves the risk management needs of customers around the globe. It provides the widest range of benchmark futures and options products available on any exchange, covering all major asset classes based on interest rates, equity indexes, foreign exchange, energy, agricultural commodities, metals, weather and real estate. CME group brings buyers and sellers together by means of the CME Globex electronic trading platform and the open outcry trading facilities in Chicago and New York City. CME Group also operates CME Clearing, which provides clearing and settlement services for exchange-traded contracts, as well as for cleared over-the-counter derivatives transactions.

Continuous Monitoring at CME

Compliance

Compliance is a major issue for CME for at least two reasons:

1. As a publicly-held company, CME Group is subject to SEC listing requirements, such as compliance with the Sarbanes-Oxley Act; and
2. CME is a self-regulated organization (SRO), subject to the regulations of the U.S. Commodity Futures Trading Commission (CFTC). As an SRO, they have two broad areas of compliance: financial surveillance and market regulation.

Financial surveillance: Clearing firms act as intermediaries between the trading firms and the markets. Clearing firms can act as brokers and also trade for their own account. CME charges fees to clearing firm members, who in turn charge fees to their customers. Clearing member firms are continually monitored and audited for their outstanding risk, capital adequacy, and compliance with customer protection rules. CME Clearing utilizes a combination of risk management capabilities to assess clearing firm and account exposure levels for all asset classes 24 hours a day throughout the trading week.

Trades are initiated and processed in the Globex environment. Surveillance can view this processing. The trade then goes through clearing in near real-time. The trade then enters the risk system. When trades exceed a certain threshold, they can be managed, and a clearing house can be shut down. The audit group can then follow up.

Trades can be made 23.5 hours per day. CME books the entire market twice a day, marking all exposure with pays and collects. Risks may vary during the day, but all accounts are settled twice a day.

Regulating the Market and Operations: For Globex, compliance with SRO regulations is a real-time process. CME has a very sophisticated market regulating system. All exceptions are reviewed.

CME's mandate is to keep the market operating smoothly. They have thousands of servers looking at orders in Globex, trades and operations. (An order is not a "trade." It's a bid or offer. There is not a trade until there is a counterparty to fill the order. In Globex, every order is matched.)

Orders enter the system, and an engine sends a message to all interested parties. The entire "highway" is monitored, watching for saturation. If it is full, they start to see retransmissions and other abnormalities. Only when CME sees these kinds of symptoms will they investigate. The problem is that when the "highway" becomes

"clogged," it takes some time for activity to build up enough to get noticed. CME does not look at the content of a transmission unless necessary. In other words, they monitor the "highway," but they don't look inside the "vehicles." (Market Regulation can mine the data on their system as needed. "Wrap It" is the application used for recovery to lock data in memory, and is used for data mining.)

In a desired future state:

- Every message will be actionable;
- They can manage behavior changes real-time to meet capacity needs, make adjustments and prevent overflow;
- Trending is dynamic, not static;
- Messages and alerts will show the root causes of an issue; and
- The system can be predictive and prevent issues.

Controls are tested with test transactions, including re-runs of historical transactions. If an out of bound condition trade is run and gets through, it is reviewed for what went wrong. As it proceeds, it is written to a file. In the real-time environment, everything is logged. Two or three weeks of data are available so that orders can be recreated, and years of data are stored. Data can be viewed with a tool called a History Replay Injector (HRI), which can be used for all testing. Also, a Trintech tool is used to do certifications at the control level and to do account reconciliations.

LESSONS LEARNED: Among all the companies in our sample where on-site interviews were performed, there is no question that the CME Group's continuous monitoring applications, especially at their Global Command Center (GCC), was the most sophisticated environment we encountered. Huge investments have been made to allow on-line real time diagnoses of market anomalies (outside of pre-established bounds and parameter values), with groups of expert analysts convening on site at the GCC to review and resolve "problems" noted. Driven by operational management, just considering the sheer size and complexity of the global marketplace this is the best example we saw on how continuous monitoring could be integrated with operations. CME is clearly a bellwether in terms of demonstrating the most complex and sophisticated continuous monitoring applications in their particular operating environment.

Hallmark Cards, Inc.

Themes
Hallmark thinks that an "end to end" monitoring tool would be ideal, but deployment would depend on the cost of the tool. This emphasizes the need for ROI analysis when discussing monitoring tools.

Current Tools and Technology
Hallmark uses several tools:

- A Back Office Associates tool integrates with SAP to check data quality
- SAP GRC utilized to manage user roles and security
- A Blackline SaaS tool automates account reconciliations and reconciles bank accounts to a sub-ledger

Persons Interviewed
Brian Kurtz, Shared Services Finance Director (Controller's Organization)
Pam Oberdiek, Senior Project Horizon Manager (Data Governance Office)

Discussion
Hallmark Cards, Inc., has been a privately-held, family-owned company headquartered in Kansas City, Missouri, for over 100 years. While best-known for greeting cards, the company's products also include paper party supplies, wrapping paper, Christmas ornaments, gifts, albums, scrapbooks, electronic greeting cards, personalized photo cards, and even a cable television channel. Now in its third generation of family leadership, Hallmark has grown from two shoeboxes of postcards into a $4.1 billion company. Their products can be found in 100 countries around the world and in more than 40,000 stores in the United States alone.

Hallmark is interested in Continuous Monitoring for two primary reasons:

- To be sure that key controls are being applied in a consistent manner. An example would be account reconciliations.
- To identify process pain points, and determine what caused any errors. An example would be the three way matches in accounts payable.

Hallmark uses an SAP platform and has a number of legacy systems. Hallmark has an inventory of key controls, although they are not documented.

Hallmark uses a Back Office Associates tool that integrates with SAP to check data quality. Hallmark also uses SAP GRC to manage user roles and security.

Hallmark uses BlackLine, a Software-as-a-Service tool, to automate account reconciliations. Hallmark reconciles accounts monthly, and does not think that they need to reconcile accounts more often. Hallmark also uses BlackLine to reconcile bank accounts to a sub-ledger. It also is used to monitor retail out of balance situations daily. Hallmark does not have the capacity or need for daily monitoring of

accounts other than cash. For other accounts, the controls are monthly reconciliation and management review/approvals.

Hallmark thinks that a hypothetical “end-to-end” monitoring tool that could be applied across systems and processes would be ideal. “If there was a tool that could be used across the organization, it would be as good as motherhood and apple pie.” “Everyone wants good data quality, but they may not want to pay for it.”

Some of Hallmark’s other automation priorities:

- Source to Pay: Increase the number of electronic invoices, using a service such as OB10, which also permits self-service Accounts Payable inquiries.
- Paperless Accounts Payable: Hallmark currently pays 65% of its invoice lines electronically, but 35% paper is still a lot.

The next priority is to increase the efficiency of Hallmark’s A/P invoicing processes. They are evaluating cloud-based solutions in this area.

Pam discussed the potential need for controls and monitoring in 2 areas:

1. Laptops and mobile devices
2. Social networks

Nobody was aware of any solution in these areas other than securing devices through password and encryption.

Hewlett Packard Company (HP)

Themes

Hewlett Packard's issue is the large volume of transactions. Its continuous auditing efforts focus on aligning multiple kinds of indicators to isolate predictive outliers, and communicating them to the right level of management as soon as possible for evaluation and remedial action. To determine the right mix of sensors, HP is constantly balancing:

- Purpose
- Risk and
- Time

Purposeful monitoring is persuasive, focuses on risk in context, to shorten the time to management action.

Current Tools and Technology

Hewlett Packard develops its own continuous auditing tools in-house, which it uses in addition to existing external tools.

Persons Interviewed

Brad Ames, Director, Internal Audit Professional Practices
Carrie Gilstrap, Continuous Controls Monitoring Manager
Patricia Geugelin-Dannegger, Audit Innovation Solution Architect

Discussion

Hewlett Packard Company (HP), headquartered in Palo Alto, California, is the world's largest IT company. HP was founded in 1939, and now has over 324,000 employees worldwide serving over one billion customers in more than 170 countries. Revenues for fiscal 2010 were $126 billion, earning it a Fortune 500 ranking for 2010 of #10.

With over $100 billion in annual revenues, HP must deal with a very large volume of transactions. Because it cannot check and verify every transaction, HP's internal audit department looks for outlier transactions and entries that are both persuasive and economically significant. This requires a balanced approach, which Internal Audit describes as "From Noise to Knowledge," which considers three dimensions, purpose, risk and time, to prioritize where and what to monitor:

Purpose:

- Balance Audit Objectives with Business Objectives
- Balance Finance with IT processes

Risk:

- Balance Transactional Outliers (Routine) with Complexity (Judgment)
- Balance Static Volume with Dynamic Change

Time:

- Balance Cyclical Key Performance Indicators with Predictive Risk Indicators
- Balance Periodic analysis with Continuous monitoring

Brad Ames, Director, Internal Audit Professional Practices, describes HP's balanced approach to Continuous Monitoring:

"Continuous monitoring originated in Audit several years ago. We wanted to condense the audit time spent in field, because subsequent to the mid-point of scheduled field work, auditors rarely found new significant issues."

We observed that most issues are identified during the first third of the field work. Therefore, the foundation of our Continuous Monitoring approach is to consider the kinds of information that seasoned auditors look for first. Secondly, we learn from their fieldwork, what information would have enabled the auditors to come to a conclusion earlier. In other words, based on knowledge learned in the field, what would they now look for sooner to gain assurance?

As a result, Internal Audit at HP has developed a set of tools to monitor data from various perspectives:

- Transaction data: Compares and trends financial indicators to a predetermined risk threshold and highlights variances from management expectations. Conditions: Examines application or infrastructure configuration setting/parameters and compares them with a baseline. An example is benchmarking configured automated controls to a previously audited baseline.
- Changes: Identifies and reports changes to critical application programs that enforce control or execute logic, making it possible to verify that changes are authorized, tested and documented. An example is trending and comparing the frequency and volume of program changes.
- Processing integrity: Verifies and monitors the completeness and accuracy of data as it progresses through various IT processes and systems. Evaluating configured account numbers in context with the transaction type is an example of monitoring for accurate classification and valuation. Another integrity example is monitoring for sequence gaps in pre-numbered transactions such as PO, invoice and check numbers.
- Error management: Monitors the volume and resolution of activity in suspense areas, error logs or exception reports, typically as part of an application or platform. Monitoring error messages considers the impact and complexity of operational incidents, as well as the response to clear them.

Ames notes that indicators exist at various levels in the organization:

- IT Infrastructure Operations;
- Applications; and
- Financial Processes

By aligning risk across three inter-related components – IT Operations, Applications and Financial Processes – auditors can come to a persuasive conclusion with minimal inspection in a more time manner than traditional testing.

Ames says that considering diverse IT and business sensors will provide a view to emerging risk. "Monitoring non-economic indicators such as operational incidents, changes and configured conditions can provide persuasive results relevant to audit objectives. Monitoring economic transactional data gives precise results specific to the business objectives specific to financial processes."

The goal is to gain an ongoing view to incident logging, changes, configured conditions, in alignment with financial transactions to give conclusions that are persuasive, timely and economically useful regarding the control environment.

Accordingly, Internal Audit has developed tools and methodology to monitor risk in these three levels:

IT Infrastructure Risk

- Release and Configuration Management
- Identity Management
- Incident Management

Application Risk

- Change Management
    - Transport Frequency & Volume
- Security Conditions
    - Granting Access
    - Revoking Access
    - Segregation of Duties
    - Periodic Reviews
- Operations Processing
    - HP Service Center Tickets

Financial Process Risk

- Automated Controls
    - Changes from Baseline
- Transaction Data
    - Credit & Collections
    - Accounts Receivable
    - P-Card
    - Travel Expenses
    - Manual Journal Entries
    - Fixed Assets

To illustrate, Ames describes how automated controls are monitored to give assurance in connection with financial process risk:

1. Systematically extract application control data directly from SAP systems;
2. Generate a benchmark report comparing the current condition of automated controls with the previous baseline conditions;
3. Evaluate the impact of all changes to determine if retesting is required; and
4. Revalidate automated controls that did not change from the baseline.

Internal audit has also recently started working directly with the business units to assist with their own efforts developing continuous transactional monitoring. The assumption is that with increased continuous monitoring activity effectively used by management, the effort level required by internal audit for controls testing will be reduced.

LESSONS LEARNED

Start with business objectives, such as a short list of KPIs, rather than audit objectives. Too often auditors attempt to assign a monitor for each step in the traditional audit program. This creates too many automated tests that tend to overlap in purpose. Instead, collaborate with management to design sensors that measure risk to the organization's success. Build an elegant monitoring model that uses a suitable combination of sensors aligned with, IT infrastructure risk, application risk, and financial process risk that is meaningful to both management and the auditor.

Transaction monitoring is precise and conclusive, but expensive! The capability to re-perform key logic on every transaction is powerful, but requires infrastructure and rigorous follow-through. Before committing to a continuous control monitoring solution, consider whether the process requires 100 percent precision in order to give assurance. With sizeable volumes of transactions, checking every transaction can cause auditors to chase after false positives, so begin by looking at the outliers. Outliers clarify which questions to ask first, about where to go next.

The most persuasive outliers address root cause and are accompanied by action. Being close to the transaction cycle, management is better positioned to monitor for outliers and act on them promptly. Therefore, when monitoring compels management to action, auditors gain comfort. Conversely, if monitoring is sporadic and response is inconsistent, auditor uncertainty regarding the control environment is increased.

IBM

Themes

Like Hewlett Packard, IBM's issue is the large volume of transactions. Audit focuses on high risk areas of the business, including Procurement and Travel. Its goal is to provide the businesses with analysis to enhance their controls. To do this, it looks at trends in data and applies logic and rules to identify new trends.

The general business model is to provide resources and technology to individual businesses. If a business sees value, it is asked to fund future costs. For example, Accounts Receivable saw value because they were able to re-allocate resources.

Current Tools and Technology

IBM's audit function develops its own continuous monitoring tools in-house. Those tools include:

- Continuous Event Processing (CEP), used by Internal Audit globally for Accounts Receivable;
- Enhanced Audit (EA), used by Internal Audit in Order to Cash and Accounts Receivable (with plans to extend to Accounts Payable this year); and
- Risk Compliance and Analysis Tool (RCAT) used by IBM businesses for Expense Reimbursement and Procurement.

Persons Interviewed

Russ Porter, Audit Director
Pat Culhane, Audit Technical Support Manager
John Langford, Audit Manager
Lori Jones, Manager, Tools and Technology (Business Control)

Discussion

IBM, headquartered in Armonk, New York, is a large technology company celebrating its 100th anniversary. It has 400,000 employees, including 200 audit staff, doing business in 170 countries. Revenues for 2010 were $100 billion, ranking #20 on the 2010 Fortune 500 list.

Russ Porter, Audit Director, says that "IBM does business in 170 countries, but we operate in a centralized manner." IBM has five major business units:

- Global Technology Services
- Global Business Services
- Software
- Systems and Technology
- Global Financing

IBM's philosophy has three key principles:

- To be as transparent as possible;
- To encourage businesses to make use of auditing tools; and
- To capture potential non-compliance early.

Internal Audit has two primary goals:

- Employ company strategy of business analytics; and
- Free up audit resources for work in emerging risk areas.

Continuous Event Processing (CEP) and Enhanced Audit (EA) form Internal Audit's bi-directional approach for proactively monitoring and independently assessing business risks with advanced analytics. Risk Compliance and Analysis Tool (RCAT) is used by IBM businesses to run their own audit analytics.

Continuous Event Processing (CEP)
CEP provides continuous monitoring using agile event processing. Internal audit provides the technology and businesses provide the business knowledge.

CEP is currently used globally in accounts receivable.

Enhanced Audit (EA)
EA builds on traditional audit using algorithmic and visual data mining. EA analyzes for abnormalities using scoring. EA is only for audit purposes, and results are only used by Internal Audit.

EA is currently used for Order to Cash, consisting of CRM, transactional pricing, fulfillment, and accounts receivable. Internal Audit has plans to extend EA to accounts payable.

Risk Compliance and Analysis Tool (RCAT)
Like EA, RCAT analyzes for abnormalities using scoring. IBM businesses conduct their own audit analytics and share the results with Internal Audit as part of an audit.

RCAT is currently used for expense reimbursement and procurement.

Internal audit sees this bi-directional approach as a Win-Win value proposition.

For audit, the results can be used:

- When performing current audits for scope and staff reduction;
- For annual planning to extend duration between reviews;
- For coverage claiming;
- To improve resource allocation;
- To reduce audit impact on line audits;
- To reduce travel; and
- To improve relations with line management.

For line businesses, the results can be used:

- To identify and remediate control deficiencies as they occur:
  - Reduces risk of negative image
  - Reduces exposure to rework costs and loss of time
  - Reduces bad behavior through continuous oversight
- To provide continuous confirmation of control health;
- To reduce the need to allocate resources to manual testing;
- For input into control framework; and
- To reduce the impact of audits by extending the time between inspections and support during engagements.

The bottom line is that both time and money can be saved.

Business Case and Executive Sponsorship

This bi-directional audit approach is in line with IBM's 2015 Roadmap Analytics strategy. It provides efficiencies needed to free up constrained resources. For audit, using analytics in mature, stable processes to supplement audit resources frees up auditors time to focus on emerging risk areas. And, coupled with other technology already in general use, such as virtual meetings and imaging, travel can be eliminated. In traditional audits, up to five auditors would have to spend up to five weeks on site. Now, up to 90% of the audit team can work from home.

This audit approach requires the joint sponsorship of audit, business controls and the business process owner.

Resource Commitment

Internal Audit covers initial cost of resources and technology. If a business unit sees value, Internal Audit will ask the business unit to fund any new activity going forward. However, Internal Audit continues to fund maintenance activity, in addition to retaining ownership of tool and the change management process. The business unit must agree to grant Internal Audit access to their supporting data repository. This audit model allows the audit team to access trusted data in advance of engagements. Having the ability to "pull" data on demand rather than having data "pushed" to the audit team increases efficiency dramatically.

Intel Corporation

Themes
Intel focuses on Global Accounts Payable and the "requisition-to-settle" process. Internal audit reviews risky transactions.

Current Tools and Technology
For proactive monitoring and error detection, Global Accounts Payable uses an internally developed program for continuous monitoring.

Persons Interviewed
Rajan Mehndiratta, Global Accounting and Accounts Payable Controller
Roch Tauer, Global Accounts Payable Controls Manager
Chris Lobas, Global Close and Reporting Manager

Discussion
Intel Corporation, the world leader in silicon innovation, develops technologies, products, and initiatives to continually advance how people work and live. Headquartered in Santa Clara, California, Intel was founded in 1968 to build semiconductor memory products and introduced the world's first microprocessor in 1971. Revenues for 2010 were over $43 billion.

Intel's monitoring efforts focus on Global Accounts Payable and the "requisition-to-settle" process. It employs proactive monitoring and error detection to focus on mistakes and fraud. This Global Accounts Payable initiative was launched as a result of a "felt need."

Internal audit reviews risky transactions as expected. However, only Accounts Payable uses continuous monitoring at this time, and monitoring is done by a separate "Controls Group" of 6 FTEs (Full Time Equivalents). Internal audit has taken a wait and see approach to continuous monitoring.

Supplier validation is important for Accounts Payable, so Intel employs a background check process before establishing a "trading partner" relationship. Invoicing is 90% electronic.

Other monitoring procedures used for Accounts Payable include:

- Looking for relationships, pushing different controls (i.e., stress testing);
- "Eyeballing" and use of Excel/Access applications;
- 12 different reports for "requisition-to-settle";
- Quarterly report on all bank changes. For example, a change of bank twice in a quarter would be considered a suspicious activity;
- After the fact analysis of events; exceeding "threshold tolerances" would trigger sampling of supplier transactions;

- Different events with different frequency tested; “invoice trending” (standard deviation in payments to catch “fumble finger” syndrome)

As success is being reported by Global Accounts Payable, more departments have expressed interest.

While initial application has been quite focused, as the breadth of initiative expands, it may be necessary to secure executive sponsorship. However, with demonstrable “low hanging fruit,” it is believed that CM will catch on rapidly.

For proactive monitoring and error detection, Global Accounts Payable uses an internally developed program for continuous monitoring. This program provides both a micro perspective at transaction level and a macro-perspective at systems level. Intel uses SAP for its “procure-to-pay” process chain, and the number of its SAP instances is down from 11 to just 3 today.

LESSONS LEARNED

Intel would like to enhance the efficiency and effectiveness of error-free Global Accounts Payable settlements. Positive results so far will be “evangelized” in other departments, such as internal audit, accounting, HR and payroll. Intel will focus on enterprise visibility, called “glass pipeline,” to better understand and improve workflow.

Intel believes in “better data for better decisions.” However, the long term benefits of continuous monitoring are yet to be fully recognized and relied upon by internal audit.

Intel expects continuous improvement in accounts payable as well as other areas by identifying gaps and having targeted discussions regarding emerging markets and other locations, such as China.

Microsoft Corporation

Themes

Microsoft's Internal Audit department has developed several continuous monitoring initiatives, which monitor accounts payable and other financial processes.

New monitoring initiatives need to be justified with a business case. New initiatives to automate or outsource can reduce headcount, and headcount reduction can be a major factor in developing a business case for new initiatives.

Current Tools and Technology

Microsoft has several continuous monitoring initiatives:

- **Technology Enabled Continuous Audit** (TECA) audits Accounts Payable for vendor fraud, such as duplicate payments, conflict of interest and common bank accounts for vendors and employees;
- **Controller Workspace** is a Continuous Monitoring tool used for financial processes, and provides transparency for compliance and the financial close process;
- The **After the Fact** Monitoring Program is a routine manual process that samples controls on a monthly basis; and
- Internal Audit has developed a Subsidiary Controls Dashboard, which is a continuous monitoring program for the subsidiaries.

Persons Interviewed

Robert M. (Bob) Weede, Assistant Corporate Controller
Kevin Funk, Director, Finance Operations
Pete Kirmer, Control & Compliance Director, Sales & Marketing

Discussion

Microsoft Corporation, headquartered in Redmond, Washington, develops and markets software, services, hardware, and solutions that they believe will deliver new opportunities, greater convenience, and enhanced value to people's lives. Microsoft does business throughout the world and has offices in more than 100 countries. Its revenues for fiscal 2010 were over $62 billion.

Microsoft's Financial Operations Group
Kevin Funk says that Microsoft's Finance Operations Group provides global shared services for Microsoft. Included in these shared services:

Outsourced Service Delivery Model

- Accounts Payable – Global, outsourced to Accenture;
- The Buy Center – Global (handles front-end to procurement), outsourced to Accenture;
- Back office accounting for international subsidiaries (200 legal entities in 96 countries) outsourced to Accenture; and
- International Payroll
    - ADP is used for payroll in 20 countries
    - Payroll for all other countries is processed by the local subsidiaries
- International Subsidiary Tax and Statutory preparation and filing (67 countries), outsourced to Ernst & Young;

Captive Service Delivery Model delivered from Fargo, North Dakota:

- U.S. Payroll
- Human Resources Data management, global
- Accounting Services, accounting service support for various Corporate and Business Group Finance teams, primarily U.S. support
- Outbound Royalty Operations, delivered from Redmond, Washington

Finance Operations has Monitoring initiatives in three areas:

Technology Enabled Continuous Audit (TECA):

- Audits Accounts Payable for vendor fraud, such as duplicate payments, conflict of interest and common bank accounts for vendors and employees;
- Audits Payroll and T&E for employee fraud, such as ghost employees and shared bank accounts;
- Audits Travel & Entertainment (T&E) for policy compliance
- Replaced a prior manual audit sampling process;
- TECA is now used to audit the entire population with the same level of resources once used for sampling;
- T&E can be audited globally with just 10 FTEs;
- Microsoft uses one instance of SAP for the entire enterprise, so all data can be accessed from one source;
- Over time, new businesses and acquisitions are integrated into the one SAP instance.

Controller Workspace is a Continuous Monitoring tool used for financial processes:

- Provides transparency for compliance and the financial close process including
  - Journal Entry documentation and approval;
  - Management of General Ledger account reconciliation;
  - Profit & Loss sign-off;
  - Audit issues;
  - Segregation of Duties;
  - Sarbanes-Oxley Section 404 compliance;
  - Establish, track and manage statutory and tax filings;
  - Month-end close checklist process and JE checklist;
  - Highlights accounting policy changes and updates within last 60 days;
  - Filtering enabled to align with Controllers span of control;
  - Enables Controller to monitor and manage that deadlines are met.
- Web JE is used to track all journal entries, tracking who prepares each journal entry and who approves it. It stores back-up support for JEs.
- Assurenet (third party application from Trintech) is used to reconcile General Ledger accounts.

After the Fact Monitoring Program;

- Ensures a sustainable control environment;
- A routine manual process that samples controls on a monthly basis;
- Audits and test sampled controls;
- Controls sampled and tested are rotated;
- Results and findings are formally published and reviewed in Operations meeting;
- Looks for recurring issues;
- Used for both outsourced and internal processes, such as Payroll;
- Focuses on root cause and long-term remediation of issues.

New monitoring initiatives need to be justified with a business case, though Microsoft still uses a lot of manual processes. New initiatives to automate or outsource can reduce headcount, and headcount reduction can be a major factor in developing a business case for new initiatives.

Microsoft takes compliance seriously, and the preservation of good reputation can be another factor in developing a business case.

Microsoft Sales & Marketing

The Microsoft sales organization has offices in 108 countries, organized into 13 different geographic areas. Pete Kirmer, Control & Compliance Director for Sales & Marketing, reports to the Sales Organization CFO. Pete notes that Accenture processes all spend transactions, and global procurement is also outsourced. He explains that Microsoft's subsidiaries only require a few key SOX controls, primarily controlling revenue.

Internal Audit audits subsidiaries, looking for problems and issues. To do this, Internal Audit has developed a Subsidiary Controls Dashboard, which is a continuous monitoring program for the subsidiaries.

The Subsidiary Controls Dashboard compiles a number of metrics, including metrics measuring:

- Anti-corruption;
- Financial management;
- Privacy;
- Journal Entry review and compliance;
- Reconciliations review and compliance;
- Sales executive, including customer billing red flags;
- Statutory compliance;
- Sarbanes-Oxley Section 302; and
- Spend management.

Relevant metrics that could be included in a subsidiaries dash board can change based on local risks, and are reviewed on a monthly basis. Internal Audit has created three audit workbooks for different sized subsidiaries. The continuous monitoring metrics used for a subsidiary will depend on its size and risks. Each subsidiary will use the financial corruption module, but most subs rely on the Accenture shared service centers for their financial reporting.

Each country does a self-assessment to determine its major risks. Internal Audit can leverage these self-assessments. If Internal Audit finds an issue at one sub, it is thoroughly investigated, because it could represent a process break down that could occur at other subs. Internal Audit looks for common issues among subs, and then decides who needs to fix the issues and who will fund the cure.

Bob Weede, Assistant Corporate Controller, notes that Microsoft is continuously improving its controls and compliance initiatives, because it always wants to do things better. He explains that every control has both a cost as well as a benefit, and Microsoft's mantra is "Take costs out of the system, and do more with less." One way to accomplish this is through standardization.

Microsoft leverages SharePoint to develop its own in-house auditing and monitoring tools, which sit on the ERP system. "We don't sell our in-house tools, but we can show others how to use SharePoint to do what we do. It will allow them to creatively solve their own problems."

Microsoft has so many internal processes, that to buy a tool externally would require significant customization. The SharePoint platform provides flexibility to scale up or down, and doesn't require the training that point solutions often do because it has common look and feel and features.

Weede says that Microsoft is evaluating whether they can actually have some of the monitoring of our operations/finance processes serve a dual purpose and be used as evidence of internal controls operating effectiveness, thereby eliminating much of the need for direct testing of SOX controls by management.

J.C. Penney, Inc.

Themes

Senior management at J.C. Penney utilizes data to support decision making and monitoring the business, and supports Internal Audit's efforts for continuous monitoring / auditing. Internal Audit's monitoring efforts started in the early 1990's as a way to provide a more cost effective method for store audit coverage. When the Company initiated efforts to centralize key business functions, Internal Audit was asked to identify and provide key metrics, which were presented to Senior Management and the Audit Committee. Internal Audit's monitoring efforts are focused on assisting management in addressing potential control gaps, assurance activities, or efficiency opportunities. To optimize the use of technology in support of these efforts, the Department relies on a group of IT professionals who are part of the Audit team. This team uses data mining techniques and develops a number of software tools to continuously monitor processes to address risks identified through audits, management requests and process observations.

The Internal Audit Department is data focused, with dedicated IT professionals on staff, and expects all auditors to be proficient in data analytics and data mining. The Company is supportive of these efforts, providing resources and tools needed to pursue continuous monitoring. With this partnership, robust tools have been developed to support Internal Audit's coverage and provide management with operational monitoring. Operational monitoring is migrated to management when existing tools are enhanced or new tools are developed.

Current Tools and Technology

The Audit team utilizes the standard Microsoft Office Suite, native SQL (Structured Query Language) and SQL generators such as ACL to access data and evaluate potential monitoring opportunities. Depending on the complexity of the monitoring effort, the Audit Technology Group (ATG) is brought in to automate and standardize the monitoring initiative. ATG uses a full suite of tools, programming languages, database platforms and other technologies available at J.C. Penney to deliver web applications, exception reports, ad-hoc data extracts and reporting, continuous monitoring tools or any other manual or automated system needed by Internal Audit or other business areas. All software development is conducted within, and in compliance with, the policies and procedures of the J.C. Penney Information Technology infrastructure.

Some of the major products developed by ATG to automate monitoring include:

- **STAR (Store Assessment Review)** - This web-based application provides Company, region, district and store-level exception reporting on several areas of store operations.
- **Inventory Management and Selling Strategy Measurements** - This web-based application provides management with reporting on operation

effectiveness in the areas of Stock Ledger Accuracy, Inventory Plan Management, Markdown Management and Item Lifecycle Management.

- **Quarterly Close Review** - This web-based application provides Internal Audit with quarterly visibility to the Consolidation system for the purpose of auditing adjustments made to the General Ledger.
- **Property Development Extract and Data Normalization** - This application extracts and normalizes data from the Property Development application and provides reporting data to Internal Audit for the purpose of identifying what Common Area Maintenance (CAM) audits to perform.
- **Fraud Monitoring** - The purpose of this application is to identify and detect fraud as it relates to Human Resources, Payroll, Time Keeping, Accounts Payable, Vendor Setup and Expense Reimbursement. Current monitoring measurements include Associate to Vendor Comparison for Domestic and International, Excessive Overtime, Excessive Other Earnings, One-Time Supplier Payments and Excessive Associate Expenses.

Persons Interviewed

Denny Beran – SVP, Chief Audit Executive
John Polarinakis – VP, Audit Director
David Williams - Associate Audit Director - IT Audit, Audit Technology Group
Jim Molzahn - Associate Audit Director - Finance. Procurement, Marketing
Alan Nelson – Audit Senior Manager – Audit Technology Group

Discussion

J.C. Penney is one of America's leading retailers, operating over 1,100 department stores throughout the United States and Puerto Rico. Based in Plano, Texas, it employs approximately 150,000 associates and had revenues of $17.8 billion in 2010.

J.C. Penney has a long history of internal audit involvement starting in 1922, and management is very supportive of the internal audit profession and role within the company. The audit team is focused on using technology and monitoring to help the Company while constantly enhancing the system of internal controls.

An integral part of internal audit is the Audit Technology Group (ATG), which consists of software developers based in Plano, Texas, who develop SQL (Structured Query Language) queries and prototypes. Technology is thus leveraged with in-house expertise in fraud prevention and detection and data mining for cost control and customer service. ATG has been well-received and will remain integrated into internal audit activities.

United Technologies Corporation

Themes

Like Hewlett Packard, IBM and Intel, United Technologies' issue is the large volume of transactions generated by its various business units. UTC's Center of Excellence launched an initiative to reduce or eliminate duplicate payments. Using Oversight Systems' Procure-to-Pay (P2P) module, it identified four Integrity Checks (ICs) to search for duplicate payments. It selected four ICs (out of 110 that could have been deployed) that would best address the higher risk areas of the accounts payable process, and generate a manageable number of exceptions to be evaluated and resolved.

Current Tools and Technology

Oversight Systems' Procure-to-Pay (P2P) module

Persons Interviewed

J.R. Bissonnette, Director, Financial Systems Center of Excellence
Chiu Ng, Analyst, Financial Systems Center of Excellence
Chris Leigh, Manager, Global Compliance & Risk Management
Marlene Goldstein, Manager, Financial Systems Center of Excellence

Discussion

United Technologies Corporation (UTC) is a large diversified manufacturing company with annual revenues of $53 billion (2009) based in Hartford, Connecticut. It has over 200,000 employees based in over 4,000 locations in 71 countries, doing business in 180 countries. Its operating divisions include Carrier, Hamilton Sundstrand, Otis, Pratt & Whitney, Sikorsky, UTC Fire & Security and UTC Power.

UTC's Center of Excellence launched an initiative to reduce or even eliminate duplicate payments. They identified Oversight Systems' Procure-to-Pay (P2P) module as a viable tool to use for this initiative. The P2P module provides 110 pre-defined, customizable Integrity Checks (ICs) from which UTC could choose for this initiative. The P2P module would then analyze data from eight divisional ERP systems:

- Carrier (GEAC)
- Corporate (SAP)
- Hamilton (2 separate JD Edwards)
- Otis (JD Edwards)
- Pratt & Whitney (SAP)
- Sikorsky (SAP)
- UT Research Center (SAP)

The P2P monitoring program would be sponsored, funded and owned by the business unit controllers.

Three FTE's were involved in this initiative, one from Finance, one from IT and one from Oversight. The UTC Business Controls Council selected 17 of the 110 available ICs to implement. When P2P was deployed for the eight ERP systems, the 17 ICs generated an unmanageable volume of exceptions (most being false positives), which had to be analyzed, evaluated and resolved. So the 17 ICs were narrowed down to four high-risk ones:

- Vendor Bank Account Duplicate (Two vendor bank accounts are the same);
- Vendor Duplicate (Two vendors are the same);
- Voucher Duplicate Invoice (Two vouchers are the same); and
- Payment Duplicate (Two payments are the same).

Results have since been very positive. The volume of false positives has been significantly reduced and reviewers are now able to handle the volume of exceptions identified within a reasonable timeframe. To date, 536 duplicate invoices and 42 duplicate payments have been identified and confirmed.

In May 2011, UTC will begin an upgrade to Oversight P2P 6.1.1. The expected benefits include improved reporting capability, removal of some correction detection bugs, and more user-friendly navigation. The go-live date is targeted for Q4 2011.

Next steps for UTC include expanding the P2P module to additional domestic business units, to pilot deployment to non-U.S. sites to transition review of the exceptions to their shared business services group (which is responsible for A/P processing) and to evaluate deploying the Financial Accounting & Reporting (FAR) module. The challenges of a global deployment include the ability of the ICs to handle multiple languages and determining appropriate local ICs.

Lessons Learned

UTC learned that the number of ICs turned on must be limited and prioritized by risk, because each IC could potentially generate a large numbers of false-positive exceptions, which must then be analyzed and resolved. Getting feedback from the reviewers and investing time to tune the ICs is also critical to help reduce the volume of false positives. The tool can also be used to filter small dollar value and/or low probability exceptions to further reduce the reviewers' workload.

As with other major initiatives, commitment of the business units and ongoing communication to key stakeholders are critical, and you must prepare for employee turnover and training.

When deciding on whether to deploy new CM modules or new ICs, keep in mind that each new module or IC will force the business unit(s) to take on more exception checking.

Wells Fargo

Themes

Audit teams have been developing and refining continuous monitoring at the Community Banking division of Wells Fargo since 2001, and at the Commercial, Corporate and Government Banking (Commercial Banking) division since 2004. These continuous monitoring programs were developed out of the need to be innovative and more efficient with coverage of homogeneous business functions. Both programs leverage Key Risk Indicators (KRIs) which are used to evaluate either control effectiveness or risk exposure at "stores" (Community Banking) and "offices" (Commercial Banking).

As both programs have matured, the IIA's Global Technology Audit Guide (GTAG) on Continuous Auditing has been leveraged extensively to further define and refine the methodology, and help develop strong policies and procedures for use across the audit department.

Current Tools and Technology

The Community Banking audit team internally developed 15 KRI's in 2001 to monitor and evaluate control effectiveness for the Regional Banking stores. After producing results for several years, the business line adopted the process as their own, and has expanded the KRI's leveraged to approximately 60 items. These 60 items have been risk ranked by the business, validated by Audit for appropriateness, and are monitored by business management on an on-going basis. The most critical, high risk KRI's (labeled Enterprise Key Indicators or EKI's) require additional due diligence by the business, which Audit then monitors and evaluates to ensure appropriate actions are taken.

The **Commercial Banking** audit team leverages both Continuous Controls Assessment and Continuous Risk Assessment techniques to audit Regional Commercial Banking Offices (RCBOs).

Persons Interviewed

Jim Rusch, Senior Audit Director
Erica Ocana, Audit Director
Dante Robinson, Audit Director

Discussion

Wells Fargo & Company is a diversified financial services company headquartered in San Francisco, providing banking, insurance, investments, mortgage, and consumer and commercial finance through more than 9,000 stores and 12,000 ATMs and the Internet (wellsfargo.com and wachovia.com) across North America and internationally.

Wells Fargo has $1.3 trillion in assets and approximately 280,000 team members across more than 80 businesses. It is ranked fourth in assets and second in market value of our stock among its U.S. peers as of December 31, 2010.

The bank charters of Wells Fargo Bank, N.A., Wachovia Bank, N.A. and Wachovia Bank of Delaware, N.A. were combined under the Wells Fargo Bank, N.A. bank charter on March 20, 2010.

Merger

With the merger of Wells Fargo and Wachovia, there have been a lot of corporate synergies. However, as expected with the largest financial services merger in history, there are a number of challenges. As the merger continues, there is on-going focus on moving towards the target operating model which includes products, services, and the underlying policies, procedures and systems.

Audit management has evaluated the target operating models for both businesses where continuous auditing techniques are leveraged. The current strategies employed will allow for on-going assessment of the business and conclusions on control effectiveness and risk exposures.

Community Banking

Before 2001, auditing regional banks involved on-site analysis, including review and testing, which was costly, time-consuming, and entailed substantial travel costs. In 2001, Wells Fargo decided that it needed greater efficiency in auditing regional banks. However, at that time, there were not a lot of existing Key Risk Indicators (KRIs) for assessing regional banks.

The audit team conducted a risk assessment and evaluated potential KRIs that would allow conclusions on control effectiveness. Over a nine month period, the audit team worked closely with the business to identify, develop and pilot potential KRIs that were meaningful and manageable to both audit and line management. Examples of KRIs included:

- Teller Overrides: Tellers are assigned individual transaction authorities. Audit evaluated the volume and reasonableness of overrides to teller authorities at a regional level to identify potential systemic issues.
- New Deposit Accounts: Bankers are required to obtain key data from customers to open a new deposit relationship. Audit evaluated the volume of incomplete data at a regional level to identify potential systemic issues.

The audit team built, maintained and executed on these new KRIs from 2001 to 2005. In 2005, regional bank management adopted the KRI's developed by audit and further enhanced the reporting to include additional operational metrics to help line management manage day-to-day operations. Today, the Regional Bank leverages an internal, web-based application called Minding the Store to monitor and evaluate store, market, division and region performance on a day-to-day basis.

The audit team then switched their efforts to evaluating the business, asking:

- How does management react to data?
- How does management leverage the data, both formally and informally?
- Is management's action plan appropriate?

Commercial Banking

Wholesale Audit team is responsible for auditing Commercial Banking, which includes:

- Commercial: Customers with $10 to $500 million in annual revenues;
- Corporate: Customers with more than $500 million in revenues; and
- Government: Cities, states, schools and non-profit organizations.

Commercial Banking had 100 offices combined pre-merger with Wachovia and now has over 200 combined offices.

In 2004, the predecessor Wholesale Audit team began identifying and monitoring key indicators that provided some insight/snapshot as to how Commercial Banking was performing. At that time, the key indicators data was gathered monthly but monitored quarterly. Audit identified eight initial key indicators, examples include:

- Wire volumes,
- Loans,
- Overdrafts,
- Daylight overdrafts,
- Commitments, and
- Outstanding balances.

At the end of the first year monitoring the data, the team prepared a final audit report opining on the control environment effectiveness of Commercial Banking. While this was a step in the right direction, the key indicators alone did not tie directly to the effectiveness of controls nor did the audit team complete enough audit work to opine on the overall control environment. This was scrutinized by the bank regulators, ultimately requiring improvement to the process.

To address the concern and to provide more substance in the coverage, the new Wholesale audit team enhanced the methodology through the development of a standard work program that would be executed at every banking office. The audit team used the key indicator data on a quarterly basis to select offices to visit and execute the standard work program.

Annually the team would visit 8-16 banking offices and use the results of the banking office audits to form an opinion on the control environment effectiveness. The continuous auditing model the Commercial Banking audit team uses is based on the Global Technology Audit Guide (GTAG) developed by the Institute of Internal Auditors (IIA). The new methodology incorporated Continuous Controls Assessment and Continuous Risk Assessment.

Through our work over the years we have identified two types of issues.

- Systemic issues: Every office has similar problems because each office follows the same procedures, and
- Individual office issues: Issues that are unique to the dynamics of an individual office (turnover, promotions, vacations etc).

At the conclusion of each office visit, the audit team provides an “Interim Summary Report” to office management recapping the control effectiveness for the office. The audit team also discloses to office management, in a memo format, any issues the team identifies as a result of its audit testing. To the extent the issues are systemic, we specifically reference the issue in the end of year audit report.

Audit has developed a tool to automatically download the key indicator data into an internally developed database that will run the trending data on a monthly basis at the office level. This database will be comprehensive once the remaining Wachovia offices convert to the Wells Fargo platform in 2012.

The Future of Continuous Monitoring: Promise and Potential

Continuous monitoring (CM) enables management to assess business performance, business risks, and associated control processes in a timely, economical, and effective manner. CM initiatives can be designed and targeted so as to mitigate risk, enhance performance, reduce cost, achieve regulatory compliance, improve business process efficiencies, strengthen internal controls, and thus drive value in a myriad of ways for organizations.

When well-implemented, CM uses sophisticated tools and has powerful capabilities in review and analysis, including performing predictive analytics. CM approaches possess the potential for surfacing deep insights into ineffective and inefficient business processes, to understand and address risks as they develop and mature, and enable pre-emptive or responsive action to be taken. CM is a critically important pre-requisite for each of the Pillars of the House of Value Creation and Value(s) Preservation to be fed with the right information, of the right quality and quantity, and at the right time. And it is these Pillars that support and makes possible both superior corporate performance and corporate governance/culture outcomes. Recent advances in technology have further accentuated the importance of CM, and it shows every sign of becoming a key source of competitive advantage in the future.

What Have We Learned About CM Thus Far

Our foray into understanding how Continuous Monitoring (CM) is currently being deployed at blue-chip companies, especially technology giants such as HP, IBM, Intel, Microsoft and United Technologies Corporation, has garnered us critically important insights. Chief among them is that although each one of these leading-edge companies has embraced CM, their motivation to do so may have been quite different. Thus, there is a certain "path dependence"[5] as to how every company in our sample arrived at the decision to launch a CM initiative and then deploy it seriously. (Exhibit depicts how each of the hypotheses have borne out in the case of each of the companies interviewed, and provides a high-level representation).

For instance, it appears that business/operational/competitive necessity influenced certain companies (J.C. Penney POS, CME Group, Intel), while regulatory compliance was the driver in other cases (AEP, CME Group). Significant advances in technology inspired cutting-edge CM innovations at technology-intensive companies in our sample, many of which developed in-house, highly-tailored applications themselves (IBM, HP, UTC, Microsoft). J.C. Penney, although not a technology company, nevertheless had the bandwidth and expertise resident within its internal audit function to achieve similarly customized CM applications. Others have used and seem to be using benchmarking to assess the quality and

[5] "Path dependency theory, originally developed by economists, helps explain technology adoption processes and industry evolution. The outcome of a path dependent process is typically variable, and will often not converge towards a unique end state byt one of several end states."

sophistication of their monitoring efforts (Hallmark, Intel). Some common factors that have given a boost to CM appear to be an expansion of a SOX compliance program to include a broader scope and applicability, including business process optimization, the role of internal audit as CM evangelists for executive management (e.g., AEP, HP, IBM, J.C. Penney), and even the speed of business that has made it imperative to possess agility in tracking and responding to business risks. In cases such as IBM and Microsoft, and even J.C. Penney, we found a clear preference for autonomy in the development of customized CM solutions. Indeed it is critically important to define an organization-appropriate CM approach; otherwise, the organization may be compelled to adopt the vendor's approach as the default, rather than a solution that matches the organization's needs and culture (Sobel, 2011).

Interestingly, once CM has taken root within an organization, despite any challenges during the formative stages, its outcomes seem to have almost always been positive. However, the speed of adoption of CM and its expansion and standardization are to some extent dependent on how it all began (i.e., the path dependence trajectory). Nevertheless, as a result of predominantly positive outcomes, companies are now focused on consolidating what they have accomplished in the CM space, and strengthening and refining existing CM processes, even attempting to expand the scope of its application beyond the initial, friendly, sponsor departments. In all cases, it is clear that having high-level executive support and sponsorship, the use of robust CM methodologies and tools, as well as a direct, unambiguous way to measure the return on any investments called for are highly desirable environmental attributes for CM efforts to be sustainable in the long run. One way to assure an increased return on investment (ROI) is by expanding successful CM capabilities across multiple systems, functions, applications, and jurisdictions, e.g., payroll, procure-to-pay, order-to-cash, etc. (KPMG, 2010).

Among the tools that we have catalogued are:

- ACL, IDEA, mostly within internal audit departments;
- TOAD for SQL server and other query/interrogation languages;
- Oracle GL monitoring tools;
- SAS, Inc. tools to capture and analyze data;
- ENVISION, Continuous Auditing and Monitoring Program (CAMP);
- Infogix *Assure* and *Insight* to assess information integrity controls;
- SAP GRC suite;
- Blackline, an SaaS tool to automate account reconciliations;
- Continuous Event Processing (CEP), Enhanced Audit (EA) and Risk Compliance and Analysis Tools (RCAT), developed by IBM;
- Technology Enabled Continuous audit (TECA), and Controller Workspace, developed by Microsoft;
- Oversight Systems' Procure-to-Pay (P2P) Module, GEAC, and JD Edwards; and
- Continuous Audit program (CAP) based on IIA-GTAG methodology.

Where Do We Go Now?

Beyond what we have gleaned from the case study companies where we conducted site visits for this research and that have been summarized earlier (see CM Hypotheses and Best Practices section), it is useful to consider "next practices in CM." For instance, the reality of a relatively large percentage of CM initiatives coming out of the internal audit department (perhaps in the garb of "continuous auditing") is worth focusing on. Equipping internal audit with a sophisticated understanding of CM would help them not only to do Continuous Auditing better, but become advocates and champions for CM in operations and compliance (Cangemi, 2010;Lehman et al., 2010). Indeed, it is in operations and compliance, far more than in financial reporting, that the greatest benefits from CM can be derived. Any cause-effect relationships between operational risk indicia, and their effective measurement and management should be highlighted and CM's role underscored. These "success stories" with CM can go a long way in establishing its desirability among senior management and the Board.

Kaplan & Norton (2001) cogently argue that the reason new strategies experience a failure rates "in the 70 to 90 percent range" is because the tools for measurement of risks and performance have, in the past, been mostly backward looking. Moreover, they have not adapted to a 21st century environment where "intangibles rule"—intangibles are the drivers of value today. They include customer relationships, innovative products and services, information technology and databases, powerful brands and corporate reputation, global supply chain configurations, management execution capabilities, employee capabilities and motivations and values-based leadership. Traditional accounting measures give short shrift to such difficult-to-measure intangible assets and generally exclude them from the balance sheet. Accordingly, these intangibles that matter a lot, but do not get measured, also do not get managed very well. (Cravens, Oliver & Ramamoorti, 2003)

Anne Milley, a Senior Director at the SAS Institute, remarks "It starts with an analytical view of data—what are you measuring and are you measuring what matters? How are people in your organization armed to make better decisions using the data, processes, and analytical methods available?" (in Business Analytics for Managers: Taking Business Intelligence Beyond Reporting, by Laursen & Thorlund, 2010).

In such a context, the ideal situation would be for executive management and the Board to use CM in formulating, executing and monitoring business strategy as well as infuse the process with on-line, real-time measurements. This evolution will take time, but this is where the "puck" lies. Contemporary approaches to business strategy are predicated upon the successful optimization of key business processes. But as Davenport et al. (2005) have persuasively pointed out, "strategies involving optimization…require extensive data on the state of the business environment and the company's place within it, and extensive analysis of the data to model that environment, predict the consequences of alternative actions, and guide executive

decision making." Such strategy-focused applications would also need a thorough understanding of leading and lagging indicators of risk and performance, and would permit timely interventions if a chosen business strategy is simply not working and needs revisiting. For instance, financial reporting today, by construction, is backward looking and can at best reveal lagging indicators of performance. It is in areas like business operations and compliance initiatives that the leading indicators can be found, and it behooves every organization to develop a crisp list of leading and lagging Key Performance Indicators (KPI) and Key Risk Indicators (KRI).

In an invited 2010 Annual Meeting lecture to the American Accounting Association (AAA), Harvard Business School Professor Robert Kaplan[6] pointed to the following areas for future research:

"How can we measure or quantify risk? Measurement is about the past; even so-called leading indicators are measuring events that have already occurred. How can we quantify risk or develop risk indicators for an event that has not yet occurred and, we hope, may never occur? Quantifying risk exposure is a challenging measurement issue."

Professor Kaplan's comments are highly pertinent in the context of CM. There is a steady drumbeat for the need to move beyond historical, or "best guess" to factual information that is holistic and stretches across the enterprise. The journey to proceed from the status quo of "static retrospective reporting" toward "factual real-time information and analytical knowledge" has already begun (cf. Laursen & Thorlund, 2010; Davenport & Harris, 2008).

The Future of Continuous Monitoring

CM is not simply a buzzword—it is here to stay. With an avalanche of data becoming available ("information overload" has become a cliché), CM is an important and enduring innovation that most leading companies have recognized and adopted in one way or another. Advances in technology are a strategic driver as well as enabler of CM approaches. And, as Appendix 1: *Business Imperatives and Corporate Governance*, makes clear, CM itself is both a key driver as well as enabler of superior corporate performance and governance outcomes.

We predict that the sophistication of CM tools will likely increase in the coming years, especially in environments such as cloud computing, globalization, and technology-savvy professionals (e.g., the coalescing of the CFO and CIO roles as seen in the CFO/CIO Gartner Study 2011). Speed and agility will likely become a major factor determining the winners in a global business context. Over a decade ago, David Ulrich convincingly argued that speed really means "changing from a mindset of

[6] Professor Kaplan is noted for his development of the widely used Balanced Scorecard methodology (Kaplan & Norton, 2001).

accuracy and precision to one of innovation and risk taking."[7] In such a context, continuous monitoring simply becomes indispensable. Further out, CM is likely to become a significant source of competitive advantage (e.g., Davenport & Harris's "competing on analytics," Gleick's "The Information," Infogix's notion of "information integrity" and information for decision making risk, and Laursen & Thorlund's perspective on "taking business intelligence beyond reporting," etc.)

Former General Electric Company CEO Jack Welch underscores the need for proactive change management and constant reassessment of the dynamic business environment with his assertion, "If the rate of change inside an organization is less that the rate of change outside... their end is in sight." And what is the most effective way of doing the environmental scanning necessary to comprehend change? Continuous Monitoring.

[7] Ulrich (2000) quotes an executive as saying: "We used to wait until we had it 98% right before we launched a product; now we have to go out with 80% right and fix the rest as we go." He also emphasizes that the first mover advantage will likely become ever more important.

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Appendix I: Business Imperatives and Corporate Governance

The House of Value Creation and Value(s) Preservation

For several years now, management experts have been emphasizing the same key factors for enhanced governance and management of organizations of the future:

- Relatively flat organizations with fewer hierarchical arrangements;
- Featuring open, flexible, nimble, but nevertheless resilient environments;
- Distributed rather than centralized decision-making structures; and
- Being prepared to encounter rapid and unexpected change, and possess the agility to adapt quickly.

With all the business uncertainties, risks, and challenges faced by global companies in the first decade of the 21st century, the one phrase that seems most worthy of attention is "corporate governance."[8] Of course, corporate performance has primacy in that most companies wish to create value for their customers and clients and demonstrate the viability of the business model. It is only then that the conversation proceeds to the sustainability of the business model—value(s) preservation--a core concern of corporate governance.[9] There is also an increasing recognition that corporate governance/culture and corporate performance may be inter-related; hence, the best way to assure superior governance and performance outcomes is by understanding, recognizing, and communicating the organization's culture and core values. After all, a corporate culture embodies what it takes to succeed in a particular configuration of the global business environment (Deal & Kennedy, 1999).[10] In this regard, a critical consideration for business and finance executives is their understanding of, and attitude towards, *information integrity risk*, encompassing both "information risk" as well as "integrity risk" (see ***Technology Issues for Financial Executives***, FERF, 2008 and 2009).

We define information integrity risk as the combination of information risk (i.e., incomplete, unreliable, inconsistent or stale information) and integrity risk (intentional falsification or manipulation of financial and other information to create bias and designed to achieve vested interests). Strategic decision making can be effective only when information integrity risk is recognized, managed and mitigated. As Dick Kovacevich of Wells Fargo maintained, the companies that survived the Wall Street financial crisis of 2008 did so because "…they were organized to deal with the

[8] One of the best and most comprehensive references on the topic is "Corporate Governance" by R.A.G. Monks & N. Minow, 3rd edition, 2004 (Malden, MA: Blackwell Publishing).

[9] Value(s) preservation refers to both value preservation as in viability of the business model in the long terms, but also the preservation of organizational culture and core values. See also the remarks of Deal & Kennedy (1992, 1999) in footnote 3 below.

[10] Consider the following observations by Deal & Kennedy (1982, 1999): "There is growing concern that companies cannot live by numbers alone…[Robust cultures] are interwoven from the interplay of a set of interlocking cultural elements: History yields values. Values create focus and shape behavior. Heroic figures exemplify core values and beliefs. Ritual and ceremony dramatize values and summon the collective spirit. Stories broadcast heroic exploits, reinforce core values, and provide delightful material for company events…"

unexpected. They were managed by people who insisted on a culture of candor, and who did not let fancy risk models cloud their basic judgment and common sense" (Murray, 2010). Kotter & Heskett (1992) demonstrated through their research that even "contextually or strategically appropriate" cultures—ones that fit a firm's strategy and **business** context, succeed only if they facilitate the adoption of strategies and practices that continuously respond to changing markets and new competitive environments. This requires "environmental scanning" best done through disciplined monitoring of risks and opportunities, of controls and capabilities, of sensing and responding with agility.

When focused on strategy, operations, and compliance rather than just financial reporting, Continuous Monitoring can serve up a wide range of benefits. Specifically, it can make relevant, reliable and timely information available for taking pre-emptive or timely and responsive action to deal with risks and opportunities. Executive management must act with a sense of urgency in launching and implementing Continuous Monitoring in an enterprise-wide fashion. When effectively implemented and optimized, Continuous Monitoring can become part of the DNA of an organization, and key source of competitive advantage.

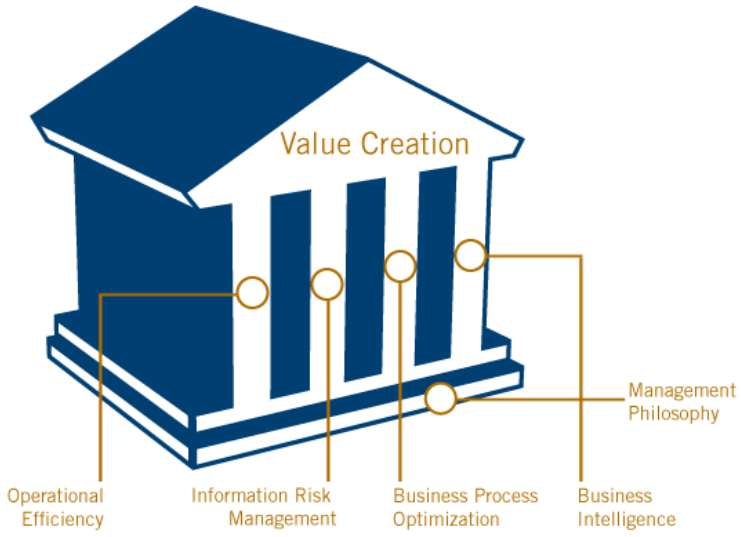
In general, for any organization, corporate performance and corporate governance/culture are top-level concerns that must be attended to for long-term viability and success. Within the context of these high-level objectives termed the *House of Value Creation and Value(s) Preservation*, corporate performance and governance/culture are supported by specific pillars such as:

- Measuring and Managing Information Integrity Risk;
- Achieving Operational Efficiency and Compliance Effectiveness;
- Realizing Management Philosophy and Innovation;
- Striving for Business Process Optimization; and
- Leveraging Business Intelligence.

Each of these pillars in turn can be seen as a driver of Continuous Monitoring efforts, for the information, analysis and insights made possible through CM constitute a pre-condition for each of these identified pillars in the House of Value Creation. These same pillars could be used for a House of Value(s) Preservation. (See page 63.)

Indeed, when CM is carried out responsively and optimally, it has a salutary effect on both corporate performance as well as governance/culture.

House of Value Creation



Enterprise Risk Management (ERM) methodology should ideally cover, in an integrated fashion, all major risk sources, i.e., those arising from poorly conceived or implemented strategy, ineffective or inefficient operations, unreliable financial reporting, non-compliance with laws and regulations, and adverse product, brand, or company reputation. Measuring and managing "information integrity risk" effectively encompasses the critical aspects of any ERM program in a comprehensive way.

CM can help identify the areas of operations that could be improved in terms of "faster, better, cheaper" type considerations. Similarly it can reveal, in a timely fashion, gaps in compliance or instances of non-compliance with laws and regulations prompting corrective action. Operational improvements have a direct impact on the "bottom line" and thus, corporate performance. The ability to chart the trajectory of an unfolding future allows organizations to prepare for the future, including any associated risks, with confidence.

Management philosophy and innovation are broader concepts, referring to novel, creative ways of solving problems that can help the company "leapfrog" competitors. It is a cultural factor that asks the fundamental question: "How do we balance the tradition that keeps us anchored and the innovation that keeps us current?" (Deal & Kennedy, 1999). With respect to divisions or functional units, it can also mean a fresh, thinking-outside-the-box approach to tackling business challenges—a cultural imperative. In this sense, CM, *per se*, can represent an innovation for certain functional departments and in certain contexts.

In general, companies tend to embrace continuous improvement strategies to remain competitive. Hence business process optimization is a worthy goal to strive for. It allows companies to mirror the complexity of the external environment and come up with commensurate ways of reflecting and managing that complexity. It implies speed-to-proficiency in learning about responsive business processes, making them scalable, and resilient, i.e., not liable to break down in face of fast-changing or extremely altered business scenarios.

Business intelligence, or BI, is a catch-all term that refers to a multiplicity of software applications used to analyze an organization's raw, unprocessed data. BI as a discipline is made up of several related activities, including data mining, online transaction and analytical processing, querying and (exception) reporting. CM can be an extremely useful adjunct for BI efforts to be successful.

Companies use BI to enhance strategic decision making, reduce costs, glean insights into correlations and associations among key variables (e.g., consumers tastes and preferences and sales), and identify new business opportunities. BI is more than just corporate reporting and more than a set of tools to tease data out of enterprise systems. CIOs use BI to identify inefficient business processes that are ripe for re-engineering. BI insights can be used to formulate or modify company strategy.

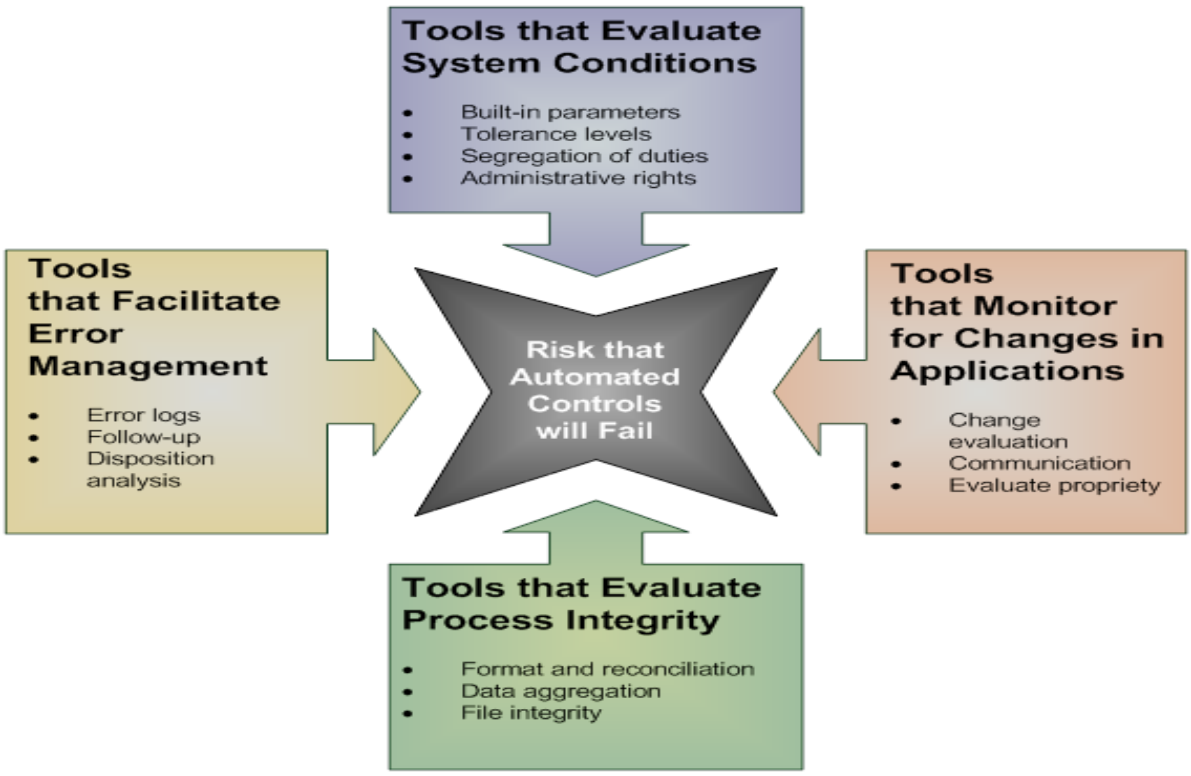
With respect to all of these so-called "pillars" of the House of Value Creation and Value(s) Preservation, across corporate performance and governance/culture-oriented matters, it is information that is a lateral construct that cuts across every one of them. Accordingly, it makes a lot of sense to do everything in our power to continuously monitor decision-relevant information.

We conjectured that the reason companies chose to undertake CM efforts was likely going to be consistent with one or more of these pillars of corporate performance and governance/culture. Underlying each one of these pillars is a critical dependency on relevant, reliable, and timely information—a precondition for each of the pillars. Such persuasive information can only be obtained through continuous monitoring (cf. COSO, 2009).[11] Therefore, these so-called "pillars" also constitute the primary drivers of Continuous Monitoring.

[11] COSO (2009) defines "persuasive information" as being both suitable and sufficient. Suitability, or the quality of information, refers to its relevance, reliability, and timeliness. Sufficiency, or the quantity of information, addresses whether the available information is adequate to draw valid inferences and conclusions.

Complementing these so-called CM drivers are CM enablers, mostly because of advances in technology. Some of these sophisticated tools and their specific capabilities have been described in the COSO (2009) *Guidance on Monitoring Internal Control Systems*:

- Tools that Evaluate System Conditions
- Tools that Monitor for Changes in Applications
- Tools that Facilitate Error Management, and
- Tools that Evaluate Process Integrity.



Developments in cloud computing will make available not only these, but even more sophisticated tools and applications at an affordable cost. This decline in the "price point" will soon become an added impetus to experiment with CM approaches for the smallest of organizations. It will also rule out the "high cost" argument for not adopting CM approaches within organizations.

Hypotheses Development

In the context of the "House of Value Creation and Value(s) Preservation" (i.e., Corporate Performance and Governance/Culture) and the desire for organizations to leverage their core values (culture) and achieve superior performance as well as corporate governance outcomes, the following hypotheses, as an outcome of our on-site company interviews, seem intuitive:

HYP#1A: Each **Pillar** of the House of Value Creation and Value(s) Preservation constitutes a **Key Driver of Continuous Monitoring**:

- Measuring and Managing Information Integrity Risk (as part of an ERM program)
- Achieving Operational Efficiency and Compliance Effectiveness
- Realizing Management Philosophy and Innovation
- Striving for Business Process Optimization, and
- Leveraging Business Intelligence.
  (NOTE: Each of these pillars requires CM as a pre-condition)

HYP#1B: Advances in technology and the availability of sophisticated tools with specific capabilities constitutes a **Key Enabler of Continuous Monitoring**:

- Tools that Evaluate System Conditions
- Tools that Monitor for Changes in Applications
- Tools that Facilitate Error Management, and
- Tools that Evaluate Process Integrity.

HYP#2: CM Drivers and CM Enablers (see HYP#1A and HYP#1B above) have, in combination, furnished a compelling value proposition for organizations to adopt and implement Continuous Monitoring with a view to achieving superior corporate performance and governance/culture outcomes.

HYP#3: Companies in different industries, but even those in the same industry, may have different motivations to embrace Continuous Monitoring initiatives.

(**NOTE**: The "Return-On-Investment" (ROI) justification is desirable, but in light of HYP#1A, HYP#1B, and HYP#2, may not necessarily be demanded by companies launching a CM initiative).

HYP#4: Continuous Monitoring of leading indicators of risk and performance (e.g., operational, business performance, compliance metrics) are considered more important than Continuous Monitoring of lagging indicators of risk and performance (e.g., monitoring internal controls over financial reporting, compliance with regulatory requirements).

HYP#5: Accelerating change, global business uncertainty and complexity, and the abundance of information are making the predictive analytic capabilities of Continuous Monitoring indispensable, and a key source of competitive advantage.

HYP#6: In many organizations, the internal audit function may be ideally positioned to launch and develop a continuous monitoring effort, and prototype it, before handing it off to management for their further customization and application in operational contexts.

In Appendix II we will assess each of the 11 Company Vignettes and case studies in light of the six hypotheses outlined above. Note that these hypotheses were crafted as an outcome of this study and await further testing and validation. Nevertheless, we will indicate the key CM drivers and key CM enablers that seemed to be important from a particular company's perspective.

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Appendix II: Evaluating Exploratory Hypotheses against Company Case Studies

We reviewed each company case study against the six hypotheses laid out earlier:

HYP#1 CM Drivers are the Pillars of the House of Value Creation and Value(s) Preservation. CM Enablers are the sophisticated technology and tools now available to implement CM.

HYP#2 CM Drivers and CM Enablers, when combined, present a compelling value proposition to embrace CM.

HYP#3 Companies across different industries, but even those in the same industry, may have different motivations to adopt and launch CM initiatives.

HYP#4 CM of leading indicators of risk and performance is considered more important than CM of lagging indicators of risk and performance.

HYP#5 CM is seen as a source of competitive advantage.

HYP#6 Internal audit may be ideally positioned to introduce and evangelize the adoption of CM in operational areas.

A snapshot of our analysis appears in the Exhibit on page 24

While most of our exploratory hypotheses appear to be intuitive and reasonable, to a large extent, some companies in our sample decided to take a completely different approach to achieve the same monitoring and governance outcomes. Clearly, additional work is needed to test and validate these hypotheses to better understand the development and evolution of CM in practice.

Comparing Company Stories to Hypotheses

	AEP	BCBS	CME	Hall	HP	IBM	Intel	MSFT	JCP	UTC	Wells
HYPOTHESIS #1											
CM Drivers											
* I*I Risk/ERM	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes		Yes
* Operational Efficiency	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* Compliance Effectiveness	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes
* Innovation			Yes		Yes	Yes		Yes	Yes		Yes
* BP Optimization	Yes		Yes			Yes	Yes	Yes	Yes	Yes	Yes
* BI	Yes		Yes		Yes	Yes		Yes	Yes	Yes	Yes
CM Enablers (Tools)											
*Eval Sys Conditions	Yes	Yes	Yes		Yes	Yes		Yes	Yes		Yes
* Monitor Apps Changes					Yes	Yes		Yes	Yes		Yes
* Facilitate Error Mgmt	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
* Eval. Process Integrity	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Tes	Yes	Yes
HYPOTHESIS # 2 HYP#1 consitutes a Compelling Value Prop.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HYPOTHESIS #3 Differing CM Motivations	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
HYPOTHESIS #4 CM of Leading Indicators is more important			Yes		Yes	Yes		Yes	Yes		Yes
HYPOTHESIS #5 CM is key source of Competitive Adv.			Yes		Yes	Yes		Yes	Yes		Yes
HYPOTHESIS #6 Internal Audit can develop CM initiatives	Yes	Yes			Yes			Yes	Yes		Yes

Appendix III: Continuous Monitoring Software Tools

FERF provides this listing of software tools as part of its Continuous Monitoring research report, simply for your information. Neither FEI nor FERF endorses the software tools listed in this appendix. The tools and products listed below should not be considered an all inclusive list of all tools available for continuous monitoring processes.

ACL™Continuous Monitoring Solution
ACL's continuous monitoring solution provides a flexible and independent control review mechanism to help organizations assure the effectiveness of internal controls, reduce operational risks, minimize profit erosion, and mitigate the risk of fraud, all while meeting increasing regulatory requirements. Management and business process owners receive timely notification of control breaches, can quickly review quantified exposure of business risk, and investigate and resolve potential problems before they escalate. Summary reports, available through an intuitive web-based interface, provide the opportunity to drill down to specific exceptions and transactions. ACL's Continuous Monitoring solution is built upon the ACL AuditExchange technology platform.
http://www.acl.com/solutions/continuous_monitoring.aspx

ACL™AuditExchange
ACL AuditExchange is a centralized, server-based business assurance platform. Leveraging server security and speed, AuditExchange provides analytic processing capabilities that allow users to create, schedule and automate analyses in support of continuous auditing and continuous monitoring. Built upon the capabilities of ACL Desktop, it provides more processing power and expanded data access capabilities to help organizations realize significant productivity gains. Using a built-in scheduler, automating analytics is greatly simplified. Users can manage the frequency, timing and parameters of each analytic, as well as have an overall view of all analytics that have run or are scheduled to run in the future. Data is stored and analyzed on the server, eliminating the need for sensitive data to be stored on laptops and personal computers where it can be compromised. Multiple servers can be networked to create increased analytic processing power.

The AuditExchange platform has an exception management add-on component that enables organizations to automatically distribute exceptions found during data analysis testing to multiple business stakeholders throughout the organization. In addition to improving efficiency, configurable workflow management system allows users to manage the distribution, assignment, escalation and remediation of each exception, ensuring that no exceptions "fall through the cracks."
For more information see:
http://www.acl.com/products/ax.aspx
http://www.acl.com/solutions/continuous_monitoring.aspx

Approva

Approva provides continuous controls monitoring (CCM) software that enables business, finance, IT and audit professionals to automate the way they monitor and test IT and financial controls for their core financial applications. Approva's software suite, Approva One is used by more than 200 customers to monitor and analyze what users "can do" and what they "did do" in your financial and business systems including SAP, Oracle and PeopleSoft. Approva One monitors 100% of your users and 100% of the transactions they execute in your systems. We identify exceptions and control breakdowns right when they occur. Then we immediately route this information to the business owners who are in a position to fix the issue.

Approva One also provides additional context about how an exception occurred in the first place. Unlike other CCM solutions that focus narrowly on monitoring one type of risk, a single application (e.g. SAP, Oracle, etc.) or serve the needs of only a single department or role (e.g. internal audit), Approva One monitors all four types of application controls (i.e. system configuration, user access, master data and transactions) for any business application and supports the unique business needs of finance organizations, internal audit, risk management and IT.

For additional information on our products, visit: www.approva.net/one .

CaseWare™ Monitor
CaseWare Monitor is a sophisticated continuous monitoring solution that allows C-level executives, Audit and Management to view the ongoing status of all controls across any business process, division or the entire enterprise. Through a single-portal, executives can govern compliance initiatives and ensure all aspects of their revenue streams are operating efficiently.

The solution presents a consolidated view of the disparate applications used within an organization such as ERPs, systems logs, legacy systems, external databases and custom applications. This ensures there are no gaps in an organization's internal control framework. Users are able to immediately remediate control breaches through an adjustable workflow and alert mechanism that allows for notification, assignment and escalation of exceptions to users to take action or for information purposes only. Business executives can also be more proactive risk managers and help increase financial performance by leveraging pre-built or custom-built rules for any business process such as purchase to pay, order to cash, payroll or any other core part of the business.

For more information see www.caseware.com/products/monitor
Tel: +1 613 842 7920 ext. 712
E-mail: rcminfo@caseware.com

CaseWare IDEA®
IDEA has been on the market since 1987 and provides users with the ability to display, read, analyze, manipulate, sample, or extract data from data files from almost any source - mainframe to personal computers, including reports printed to a file. Imported data is protected with read only rights and data files can range in excess of 2 billion records and physical sizes in the exabyte range.

A leading data analysis software tool, IDEA breaks down many of the barriers and challenges that exist in generalized desktop application software such as spreadsheets. With limited involvement from IT, financial professionals can create a data analysis support environment as small as one individual on a laptop or desktop, to a small group of professionals working on a network, or extending to and including a server version for very large groups and data files.

Programs are easily created by recording the activities performed once as a macro, then saved as source or executable-only files to enforce production change control policies. They can also be called by schedulers to provide continuous auditing capabilities.

For more information see www.caseware.com/products/idea
or call +1 888-641-2800 ext XX or **E-mail:** sales@audimation.com
IDEA is a registered trademark of CaseWare International Inc.

Infogix Controls
Infogix Controls comprise transaction validation and monitoring solutions that enable organizations to automatically validate financial and operational information with standardized user defined business rules. Fortune 500 organizations use Infogix Controls to prevent and detect financial and operational anomalies to reduce financial risk and cost, improve operational efficiency and to ensure compliance with applicable regulations. Infogix Controls improve accuracy and provide transparency into many financial processes such as general ledger reconciliation, accounts payable management, operational processes such as branch reconciliation, SLA monitoring and technology processes such as data conversion.

In the event of exceptions or violation of business rules, Infogix Controls send real time alerts to the appropriate personnel, and in some cases, stop processes to prevent further processing of erroneous or fraudulent transactions. The Infogix Controls are designed for high-volume, multistep transactional processes in environments where there are multiple heterogeneous financial and operational systems, with transactional processes that go across those multiple systems, and that involve both batch and real time transaction processing.

Infogix Visibility and Monitoring
Infogix Visibility and Monitoring enables organizations to track, manage and optimize their financial and operational processes to reduce cost of operations and to improve operational efficiency. Infogix Visibility brings greater process visibility and transparency in the context of risk, control and operational effectiveness. Infogix Visibility and Monitoring comprises four components: Process Monitoring, Continuous Monitoring, Exception Management, Reporting and Analytics.

The process monitoring component enables web based visualization of business process flows and how they are controlled – which demonstrates where there may be needed coverage. Fortune 500 organizations use the continuous monitoring component to manage up to thousands of controls in groupings meaningful to the organization. With easy-to-understand visual cues, monitor control status and annotate execution detail with a complete audit trail. The exception management component provides rule based exception research, resolution and reporting processes to ensure timely resolution of exceptions to minimize financial risk arising from exceptions. The reporting and analytics component provides a centralized repository for assimilating information from multiple sources. Organizations use this component to reduce the risk and cost of maintaining and relying on disparate reporting systems. Infogix Visualization ties monitoring, reporting and analytics efforts into consolidated, personalized views meaningful to individual users to quickly find ways to improve operational processes and reduce risk.

For more information, go to www.infogix.com or email us at info@infogix.com or call us at 630.505.1800

Oversight Systems
Oversight Systems' continuous transaction monitoring software enables enterprise organizations to drive cost savings, reduce risk, combat fraud and document regulatory compliance. From disbursements to revenue recognition to ERP, Oversight acts as a virtual analyst that detects operational variance within targeted business processes. CFOs, controllers and auditors rely on Oversight's real-time inspection of every transaction to direct staff and resources for greatest impact. Process owners use Oversight's dashboard-driven workflow and audit trail to generate an automatic, ongoing correction and validation cycle that resolves issues quickly and efficiently. SAP-endorsed, Oversight is an essential resource for improving overall process quality and financial performance.

Oversight delivers systemic analysis of process breakdowns, control deficiencies, improper training and data/information gaps across major ERP and financial transactional systems. This insight helps organizations correct process issues before cash leakage, loss of customer confidence, issuance of erroneous reports and similar operational threats affect the bottom line. Oversight's tight focus on audit and business performance helps encourage desired employee behavior by rapidly identifying policy violations and unexpected outcomes. The end result is better business processes that save money, reduce fraud and ensure regulatory compliance.

For more information, email us at info@oversightsystems.com, or call us at 770.984.4600.

Trintech - Continuous Monitoring in the Last Mile of Finance
Continuous monitoring has been integrated into the transaction processing systems of many large organizations in order to monitor and measure expected outcomes of transactional events to the actual results. For example, tolerance on account variations, expected account balances at given dates, and even levels of returns can be monitored, and remediations can be set into motion on a mostly automated basis. The automated monitoring of key controls has been well-tuned since the advent of the Sarbanes-Oxley Act of 2002.

The ability to perform continuous monitoring works very well when the event is fully automated, but becomes more difficult when a process or transaction crosses multiple systems or has manual controls or interventions. Trintech wraps the financial processes that occur from subsidiary close to filing in technology that allows for real-time dashboards. The dashboards are updated as key events, such as close task, controls, remediations and reconciliations occur, and reports the status of these activities. Additionally, issues can be raised by individuals or systems to ensure timely response to key control or process failures.

Companies use Trintech to monitor key events, such as ensuring critical billing files have run before billing is completed, or to compress the process by automatically kicking off the manual analytics after allocations have run. Trintech compliance application monitors key ERP events and starts remediation or records a controls test based on specified business rules. Trintech's Unity applications bring the integration of manual and automated across multiple systems to enable the governance required to deliver accurate and timely financial results.

For more information, contact Hilliary Opseth at 1-800-416-0075 or
info@trintech.com

Appendix IV: Annotated Bibliography

2010 Gartner FEI Technology Study: The CFO's Perspective on Data Quality
Gartner Publication ID Number: G00175819
Publication Date: 27 April 2010

- Two-thirds of respondents identified data quality issues as a constraint on, or barrier to, the achievement of business success
- Despite broad awareness of data quality issues, only 49% (up from 41% in 2009) had responded with a formal, structured improvement program
- However, almost all indicated they were pursuing several one-off approaches to improve integrity of their information
    - Implement new applications: 44.9%
    - Cleanse databases: 36.4%
    - Implement automated tools to monitor data quality: 30.1$

Gartner's recommendation (page 1):

- Finance, business and IT executives focused on information management "should focus on data quality improvement projects that enhance the accuracy and consistency of financial information, as this is clearly a problem area and one that finance executives think important."

CAESARS Framework Extension: An Enterprise Continuous Monitoring Technical Reference Architecture (Draft)

Peter Mell, David Waltermire, Harold Booth, Timothy McBride, Alfred Ouyang
National Institute of Standards and Technology
U.S. Department of Commerce
NIST Interagency Report 7756 (Draft), February 2011

This publication presents an enterprise continuous monitoring technical reference architecture that extends the framework provided by the Department of Homeland Security Federal Network Security CAESARS (Continuous Asset Evaluation, Situational Awareness, and Risk Scoring) architecture. This extension enables added functionality, defines each subsystem in more detail, and further leverages security automation standards. It also extends CAESARS to allow for large implementations that need a multi-tier architecture.

The goal of this document is to facilitate enterprise continuous monitoring by presenting a reference architecture that enables organizations to aggregate collected data from across a diverse set of security tools, analyze that data, perform scoring, enable user queries, and provide overall situational awareness. The architecture design is focused on enabling organizations to realize this capability by leveraging their existing security tools and thus avoiding complicated and resource intensive custom tool integration efforts. (p. iv)

The CAESARS Framework Extension (FE) is a technical reference architecture for enterprise continuous monitoring (CM) that builds upon the Department of Homeland Security's Continuous Asset Evaluation Situational Awareness and Risk Scoring (CAESARS) reference architecture. Most of the CAESARS Subsystems remain in CAESARS FE, but modest revisions have been made to the higher level architecture to provide enhanced functionality and allow multi-tier CM implementations. (p. 17)

CAESARS enables organizations to implement a single CM instance that consists of four subsystems: Sensor, Database, Presentation/Reporting, and Analysis/Risk Scoring. All subsystems, except the Database Subsystem, may contain multiple tools providing independent observation or analysis. A single database is used to aggregate monitoring data from the Sensor Subsystem and all its distinct sensor products and their instantiations throughout the enterprise. This central database is also used by the Presentation/Reporting and Analysis/Risk Subsystems as their source of monitoring data. An enterprise service bus (ESB) is used for all inter-subsystem communication. (p. 11)

"Continuous Monitoring and Continuous Auditing: From Idea to Implementation"

"Continuous monitoring (CM) enables *management* to continually review business processes for adherence to and deviations from their intended levels of performance and effectiveness."

"Continuous auditing (CA) enables *internal audit* to continually gather from processes data that supports auditing activities."

CM enables management to determine more quickly and accurately where it should be focusing attention and resources in order to improve processes, implement course corrections, address risks, or launch initiatives to better enable the enterprise to achieve its goals.

CM is an automated, ongoing process that *enables management* to:

- Assess the effectiveness of controls and detect associated risk issues.
- Improve business processes and activities while adhering to ethical and compliance standards.
- Execute more timely quantitative and qualitative risk-related decisions.
- Increase the cost-effectiveness of controls and monitoring through IT solutions.

The value of CM is that it gives management greater visibility into, and more timely information on, business processes designed to achieve strategic and operational goals. The value of CA is that it enables internal audit to move from sampling accounts and transactions to coverage of 100 percent of accounts and transactions (when and where desired). Although CM and CA can be adopted separately or together, enterprises may achieve the most cost-effective development by implementing both; either simultaneously or in planned sequence.

The CM/CA Roadmap

1. Develop the business case;
2. Develop a strategy for adoption;
3. Plan the design and implementation;
4. Build and implement the CM or CA system; and
5. Monitor performance and progress, and refine as needed

GRC in 2010: $29.8 B in Spending Sparked by Risk, Visibility, and Efficiency
John Hagerty and Bob Kraus, AMR Research
November 2009

- Streamline, Automate, Improve, Monitor: These words have become the new GRC (Governance, Risk and Compliance) mantra. (page 7)
- Cost reduction is prominent in any discussion of benefits companies hope to achieve from GRC spending.
- Now there is even more urgency for spending in one area to pull double or triple duty to maximize payback.
- GRC Software investments planned for 2010 are skewed toward defining the GRC (Governance, Risk and Compliance) universe, then managing and monitoring against it. (page 6)
    - Compliance management: 18%
    - Business process management: 17%
    - Continuous control monitoring: 16%

Guidance on Monitoring Internal Control Systems
COSO, 2009
Volume I
42. The COSO Framework makes an important point with respect to building monitoring into the routine operations of an organization:
“An entity that perceives a need for frequent separate evaluations should focus on ways to enhance its ongoing monitoring activities, and, thereby, to emphasize ‘building in’ versus ‘adding on’ controls.” (COSO Framework, p. 70)

44. “Because they are performed routinely, often on a real-time basis, ongoing monitoring procedures can offer the first opportunity to identify and correct control deficiencies. When external reporting requirements exist, management may design ongoing monitoring such that it provides the majority of evidence management needs to support its assertions, possibly reducing the extent of separate evaluations whose sole purpose is to support the external assertions.”

60. “Organizations often use information technology (IT) – through control monitoring tools and process management tools – to enhance monitoring. As the use of IT increases, both as part of an organization’s operations and as tools used in monitoring, the need increases to evaluate internal control over those information systems.”

73. “Properly designed and executed monitoring (1) provides persuasive information to evaluators regarding the internal control system’s effectiveness, and (2) identifies and communicates internal control deficiencies in a timely manner to those parties responsible for taking corrective action and to management and the board as appropriate. In doing so, it facilitates the correction of control deficiencies *before* they materially affect the achievement of the organization’s objectives.”

“Internal Audit’s Role in Continuous Monitoring”
Michael P. Cangemi, in “EDPACS: the EDP Audit, Control, and Security Newsletter”, April 2010, Vol. 41, No.r

Continuous Monitoring (CM) is an evolving use of technology to improve operations integrity and information and transaction quality. This article pleads for internal auditors to promote the expanded use of continuous monitoring by operations, as well as, internal audit.

Audit is an independent verification function. Auditors can and do use automated, independently implemented computerized applications as part of their audit coverage. On occasion these audit routines are built into operations, but controlled by audit. In all cases audit should and will adjust their audit scope to value CM systems built into operations. However, the most important role auditors can serve, with regard to CM, is to recommend its expanded use, thereby leveraging systems efficiency and effectiveness, as well as the overall control environment.

A CM program is a non-emotional, never tiring automated ‘‘monitoring agent’’ inspecting, in real time, verifying adherence with company policies, authorizations, proper sequence, correct timeframe, in the right location/region, and so on. When exceptions are identified by computer monitoring, you can add to efficiencies with automated ‘‘dashboards’’ and follow-up systems to limit manual intervention and assessment.

According to the Corporate Library audit costs increased 64% from 2001 to 2006. How do we reverse the trend? Companies need to look at the significant opportunities to reduce the cost of audits and compliance, and save money by using continuous monitoring (Continuous Controls Monitoring, or CCM, and Continuous Controls Monitoring of Transactions, or CCM-T) and continuous auditing.

According to a January 2009 Gartner report, despite the benefits of CM, too little attention has been placed by chief financial officers, internal auditors, and corporate risk management and compliance leaders on the automation of financial controls monitoring.

Finance and IA understand controls but maybe not understand all the operating issues. Operations management may not be aware of the emerging field of CM software. Therefore the opportunity for IAs, with a broader focus on improving the business, to recommend specific CM applications, is like low-hanging fruit, to impact the business in a positive way.

Magic Quadrant for Continuous Controls Monitoring
Gartner RAS Core Research Note G00174594
French Caldwell, Paul E. Proctor
Publication Date: 23 March 2010

Continuous controls monitoring is an emerging governance, risk and compliance technology that monitors controls in ERP and other financial applications to improve financial governance, monitor and verify access and transactional rules, and automate audit processes. (page 1)

Within the governance, risk and compliance (GRC) marketplace, continuous controls monitoring (CCM) is a set of technologies that assist the business in reducing business losses from fraud or failure to follow rules governing financial transactions, and improving performance through continuous monitoring (CM) and reducing the cost of auditing through continuous audit (CA) of the automated controls in ERP systems or other financial applications. CCM contributes value to risk management and compliance initiatives in three ways:

- **Lowering compliance costs —** A CCM solution can reduce the cost of audits by eliminating much manual sampling and minimizing the time it takes to gather documentation.
- **Improving financial governance —** CCM can increase the reliability of transactional controls, improve auditor trust and increase the effectiveness of antifraud controls.
- **Improving operational performance —** CCM controls, such as those that monitor duplicate payments, incorrect discounts or misapplied warranties, go beyond what most people consider compliance. By preventing these violations of business rules, CCM can improve key financial processes and increase the availability of working capital.

Monitoring Internal Control Systems and IT
ISACA, 2010

Technology can be important to the monitoring of internal controls in two related but very different ways. It is both an enabler of effective monitoring and, as an important part of many internal controls, a key area that must be monitored in its own right. (page 10)

Currently, technologies provide management with the opportunity to improve monitoring and oversight of business processes and controls. For example, the growth and complexity of enterprise resource planning (ERP) systems, the increased use of networks and speed of processing, and the globalization of business have driven the development of more intelligent software tools. These tools can now help management to better capture and analyze key data for strategic and operational decisions and trigger alarms when unusual transactions or patterns occur.

Apart from enabling monitoring, technology is often an integral supporting component for internal controls and must itself be subjected to rigorous oversight. For instance, technology-based systems—many of them automated—are often the source of information used by auditors and risk managers to answer two critical questions: what to monitor and how to monitor it. Inaccurate or incomplete information can lead to a breakdown in governance and misguided risk management strategies and outcomes.

The monitoring of Information Technology (IT) controls and automation of the monitoring process can offer substantial benefits. These include:

- Earlier identification and timely corrective action of breakdowns in processes and internal control deficiencies.
- Leveraging of processes to monitor controls to also monitor business performance. Information used for one can often be used for the other and *vice versa*. Emphasizing to boards the value-add of monitoring business performance and early warning systems is often the best way to justify the investment in monitoring tools and technology.
- Provision of more accurate, decision-relevant information through reliable financial and operational reporting.
- Better access to real-time data and, by extension, increased speed and quality of management decision making.
- Enhanced assurance of compliance with laws and regulations, internal policies and standards, and client contracts.
- Ability to furnish periodic certifications or assertions on the effectiveness of the framework of internal controls.
- Better detection and prevention of fraud, waste and abuse, and reduced business impact when they do occur.

- Removal of excess costs from operations through more efficient controls and processes.
- Increased management confidence in the information generated by business processes.

Automated monitoring processes have significant advantages. They are replicable, consistent and can handle huge volumes of transactions and data at great speed. (page 11)

Automation can significantly increase efficiency and decrease the cost of operations. When many key systems and control processes within an enterprise rely on information technology, an effective way to perform monitoring is often to automate the monitoring process. In some situations, it is neither cost-effective nor desirable to monitor automated processes and controls without using IT.

Automated monitoring processes can be particularly effective when information about controls is dispersed or voluminous, or to address conditions that drive fraud and waste.

Fraud is more likely to occur when basic internal control processes are ineffective or can easily be circumvented, or when changes in employee responsibilities result in a lack of segregation of duties (SoD).

An effective monitoring approach, especially when it is automated, may serve as a deterrent to potential fraud. Why? Because employees are more reluctant to attempt a fraudulent act when they are aware that management has a process in place to monitor their activities.

One common practice, continuous controls monitoring, complements normal transaction processing by checking every transaction or selected transactions against pre-specified criteria (e.g., identifying transactions that exceed predefined thresholds or flagging transactions with segregation of duties conflicts).”

Technology Issues for Financial Executives: 2010 Annual Report
John E. Van Decker, Gartner
Financial Executives Research Foundation
May 2010

Key Findings

- The quality and consistency of data remain a key concern, as shown in the 2009 Gartner FEI Technology Study. There are a number of reasons why this concern did not necessarily translate into action, ranging from a challenging economic environment to an array of business and market conditions that hindered a focus on data quality in this particular year.
- Three-quarters of the respondents considered data quality problems a constraint on, or a barrier to, achieving business success. In fact, the 2009 Gartner FEI study showed that information integrity was viewed as a top area of concern. The most critical technology issue was the need to improve data quality to enhance the accuracy and consistency of financial reporting.
- Even so, only 49% of respondents had a formal improvement program — the rest were doing nothing formally to improve matters.
- As an indirect approach to data quality issues, 44% (up from 27% a year ago) saw implementing new applications as a major way to improve information integrity.

Recommendations

Finance, business and IT executives focused on information management should:

- Assess the perceived and actual quality of data for their organizations' financial reporting, and compare their findings with the views of respondents to the 2010 survey.
- Focus on data quality improvement projects that enhance the accuracy and consistency of financial information, as this is clearly a problem area and one that finance executives think important.
- Justify investments in these projects on the basis of current business drivers and issues, such as regulatory compliance, governance and cost optimization.
- Establish data-quality-specific roles and processes, adopt best practices from other organizations, and use data quality tools where they support — rather than replace — people and processes.

What is Driving Continuous Auditing & Continuous Monitoring Today?
KPMG, 2010

In a volatile economic environment, a number of key drivers are prompting companies to employ continuous auditing and continuous monitoring (CA/CM) techniques to do more than manage risk, including help reduce cost, improve performance, and create value. (page 3)

Perhaps the most significant of these drivers are stakeholder demands that management improve its governance capabilities to enhance oversight and transparency and manage risk.

According to a recent KPMG LLP survey, the drivers for CA/CM include the following:

- Fraud detection/ prevention – 68%
- ERM – 50%
- SOX 404 compliance – 40%
- Compliance with policies and procedures – 38%
- Regulatory compliance – 29%

Drivers and Benefits of CA/CM (pages 5 and 7)

Improve Risk Management
Automating risk monitoring (i.e., through CM) in a repeatable and sustainable manner is the beginning for management (and the internal auditors) to move toward a continuous risk assessment process.

Optimize Costs and Improve Profitability
CA/CM can enable organizations to (1) automate controls, processes, and activities to streamline operations and drive efficiencies; and (2) deploy monitoring activities that help them leverage the benefits of such efforts – and prevent them from lapsing back into inefficient patterns. Organizations can realize such benefits across a wide spectrum of efforts they are pursuing now – in areas such as cost optimization, alternative business models, contract and spend management, and process improvement.

Monitor for Potential Fraud and Misconduct
Along with codes of conduct; due diligence hotlines and whistleblower mechanisms; and investigation and remediation protocols, CA/CM can become a key component of an effective fraud risk management process to prevent and detect fraud and misconduct. “

Address Regulatory Pressures
A lack of visibility and transparency can develop when globally disparate ERP systems are not necessarily connected. CM can help organizations draw those systems together to gain an enterprise view of regulatory compliance, enabling them over time to reduce the costs of compliance with regulations and policies.”

About the Authors

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Sri holds a Bachelors degree in Commerce and a Diploma in Mathematics & Statistics from Bombay University, India. After completing his Chartered Accountancy qualification from India, Sri worked for Ernst & Young in the Middle East before pursuing graduate studies in the United States. He earned the MAcc. and Ph.D. degrees from The Ohio State University in Columbus, Ohio. He holds numerous professional designations, and has received several teaching excellence awards and prestigious research grants. While at Andersen, he was a key liaison for a multi-million dollar Andersen-MIT research collaboration. At Ernst & Young, he spearheaded the development of a litigation risk management model that attained "patent pending" status from the U.S. Patent & Trademarks Office. He is a co-author of *Internal Auditing: Assurance and Consulting Services* (IIA Research Foundation, 2nd ed., 2009), *The Audit Committee Handbook* (5th ed., Wiley, 2010), and *Sarbanes-Oxley section 404 for Small, Publicly-Held Companies* (CCH/Wolters Kluwer, 2011),

A respected thought leader on governance, risk, and compliance (GRC) topics, Sri has published over 25 research and practitioner-oriented articles, nine books and monographs (some of which have been translated into Chinese, Japanese, and Spanish), and has been a conference speaker internationally. His keen interest in continuous monitoring comes from his having been on the development/authoring teams of the COSO 2009 and ISACA 2010 guidance on monitoring internal control systems. He is a technical advisor to FEI's Committee on Finance and Information Technology (CFIT) and is the President of the Board of Directors of the Information Integrity Coalition. He is a member of the American Institute of CPAs, the Institute of Internal Auditors, the American Accounting Association, the Association of Government Accountants (AGA), and the National Association of Corporate Directors. Over the last decade or so he has made professional presentations in 12 countries on topics ranging from corporate governance and fraud risk, to internal controls in financial reporting, to mentoring within organizations, soft skills and professional ethics.

Michael P. Cangemi, CPA (mpcangemi@msn.com, www.canco.us), an author and business advisor, is the former President, Chief Executive Officer and Director of Etienne Aigner Group, Inc., a leading designer of women's accessories (Aigner-1991-2004) and President and Chief Executive Officer of Financial Executives International, the professional association for senior-level corporate financial executives (FEI 2007-08).

Michael currently serves as President of Cangemi Company LLC, which he founded in 1968, and has a significant focus on Continuous Monitoring and Auditing. He is a Senior Advisor to Oversight Systems, has served on the Approva Corporation advisory board, and serves on the Pace University Lubin School of Business Advisory Board, the Rutgers Continuous Audit Advisory Board (Founding Member), the EDPACS Editorial Advisory Board, the SOX&GRC Institute Advisory Board, and on the Board of the Association of Certified Green Technology Auditors.

Michael has had a successful career with a long term significant focus on continuous monitoring. He progressed from auditor to CAE, to CFO, CEO and Board member. He served in numerous ISACA and IIA professional capacities, including International President of ISACA, many years on IIARF BORA and the IIARF Board of Trustees. His experiences as a CAE were published in his successful book, ***Managing the Audit Function***, now in a third edition (Wiley, 2003).

From 2007 to 2008, he served as the FEI representative on the Board of COSO, during which the Guidance on Monitoring Internal Control Systems was drafted and issued in January 2009. He was the Editor-in-Chief of the ***IS Control Journal***, in which his regular column, **Issues & Comments** appeared from 1987 to 2007. His **Presidents Page** editorial column appeared in **Financial Executive** magazine 2007 – 2008. In 1991, Mr. Cangemi co-authored ***Auditing in an EDP Environment*** with Peter Reed.

Michael is a Certified Public Accountant, and a Certified Information Systems Auditor-Honorary/Retired and member of FEI, AICPA, Institute of Internal Auditors (IIA), and the N.Y. Society of CPAs. Mr. Cangemi is a honorary life member of the IS Audit & Control Association (ISACA). In 2000, **The Cangemi Audit & IT Audit Library** was established at the University of Mississippi's National EDP Auditing Archival Center to house his collection of over 250 books on Auditing and EDP Auditing. He recently completed a two year term on the International Accounting Standards Board (IASB 2007-8)-Standards Advisory Council and served four years as a member of the FASB's Financial Accounting Standards Advisory Council (FASAC 2007-10)

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- Building an Agile Finance Function
- Excellence in Information Integrity
- IFRS for Mid Market Companies: Tips for Transition

Bill joined FEI as Accounting Manager in 1985, and became Manager of Research for FERF in 1989. He was promoted to Director of Research in October 2005. Prior to his positions at FEI and FERF, Bill was employed by Carnegie-Mellon University and Mellon Bank in Pittsburgh. He has an M.B.A. from the University of Pittsburgh, and is listed in *Who's Who in Finance and Industry*.

About the Sponsor: Infogix, Inc.

Infogix is the leading provider of automated controls, reconciliation and monitoring solutions. For over 29 years, hundreds of Global 2000 organizations have depended on Infogix solutions to reduce cost, to reduce risk and to improve efficiency in their business operations. Infogix solutions are independent, continuous, and automated. Infogix solutions are used in high-volume, multistep operational and financial processes in both batch and real time processing environments.

Infogix customers include eight out of the top ten financial services organizations, six out of the top ten healthcare insurance, eight of the top ten U.S. P&C Insurers, eight of the top ten U.S. Life Insurers, two of the top three U.S. Retailers, and eight of the top ten U.S. Telco Carriers. These organizations rely on Infogix solutions to verify, balance, reconcile and track information across different processes and applications including general ledger reconciliation, accounts payables, claims management, SLA monitoring, regulatory compliance and data warehouses.

For more information, go to http://www.infogix.com/

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("CFIT" indicates that the individual identified is a member of FEI's Committee on Finance & IT.)

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Dr. Sridhar Ramamoorti
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