

● ● ● CONTINUOUS MONITORING, AUDITING AND ASSURANCE:
CAATs FOR THE 21ST CENTURY



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INTRODUCTION

The concept of continuous assurance emerged in the late-1980s¹. In 1999, the AICPA and CICA jointly published a research study entitled Continuous Auditing (CA), which defined continuous auditing as:²

“...a methodology that enables independent auditors to provide written assurance on a subject matter using a series of auditors’ reports issued simultaneously with, or a short period of time after, the occurrence of events underlying the subject matter.”

The “auditing” in “continuous auditing” relates to the types of procedures that are performed whereas “assurance” relates to the reports that provide comfort to management and external parties based on those procedures. When continuous auditing is performed, management and other interested parties can obtain continuous comfort about the sound operation of their systems and processes, as contrasted with the periodic assurance provided by annual audits or quarterly reviews of financial statements and the systems that produce them.³

Continuous monitoring (CM), which is an offshoot of CA, is implemented by management to ensure policies, procedures, and business processes operate effectively and help management assess the effectiveness of internal controls.⁴ The key distinction between CA and CM is in the ownership of the process: assurance must be provided by parties that are independent from the management of the activity being assessed. This distinction becomes blurred when internal auditors collaborate with management to implement dual purpose CM systems designed to both monitor performance and also generate signals or “alarms” and related data for auditors to investigate.

CM and CA are concepts that naturally evolve from the underlying automation of business process and digitization of information. To interact with systems, CM and CA require the implementation of computer-assisted auditing techniques (CAATs). Traditional auditing methods and techniques were established in the paper-based era. As these methods and techniques give way to technological improvements, the natural question becomes: how can technology be used to automate the auditing methods and techniques developed in the paper-based era? In addition, applying audit procedures in a real-time or near-real time basis requires extending CAATs and linking them to enterprise systems or even embedding them within those systems. This in turns opens up the possibility of providing assurance on a more frequent basis or even on a continuous basis (e.g. the system is to be considered reliable unless a warning is posted that it is not). Automating auditing procedures in-and-of-itself can make the underlying processes more transparent and allow for the independent scrutiny of processes (i.e. from a SOX or controls perspective) and transactions (i.e. from a substantive assurance perspective).

1 Michael Alles, Fernando Tostes, Miklos Vasarhelyi, and Edson Luiz Riccio, *Continuous Auditing: The USA Experience and Considerations for its Implementation in Brazil* (Rutgers University, 2008).
2 Zabihollah Rezaee, Ahmad Sharbatoghlie, Rick Elam, and Peter L McMickle, “Continuous Auditing: Building Automated Auditing Capability,” *Auditing* Vol. 21, No. 1 (March 2002): 147-163.
3 Rezaee, “Continuous Auditing,” 147-163.
4 Carlos Elder Maciel De Aquino, Washington Lopes Da Silva, and Miklos A Vasarhelyi, “Moving Toward Continuous Auditing,” *The Internal Auditor* Vol. 65, No. 4 (August 2008): 27.

These and other factors that will be discussed below have resulted in an environment that is more favorable to the adoption of CA and CM. PricewaterhouseCoopers' "2006 State of the internal audit profession study" notes that:⁵ "Continuous auditing solutions are being pursued by chief audit executives as a means to shorten audit cycle times and provide more timely risk and control assurance to key stakeholders." Survey responses from 392 companies indicated that:

- 81% of respondents "had a continuous auditing or monitoring process in place or were planning to develop one".
- 50% of respondents "have some form of continuous auditing or monitoring process within their internal audit functions", which was a 15% increase from 2005.
- 57% of respondents have a quarterly "continuous auditing 'cycle'", 34% have "monthly monitoring activities", and "9% focus on daily applications of their continuous auditing processes".

According to a recent survey performed by the Financial Executives Research Foundation, for the Institute of Internal Auditors (IIA), 28% of companies are currently using some form of continuous auditing, while another 15% plan to start in 2009. According to IIA president and CEO Richard Chambers, those numbers are likely to grow since the approach "is the only way to be in front of emerging risks."⁶

The balance of this whitepaper is organized as follows. The next section explores what's changed in the last few years; identifying the factors that have fuelled wider adoption of the methodology. The following section looks at research studies and case studies that identify benefits and challenges of continuous assurance with respect to implementation and wider adoption. This is followed by a section on continuing challenges and a conclusion.

Continuous Assurance: Why Now?

Until the last few years the actual implementation of continuous assurance remained largely theoretical. Obstacles to adoption included the following: low demand for audits more frequent than annual, liability concerns on the part of external auditors, shortage of qualified personnel, limitations of processes that might be candidates for continuous auditing and limitations of enterprise systems.⁷ Some of the obstacles relate to the need for continuous assurance while other relate to technology issues.

Although some of these obstacles are still present today (and will be examined below), the corporate landscape has changed dramatically primarily due to several factors: the passage of the Sarbanes-Oxley Act (SOX), the need for and search for cost reductions, increased attention and scrutiny of fraudulent behavior, increased standardization and integration of processes/systems, and changes in reporting requirements emphasizing more frequent reporting and digital reporting requirements such as XBRL.

5 PricewaterhouseCoopers (PWC), "State of the internal audit profession study: continuous auditing gains momentum," (2006). [http://www.pwc.com/extweb/pwcpublishings.nsf/docid/76357CE81F5CD43C852572D70060CCCA/\\$file/state_internal_audit_profession_study_06.pdf](http://www.pwc.com/extweb/pwcpublishings.nsf/docid/76357CE81F5CD43C852572D70060CCCA/$file/state_internal_audit_profession_study_06.pdf) (accessed July 30, 2009).

6 David McCann and Alix Stuart, "The 24/7 Audit," *CFO Magazine* <http://www.cfo.com/article.cfm/13983436> (accessed July 15, 2009).

7 DeWayne Searcy, Jon Woodroof, and Bruce K. Behn, "Continuous Audit: The Motivations, Benefits, Problems, and Challenges Identified by Partners of a Big 4 Accounting Firm," *Proceedings of 36th Hawaii International Conference on System Sciences*, (January 2003): 210-219.

The New Regulatory Environment: Impact of SOX on CA

The passage of the Sarbanes-Oxley Act (SOX) forced corporations to open-up their financial processes to the scrutiny of auditors. A study that evaluated CA as a response to SOX, found that continuous online auditing *increased* after the introduction of SOX in July 2002.⁸ Furthermore, SOX required executives to certify their quarterly statements, which “nudged many enterprises to increase the frequency of auditing activities.”⁹

Need for Cost Reductions

Another reason that continuous assurance is gaining momentum is cost reduction. According to a 2005 survey conducted by the Financial Executives Institute (FEI), companies with “\$5 billion in revenue spent more” than “\$10.4 million on average” and their “employees logged an average of 64,768 hours to comply with the [SOX] regulation.”¹⁰ As CA requires enhanced use of technology to facilitate the assurance process, it is being viewed as a means to reign in escalating costs associated with assurance activities in an organization.¹¹ Automating reviews of controls is expected to increase productivity and reduce the cost of compliance.¹²

Fraud Detection

Auditors' increased responsibilities for fraud detection are also increasing interest in CM and CA. AICPA's “Statement on Auditing Standards (SAS) 99, Consideration of Fraud in a Financial Statement Audit”, recommends auditors perform additional steps to detect fraud.¹³ For example, the standard recommends “brainstorming sessions” to identify possible fraud schemes. One way to address the underlying frauds identified by such sessions is to use technology to target specific populations of transactions (e.g. sales, journal entries, etc.) that contain “unusual patterns.”¹⁴ Also, there is a growing demand for internal auditors to have the skills necessary to combat fraud. Protiviti's “2009 Internal Audit Capabilities and Needs Survey”¹⁵ notes that: “Organizations are relying more heavily upon their internal auditors to help manage fraud risk through execution of fraud risk assessment”. In addition, the survey points out that this will necessarily require auditors to have a good understanding of the “tools and techniques” required to deal with “electronic data that is a hallmark of today's corporate environment”. For example, digital analysis techniques, such as Benford's Law (“which predicts the occurrence of digits in large sets of numbers”¹⁶) are embedded in generalized auditing software packages (e.g. IDEA) that can be used to identify fraud.

The value of fraud detection can increase when it is part of a continuous assurance program due to efficiencies obtained when the audit addresses all the key controls rather than being restricted to the subset related to fraud.¹⁷

8 El-Hussein E. El-Masry and Jacqueline L. Reck, “Continuous online auditing as a response to the Sarbanes-Oxley Act,” *Managerial Auditing Journal* Vol. 23, No. 8 (2008): 779.

9 Eric Krell, “Continuous Auditing is Here to Stay,” *Business Finance* Vol. 12, No. 3 (March 2006): 22-27.

10 Frank H. Brod and Colleen Cunningham, “Getting Control Over Internal Control Rules,” *Compliance Week* (May 17, 2005) <http://www.complianceweek.com/article/1762?printable=1> (accessed July 29, 2009).

11 Krell, “Continuous Auditing,” 22-27.

12 Michael P Cangemi, “Internal Controls: Where We've Been, and Where We Need to Go,” *Financial Executive* Vol. 23, No. 10 (December 2007): 6.

13 Michael Ramos, “Auditors' Responsibility for Fraud Detection,” (January 2003) www.journalofaccountancy.com/issues/2003/Jan/AuditorsResponsibilityForFraudDetection.htm (accessed July 29, 2009).

14 Ronald L. Clark and Gary D Zeune. “Recognizing Fraud Patterns in Accounting Data,” *The CPA Journal* Vol. 77, No. 4 (April 2007): 68-71.

15 Protiviti, “Internal Audit Capabilities and Needs Survey,” <http://www.protiviti.com/en-US/Insights/Surveys/Pages/IA-Capabilities-and-Needs-Survey.aspx> (accessed July 26, 2009).

16 Vinita Ramaswamy and John Leavins, “Continuous Auditing, Digital Analysis, and Benford's Law,” *Internal Auditing* Vol. 22, No. 4 (July/August 2007): 25-32.

17 Norman Marks, “Fraud Management in the 21st Century,” *EDPACS* Vol. 38, No. 6 (December 2008): 1-10.

Standardization, Integration and Enabling Technologies

Another factor that has increased adoption of CM and CA is the standardization and integration of systems through the widespread adoption of technologies such as ERPs, databases and data warehouses.¹⁸ In addition, "Internet and networking technologies have improved the availability of and timeliness with which information is relayed, moving toward a real-time system of communication."¹⁹ Also, the advent of "governance, risk and compliance" (GRC) "as a new category of software geared specifically toward the audit profession" has also aided in making CA a reality.²⁰ Gartner, in its "Magic Quadrant for Enterprise Governance, Risk and Compliance Platforms", defines the "enterprise governance, risk and compliance" marketplace as a "platform" that supports "audit management, compliance management, risk management and policy management."²¹

Continuous Reporting, Continuous Assurance and XBRL

Regulators around the world have been increasing continuous reporting obligations of public companies. Management, boards/audit committees and, for some reports, auditors, have responsibilities for information disclosures in management's discussion & analysis (MD&A), earnings press releases (EPR), material change reports (MCR), annual information forms (AIF) and other information significant to the capital market. These responsibilities create a virtually continuous stream of reporting that must be matched by processes and controls that can provide for integrity of disseminated information.²²

The use of electronic filing and digital reporting around the world is enabling the application of CAATs to the quality assurance processes related to those filings and reports. For example, the Securities and Exchange Commission (SEC) in the US is requiring companies that file statements to "publish" electronic statements that are "tagged" with eXtensible Business Reporting Language (XBRL). Initially, companies with a "worldwide public float greater than \$5 billion" and that have a fiscal year-end that is after June 15, 2009 must comply with this requirement. By 2012, all remaining companies will be required to publish their statements with XBRL.²³ XBRL enables companies to "tag" their financial statements with "terms" from a standard taxonomy that allows for the generation of financial statements that are "readable and searchable".²⁴

With XBRL tagged statements, it is possible to develop "continuous reporting" processes that generate "financial and non-financial information in 'near' real-time".²⁵ With the use of "push technology"²⁶, it is possible that statements can be generated and sent out to users via technology similar to Real Simple Syndication (RSS).²⁷ By implication, XBRL "provide[s] the base technology" to implement continuous reporting which leads naturally to continuous monitoring and auditing.²⁸

18 Shing-Han Li, Shi-Ming Huang and Yueh-Chiao G Lin, "Developing a Continuous Auditing Assistance System Based on Information Process Models," *The Journal of Computer Information Systems* Vol. 48, No. 1 (Fall 2007): 2-14.

19 Tommie Singleton and Aaron J. Singleton, "Auditing Headaches? Relieve them with CAR," *The Journal of Corporate Accounting & Finance* Vol. 16, No. 4 (May/June 2005): 17.

20 Gerard (Rod) Brennan, "Continuous Auditing Comes of Age," *Information Systems Control Journal* Vol. 1 (2008): 1-2.

21 French Caldwell and Tom Eid, "Magic Quadrant for Enterprise Governance, Risk and Compliance Platforms," June 30, 2008 www.metricstream.com/pressNews/pressrelease_119.htm (accessed July 29, 2009).

22 J. Efrim Boritz, "Maintaining Quality Capital Markets Through Quality Information," A Discussion Paper prepared for the Capital Markets Leadership Task Force, Canadian Institute of Chartered Accountants, April 2006.

23 Stephen Barlas, Dallan Christensen, Bill Cordes, Mike Osheroff and Kathy Williams, "XBRL Reporting Is Now Mandatory," *Strategic Finance* Vol. 90, No. 7 (January 2009): 61.

24 David Plumlee and Marlene A. Plumlee, "Assurance on XBRL for Financial Reporting," *Accounting Horizons* Vol. 22 (2008): 353-368.

25 J. Hunton, A. Wright and S. Wright, "The Supply and Demand for Continuous Reporting," *Trust and Data Assurances in Capital Markets: The Role of Technology Solutions* PricewaterhouseCoopers Research Monograph (2003): 7-16.

26 Hunton, Wright, and Wright. "The Supply and Demand," 7-16.

27 Dirk A. Zetzsche, "Corporate Governance in Cyberspace – A Blueprint for Virtual Shareholder Meetings," (June 19, 2005) CBC-RPS No. 0011.

28 Michael P. Cangemi, "XBRL – Will It Change the Paradigm?" *Financial Executive* Vol. 23, No. 8 (October 2007): 6.

RESEARCH STUDIES ON CONTINUOUS MONITORING AND ASSURANCE

Communicating the Tone from the Top

One study²⁹ demonstrated that (CM) had both functional and dysfunctional impacts on the investing behavior of management. A total of 72 corporate managers participated in the study which recorded their reactions to a hypothetical scenario. The study found that “implementation of continuous monitoring in organizations can yield a potential reward to the firm by discouraging certain types of inappropriate behavior”. Consequently, CA/CM can assist executive management who are looking to transform their organizations from 'excessive risk taking' to a 'culture of compliance'. However, the study also noted that in instances where the outcome of an investment decision is not objectively determinable there is the possibility that management will forgo potentially beneficial projects as CA/CM increases the level of 'risk aversion' in management. As a result, the deployment of CA/CM should be done in manner that minimizes this potential downside.

Early Detection of Fraud

As noted previously, the increased use of automated solutions to detect fraud is one of the forces driving organizations to adopt CA. A 2006 study analyzes the particular frauds that WorldCom's management used to deceive investors and assesses whether the “continuous auditing alarms” prescribed in CA literature would have caught the frauds.³⁰ In effect, this study provides guidance to auditors who are establishing CA initiatives (or planning a CA initiative) to leverage the lessons learned from the WorldCom debacle and ensure that their CA routines are able to identify the type of financial fraud that occurred at WorldCom. The study concludes that CA can be used to improve the ability of external auditors to catch such frauds. Table 1 summarizes the fraud scheme and the corresponding “CA alarm” that would flag the activity for further review.

Possible Alarms that would detect WorldCom type fraud

WorldCom Fraud Scheme	Proposed “CA Alarm”
Operating expenses were illegitimately reclassified as capital expenditures, which improved the “expenditure-to-revenue” (E/R) ratio by reducing the amount of expenses recorded in the current fiscal year.	Create an alarm that simultaneously identifies (1) reductions in operating expenses that exceed the industry average and (2) increases in capital expenditures that exceed the industry average.
Book values of acquired entities were illegitimately reclassified as goodwill on the books, which improved the E/R ratio by increasing the effective amortization period of the amounts in question.	Create an alarm that identifies increases in plant, property, equipment, and goodwill that differ significantly from historical averages.
“Taking a bath” by excessively writing down the assets included in the corporate acquisitions, which gave “the false impression that expenses were declining over time in relation to revenue (i.e., reducing the E/R ratio and increasing net income from operations)”.	Benchmark key ratios (e.g. E/R) against industry averages and generate an alarm when there is a significant discrepancy between the two.
Allowance for doubtful accounts was underestimated (along with the corresponding expense entry, bad debts expense) to falsely improve the E/R ratio.	Generate an alarm if the allowance for doubtful accounts differs significantly from the last month's ratio (i.e. to Accounts Receivable).

Source: J. Randel Kuhn and Steve G. Sutton, “Learning from WorldCom: Implications for Fraud Detection Through Continuous Assurance,” *Journal of Emerging Technologies in Accounting* Vol. 3, No. 1 (2006): 61-80.

29 James E. Hunton, Elaine Mauldin and Patrick Wheeler, “Potential Functional and Dysfunctional Effects of Continuous Monitoring,” *The Accounting Review* Vol. 83, No. 6 (November 2008): 1551-1570.

30 J. Randel Kuhn and Steve G. Sutton, “Learning from WorldCom: Implications for Fraud Detection Through Continuous Assurance,” *Journal of Emerging Technologies in Accounting* Vol. 3, No. 1 (2006): 61-80.

The ability of CA to catch Enron type frauds has also been examined in the literature. One article argued that “Enron’s transactions with its special purpose entities were abnormal in nature and detectable as such. For example, many of the ratios of Enron’s sub-entities would not have been consistent with their competitors and would have triggered an investigation. Also, an end-to-end flow analysis and monitoring of Enron’s component value additions would not have reconciled, triggering audit procedures to look for nondisclosed entities.”³¹ Another article³² suggested that CA would catch Enron-type fraud where a “continuous audit would focus on all processes, including those that are not a component of the financial report”. According to this analysis CA would have been able to detect such a fraud because it “might have revealed the cash flow problems of the company’s financing (both direct and indirect) prior to the company’s collapse”.

Continuous Auditing: The Highest Level of CAATs Maturity

One study³³ reviewed the level of adoption of CA and CM within the internal audit departments of 8 different organizations. It proposed a maturity model with several stages, including “traditional audit, emerging, maturing, and continuous audit”. The audit maturity of each organization was assigned based on their rating across seven domains: objective, approach, IT/data access, audit automation, audit and management sharing, management of audit functions, and analytic methods. Most organizations fell between “traditional audit” (stage 1) and “emerging” (stage 2).

31 Miklos A. Vasarhelyi, Alexander Kogan and Michael G. Alles, “Would continuous auditing have prevented the Enron mess?” *The CPA Journal* Vol. 72, No. 7 (July 2002): 80.

32 Donald J. Warren Jr., and L. Murphy Smith, “Continuous Auditing: An Effective Tool for Internal Auditors,” *Internal Auditing* Vol. 21, No. 2 (March/April 2006): 27-35.

33 Miklos A. Vasarhelyi and Siripan Kuenkaikaw, *Continuous Auditing and Continuous Control Monitoring: Case studies of technology adoption in leading internal audit organizations* (Rutgers University, 2009).

CASE STUDIES ON CONTINUOUS ASSURANCE PROJECTS

As interest in CM and CA has increased, practitioners and academics are publishing articles that provide insights into how CM and CA are being implemented and used and their future potential. This section summarizes the reported benefits and challenges of implementing CM and/or CA at Unibanco, Wells Fargo and Siemens.³⁴ The section also will identify continuing challenges associated with implementing CA.

Unibanco: “Productivity with Quality and Efficiency”³⁵

Unibanco is the third largest privately owned bank in Brazil. The bank earned US\$ 2.1 billion in 2007.³⁶ Unibanco's objective in implementing CA was to automate the monitoring of controls to identify anomalous transactions and thereby contribute to corporate governance. The CA Program at the bank had a wide scope that encompassed all technology-enabled products, processes, and services. The CA Program monitors 5 million customer accounts through 25 automated procedures, which work to identify errors, deter “inappropriate events”, avoid financial losses, and ensure compliance with laws, policies, norms and procedures.

Key Benefits

- *Greater Audit Coverage.* A large volume of accounts, 5 million, are reviewed, which would be impossible to do using manual audit procedures. Consequently, management has comfort over these transactions in terms of identifying errors/issues with respect to “customer advances”, customers who exceed their credit limits, bounced checks, and “[f]ederal tax payment cancellations” on a *daily* basis.
- *Regular Review of Transactions.* Approximately “200-400 accounts with unjustified “above the limit” drafts, on average are identified.”³⁷

Wells-Fargo: 100% Coverage of Banking Locations³⁸

Wells-Fargo is a major US financial institution with 3,300 banking locations spread over 23 states and \$1.3 trillion worth of assets.³⁹ The audit team recognized the limitations of traditional auditing methods, which only allowed them to audit 10% of their locations. With the move to CA, they were able to cover 100% of their locations. The CA project was implemented in six phases. This included, conducting a gap analysis where the gap between controls and risks was identified, building an understanding of the underlying data model, and implementing a pilot once the Key Risk Indicators (KRIs) had been identified. The project took 9 months of which 5 months was spent on identifying, developing, and validating the KRIs.

Key Benefits

- *Annual Savings.* Wells-Fargo saved \$400,000 *annually* with respect to travel costs associated with internal audit.
- *Focus on Key Risk Areas.* The company was able to redeploy 23,500 hours of internal audit labor to focus efforts on those areas deemed to be of higher risk and analyzing the root cause of errors which impacted the entire population of data.

³⁴ The information in this section was obtained from company presentations at various conferences on Continuous Auditing that have been held at Rutgers University.

³⁵ Miklos A. Vasarhelyi, “Continuous Audit: Today and Tomorrow,” *PPT Slide Deck* (Rutgers) <http://raw.rutgers.edu/18thwcas> (accessed July 9, 2009).

³⁶ Wikipedia contributors, “Unibanco,” *Wikipedia, The Free Encyclopedia*, <http://en.wikipedia.org/w/index.php?title=Unibanco&oldid=275590908> (accessed July 29, 2009).

³⁷ The report did not specify the period.

³⁸ Erica Ocana-Smith, “Case Study: Continuous Auditing at Wells Fargo,” <http://fei.mashnetworks.com/player.aspx?clip=0101071021&type=text&q=wells%20fargo> (accessed July 27, 2009).

³⁹ Wells Fargo 10K Annual Report https://www.wellsfargo.com/downloads/pdf/invest_relations/2008_10k.pdf (accessed July 30, 2009).

Key Challenges

- *Buy-In.* Obtaining support from audit executives, as well as operational management, is important given the significant amount of investment required for a CA initiative.
- *Defining Benefits.* The CA team needs to clearly define benefits or outcomes: this can be critical for getting buy-in from the executives.
- *Qualified Personnel.* The team needs to have members that are resourceful in identifying how to use existing data to meet CA testing requirements.
- *Continuous Improvement.* CA is not static and must be updated continually to meet the needs of the changing business environment and to consistently demonstrate value.
- *Communications.* Impacted parties must be made aware of how the move to CA affects them, including operational management and regulators. Regulators were concerned whether the new CA methodology would enable Wells-Fargo to opine on the effectiveness of controls. As a result, Wells-Fargo regularly updated their regulators on the progress of the CA project and addressed any concerns that they had.
- *Maintaining Independence.* To generate the KRIs, significant line management was involved. As noted in the case study, audit became viewed as a “partner”. As noted in the section below, maintaining independence is a continuing challenge within the deployment of CA.

Siemens: “Cost savings through greater productivity”

Siemens conducted an implementation pilot of CA in their IT internal Audit department of the US region. The pilot was conducted with the help of a team from Rutgers University.⁴⁰ The US region annually generates \$20 billion in sales and the IT internal audit department provides services for approximately 70,000 employees. They hoped that CA would allow them to achieve greater productivity, cost savings,⁴¹ reallocation of auditors' time to spend on other audit tasks, “improve skill level”, and quality of the auditor's work-life balance, and “[m]ove closer to real-time reporting”. The initial investment in the CA program was approximately \$1 million.

Key Benefits⁴²

- *Reduced Manual Testing.* The automation provided by CA enables Siemens to eliminate “manual-intensive sampling approach that has driven its audits for the last several decades”.
- *More Effective Audits.* CA enables audits to provide greater coverage with less effort.
- *Reduced Audit Cycle Times.* As CA forces the end-to-end standardization of the audit process – from documentation to analyzing results – audits take a “few days” instead of “weeks”.
- *Better Allocation of Internal Audit Resources.* Siemens was able to realize the goal of enabling auditors to spend more time on value-added efforts instead of the routine aspects of the traditional audit. In addition, the automation also allowed subject matter experts in the internal audit department to use their skills in more locations – as they could access the data remotely and did not need to travel there. This “saves time, money and ultimately results in higher-quality audits, as well as an improved quality of work life for the audit staff”, which were some of the original goals of the CA project.
- *Greater Transparency.* The specific tool used by Siemens enabled the internal audit staff to provide standardized communications with greater transparency to the auditees within Siemens.

⁴⁰ Michael G. Alles, G. Brennan, Alexander Kogan and Miklos A. Vasarhelyi, “Continuous Monitoring of Business Process Controls: A Pilot Implementation of a Continuous Auditing System at Siemens,” *International Journal of Accounting Information Systems* (2006): 137-161.

⁴¹ A savings of 25% would save Siemens \$19 million per year, which would far exceed the initial investment of \$1 million.

⁴² Brennan, “Continuous Auditing,” 1-2

Key Benefits (cont'd)

- *Greater Control over Testing.* The internal auditors were able to maintain greater control of the testing and reduce the ability of auditees within Siemens to manipulate configurations/settings.
- *Reduced Number of Key Controls.* Due to the “automated and transparent approach to auditing” the audit was able to “increase its reliance on automated controls and reduce the number of key controls it maintains, monitors and audits by revealing where it had unnecessary or overlapping controls”.

Key Challenges

- *Buy-in from External Auditors.* Obtaining external auditor buy-in early on in the project avoided after-the-fact second guessing by the external auditor about how Siemens' internal auditors conduct their audits.
- *Cultural Barriers.* The shift to a more automated audit moves both internal and external auditors out of their comfort zones. Rod Brennan, director of IT audit for Siemens observed: “We're probably our own worst enemy as internal auditors because [continuous auditing] scares us from a standpoint of job security, new skills and technical activities”⁴³.
- *Formalizing Manual Audit Procedures.* Alles et al. note that “formalizing manual audit procedures to facilitate automation is much more difficult than might have been anticipated”⁴⁴.
- *Limited Ability to Re-engineer.* Although reengineering the audit process would optimize the CA process, it was determined that an intermediary step is required. That is, within the CA project Siemens first had to automate existing audit procedures rather than reengineer them.
- *Managing Volume of Audit Data.* CA tests that were oriented towards “time-series” (e.g., accounts receivable or accounts payable) had to be retained longer than data that was reviewed for conformance with standards or business rules (e.g., password met length requirements). The latter could be deleted as once it was proven to conform it was no longer needed. On the other hand, if it was proven not to conform then it would be reviewed in greater detail as an exception.
- *Security and Confidentiality of Data.* Test-related data should not be retained longer than necessary and the data should be kept secure to ensure that the weaknesses identified are not disclosed to unauthorized parties who could take advantage of those weaknesses.
- *Tuning of “Alarms”.* The CA process was set-up to alert internal audit when a problem or exception was identified that needed to be investigated (similar to Unibanco). Alles et al. report: “The worst case outcome of the alarm flood happens if the enterprise personnel decide to ignore the ...alarms altogether, or if the auditor is forced to switch all the ...system alarming off”. Consequently, “overly conservative” tendencies of audit professionals could result in the situation where the audit team is overwhelmed with false positives and this could undermine the project.⁴⁵

43 Eric Krell, “Continuous Auditing is Here to Stay,” *Business Finance* Vol. 12, No. 3 (March 2006): 22-26.

44 Alles et al. “Continuous Monitoring”, 137-161.

45 Alles et al. “Continuous Monitoring”, 137-161.

CONTINUING CA CHALLENGES

Lack of System Integration

Although system integration has come a long way, companies continue to have computing environments that are problematic in the following ways:

- significantly disaggregated and decentralized
- infrastructure handling much of the data includes an array of legacy systems with various underlying technologies
- large number of mainframes and minicomputers that are geographically dispersed
- numerous customer networks in addition to their own operations
- management routinely elects to retain acquired systems and create complex interfaces
- numerous billing and accounts receivable systems outside the ERP system

In such environments, CA routines would likely be unable to detect fraud such as WorldCom's. In other words, CA and CM will likely be unable to achieve the maximum potential benefits in environments that are not standardized and are widely dispersed.

Lack of Data Integrity

A CICA publication aimed at Boards of Directors lists data integrity as one of 20 key issues that Directors should be concerned with.⁴⁶ Yet many Boards do not address it, placing responsibility for it solely on the CFO, CIO or IT department.⁴⁷ A 2007 survey⁴⁸ of financial executives found that a significant portion of respondents had concerns about their organization's information integrity, with a majority reporting that their current level of information integrity was hampering their ability to attain their business objectives. It might seem that data integrity problems would provide fertile ground for the implementation of all manner of audit techniques, including CA and CM. However, when data integrity problems are pervasive, continuous monitoring systems can become overwhelmed, leading to potentially costly but unrewarding investigations of data and undermining the economic advantages of CA and CM approaches. Paradoxically, organizations must first clean up their data to provide a suitable environment for the implementation of cost-effective CM and CA programs.

Working with Process Owners to Implement Continuous Monitoring

Some CA routines are suited to being recast as CM routines that are then "owned" by management rather than the auditor. The auditor's role would then be to assess whether the CM procedures are operating correctly and continuously throughout a period rather than performing those procedures. One problem that arises here is that the auditors who help implement CM procedures may then be precluded from assessing those procedures since auditing their own work would be a threat to their objectivity and independence.

46 CICA (Canadian Institute of Chartered Accountants), *20 questions directors should ask about IT* (Toronto, ON: CICA; 2002).

47 J. Efrim Boritz, "IS Practitioners' Views on Core Concepts of Information Integrity," *International Journal of Accounting Information Systems* Vol. 6 (2005): 260- 279

48 Financial Executives International, *Technology Issues for Financial Executives*. (2007) 9th Annual Report. Joint publication of the Financial Executives International, Financial Executives Research Foundation and Computer Sciences Corporation. (September 30, 2007).

Maintaining Auditor Objectivity and Independence

CA tools that are embedded in the auditee's system may impair the auditor's objectivity because as noted in the case studies above, to implement CA, the team needs to work with the process owners in order develop the routines. That is, if business line management is antagonistic to the CA project it can be difficult to achieve the desired benefits. However, at the same time the auditors must maintain control of the CA application and their objectivity when managing the CA process on a day-to-day basis. If the threat to objectivity is high, CA tools that are independent of the system (e.g., analyze the data independently of the system) should be used. Internal auditors must also establish procedures and ownership rules to ensure that the auditor-auditee relationship is maintained. For example, internal auditors should retain ownership of CA scripts that line of business management may use – but not modify.⁴⁹

Demonstrating ROI

A significant hurdle for implementers of CA internal audit or others that would like to implement CA is demonstrating the ROI to executive management.⁵⁰ “Management is often reluctant to spend funds on technology initiatives unless the benefit of such technology and business measurement can be effectively demonstrated, such as by a determination of ROI.”⁵¹ Another related issue is the training and communications effort required to get staff to fully understand the continuous auditing process and its output.

CAATS: Bridging Between Traditional Auditing and Continuous Auditing

Using the CA methodology can be an answer to the growing demand to increase audit efficiency without compromising audit effectiveness. However, there is a gap between the traditional audit environment and the technology-driven CA environment. Audit managers could bridge the gap between the current technological skills of an auditor and the skills that would be needed in a continuous audit by increasing their usage and understanding of computer assisted audit tools and techniques, especially generalized audit software.⁵² However, one article cautions that the transition from generalized audit software to continuous monitoring in a bank, although technologically feasible and desirable, could not be implemented until the implementation of continuous monitoring met the security requirements of the entity's server.⁵³

Audit Maturity Model: From Manual Procedures to CAATs to CA and CM

The concept of maturity models is well known within the software development field as well as in the field of IT controls. The IT Governance Institute's COBIT proposes a 6 level maturity model to measure the effectiveness of the control environment. The concept may be applied to auditing (not restricted to internal auditing) as well.

- Level 0: “Non-existent” – An audit function does not exist or is not performed.
- Level 1: “Informal manual audit” – Individual(s) perform audit tasks on an ad hoc basis, but do so without formalized policies or procedures.
- Level 2: “Formal Manual Audit” – An audit function is established with a charter and set of standard operating procedures that govern its tasks and roles.

49 Jill J. Daigle, Ronald J. Daigle and James C. Lampe, “Auditor Ethics for Continuous Auditing and Continuous Monitoring,” *Information Systems Control Journal* Vol. 3 (2008): 1-4.

50 Warren and Smith, “Continuous Auditing,” 27-35.

51 Warren and Smith, “Continuous Auditing,” 27-35.

52 Robert L. Braun and Harold E. Davis, “Computer-assisted Audit Tools and Techniques: Analysis and Perspectives,” *Managerial Auditing Journal* Vol. 18, No. 9 (2003): 725-731.

53 Roger Debreceny, Sook-Leng Lee, Willy Neo and Jocelyn Shuling Toh, “Employing Generalized Audit Software in the Financial Services Sector: Challenges and Opportunities,” *Managerial Auditing Journal* Vol. 20, No. 6 (2005): 605-619.

- Level 3: “Ad hoc Technology Enabled Audits” – The formal audit function uses technology to complete its audits but in an ad hoc way. If specific tools are used, they are not used consistently nor are the audit staff well-versed in using them.
- Level 4: “Technology Enabled Audits” – The formal audit function uses technology wherever possible and works to automate remaining manual procedures. Staff is comfortable and capable in using audit tools, such as generalized audit software. Policies and procedures exist that govern the planning, design, and execution of technology enabled audits.
- Level 5: “Continuous Auditing” – Audit evidence is gathered in real time or near time and the auditor can assess the reliability of reported information without significant manual efforts or reconciliations.
- Level 6: “Optimized Continuous Monitoring and Auditing” – Continuous Monitoring is performed by business process owners and Continuous Auditing is performed to verify the continuous operational effectiveness of the Continuous Monitoring procedures.

The previously mentioned study of eight internal audit organizations suggests that much work needs to be done to raise the maturity of auditing. Some actions that may be taken in this regard include:

- Formalize audit procedures.
- Involve the audit function in the systems development lifecycle and change management process.
- Encourage auditors to explore ways to automate key audit procedures.
- Ensure that auditors are capable of using technology and audit tools, such as generalized audit software.
- Increase the visibility of the audit process to business process owners and top management.

Conclusion

With the recent advances in technology, greater demand for automated fraud detection, changes in the regulatory environment, and the move towards XBRL reporting, organizations are increasingly looking toward CA as a means to make audits more effective, manage audit and control costs and provide value to business management. Many of the tools used in CA are similar to the CAATs that can be used in non-CA contexts. Investments in such tools and the personnel who operate them can be an effective forerunner to the deployment of CA. This is due to the fact that the success of a CA program depends upon the ability of auditors to obtain assurance through automated routines that interrogate the data. Data-oriented CAATs require the audit specialist to delve deep into the data structure and use their resourcefulness and creativity to develop audit testing routines. However, a significant pre-requisite to such an endeavor is to develop an understanding of the data structure, which most likely is not fully documented. This work, and the experience gained by the auditor, can then be leveraged for a full-fledged CA program.

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