The Intelligent Real-Time Enterprise and Continuous Auditing

Institute of Internal Auditors

Dallas / Fort Worth
February 2, 2006

Phil Samson

© 2006 PricewaterhouseCoopers LLP
Outline of Today’s Presentation

- Demands Faced by IA as Technology Complexity Increases
- Technology Forecast Observations
- Continuous Auditing
- Conclusion
Outline of Today’s Presentation

- Demands Faced by IA as Technology Complexity Increases
- Technology Forecast Observations
- Continuous Auditing
- Conclusion
Internal Audit Challenges: Five Transformational IA Trends

- Realignment of IA to ensure greater independence
- Stronger relationships with the audit committee
- Fostering enterprise compliance with new statutes and regulations
- Focus on risk
- Leveraging technology
  - “Continuous auditing (or Real Time Auditing RTA) is emerging as the next transformational trend.”
Internal Audit Challenges:

- Difficulty hiring and retaining staff members who can quickly integrate into IA and develop an understanding of company business processes.

- Management wants IA “more connected” to business process monitoring and risk.

- Developing IA expertise with technologies used by the organization.

- The need to create a data-driven auditing approach to identify and address risk with less emphasis on hunches.
Outline of Today’s Presentation

- Demands Faced by IA as Technology Complexity Increases
- Technology Forecast
  - Observations
- Continuous Auditing
- Conclusion
Technology Forecast Observations: Business Drivers Impacting Information Use

- **Competition** and the need to constantly evaluate business strategy effectiveness

- **Legislation** and **regulations** are increasing the need for more transparent and responsive access to information
  - Sarbanes-Oxley, similar legislation
  - Anti-Money Laundering
  - Basel II
Technology Forecast Observations: Business Requirements for Information Systems

- **End-to-end business process automation**
  - Ability to reconfigure and monitor processes rapidly – including relationships with suppliers and partners

- **More relevant data for complex business decisions**
  - Improved ability to extract data from existing applications and from multiple business units

- **Easier to use, self-service Business Intelligence software . . . fewer spreadsheets.**

- **Ability to evidence business process controls**
  - Sarbanes-Oxley and similar initiatives, anti–money laundering, Basel II requirements, etc.
Technology Forecast Observations: The Intelligent Real-Time Enterprise

- **Responds to** the need to make more timely and effective decisions
- **Requires** the ability to monitor and manage business processes in real-time
- **Enabled by** end-to-end automation of business processes
- **Confident** in the integrity of its information systems.

*How does a Real-Time Enterprise monitor itself?*
Technology Forecast Observations: Business Intelligence (BI) Has Expanded Beyond the Data Warehouse

- Digital dashboard
- Traditional data warehousing
- Fraud detection
- Audit
- Continuous audit

Highly aggregated
Transaction-specific
Real time
Historical data
Technology Forecast Observations: Business Intelligence (BI) Has Expanded Beyond the Data Warehouse

- Traditionally, BI focused on highly-aggregated and historical data
  - Now encompasses data that is more granular and more current (even real-time)

- Digital Dashboards provide information in a continually updated display (“push” delivery)
  - Dashboards are customized for specific management roles

- Key Performance Indicators (KPI) monitor major factors influencing the success of specific processes or the entire enterprise
  - Uses a combination of historical and current data
Technology Forecast Observations: Business Intelligence (BI) Has Expanded Beyond the Data Warehouse

- **Activity Monitoring and Alerts / Event Notification**
  - Monitor business processes for departures from expected behavior or to detect whether predefined thresholds are exceeded
  - Provide that information to other applications (via an event) or to a person (via an alert)

- **Transaction-specific uses of BI**
  - Used in monitoring specific types of high-risk, high-impact transactions (e.g., fraud detection)
  - Used for planning business processes (e.g., re-routing order fulfillment to another location)
Supply Chain Cycle Times
Understand the time taken to progress orders through the various stages of the Supply Chain Cycle to enable understanding of lead times.

Inventory Degradation
Provides information on the breakdown of inventory degradation by cause displayed over time to allow trend analysis.

Customer Delivery Performance
Figure 2—Digital dashboard in BusinessObjects WebIntelligence

Delivery Performance Change for Period "Current Full Year" to "Last Full Year"

<table>
<thead>
<tr>
<th>Metric</th>
<th>01-Oct-2000</th>
<th>01-Oct-2009</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change Perfor Delivery Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Damages Free Rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Early On Time Rates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Correct Shipping Doc Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Correct Invoice Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change Correct Installation Rate</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Change Perfor Delivery Rate: 4%
- Change Damages Free Rates: 0%
- Change Early On Time Rates: 0%
- Change Correct Shipping Doc Rate: 0%
- Change Correct Invoice Rate: 0%
- Change Correct Installation Rate: 0%

Days of Sale
Use as a strategic tool to identify whether changing the location of stock could improve the efficiency or reduce the risks within your supply chain.

Delivery KPI Dashboard
Enables easy access to the key information used to measure the performance of the delivery process.

Source Headlines

Source KPI Dashboard

- Count Purchase Orders
  - 01-Oct-2009: 205
  - Change: 62.1%

- Sum of City Received
  - Change: 46.5%

- Supplier Spend
  - 01-Oct-2009: 529,247
  - 01-Aug-2009: 493,558
  - Change: 5.7%
Technology Forecast Observations: Relevant Technologies

- **BI tools automate the process of:**
  - Aggregating operations data, Analyzing it, Distributing the resulting information to decision makers

- **BI tools can be used across the enterprise**, making their capabilities available in real time, to increasingly larger user communities

- **BI will monitor information on a continuous basis**, as well as provide information on request

- **Multitude of BI vendors** including Applix, Business Objects, Cognos, DataMirror, IBM, Information Builders, MicroStrategy, ProClarity, SAS, SL Corp, Sybase, and many more.

*Why are BI tools needed?*
Technology Forecast Observations: Multisource Business Intelligence Architecture

- Tailor functionality and content
- Distribute to respective persons/devices

Operational Sources
- ERP
- SCM
- SFA
- CRM
- Contact Center
- Third Party
- Web/E-Commerce

Multichannel Data Integration Infrastructure
- Data Preparation (ETL):
  - Extraction
  - Transformation
  - Loading

Operational Query and Reporting

Metadata

Data Warehouse

ETL/EAI

EAI (for real-time analytics)

CRM Analytics

Finance & Accounting Analytics

HR/Workforce Analytics

Supply Chain Analytics

Analytics, Metrics, KPIs

Portal/Digital Dashboard

In Consumers
- Employees (analysts, executives, and managers)
- Partners (suppliers and distributors)
- Mobile Users (employees and partners)
Technology Forecast Observations: Other Aspects of Enterprise Intelligence

- Provides the **infrastructure necessary for real-time business intelligence services**
- Increased use of **XML, XBRL and self-describing data**
- **Use of graphical modeling tools** for designing business processes and the applications that implement them
Technology Forecast Observations: XBRL Can Facilitate Corporate Reporting

- **XBRL** (eXtensible Business Reporting Language) is a standard (based on XML) for business reporting
- Provides a set of common “tags” to allow industry-specific application-to-application exchange of financial and accounting information
- Data presented in industry’s format and units.
- Data can be exchanged within the enterprise and inter-enterprise
Technology Forecast Observations: The Business Reporting Problem

- Collection, distribution, and assembly of corporate financial reports is complicated by lack of standards

- This is a problem for:
  - Companies that still use manual (e.g., spreadsheets) methods to integrate information from multiple systems for reporting purposes
  - Investors who have no easy way to collect and analyze information from multiple companies
  - Credit analysts who have no easy way to process company financial information automatically
  - **Auditors**, regulators, taxing authorities, etc.
Technology Forecast Observations: XBRL is Applicable at Many Points in the Corporate Reporting Supply Chain
Technology Forecast Observations: Composite Applications

- **Composite applications** – encapsulate functionality from across an application suite (and third-party applications) to allow easy integration of functions
  - Allow new applications that consolidate information from multiple modules of an enterprise suite

- **Examples:**
  - SAP’s xAPPs,
  - PeopleSoft’s AppConnect,
  - Oracle’s Business Flow Accelerators
Business Process Monitoring: Example: Oracle Internal Controls Manager

- Document Business Processes and Support Compliance
- Validate and Certify Internal Controls and Compliance
- Process Control Limit Measuring Tools
- Sampling and Statistical Tools
Business Process Monitoring: Other BI for Auditors Examples

- **Applimation Integra Transaction**
  - Define thresholds to monitor sensitive accounts
  - Monitor specific transaction types to detect anomalies
  - Sample transaction data for quarterly and annual audits

- **LogicalApps’ ACTIVE Policy Governor**
  - Continuous, real-time monitoring of key transactions, as well as changes made to application setups and master data
  - Automatic notification of control violations, inappropriate business activities or suspicious activity
  - Continuous, real-time monitoring of key transactions, as well as changes made to application setups and master data
  - Automatic notification of control violations, inappropriate business activities or suspicious activity
Outline of Today’s Presentation

- Demands Faced by IA as Technology Complexity Increases
- Technology Forecast Observations

- Continuous Auditing

- Conclusion
Continuous Auditing: Definitions

Per the Global Technology Audit Guide, *Continuous Auditing* available on the IIA website:

- **Continuous Auditing** – any method used by *auditors* to perform audit-related activities on a more continuous or continual basis

- **Continuous Risk Assessment** – identifies and assesses risks by examining trends for the purpose of modifying the risk value of an entity, process, service, or product.

- **Continuous Monitoring** – *management’s* automated controls / process monitoring.
Continuous Auditing: Background

- Limited use goes back at least three decades
- Query-based reporting associated with specific business process audits and IA planning.
- Evolving from *Asking-the-Systems* to *Systems Telling*
Continuous Auditing: Today’s Drivers of Continuous Auditing

- **Technical maturity** - XBRL, ERP maturity, improved cross-application reporting technology, shortened financial reporting deadlines, and increased focus/reliance on controls.

- **Changing governance perception** that real time assurance provides greater assurance and greater likelihood to detect fraud.

- **Auditors should be utilizing the company’s technology** to assess controls & compliance.

- **The merging of Business Intelligence capabilities and Continuous Auditing needs.**

*Some of today’s Continuous Auditing Examples include:*
Continuous Auditing: Examples: Oracle Financials

- PO's over a certain dollar limit
- Manual journals over a certain dollar limit
- Journals that were created/approved/posted by the same individual
- Payments to certain vendors
- Orders from certain customers
- Changes to key standing data (GL accounts, ledger setup)
- Changes to Customer Credit Limits
- Changes to default depreciation life, method and prorate convention for Assets in service
- Vendors placed on/off hold
- Changes made to PO approval hierarchy or buyers
- Customers placed on/off credit hold
- Orders shipped by non-shipping personnel
Continuous Auditing: General Examples

- **Overrides** - Any significant deviations from the average range of management override transactions, even if they are also reported to management.

- **Exceptions** - Significant increases in number of items on exception reports given to management.

- **Segregations of Duties**
  - Increase (or decrease) in the number of authorized users with access to key functions
  - Changes to privileges in application security roles
  - Changes to the number of active application roles
Continuous Auditing: Examples: Stress-in-the-System Monitoring

- Significant changes to the number of “one-time” vendors
- Significant changes to the number of invoice approval days outstanding
- Significant change in PO aging days against received items
- Significant change in item receipt to invoice days
- Significant differences in number of days between invoice date and invoice entry date.
- Sales returns exceeding thresholds during the first 5 days of the month.
Continuous Auditing: Business Process Outsourcing (BPO)

- BPO does not reduce management or IA’s responsibility to monitor operations and controls.
- BPO’s are not inherently more controlled. However, processes may be more standardized.
- SAS 70’s and Agreed-Upon Procedures may reduce SOx efforts for key controls at BPOs, but they provide limited continuous assurance of process and control effectiveness apart from “key” controls.
- Outsourced functions should received the same amount of raw consideration in the IA Risk Assessment and CA as non-outsourced functions.
Continuous Auditing: Benefits

- Increased ability to identify and monitor risk.
- Analyzing 100% of the transactions . . . in near real-time.
- IA develops a much better understanding of business processes and their underlying controls during the effort to implement continuous auditing.
- IA in a better position to discuss with management changes in the business and the effect on controls.
- IA can better identify root-cause from their knowledge of business performance measurements and control breakdown symptoms.
Continuous Auditing:
Benefits (cont.)

- Management can benefit from utilizing a similar approach to monitoring the company’s controls health.
- Employee knowledge that transactions are being continuously monitored (e.g., red-light cameras).
- Helps validate the comfort management receives in their own data-driven monitoring processes.
- Rapid identification of issues allowing rapid resolution and remediation.
- Ability to monitor the effectiveness of control and process improvements.
Continuous Auditing: Implementation Challenges

- Translating risk into monitorable events
- Changing risk prioritizations in IA and the company
- Voluminous and dispersed data, poor data quality
- Inadequate technology infrastructure for automated monitoring
- Changing business practices obscure monitoring intent
- IA CA knowledge management to maintain monitoring mechanisms and triggers
- Enhanced IA productivity resulting from Continuous Auditing does not mean IA cost savings
- Implementing CA in a BPO (or auditing around the BPO)
## Continuous Auditing: High-Level Decision Matrix

<table>
<thead>
<tr>
<th>Business Process / Application System</th>
<th>TCG Strength</th>
<th>Application Controls Quality</th>
<th>Data Quality</th>
<th>IT SMEs Avail.</th>
<th>IA Risk Rank</th>
<th>Strength of Mgmt Monitoring</th>
<th>IA Purpose: (RA - Risk Assess.; APEX - Audit Planning/Execution; FU - Follow Up; CA - Corp. Auditing)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Order Management</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- PO (Oracle)</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Medium</td>
<td>RA - Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>APEX - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FU - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CA - Low</td>
</tr>
<tr>
<td><strong>Inventory (receipt, returns, release to mfg, release to distribution)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Inventory Management (BAAN)</td>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
<td>RA - Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>APEX - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FU - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CA - Low</td>
</tr>
<tr>
<td>- Inventory Supplier Fcst (ABC)</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Low</td>
<td>High</td>
<td>RA - Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>APEX - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FU - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CA - Low</td>
</tr>
<tr>
<td>- EDI Link (XYZ) (outsourced)</td>
<td>SAS 70</td>
<td>Medium</td>
<td>Medium</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>RA - Yes</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>APEX - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FU - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CA - Low</td>
</tr>
<tr>
<td><strong>Payables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Accounts Payable (Oracle)</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>Medium</td>
<td>RA - Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>APEX - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>FU - High</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>CA - High</td>
</tr>
</tbody>
</table>
Continuous Auditing: Interplay between SOx Efforts and CA

- Ineffective SOx “key” management monitoring controls should lead to enhanced CA in that area, especially if the CA design previously contemplated strong management monitoring.

- Early warning of potential ineffective SOx key controls or excessive controls stress.

- Some credit towards SOx for CA efforts (Control Environment, Monitoring)
Continuous Auditing: The Path Forward

- Get executive management buy-in for CA. An official internal audit is not the only reason IA will question management about potential issues.

- Add technology awareness to the risk assessment

- Use the company’s BI tools and participate in their acquisition

- Start small, initially avoiding complex data sources

- Leverage management’s existing monitoring activities and add a controls-focus
Continuous Auditing:
The Path Forward (cont.)

- Less focus on areas already receiving significant risk-focused attention from management, instead, those areas can be assessed in the more traditional methods (e.g., audits)
- Get involved early in new system implementations to include continuous auditing requirements and obtain BI tool training
- Enlist support from an IT data / application SME to assist in developing / maintaining monitoring systems
- Closely monitor the initial CA results (e.g., break-in period) to establish acceptable data ranges and reduce the false positives
Continuous Auditing: The Path Forward (cont.)

- **Don’t over engineer monitoring process.** For example, if you don’t have consistent resources to develop and maintain an Internal Audit datamart, don’t create a datamart. Utilize scheduled reporting and analysis processes instead (weekly, monthly, quarterly).

- **While management may want to integrate CA into their existing monitoring processes, avoid being given the management controls monitoring responsibility**

- **Understand the data quality, the underlying ITGC, and the Application controls before selecting a CA area**

- **Managing expectations** that “Internal Audit should have caught that” in a CA environment. Make sure that the AC and Executive management knows that you are monitoring, but only where the IA Risk Assessment leads.
Continuous Auditing: The Path Forward (cont.)

Your first attempt at Continuous Auditing should not look like:
Outline of Today’s Presentation

- Demands Faced by IA as Technology Complexity Increases
- Technology Forecast Observations
- Continuous Auditing

- Conclusion
Conclusion: Real-Time Intelligent Enterprise

- The transition to the intelligent real-time enterprise will be a key focus of IT efforts over the next few years.

- Many technologies – not just traditional “business intelligence” – are part of the intelligent enterprise:
  - Focus has shifted from highly-aggregated and historical data to less aggregated and real-time data.

- The time for Continuous Auditing is arriving with the introduction of specialized “audit and compliance” Business Intelligence tools.

- Increased focus on IA to help monitor business controls in a more real-time manner.
Sources and Additional Information

- Technology Forecast: The Intelligent Real-Time Enterprise; PricewaterhouseCoopers 2003

- Continuous Auditing: Implications for Assurance, Monitoring, and Risk Assessment; David Coderre, Global Technology Audit Guide; 2005 The Institute of Internal Auditors Research Foundation

- Continuous Audit: The Motivations, Benefits, Problems and Challenges Identified by Partners of the Big 4 Accounting Firms; IEEE Computer Society; DeWayne Searcy, Jon Woodroof and Bruce Behn; 2002

- Continuous Auditing: An Operational Model for Internal Auditors; Mohammad J. Abdolmohammadi, DBA, CPA and Ahmad Sharbatouglie, Ph.D; 2005 The Institute of Internal Auditors Research Foundation