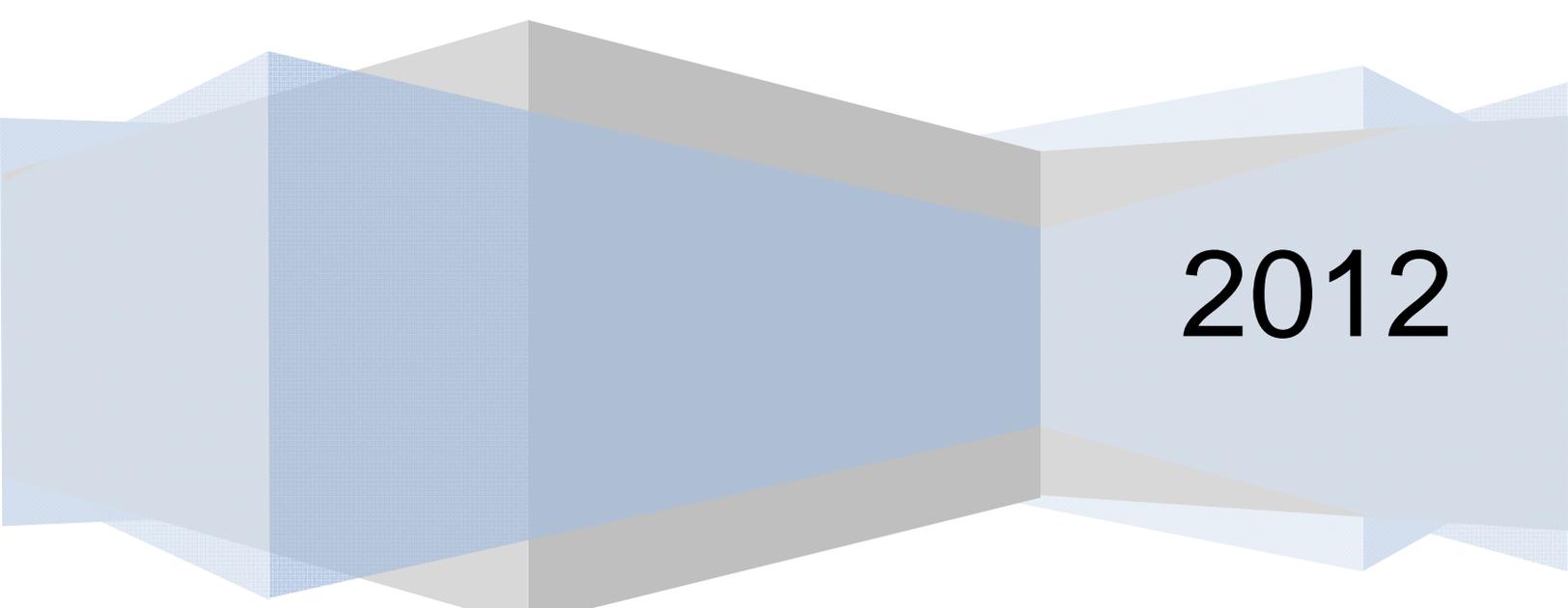




Cloud Computing: A Study of Internal Audit's Preparedness in the Dallas Area

The Research Committee of the Dallas Chapter of the IIA

A decorative graphic consisting of several overlapping, semi-transparent blue and grey geometric shapes, resembling a stylized wave or a series of connected blocks.

2012

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Introduction

Cloud computing is a fast-growing industry. According to Gartner, Forrester, and other leading industry and research organizations, the worldwide market of cloud computing users is expected to skyrocket. Indeed, Gartner predicts that the market will rise from \$58 billion in 2009 to \$150 billion in 2013 (Gartner, 2010) and Forrester predicts that the market for cloud computing is going to increase from about \$41 billion in 2010 to \$241 billion in 2020 (O'Neill, 2011). Several other studies lend credibility to the prediction that cloud computing is here to stay and will see tremendous growth, as will be discussed in our Literature Review. Given the anticipated rise of the cloud computing market, the Dallas IIA Research Committee (“Committee”) saw an opportunity to gain insight into the impact of this technology on Dallas-area Internal Audit departments.

The key objective of this research project is to gain an understanding of the existing state of awareness of cloud computing and the implications of this new technology on the Internal Audit profession. Our research methods incorporated a review of existing studies related to cloud computing. The Committee then surveyed the members of the Dallas Chapter of Institute of Internal Auditors to gain a local perspective on the research topic. The survey sought to determine the overall awareness, preparedness, and involvement of Internal Auditors with respect to cloud computing. Results, findings, and future opportunities observed through analysis of survey results are also presented in later sections of the paper.



Literature Review

The Committee commenced its study with a review of existing studies related to cloud computing risks in order to gain an understanding of the current state of the industry on a national and global level. Following are the definitions, articles and studies we utilized in our analysis.

Cloud Computing Definition

Fundamentally, Wikipedia defines cloud computing as the delivery of computing as a service rather than a product (Wikipedia, 2012). For the purposes of this study, the research committee of the Dallas Chapter of Institute of Internal Auditors will adopt the more elaborate and formal definition provided by the National Institute of Standards and Technology (NIST): “Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction (Grance & Mell, 2011).” The NIST goes on to state that the following are essential characteristics of the cloud computing model:

On-demand self-service- Unilateral provisioning of computing capabilities (i.e., server time and network storage) is performed automatically, without human interaction with a service provider.

Broad network access- Capabilities are available over the network via thin or thick client platforms, such as mobile phones, tablets, laptops, and workstations.



Resource pooling- Multiple consumers are served using a multi-tenant model, with different physical and virtual resources dynamically assigned and reassigned according to consumer demand.

Rapid elasticity- The provider can elastically (sometimes automatically) provision and release resources commensurate with demand. To the consumer, the capabilities often appear to be unlimited and can be appropriated in any quantity at any time.

Measured service- Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service (Grance & Mell, 2011).

The above characteristics are all inherent within the service delivered by a cloud service provider. The cloud service itself can then be administered to consumers, according to NIST, in any of the following service models:

Software as a Service (SaaS) - The user runs applications on the provider's cloud infrastructure, which is accessible from client devices. The consumer does not control the infrastructure, but may be able to apply user-specific application configuration settings.

Platform as a Service (PaaS) - The consumer may deploy consumer-created or acquired applications on the provider's infrastructure, in formats supported by the provider. The consumer still does not manage or control the underlying cloud infrastructure, but has control over the deployed applications.

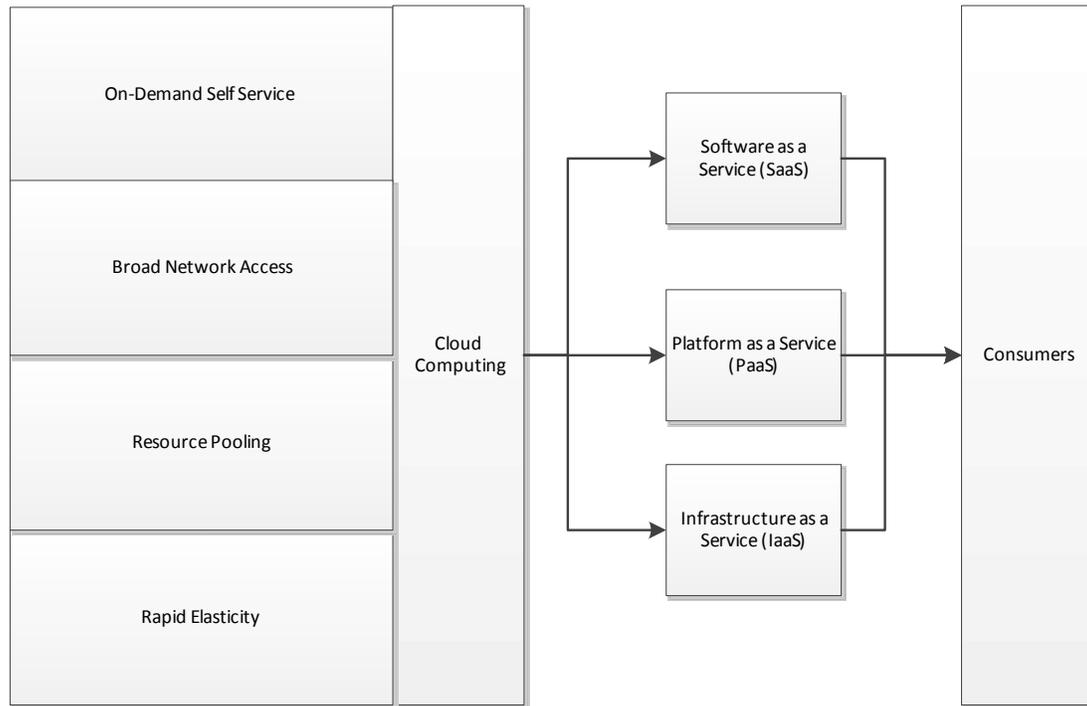


Infrastructure as a Service (IaaS) - Consumers may provision processing, storage, networks, and other fundamental computing resources, and may deploy and run arbitrary software over the provider's infrastructure. The consumer does not manage or control the underlying cloud infrastructure, but does have control over operating systems, storage, and deployed applications (Grance & Mell, 2011).

Additionally, the Bring Your Own Device "BYOD" model is also used by a number of organizations to allow consumers to use their own personal devices (laptop, smart phones, etc.) to access the provider's network. However, BYOD is more of a service strategy and not necessarily a cloud service unto itself. The essential characteristics of cloud computing comprise the basic definition of cloud computing, while the service models expand the definition to illustrate how cloud computing can be provided as a service. This relationship is depicted in the diagram on the next page.



Relationship of Cloud Computing Concepts



Growth of Cloud Computing

The adoption of cloud-based applications and outsourcing of services through cloud-delivered mechanisms is gaining in popularity. This is due primarily to the unique value proposition of cloud computing, which boasts at least two key benefits for customers: First, companies that utilize cloud computing tend to have leaner, more nimble, and better adaptable IT environments, and are better able to control their IT spend. Second, companies inclined to reduce capital expenditures have the ability to shift their cost structures accordingly (Thethi, 2009).

The benefits of cloud computing, however, are not without their potential downsides. First, there is the potential that data hosted by the service provider could



be lost, stolen, or comprised. Second, it is possible that the service provider may not have adequate capacity to meet demand, which can result in loss of service to the customer. The topic of how to obtain assurance that the service provider has adequate controls in place to mitigate the risks associated with loss of data and/or loss of service is therefore very relevant. The customer's ability to develop adequate controls to cover user control considerations also becomes critical. Thus it is worth asking whether or not companies considering adopting cloud computing have adequately considered the risk of a cloud-based IT strategy, and whether Internal Audit has been consulted to advise on risk. These points will be investigated and expanded upon in the Research Method section.

In any case, the adoption of cloud computing has increased rapidly in the past five years, and is expected to continue to soar in the years to come based on a number of studies. Findings from the studies reviewed by the Committee are summarized below.

Trending of Increased Outsourcing of IT Resources and Business Processes

In early 2010, Gartner, Inc., a highly reputable information technology research company, noted that by 2012, 20% of businesses will own no IT assets (Gartner, Gartner Highlights Key Predictions for IT Organizations and Users in 2010 and Beyond, 2010). Gartner based this prediction on several factors, such as the trend towards decreased IT hardware assets, virtualization, cloud-enabled services, and the use of personal employee-owned desktops and notebooks running on corporate networks. In



addition to the above prediction, Gartner believes that by 2016, more than 50% of Global 1000 companies will have stored customer sensitive data in the public cloud.

Significant Growth of the Cloud Computing Industry

A number of studies indicate that cloud computing is a high growth industry.

Findings from three of those studies are noted below:

- Gartner estimated that the market for cloud services will nearly triple from \$45 billion in 2009 to \$150 billion in 2013 (Gartner, Gartner Newsroom, 2010).
- Forrester predicts that the market for cloud computing is going to increase from about \$41 billion in 2010 to \$241 billion in 2020 (O'Neill, 2011).
- Markets and Markets, a full service market research company, noted that the global cloud computing market is expected to grow from \$37.8 billion in 2010 to \$121.1 billion in 2015 at a compounded annual growth rate (CAGR) of 26.2% from 2010 to 2015. SaaS is the largest segment of the cloud computing services market, accounting for 73% of the market's revenues in 2010 (Marketsandmarkets.com, 2010).

Proliferation of Cloud and Impact to Internal Audit Profession

Cloud computing offers many advantages. However, as noted above, those advantages come with additional risk. The drastic increase in the adoption of cloud computing requires that Internal Audit professionals are aware of the uses and risks associated with this technology.



Key Focus Areas of the Research Study (Scope)

Although a number of opportunities for research exist in this area, the committee focused specifically on the aspects related to Internal Audit profession. The areas of focus are:

- Internal Auditors' awareness of cloud adoption
- Perspectives of Internal Auditors about the cloud with respect to the 'Hype Curve'
- Internal Auditors' cloud risk perceptions and mitigation plans
- Trends in cloud adoption

Findings from our literature review are summarized below.

Internal Auditors' Awareness of Cloud Adoption

A recent study by Microsoft Canada noted that a number of organizations are unclear about their own adoption of cloud technologies. The study states that 19% of Canadian businesses who thought they weren't using cloud services actually were leveraging cloud computing solutions (Microsoft, 2011). In addition to such misunderstanding, the term "cloud computing" itself is a widely misunderstood term. The study found the terms actual cloud hosting versus software delivered on demand are being used interchangeably. In such an environment, the Internal Audit professionals may also tend to misinterpret the concept and the associated risks, which could set a dangerous precedent. As Jack Uldrick notes in his popular book "Higher Unlearning", unlearning, which is the release of something old (i.e. obsolete knowledge, outdated or incorrect assumptions, habits or beliefs) is more difficult than the act of learning something new. (Uldrick, 2011) In the survey, the committee endeavored to



understand the level of misinformation or incorrect assumptions among Internal Auditors in the Dallas area related to the cloud computing.

Cloud Computing Relative to the 'Hype Cycle'

In 1995, Gartner developed the 'Hype Cycle' as a conceptual framework to measure the staying power of new technologies and help companies evaluate new technologies (and when to adopt them) in the context of a maturity model. According to Gartner, the Hype Cycle provides "a graphic representation of the maturity and adoption of technologies and applications, and how they are potentially relevant to solving real business problems and exploiting new opportunities (Gartner, Methodologies: Hype Cycles, 2012)." The Hype Cycle is comprised of the following five stages. Successful technologies that proceed beyond the "fad" stage will traverse all five stages.

Technologies that really are just "hype", however, end up stuck in the third stage. Each of the stages is briefly described as follows:

- **Technology Trigger:** The first phase of the hype cycle, during which the breakthrough occurs that creates the "buzz" around the technology and generates interest.
- **Peak of Inflated Expectations:** The peak of media hype and frenzy. During this phase, expectations tend to be unrealistic as the market struggles to find applications for the much-hyped technology. Many failures occur.
- **Trough of Disillusionment:** The slump after the hype fades. Media loses interest and the technology is no longer in fashion as it has failed to meet the

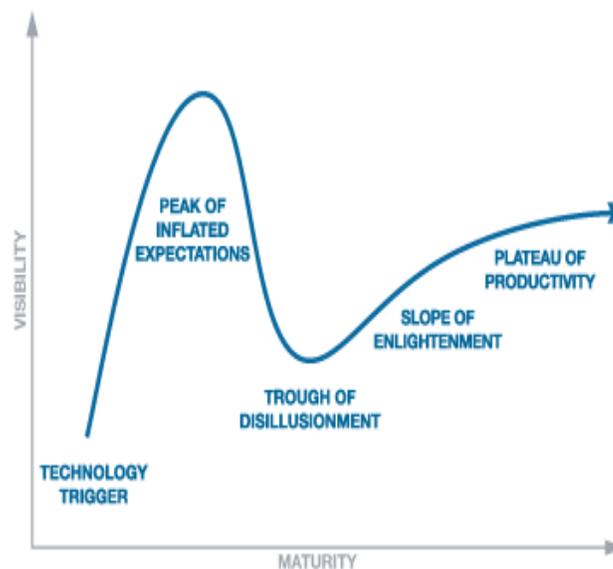


public's (often unrealistic) expectations. Many technologies may stay here and never recover.

- **Slope of Enlightenment:** A continued pursuit of benefits despite lack of popularity. Despite the lack of media attention, companies that see value in the technology continue to struggle to apply it in value-adding ways.
- **Plateau of Productivity:** Success and stability. The technology has been shown to provide benefits and those benefits become widely accepted based on experience instead of hype. Depending on whether the technology benefits a mainstream or niche market, the plateau may crest at a higher or lower level of visibility.

A visual model illustrating these phases is provided below.

Hype Cycle for Emerging Technologies

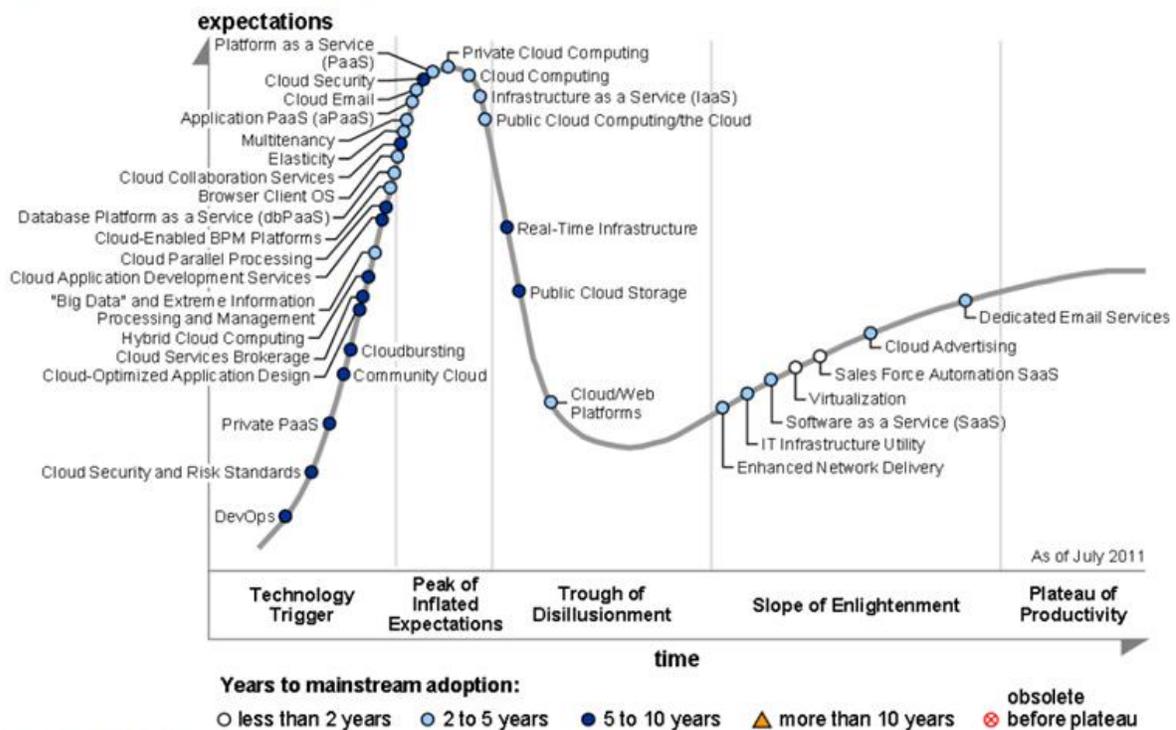


Source: Gartner.com



Where does cloud computing sit in the Hype Cycle? The answer is somewhat murky since, as described in the definition section, there are various applications of cloud under different service models. Based on Gartner's 2011 Hype Cycle for Cloud Computing, as a whole, the cloud computing industry is "just beyond the Peak of Inflated Expectations and headed for the Trough of Disillusionment (Columbus, 2011)." To prove this point, Gartner states that most vendors from whom they receive briefings have a cloud strategy, however, in most cases the strategies fail to be cloud-centric, which seems to indicate that there is a high degree of hype that will steer the industry into the Trough of Disillusionment.

2011 Hype Cycle for Cloud Computing (Gartner)



Source: Gartner (July 2011)



The Hype Cycle and Its Implications for Internal Auditors

What does this information have to do with Internal Auditors? The Committee hypothesizes that Internal Audit and Risk Management professionals may take different approaches in planning for risk associated with emerging technologies. For instance, many Internal Auditors who are unaware of the intricacies of cloud computing or who believe that cloud computing is merely hype may underestimate the amount of attention they should pay to this emerging technology. The committee noted this possibility for Risk Management professionals to discount an emerging risk as hype and believe it to be an area for further research.

Internal Auditors' Risk Perceptions and Mitigation Plans

As noted before, the concept of cloud computing is open to misinterpretation due to the varied potential applications of the technology and the degree of hype that may be skewing expectations. Therefore, risk perceptions may vary widely among auditors, which can play a key role in determining the mitigation strategies. A survey by Information Systems Audit and Control Association (ISACA) of IT professionals through the annual risk-reward barometer indicates that in the United States, 45% of IT professionals believed that the risks of cloud computing outweigh the benefits (Information Systems Audit and Control Association, 2011). The committee reviewed the risk perceptions and mitigation plans of Internal Auditors, and the results of this review will be expanded on in the Survey Results section.



Trends in Cloud Adoption

The committee hypothesized that, due to the advantages of quick deployment, low cost and simpler pricing models of cloud technologies, it should be expected that cloud technologies will be widely adopted by the younger, growth-oriented organizations as compared to mature organizations that tend to already have robust and established IT systems and business processes in place. This hypothesis is supported by studies conducted by private organizations and universities. One prominent study by Egnyte notes that small and medium sized businesses adopt cloud technologies at a higher rate than larger companies (Simply Security, 2011). The committee reviewed adoption metrics and compared them to organizational demographics such as employee count and revenue.

Research Method

In reviewing existing studies, the Committee noted that specific data related to Internal Auditors' views on Cloud Computing risks does not exist in adequate detail. The committee elected to administer its own survey in order to gather information specific to Internal Auditors in the Dallas area and test its hypotheses. This section discusses the survey design and administration, the demographics of respondents, and findings discovered through analysis of the data.

Project Management and Survey Design

The research committee started planning the study in September, 2011. Topic selection was made by identifying the research priorities of the profession and ranking



the suggestions of the committee members based on the alignment of each suggestion with the IIA's stated research priorities (Institute of Internal Auditors, 2012). The final topic was presented to the Dallas Chapter Board Members for approval in November. The detailed timeline for various activities is presented through the project plan shown below.

In order to achieve the objectives of the study, the committee surveyed the IIA-Dallas Chapter members during the month of February 2012. An online survey tool was used to reach as many members as possible and facilitate online collection of data. The survey was held open for 10 days. In consideration of the possibility that respondents may be from professional services organizations or former Internal Auditors, the committee included instructions to respondents to use a representative client or recent experience for reference in answering the questions. To encourage participation, a

drawing for three \$25 gift cards was advertised. In order to minimize survey fatigue, the survey was designed to be less than 10 minutes.

Data Validation

In order to gauge the respondents' knowledge level of the topic, the initial survey question asked respondents to assess their familiarity with the term "cloud computing". The respondents who assessed themselves as unfamiliar with cloud computing were eliminated from the detailed data collection questions and were only asked to provide basic demographic information. Those that assessed themselves as familiar with cloud computing were asked to indicate their familiarity with various cloud service models and were asked two basic questions regarding American Institute of CPA's assurance assessment standards.

Data Collection

After the basic validation questions were presented, the respondents were asked questions about:

- The respondent's organization's adoption of cloud computing and how/whether Internal Audit was involved or consulted
- The individual respondent's views about cloud computing and its risks
- Demographic information about the respondent's organization



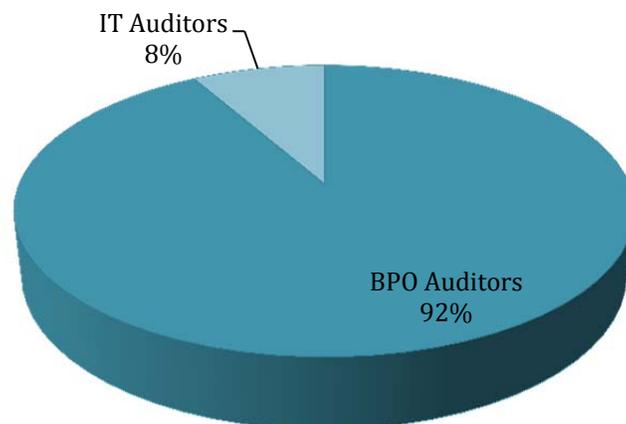
Participants' Profile

The online survey was sent through email to approximately 1,300 members. The initial email yielded 168 initiations. Of these initiations, 35 surveys were not fully completed before the survey was closed. Therefore, these 35 surveys were excluded from the data analysis. The remaining 133 surveys with full responses were considered for the analysis. The relevant demographic information of the 133 respondents is noted below.

Primary Job Focus:

The majority (92%) of the respondents identified their job focus as business process and operational (BPO) audits. Eleven respondents (8%) were IT auditors.

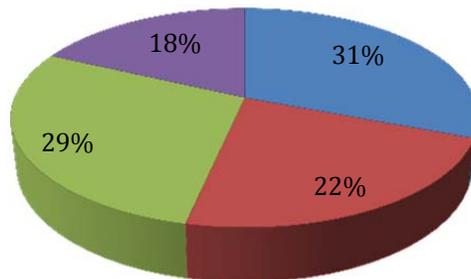
Respondents by Area of Focus



All organizational levels were represented as shown by the distribution below:

Respondents by Title

- Director or above
- Manager (with direct reports)
- Senior (lead teams)
- Staff (individual contributor)

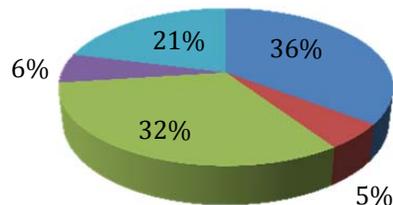


Business Area of the Respondents' Organizations:

Two-thirds of the respondents' organizations were operating either nationally or internationally. However, strong local presence was also noted with the remaining one-third operating only at the state or local levels. The distribution of the data points is as follows:

Respondents by Geographic Area

- International
- Americas
- National
- StateWide
- Local



Size of the Respondent's Organization by Revenue & Employee Count

The majority of the respondents were from larger firms. 58% of the respondents reported that their firms earn more than \$1 billion in revenue. Below is the distribution:

Respondents' Organizations by Revenues



Additionally, 79% of the respondents indicated that their organizations had more than 1,000 employees. Below is the distribution:

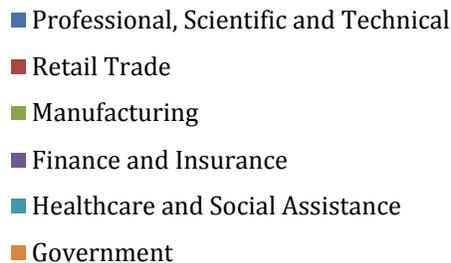
Respondents' Organizations by Size



Respondents' Industry

Most industries were represented; however, the majority (61%) fell into one of the following: Healthcare and social assistance, finance and insurance, retail trade, or manufacturing. Below is the distribution:

Respondents by Industry



Survey Results

Internal Auditors' Awareness of Cloud Adoption

127 of the 133 respondents indicated that they are familiar with the concept of Cloud computing. Upon further analysis, the following pattern was noted:

- All the respondents who were not familiar with the concepts of cloud computing identified themselves as non-IT auditors. This pattern of response is consistent with the potential IT training and experience of IT auditors, however, it does represent an opportunity for Business Process and Operational auditors to



expand their understanding of cloud technology, to the extent that it could impact their organizations.

- Of the 127 respondents who indicated that they were familiar with the cloud computing concept, only 14 were familiar with all the cloud services model and terminologies (i.e. Saas, IaaS, PaaS and BYOD).
- Of these 14 respondents familiar with all types of cloud services, 5 identified themselves as IT auditors, which represented 45% of the total IT auditors who took the survey. In contrast, the 9 respondents who identified themselves as non-IT auditors comprised only 7% of the total non-IT auditors. This pattern of response is consistent with the additional IT training and experience of IT auditors.
- Of the 127 respondents who indicated that they were familiar with the cloud computing concept, 21 (16%) indicated that they were not aware of any cloud service models or the BYOD concept. All these 21 respondents identified themselves as non-IT auditors. Again, this pattern is consistent with the IT training and experience of IT auditors.

Trends in Cloud Adoption among Various Organizations Based on Size, Geographic Area, Revenue and Industry

We attempted to conduct further detailed analysis of the correlation between different demographic data collected. However, further analysis did not reveal any strong correlation to the size or industry of the respondent's organization or the level of experience/ title of the respondent.



Understanding of Cloud Assurance Needs

As per the survey design, two questions relating to the Statements on Standards for Attestation Engagements (SSAE) #16, which relates to the methods of obtaining assurance on cloud service providers, were included. These questions were specifically included to evaluate, at a deeper level, the respondent's knowledge of cloud computing issues. Of the 127 respondents who indicated that they were familiar with the cloud computing concept, only 39% of the respondents answered both the validation questions correctly, 32% answered at least one of the questions correctly, and 29% answered both the questions incorrectly.

The specific patterns noted were:

- Of the 49 (39%) who answered both validation questions correctly:
 - 7 were IT auditors; 63% of total IT auditors
 - 42 were BPO auditors ; 34% of total BPO auditors
- Of the 37 (29%) who answered both validations incorrectly:
 - 1 was an IT auditor ; 9% of total IT auditors
 - 36 were BPO auditors ; 30% of total BPO auditors

The data pattern observed appears to be consistent with the adult learning challenges that are similar in nature to unlearning. This observation indicates that a significant amount of focused training may be needed for Internal Auditors to overcome initial assumptions that may have been incorrect, and obtain a correct assessment of risk presented by Cloud Computing.



Perspectives of Internal Auditors about the Cloud with Respect to the Hype Curve

The research committee analyzed the data obtained regarding the hype perception among Internal Auditors with respect to cloud computing. Consistent with Gartner's predictions, the majority of the respondents (76%) indicated that they believe the cloud computing concept will increase in application. Below is the distribution:

- 71 of 127 indicated Concept has not yet matured but is increasing in application.
- 30 of 127 indicated Concept is widely adopted and continues to increase in use.
- 14 of 127 indicated Cloud computing is the latest vendor buzzword for a technology that already existed
- 9 of 127 did not have any comments (all BPO auditors)
- 2 of 127 indicated Cloud computing is already a stable concept
- 1 of 127 indicated Concept has not yet matured and will likely decrease in application.

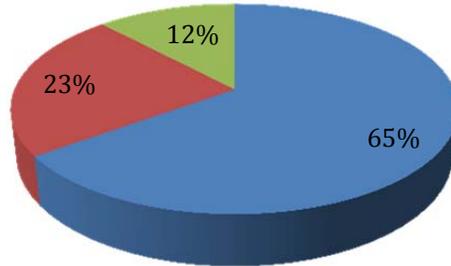
Internal Auditors' Cloud Risk Perceptions and Mitigation Plans

The majority (65%) of the respondents indicated that they are not involved in assessment or review of Cloud computing at their organizations. The distribution of the responses is as noted in the next page.



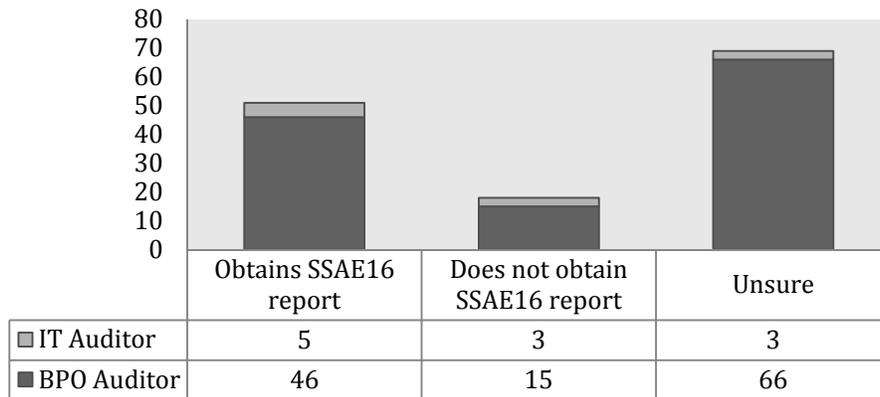
Internal Audit Involvement in Implementation of Cloud

■ Not involved
 ■ Consulted in initial stages
 ■ Involved throughout



The committee also noted that a high percentage (52%) of the respondents were not sure if their organization obtains an SSAE16 report. Only 48% were able to provide a definitive answer. The pattern of response obtained is as follows:

Obtaining SSAE 16 Reports



Based on the above analysis, it appears Internal Audit is not highly involved in cloud implementations. However, the Committee found in its 2011 research project that, if Internal Audit is not involved from the initial stages of large project implementations, there are usually negative consequences in the form of control



deficiencies or unmitigated exposure to risk (Dallas IIA Research Committee, 2011). The Committee observed that, per prior year research, many interviewees stated that the failure to involve Internal Audit at the outset of a major project (such as a major technology project implementation) has negative ramifications for the success of the overall project. Thus the Committee believes an opportunity exists for Internal Auditors to proactively learn about cloud computing and assess their organizations' potential adoption. Internal Auditors in organizations that are considering or likely to adopt cloud technology should attempt to engage Management in discussions about the inherent risks and exposures to help promote a culture of risk awareness.

Conclusions and Implications

Based on the research conducted by the Committee, cloud computing is a technology that is predicted to continue to grow. As such, it will be crucial in the months and years to come for Internal Auditors to develop additional understanding about this emerging technology in order to add value and better advise their organizations on relevant risks and controls. In summary, the study noted the following:

- Consistent with the expectation that IT auditors would have a higher degree of specialized training on technical topics and would be more aware of recent developments in their field, IT auditors appear to have a higher level of awareness of cloud computing concepts compared to Business Process and Operational auditors.



- The IT auditors were twice as likely to have a correct understanding of the assurance procedures and practices compared to the Business Process and Operational auditors.
- Internal Auditors face ‘unlearning challenges’ related to misunderstandings about Cloud computing concepts. These misunderstandings may be difficult to overcome and may require additional training to ‘unlearn’ incorrect beliefs about cloud computing.
- Internal Auditor perceptions of cloud computing with respect to the Hype cloud appear to be consistent with Gartner’s 2011 cloud computing hype curve.
- Proactive involvement of Internal Auditors in cloud technologies appears to be low. This represents an opportunity for Internal Audit to increase awareness of a key emerging technology, and attempt to champion risk awareness about the technology within their own organizations.

Future Research Opportunities

The committee notes the following opportunities for gaining additional insight-

- There is potential for further research to determine and enable better alignment of Internal Audit activities alongside the organization’s adoption of cloud computing.
- There is an opportunity to further assess training needs to enable Internal Auditors to gain the correct perspective of Cloud computing and its associated risks.



- The study can be expanded to include a wider population of Internal Auditors outside the DFW region.

Acknowledgements

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Bibliography

- Columbus, L. (2011, July 27). *Gartner Releases Their Hype Cycle for Cloud Computing, 2011*. Retrieved March 4, 2012, from Software Strategies Blog: <http://softwarestrategiesblog.com/2011/07/27/gartner-releases-their-hype-cycle-for-cloud-computing-2011/>
- Dallas IIA Research Committee. (2011). *Internal Audit's Value Addition Approach - A Study in the Dallas-Fort Worth Area*. Retrieved March 4, 2012, from Institute of Internal Auditors: <http://www.theiia.org/research/research-reports/chapter-sponsored-research-list/>
- Gartner. (2010, January 13). *Gartner Highlights Key Predictions for IT Organizations and Users in 2010 and Beyond*. Retrieved March 4, 2012, from Gartner Press Release: <http://www.gartner.com/it/page.jsp?id=1278413>
- Gartner. (2010, 22 June). *Gartner Newsroom*. Retrieved February 28, 2012, from Gartner: <http://www.gartner.com/it/page.jsp?id=1389313>
- Gartner. (2012). *Methodologies: Hype Cycles*. Retrieved March 4, 2012, from Gartner Research Methodologies: <http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp>
- Grance, T., & Mell, P. (2011, September). *The NIST Definition of Cloud Computing*. Retrieved March 4, 2012, from National Institute of Standards and Technology - NIST Special Publication 800-145: <http://csrc.nist.gov/publications/nistpubs/800-145/SP800-145.pdf>
- Information Systems Audit and Control Association. (2011). *ISACA's 2011 IT Risk/Reward Barometer*. Retrieved March 4, 2012, from ISACA: <http://www.isaca.org/Pages/Survey-Risk-Reward-Barometer.aspx>
- Institute of Internal Auditors. (2012). *Topics Awaiting Proposals for Funding or Development*. Retrieved March 4, 2012, from The Institute of Internal Auditors: <http://www.theiia.org/research/research-reports/topics-awaiting-proposals-for-funding/>
- Marketsandmarkets.com. (2010, October). *Cloud Computing Market: Global Forecast (2010 – 2015)*. Retrieved March 4, 2012, from Markets and Market: <http://www.marketsandmarkets.com/Market-Reports/cloud-computing-234.html>
- Microsoft. (2011, 11 24). *Canadian Businesses Unclear When It Comes to Cloud Computing*. Retrieved March 4, 2012, from Microsoft: http://news.microsoft.ca/press_releases_business/archive/2011/11/24/canadian-businesses-unclear-when-it-comes-to-cloud-computing.aspx
- O'Neill, S. (2011, April 26). *Forrester: Public Cloud Growth to Surge, Especially SaaS*. Retrieved March 5, 2012, from CIO: http://www.cio.com/article/680673/Forrester_Public_Cloud_Growth_to_Surge_Especially_SaaS
- Simply Security. (2011, May 26). *SMB cloud adoption outpacing larger companies, study reveals*. Retrieved March 04, 2012, from Simply Security: <http://www.simplysecurity.com/2011/05/26/smb-cloud-adoption-outpacing-larger-companies-study-reveals/>



Thethi, J. P. (2009, April). *Realizing the Value Proposition of Cloud Computing*. Retrieved March 4, 2012, from Infosys: <http://www.infosys.com/cloud/resource-center/documents/realizing-value-proposition.pdf>

Uldrick, J. (2011). *Higher Unlearning*. Beavers Bond Press.

Wikipedia. (2012, March 4). *Cloud Computing*. Retrieved March 4, 2012, from Wikipedia: http://en.wikipedia.org/wiki/Cloud_computing

