COMPUTER AUDIT USING ARTIFICIAL INTELLIGENCE
КОМП'ЮТЕРНИЙ АУДИТ З ВИКОРИСТАННЯМ ШТУЧНОГО ІНТЕЛЕКТУ

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The article describes concepts of the Cloud Based Computing platform and how companies can benefit by moving their audit operations to the Web. It also describes new Artificial Intelligence tools that can be presented with the new auditing platform and what opportunities this combination can provide to the business development.
Key words: *Cloud Based services, Artificial Intelligence, Artificial Intelligence tools, Audit with the help of the Artificial Intelligence, Cloud auditing, Data Mining, and Audit cost reduction.*

У статті розглянуті концепції хмарного сервісу і як компанії можуть отримати вигоду від перенесення своєї аудиторської діяльності на Інтернет. Також були визначені нові інструменти штучного інтелекту, які можуть бути запропоновані з новою аудиторською платформою і які можливості ця комбінація може надати компаніям для розвитку бізнесу.

Ключові слова: *хмарні сервіси, штучний інтелект, інструменти штучного інтелекту, аудит за допомогою штучного інтелекту, хмарний аудит, пошук інформації, зменшення ціни аудиту.*

В статье рассмотрены концепции облачного сервиса и как компании могут получить выгоду от переноса своей аудиторской деятельности на Интернет. Также были определены новые инструменты искусственного интеллекта, которые могут быть предложены с новой аудиторской платформой и какие возможности эта комбинация может предоставить компаниям для развития бизнеса.
Ключевые слова: *облачные сервисы, искусственный интеллект, инструменты искусственного интеллекта, аудит с помощью искусственного интеллекта, облачный аудит, поиск информации, уменьшение цены аудита.*

Problem definition. With development of the new computer technologies, Web based Cloud computing platforms, and exponential increase of the available data, a need for the more robust tools, capable to deal with more sophisticated audit tasks, have risen.

Analysis of the latest researches and publications. Researches of the new aspect of the Cloud based computing and auditing, Artificial Intelligence tools and their new use on the Internet platforms for the purposes of enhancing audit in the emerging digital world were primary goals of the publications done by the Lara Abrash (National Managing Partner, Audit Transformation, Deloitte & Touche LLP), Rob van der Meulen (Gartner Research), Kay Kinsella (CPA, Ireland), Teresa Meek (Forbes magazine), Joe Ucuzoglu (Chairman and CEO, Deloitte & Touche LLP), and Nick Heath (chief reporter for TechRepublic).

Task definition. Describe new web-based auditing platforms and give introduction to the Artificial Intelligence tools and their capabilities for the purpose of improving quality, reliability, and cost reduction of the audit.

Presentation of the research material. In the past ten years the Cloud Computing gained a significant share of the accounting business worldwide. Many American and European companies list intend to establish or increase their presence in the Cloud as priority for the next few years. This trend will continue in the upcoming years. Just in the past 2017 fiscal year, the Cloud Service market was projected to grow by astounding 18,5 % and reach $260,2 billions worldwide, according to analytical firm Gartner, Inc. As of now, almost 17 % of the global «business process services had already shifted to cloud». That number is projected to almost double

in the next 5 years [1]. Taken into consideration this information, what accounting companies can gain by switching their current practices by doing business locally, on paper or with custom developed auditing software to the Cloud based accounting? What are the benefits of this move can be? In this article the author will try to answer some of these questions and describe some benefits of the possible move.

One of the main advantages of the Cloud based computing is a reduction of the cost of doing business. Any medium to large accounting firms have a fix cost associated with investments in the computer's hardware, software licensing, data backup, hardware / software support, cost of renting or owning an office space, and lastly, but not the least, employee's cost.

In relation to the variable cost, we can list a cost of electricity, maintenance and administrative cost, software update and travel cost (in case if an employee needs to go the customer side to perform requested services), as well as postal and communication cost associated with dealing with the customers. On top of everything listed above, it would be worth to mention a time that takes correspondence to go back and forth between company and customer by mail. So, let discuss these aspects in more details and see how Cloud based accounting can save companies money [2].

Software.

Accounting software package licensing cost will be less with the Cloud base computing because it will be based on the number of simultaneous users rather than the number of the available computers in the office. Also, all of the software packages used in the daily business routines will always be up to day with the most recent patches and updates. This would be done centralized to all clients of the hosting company that provides private Cloud services [2; 3].

Hardware.

With the Cloud based solution there would be no need to buy, maintain, upgrade and support high performance, security grade network servers where information would be stored, compare to a local version of the accounting packages implemented. All of this would be done on the Web, completely transparent to the accounting company and probably in the much cheaper way as well. The large data storage of the web hosting provider will cost a lot less in the long run than the similar but less robust local network data drives. Also, if in the future the data storage on the Cloud will need to be increased, it can be easily accomplished without expensive hardware upgrade by the customer of the web hosting provider. All of the above lead me to a conclusion of the savings the accounting company can have in the relatively short to medium period of time [2; 3].

Information Access, Scalability, and Client Setup.

The employees will be able to access the accounting software packages, client's information and documents from anywhere in the designated regional area, whole country, or even anywhere in the world, if needed, based on the privacy and security rules established by individual accounting firms. This could be achieved because information can be stored in multiple locations anywhere in the world and can be mirrored on separate (but related) servers, for the benefit of the data security and data accessibility. This approach gives accounting companies, doing their business on the Cloud, a different unique benefit: speedy setup of the new clients in multitude of different locations. To establish a new client anywhere in the service area the accounting company no longer needs to send employee(s) to the client side. Everything can be done remotely by establishing a direct point to point connection to the client's servers. That link will allow accountants and auditors to automatically receive all (or some) of the documents that client adds to its books, analyze them and perform necessary auditing function in almost the real time. Also, if the accounting service area is large, and information is stored on multiple servers (with centralized back up location), the server that will hold the client's most current information can be located in the close proximity to the client's primary location. This will allow better communication and processing speed between the client and the auditor, without any reduction in the quality of the services. Also, as a result of such techniques, the cost of doing business and providing accounting services will be reduced substantially for the client and the auditing firm equally. Primarily, this saving is resulted from reduction in time on establishing the new client, daily processing of the documents, and book keeping and auditing. Finally, the saving can also be attaining by reduction of possible audit mistakes (because human factor will be taken out of the question almost entirely).

Clients Communication.

Communication with the clients, in respect to the sending and receiving documents, can also be simplified because each client will have its own individual portal on the web where documents will be securely exchanged (uploaded and downloaded). After client has been initially established on the system, exchange of the documents can happen in the automatic mode (agreed upon signing the auditing contract). Also, because of the real time processing of the documents, clients will be able to login to their own portal and see a point of time accurate accounting / audit information and make business decision based on the hard fact and not just estimations. The same portal will also provide a secured video / text chat rooms, if conversation needs to be private and cannot be done over the phone. Access to such type of portals is usually limited to the customer, employee who provides accounting services to the client and security team of the accounting firm. Such precautions are necessary because of the high sensitivity of the data and privacy concerns.

Data and Communication Security.

Data security and data guard are the items of the paramount importance for any firms (accounting firms especially). So, security of the data plays a crucial role in selecting the Cloud service provider. The private Cloud service provider for accounting and auditing firms must maintain Cloud Business Process Services (BPaaS), Cloud Application Services (SaaS) and Cloud Management and Security Services. Also, hosting provider must provide certifications on 3 AICPA Service Organization Controls (SOC) reports: AICPA SOC1 / SOC2 / SOC3 [3].

All of these services and certifications will be providing reliable and secure environment for any companies and their clients, in regard to the data safety (including encryption of the sensitive data, access monitoring and login and etc), 24/7 data availability, and cost reduction. All of the communications channels (between the company and the clients) are also safe guarded against unauthorized access by establishing point to point connections, secured by at least 256 KB encryption protocols or other control mechanisms.

Finally, the accounting firms that switched to the Cloud would no longer need to maintain their own expensive backup and disaster recovery solutions. The license and maintenance cost of the private Cloud based solution should already include that option, and the web hosting provider will guarantee client's data integrity. On top of everything, the companies can save on the employee cost as well. It would be unnecessary to keep on the payroll a technical team whose primary function is data guard and backup.

To summaries cost saving estimates about Cloud based accounting solutions it would be worth to add: the actual cost reduction from switching to the Cloud would not instantaneous. Based on the size of the

accounting firm, amount of transaction done in the Cloud, number of services transferred to the vendor(s) and other variable components, it might take up to 3-5 years to break even on the cost of doing business locally and on the web. So, improvements in the return on investment (ROI) might take short to medium time frame. Because of that, as well as other factors, such as logistical infrastructure in specific region of the country, qualification of the company's employees, cost of the network infrastructure and others, decision to move to the Cloud might take significant considerations by the top management of the accounting firms.

Advantages of the Cloud Based Auditing.

In the first part of this article we discussed advantages of the Cloud based accounting solutions. So, let's now discuss what modern auditing approaches are, and what primary goals they pursue.

The purpose of the most modern and the current audits will remain the same: «The core financial statement audit and internal control work», according to Joe Ucuzoglu (Chairman and CEO, Deloitte & Touche LLP) [4]. However, there would be some significant changes to the way how this audit will be performed and what tools will be used. The major innovations of the modern auditing tools will be introduction of two key components: Artificial Intelligence (AI) and innovative analytical tools. So, what they are and how they will affect the auditing? In the current age information technology increasingly affects our lives. We became depended on the machines to select, process, and transform large amount of data into meaningful information that can be easily presented for the people's consumption. One of the leading roles in such data transformation plays AI. In the broader definition AI is an «intelligent systems that have been taught or learned how to carry out specific tasks without being explicitly programmed how to do so» [5]. But what that means for auditing? The present-day audit involves sorting, analysis, and consumption of the vast amount of data in different ways and forms. It becomes increasingly difficult, if not impossible, for the human being to process that avalanche of data and form a fact-based opinion or find a pattern in the seemingly unrelated data. This is where AI comes to help. The machine algorithm can be self-trained to read financial statements and analyze them to find possible deficiencies, such as lack of specific terminology, incorrect provisions etc. AI is also having at its provision a cognitive (self-adaptive) tool that can sort thru millions of documents to find, for example, all information about company contracts, leases and identify related side agreements, provisions, employee contracts and etc that might be impacted by these statements and must be changed or amended to avoid financial or legal liabilities. All of this without direct intervention of the people. Based on the collected information from different sources, the AI can point auditors into directions were financial statements might need

corrections, or represent a possible financial risk, or, even a possible trace of a fraud. In other words, the AI in the new audit world can automate such crucial processes as customer book closing, communication with the customers on the repeating processes, audit information collection and analysis, fraud prevention and many other things with a speed that cannot be matched by the most prepared financial analyst. Importantly, these processes do not depend on the platforms individual clients are using. The AI can work on the cross-platforms basis by default and use parallel computing power to gain a superior performance. Just that ability of the AI by itself shrinks the audit process by a staggering amount of time and reduces client and administrative cost of the audit. Also, being able to provide reliable information in a fraction of the time, AI enhances ability of the auditors to make the right and timely judgments and, as a result, provides better and more accurate auditing conclusions [6]. AI can also be trained to provide high-level prediction models that can be pointed into direction to find probability of the misstated financial information based on the previous company statements and overall segments of the market where company operates. Such operations can be called a pattern finder. The main goal of the pattern finder is to find something that is outside of the norm and does not match a usual state of the things [7]. If such pattern is found, that might give auditing team a hint to revisit part of the financial statements for further review and analysis. When auditors will have into their disposal such data driven insight, the goal of the audit itself might shift. On top of the usual audit information AI collects and processes, this system also identifies a lot of supporting materials that might have no value for the auditing purposes but provides a significant information perspective for the top management of the company. According to Lara Abrash, such information can be related to the company pricing in different markets and how it compares to the competitors (pricing strategy and analysis of the competitors models can also be collected by the AI as part of the market analysis) as well as financial risk sensing, «such as results that compares an organization's disclosures to those of its peers» [8; 9]. The human brain simply does not have that much capabilities to perform similar operations in any meaningful amount of time.

Conclusion. As you can see from the above material, combination of the new Cloud based platform with a variety of greatly enhanced AI data analytical tools provides auditors and companies they manage a lot of new opportunities to perform their operations on the significantly higher level. The same approach will also provide benefits to investors and government regulators, assuring them about company's data reliability. This can be all that investors might need to have peace of mind about company's efficiency, honestly, and ability to provide ROI, as stated in the documents.

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Cloud Computing gained a significant share of the accounting business worldwide. To save cost and enhance their reach and capabilities, the more increased number on the accounting firms already moved or planning to move their services to Web. By deciding on this move, the companies are trying to accomplish the following goals: save on the software licensing and hardware cost, improve information access for the clients, simplify new client setup, establish more sophisticated and, at the same time, simple and secured channels of communications with the clients. However, the main goal of the move is to provide a better security and scalability for the company's data and establishing of the new services, such as Artificial Intelligence (AI) tools for the auditing purposes (that otherwise might not be available to them). Because data will be stored on the Cloud and protected by multiple layers of encryptions, the companies would no longer need to worry about unauthorized access. The same thing applies to the data corruption and data loss. This concern will be addressed by a vast array of application techniques, starting with the data mirroring and ending with the implementation of the services such as Cloud Management and Security Services. In relation to the new advanced capabilities of the auditing tools, AI starts playing an increasingly more important role. The most modern audit involves sorting through tens of thousands of documents, finding specific trends and patterns, identifying risk factors and help in fraud prevention and many others. With the help of AI, the modern auditing software packages can perform these tasks in the fraction of the time and cost the humans would do. More importantly, the result of these operations will always be very accurate, reliable, and fast. These processes can also be repeatable across multiple clients, working on different platforms, in the instant of the time and without a need for any special changes or adaptions to the algorithms, or implementation techniques.