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Overview of and Accounting for Cloud Computing

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Abstract:
It is clear that cloud accounting has revolutionized and changed the lives of many small and large business owners. Everyone has their own version of where and when the cloud originated. Many put the date back to 1955, when the idea of computing timeshares emerged. In those days, cutting-edge commercial computers, like the IBM 702, took up roughly the square footage of a roomy Brooklyn apartment and cost just about as much to rent ("A brief history." 2019). A new implementation cost in Cloud Computing arrangement was proposed by the Financial Accounting Standards Board (FASB) to clarify that a customer has a hosting arrangement. This article addresses the diversity in accounting and the cost incurred in hosting arrangement in a service contract. Some entities would defer certain implementation costs incurred during the application development stage. Entities would expense other costs as incurred like planning, training, maintenance, and data conversion. Cloud Computing uses hosted services over the Internet to access services and different resources to perform jobs with changing and dynamic needs. Cloud Computing has changed the way companies do business with other businesses and the way their own data is stored.

Keywords: Future of cloud computing, different attacks on cloud, security handling in cloud, cloud technology, cloud computing security concerns

1. Introduction

Cloud Computing will be reviewed regarding how to account for implementation, setup and other upfront costs incurred in a Cloud Computing arrangement that is considered a service contract. This topic will be researched from all of the major accounting perspectives to provide a better understanding of the accounting requirements promulgated in the second decade of the 21st century. The Financial Accounting Standards Board (FASB) is a primary source information on the topic. Individual businesses, private business, and public organizations typically know about Cloud Computing. The most beneficial aspect of Cloud Computing is the fact that one can access any information stored from anywhere using any compatible device. There are times when it is needed to access certain information and one unable to do it due to the way it was stored. If the same information would have been stored in the cloud, then it could be easier to access from nearly anywhere.

Cloud Computing is very convenient to anyone currently in the work force, but also to those who are unemployed and need to store some valuable things in a storage. The cloud is capable of managing multiple infrastructures and also ties the resources necessary to give access to services when needed. Although Cloud Computing can provide many significant advantages, it also brings new security problems which present strong barriers for individuals/enterprises to adapt into Cloud Computing (Liu, Chen & Tung, 2011).

1.1. Cloud Computing Future

There are many companies that store data with cloud providers may no longer have physical control over it, but they're still on the hook legally for its protection and security (Mearian, 2013). The cloud maintains itself and all of it resources only requiring people to maintain the actual hardware and operating systems in complete working order for the cloud to run effectively. The following is a list of some companies that have adopted Cloud Computing as of 2013. (Allouche, 2013):

- Netflix
- Xerox
- Pinterest
- Instagram
- Etsy
- Apple
- Media Math

One of the main benefits and a top key feature of Cloud Computing is it scalability which is the ability of a program to scale. Organizations that offer Cloud Computing can offer companies more power and more hardware and software when they are needed instead of companies having to go through the hassle of securing additional hardware and

software themselves. This benefit led companies to worry less when their needs change or conditions require them to seek more data/server capabilities. Another benefit is the reduced costs that comes with the use of Cloud Computing. Cloud service providers manage cloud architecture and ensure data security. The top three cloud service provider companies are as follows (Dignan, 2018):

- Amazon
- Google
- Microsoft

The key features of the cloud service are listed below (Dignan, 2018:

- High availability
- Service on demand
- Resource sharing and pooling
- Multi device support

1.2. Different Attacks on Cloud

There are various attacks that can affect the cloud. The injection of malware in the cloud can be done by the intruder attacking the client as well over server (Achbarou,El Kimar, &Elbouanani, 2017). Other attacks can be flooding attacks, in which there is flood of messages from cloud to client. The makes the client's behavior to appear in an abnormal way (Achbarou, et al.,2017).

1.3. Security Handling in Cloud

Cloud security also refers to the information security on the broad level, for securing the cloud data various set of rules and protocols have been made. One of these rules is cipher creation of the cloud data, that can be done using asymmetric or the symmetric encryption a-logs. Network Troubleshooting Tool for Cloud Computing Wireshark is one of the important troubleshooting tools. With Wireshark you can take snoop of the traffic data and with this snoop, easily troubleshoot the internal protocol packets and bits which are getting transferred.

1.4. Cloud Technology

While Cloud Computing is often described as a transformative and even revolutionary, technology that completely changes how organizations utilize its computing resources, the lack of agreed-upon terminology hinders the research (Blaskovich& Mintchik, 2011). Management accountants can play a role in not only evaluating costs of cloud technology, but also in ensuring that the advantages of more collaborative business processes are communicated to managers and realized by any implementations of cloud technology. Second, management accountants are well-placed to work with technical experts and/or cloud service providers to ensure data security issues are properly addressed. It may be that businesses decide to always keep some data in-house or to adopt a private-cloud (Sunarni, 2015).

1.5. Advantages to Cloud Computing Are as Follows

- It helps to reduce Information Technology cost in terms of maintenance and management
- It supports better business scalability
- It provides collaboration efficiency for the perspective of business
- It supports business continuity
- It provides automatic updates according to requirements of IT
- It supports flexible work practice environment.

1.6. Security Concerns in Cloud Computing:

- Conflict with other clients and cloud providers
- Availability of trusted Cloud Computing related to the security of the data from being lost or leaked.
- Trusted Cloud Computing environment is available or not with critical systems

Lists of insecure Application Programming Interface (API) and user interface; International accounting is a specialty within the entire discipline that is focused on using specific accounting standards that are as relevant in the United States (US) as they are when balancing the books of a company overseas. Cloud Computing is the on-demand delivery of compute power, database storage, applications, and other information technology(IT) resources through a cloud services platform via the Internet with pay-as-you-go pricing. The Cloud services platform provides rapid access to flexible and low-cost IT resources. With Cloud Computing, it is not needed to make large upfront investments in hardware and spend a lot of time on the heavy lifting of managing that hardware.

1.7. Cloud Income Tax Complexities

Cloud Computing can give rise to a number of tax complexities, especially in the cross-border arena. The Department of Taxes has issued a Fact Sheet that states that charges to remotely accessed computer software over the cloud and the use of the software is an exempt computer service or the sale of an intangible (Vertex, 2019).It could have been intended for the royalties' definition to be interpreted so broadly as to cover these other cases of payments for goods or services where some use of software is involved. Payments for Cloud Computing are not treated as royalties for tax purposes in Singapore, Germany, Japan, Hong Kong, and the U.S. (Internal Tax, 2018).

1.8. Internal and External Audits

Cloud Computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Audits typically fall into two main categories:

- Internal
- External

Internal audits refer to work done by an organization's own employees, concern very specific organizational processes, and focus primarily on optimization and risk management. Internal audit and compliance have a key role to play in helping to manage and assess risk as cloud services evolve, especially for third-party compliance. Externalaudits give an outside perspective on an organization's ability to meet the requirements of various laws and regulations. Organizations have used traditional IT audits to evaluate issues such as availability to authorized users and integrity and confidentiality in data storage and transmission. An audit or compliance check is always done against a pre-specified benchmark. The clearer you are, fewer the possibilities of a costly misunderstanding (Computer Weekly, 2012). It is recommended for every company to develop their own in-house audit program such as the following (THEIIA, 2017):

- Develop a Company-specific audit program to assess and mitigate your organization's risks of Cloud Computing.
- Develop a company-specific audit program based on topic areas.
- The first portion of the audit program could focus on activities to be performed prior to using any new Cloud Computing vendors coming into use.
- The second portion of the audit program could focus on audit activities to be performed for existing Cloud Computing vendors.

1.9. Governmental Accounting

Governmental accounting is the process of recording and managing financial transactions incurred by the government which includes its income and expenditures. Cloud Computing has emerged as a dynamic and promising technological platform that can provide many benefits not only for business but also for local and central governments (Stefanou & Skouras, 2015). Various governmental accounting systems are used by various public sector entities. Cloud Computing is basically an on-demand computer system resource, especially data storage and computing power, without direct active management by the user.

The Governmental Accounting Standards Board (GASB) issues new accounting and financial reporting standards only when the benefits of the standards improvements in the usefulness of reported financial in- formation for making decisions and assessing government accountability (GASB, 2018). GASB (2018) also said that a governmental entity that utilizes Cloud Computing services may incur costs related to the preparation and configuration of the existing system to be able to utilize those services.

1.10. Accounting Fraud

Accounting fraud is a deliberate manipulation of accounting records in order to make a company's financial performance or condition seem different than it actually is. The factors that contribute to fraud include the following:

- Poor internal control-will lead to fraud as perpetrators look for poor controls.
- Management override of internal control-If management does not look to internal control in operating the business there are chances of fraud
- Collusion between employees- These types of situation make it difficult to both prevent and detect. This is particularly true when the collusion is between managers and their subordinate employees. Management plays a key role in the internal control structure of an organization. They are relied upon to prevent and detect fraud among their subordinate. When managers participate in fraud then the organizations control structure is weakened and the company becomes more vulnerable to losses.
- Collusion between employees and third parties- this may also result in fraud and losses to the company.
- Lack of management information system- The inadequate management information system may result in fraud.

Fraud in Cloud Computing is as popular as any other fraud and very similar when it comes to the causes. In Cloud Computing, the security issues fall down into two categories, the first category the issues faced by cloud providers and second are their customers (CWPS, 2018). Mainly the security challenge comes down from the cloud service providers and their customer experiences faced during the operation of this service. Cloud Computing is increasingly being adopted by organizations worldwide due to its ease, cost benefits and flexibility in usage. Despite the benefits, Cloud Computing has also exposed individuals and organizations to various security and fraud related threats. Any internet-enabled device has the potential to access the cloud, such as a computer, tablet, smartphone or games console. Businesses also need to purchase, maintain and operate computer systems, operating systems, security products, network and broadband connectivity within the office. Without these, it will not be possible to access the cloud (Moorgate, 2011).

1.11. Public Opinion of Recent Proposed Financial Accounting Change

The FASB proposed changes to accounting for Cloud Computing received a total of fifty-three comment letters from various businesses (Appendix A). All commenters were thankful for the opportunity to comment and provide additional feedback. The first question was the only question that everyone supported. Most respondents agreed that eligible implementation costs of a hosting arrangement that is a service contract can be capitalized using the guidance on

internal-use software. For question two (questions are listed below the table in Appendix A), eighty-four percent of the customers agreed with including an amendment to the definition of a hosting arrangement in the Master Glossary. Question three was not supported by most of the respondents. Most of the commenters did not agree with the additional guidance needed to determine whether the amendments apply to arrangements that include a minor hosting arrangement. The guidance for determining the project stage on FASB Accounting Standards Codification (ASC) Subtopic 350-40 be applied to a hosting arrangement was supported by eighty percent of the respondents. A majority of the commenters did not agree with the idea of applying an impairment model to implementation cost. Question five had the same results since most of the respondents disagreed with most of the questions overall. Question six also has the same results with fifty-eight percent disagreeing with the proposal. Question seven was the only question that was also in the middle when it came to the support for the proposal regarding the amendments being added to the internal use software and hosting arrangements. Number eight is regarding entities being permitted to elect prospective transition or retrospective transition. This question was supported by seventy percent. Question nine was also supported by most of the respondents. Questions ten and eleven did not receive the same since most of the commenters disagreed with it. The companies that agreed with all the questions and all statements made were the following:

- American bankers Association
- The Williams Companies Inc.
- Markel Corporation

The following five organizations disagreed with most of the questions:

- Independent Sector and TechSoup
- Workiva Inc.
- T-Mobile USA Inc.
- Ford Motor Company
- ICPAS/APC

1.12. Unresolved Questions for Future Research

Cloud computing is a new service style with many significant advantages. It seems to be becoming a trend in the world in the second decade of the 21st century. Although cloud computing can provide many significant advantages, it also brings us new security problems which present strong barriers for individuals/enterprises to adapt into cloud computing (Liu, Chen & Tung, 2011). There is the risk that hundred per cent safety is not available in the environment of information technology. Anything related to the cloud accounting world is not going to be completely without any risk. This will immediately present accounting problems that could possibly serve as future research. The general risks of using cloud computing in accounting field have been examined under three titles as "Risks Arising from Service Providers", "Contractual Risks" and "Risks Arising from Legal Structure" (Ozdemir & Elitas, 2015).

- Risk arising from service providers- Not being able to control your own data and unable to know where it is exactly being stored. While there is the risk to lose the data on cloud computing system due to the reasons such cyber-attack, it is also possible that the data stored on personal computers may get harmed.
- Contractual Risks-The provider of the service has the probability of leaving the sector after going bankrupt. In case of any disaster the service provider must be able to maintain the sustainability of your access.
- Risks arising from legal structure- Structural problems and tax related issued may be revealed clandestinely by viewing the customer's data.

2. Conclusions

The accounting new guidelines are hoped to improve the cloud computing world, customer's accounting for implementation, set-up, and other upfront costs incurred in a cloud computing arrangement that are hosted by the vendor. The cloud industry has matured and improved so much with the years that it will eventually become the generator for the next wave of technologies. Anyone creating anything new and businesses that use computers will eventually require the services cloud computing has to offer. What has been proposed does look like it could be beneficial, but more changes in the methods of accounting for cloud computing will probably emerge.

APPENDIX A
Comment Letter Tabulation of Agreement versus Disagreement
0=Agreement, 1=Disagreement, .5= Both

Affiliations	Comment Letter Respondent	Q#1	Q#2	Q#3	Q#4	Q#5	Q#6	Q#7	Q#8	Q#9	Q#10	Q#11
MIND THE GAAP LLC	SCOTT EHRLICH	0	0.5	1	1	1	1	1	0	0	0	1
APPLE INC.	CHRIS KONDO	0	0	1	0	1	0	0	1	0	0	0
CALCPA/APAS COMMITTEE	MATTHEW J. LOMBARDI	0	0	1	0	1	1	1	1	0	1	0
N/A	ROB HOLLASCH	0	0	1	0	1	0	0	1	0	1	1
WESTERN DIGITAL CORPORATION	DONALD F. ROBERTSON JR.	0	0	0	0	1	1	0	0	0	0	1
IBM CORPORATION	ALISON YARA	0	0	1	0	0	0	0	0	0	0	0
AMERICAN BANKERS ASSOCIATION	JOSHUA STEIN	0	0	0	0	0	0	0	0	0	0	0
VSCPA/AAAC	CHARLES M. VALADEZ	0	0	1	0	1	0	0	0	0	1	1
THE WILLIAMS COMPANIES INC.	TED TIMMERMANS	0	0	0	0	0	0	0	0	0	0	0
HERTZ GLOBAL HOLDINGS INC.	ROBIN KRAMER	0	0	1	0	0	0	0	0	0	0	1
RSM US LLP	N/A	0	0	1	0	1	0	0	0	0	1	1
EXELON CORPORATION	FABIAN E. SOUZA	0	0	1	0	0	0	0	0	0	0	0
NYSSCPA	HAROLD L. DEITERS III	0	0	0	0	1	0	1	0	0	1	1
HP	MARIE MYERS	0	0	1	0	1	1	1	0	1	1	1
SCANSOURCE INC.	GERALD LYONS	0	0	1	1	1	1	1	0	1	1	1
N/A	JAY N. GRANT	0	0	1	1	1	0	0	0	1	1	1
DUKE ENERGY	WILLIAM E. CURRENS JR.	0	0	0	0	1	1	0	0	1	1	1
N/A	TIM CHATTING	0	0	1	0	1	1	1	0	0	1	1
CHINA CORPORATION	MARY T. AGOGLIA HOELTZEL	0	0	1	0	0	1	1	0	0	0	1
AGGREGATE SINGULARITY INC.	TERRY W. KIZZAR	0	0	0	0	1	0	1	0	1	0	
MARKEL CORPORATION	NORA N. CROUCH	0	0	0	0	0	0	0	0	0	0	0
BDO USA LLP	N/A	0	0	1	1	1	1	0	0	0	0	1
GLOBAL PAYMENTS INC.	DAVID M. SHEFFIELD	0	0	1	1	1	1	1	0	1	1	1
IMA/FRC	NANCY J. SCHROEDER	0	0	1	0	0	1	0	0	1	0	0
GRANT THORNTON LLP	N/A	0	0	1	1	1	0	0	0	0	0	1
AAA/FARS/FRPC	TERI LOMBARDI YOHN	0	0	0	1	0	1	0	0	0	0	1
WORLD VISION INC.	SEE LISTED	0	0	1	0	0	0	0	0	0	0	1
NACUBO	SUSAN M. MENDITTO	0	0	1	0	1	0	0	0	0	0	1
INDEPENDENT SECTOR AND TECHSOUP	N/A	0	1	1	1	1	1	1	0	1	1	1
FEI/CCR	MICK HOMAN	0	0	1	1	1	1	1	0	1	1	1
DIGNITY HEALTH	MARY CONNICK	0	0	1	1	1	1	1	0	1	0	1
WORKIVA INC.	J.W. MIKE STARR	0	1	1	1	1	1	1	1	1	1	1
HYDRO-QUEBEC	NADINE THIBODEAU	0	0	1	0	1	1	0	1	0	1	0
BANK OF AMERICA	JOHN M. JAMES	0	0	1	0	1	1	0	1	0	1	1
PNC FINANCIAL SERVICES GROUP INC.	LAUREN BELOT	0	0	0	0	1	0	1	0	0	1	1
FEDEX CORPORATION	JOHN L. MERINO AND JENNIFER L. JOHNSON	0	1	1	0	1	0	1	0	1	1	1
FACEBOOK INC.	NISARG JARIWALA	0	0	1	0	0	1	1	1	1	1	1
BOK FINANCIAL	JOHN C. MORROW	0	0	1	1	1	1	1	1	1	1	0
CAPITAL ONE FINANCIAL CORPORATION	TIMOTHY GOLDEN	0	0	1	1	1	1	1	0	1	1	1
MSCPA/APAPC	PHILIP B. PACINO	0	0	1	0	1	1	0	0	1	1	1
NEXTERA ENERGY INC.	KIRK CREWS	0	0	0	1	0	0	0	0	1	1	1
T-MOBILE US INC.	DAN DROBAC AND ADAM NELSEN	0	1	1	1	1	1	1	0	1	1	1
CISCO SYSTEMS INC.	PRAT BHATT	0	1	0	0	1	0	0	0	1	0	1
ALPHABET INC.	JOSH PAUL	0	0	0	0	0	0	0	0	1	0	1
EEI/AGA	RICHARD F. MCMAHON JR. AND GREGORY J. PETERSON	0	0	0	0	0	0	0	0	1	0	1
PLANTE & MORAN PLLC	N/A	0	0	1	0	0	1	1	0	0	1	0
FINANCIAL REPORTING ADVISORS LLC	N/A	0	0	1	1	1	1	1	0	1	0	1
CONNOR GROUP INC.	N/A	0	0	0	0	0	1	1	0	0	1	0
HUNTINGTON INGALLS INDUSTRIES	NICOLAS SCHECK	0	1	1	0	1	1	1	0	1	1	1
FORD MOTOR COMPANY	JULIE SHEPHERD	0	1	1	1	1	1	1	0	1	1	0
MOCPA/TIC	MARK WINIARSKI MIKE SCANLON JEFF ANTRAINER	0	0	1	0	1	1	0	0	0	1	1
SALESFORCE.COM INC.	JOSEPH C. ALLANSON AND ALEXANDRA BULDRINI	0	0	1	1	1	1	0	1	1	1	1
ICPAS/APC	BRIAN KOT AND WILLIAM KEIRSE	0	0	1	1	1	1	1	1	1	1	1
TOTAL		0	8.5	39	21	38	31	26	16	21	37	38

		Q#1	Q#2	Q#3	Q#4	Q#5	Q#6	Q#7	Q#8	Q#9	Q#10	Q#11
AGREE		53	44.5	14	32	17	22	27	37	32	16	15
DISAGREE		0	8.5	39	21	38	31	26	16	21	37	38
Agree %		100%	84%	26%	60%	32%	42%	51%	70%	60%	30%	28%
Disagree %		0%	16%	74%	40%	72%	58%	49%	30%	40%	70%	72%

Figure 1

2.1. Eleven Comment Letter Questions

- Question 1: Should eligible implementation costs of a hosting arrangement that is a service contract be capitalized using the guidance on internal-use software, recognized in profit or loss over the term of the hosting arrangement as defined in this proposed Update, and presented in the same line item in the statement of income as the fee associated with the hosting arrangement? If not, what accounting is more appropriate and why?

- Question 2: This proposed Update includes an amendment to the definition of hosting arrangement in the Master Glossary. Do you agree with the amendment, and do you have any other concerns with the definition, as amended?

- Question 3: Is additional guidance needed to determine whether the amendments in this proposed Update apply to arrangements that include a minor hosting arrangement?

- Question 4: Can the guidance for determining the project stage (that is, preliminary project stage, application development stage, or post-implementation stage) in Subtopic 350-40 be consistently applied to a hosting arrangement? Why or why not?

- Question 5: Should an entity apply an impairment model to implementation costs of a hosting arrangement that is a service contract that is different from the impairment model included in Subtopic 350-40? Why or why not?

- Question 6: Do you agree with the disclosures included in the proposed amendments? If not, what additional disclosures do you recommend, or what disclosures should be removed and why?

- Question 7: Should the disclosures included in the proposed amendments be applied to internal use software and hosting arrangements that include a software license? Why or why not?

- Question 8: Should an entity be permitted to elect prospective transition or retrospective transition? If not, please explain what transition method should be required and why. If an entity elects prospective transition, should the entity apply the transition requirements to each hosting arrangement, each module or component within a hosting arrangement, or costs of the hosting arrangement?

- Question 9: Should an entity be required to provide the transition disclosures specified in the proposed amendments? If not, please explain what transition disclosures should be required and why.

- Question 10: How much time would be needed to implement the proposed amendments? Should early adoption be permitted? Do entities other than public business entities need additional time to apply the proposed amendments? Why or why not?

- Question 11: Should the proposed amendments be more broadly applied to similar transactions beyond hosting arrangements or be limited to transactions based on the scope of the proposed amendments? If more broadly applied, what transactions are similar to those included in the scope of the proposed amendments?

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