Утицај Cloud Computing-а на савремено пословање

Brankica Pažun[1]

[1]School of Engineering Management, University Union – Nikola Tesla, Belgrade, brankica.pazun@fim.rs

Сажетак: Рачунарство у облаку представља огромни потенцијал за стварање нових пословних вредности за све оне који су спремни и у могућности су да спроведу техничку, културну и организациону промену која је потребна за усвајање новог концепта. Аргумент редукције трошкова у пословању не наводи крајње кориснике на приступ клауду, већ аргумент флексибилног коришћења IT извора. У данашњој пракси клауд се примењује за апликације, као нпр. за тест и за развојне системе, у виду основе за обуке запослених или резерве за инфраструктуру тј. услед повећане потребе за складиштењем података, мада се и друге клауд апликације (као нпр. CRM или колаборативне апликације) у све већој мери примењују, притом заобилазећи IT сектор. Предузећа би требала да предухитре овакав тренд из безбедносних и законских разлога тако што би проактивно овај концепт увели у своје стратегијско планирање. Финансијска рачуница и исплативост клауда се израчунава за сваки случај понаособ и зависи од постојећих услова и пословних захтева предузећа.

Кључне речи: информационе технологије, интернет ствари, магични квадрант, пословни системи, рачунарство у облаку

Cloud Computing Influence on Modern Business

[1] School of Engineering Management, University Union – Nikola Tesla, Belgrade

Abstract: Cloud computing represents a huge potential for creating new business value for all those who are willing and able to implement the technical, cultural and organizational change needed to adopt a new concept. The cost reduction argument in business does not list the end users for access to cloud, but the argument for the flexible use of IT resources. In today's practice, cloud is applied to applications, for example, for testing and development systems, in the form of a training for employees or an infrastructure reserve, i.e. due to the increased need for data storage, although other cloud applications (such as CRM or collaborative applications) are increasingly being applied, while bypassing the IT sector. Enterprises should advance this trend for security and legal reasons by introducing proactively CC into their strategic planning. The financial calculation and profitability of cloud computing is calculated for each case individually and depends on the existing conditions and business requirements of the company.

Key words: Business Systems, Cloud Computing, Information Technologies, Internet of Things, Magic Quadrant
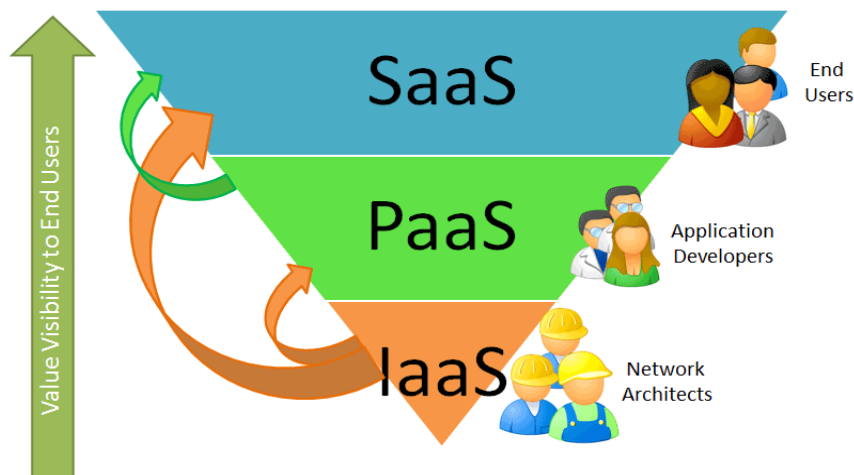
1. Introduction

Cloud computing (CC) services are particularly attractive for small or startup companies that can not afford large initial investments in IT equipment. Large firms have a problem of not being so agile and flexible, in other words, they can not react quickly to changes or adapt to them. New hardware procurement, maintenance of the existing one, software and operating systems purchase and upgrade take a lot of time and resources. However, it is unlikely that larger organizations will completely abandon the information technology (IT) model on the spot or replace the IT services that play a central role in their market competitiveness. Many companies will still require a level of security, performance, or specialization of applications that can not be reached by using CC public services. They may form their own private CC architecture, hidden behind corporate firewalls, due to taking advantage of their efficiency, but with larger security and control.

In short, cloud computing does not represent a passing mode, nor a revolution in electronic commerce. Instead, most companies are likely to use a combined IT environment where applications, infrastructure, and business processes will be implemented through public and private CCs, and possibly using a hybrid cloud model. In any case, the undeniable fact is that CC changes existing business models.

2. Cloud Computing – challenge for management and IT

As shown in figure 1, Cloud computing models are broadly divided into three categories (SPI model): Software-as-a Service (SaaS), Platform-as-a-Service (PaaS) and Infrastructure-as-a-Service (IaaS).

Figure 1: Pyramid of SPI Models

Source: Techtarget (n.d.)

Cloud computing has seamlessly established itself in the market as a new IT model (Langović, Pažun, and L.Milićević, 2011). Many great names such as Facebook, Google or Amazon use this production method to meet dynamic resource requirements and different levels of load. These services are mostly free and as in the Amazon case, easy to understand as they are integrated into the business process. This kind of use of IT represents a revolution for companies. Previously, it was common for the IT business focus primarily on the highest estimated IT system load and accordingly invests in IT systems. Various studies have shown that such classical systems have an average system load of between 10% and 50%. In other words, the other 50% were invested in some of the maximum system loads. CC offers a completely new solution to this model. Consequently, in small and medium-sized enterprises, the risk of investment is reduced, whereby CC offers absolute transparency of costs incurred. The provider takes over the entire management of the service, opening up the possibility to try out new business models promptly, entering the market and, in case of failure, promptly retreat from the market with minimal costs.

2.1 Cloud Implementation Types

Although cloud computing has emerged mainly from the view of public utilities, other deployment models, with variation in physical location and distribution, have been adopted. In this sense, the cloud deployment models can be classified as private, public, community and hybrid as shown in Figure 2:

Figure 2: Cloud Deployment Models
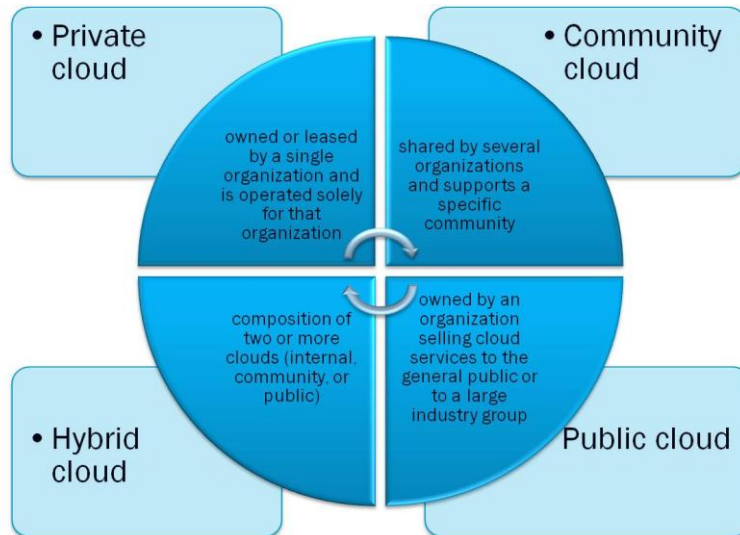
Source: Sujana, 2014

Comparison between deployment models is given in the following Table 1:

Table 1: Comparison of Deployment Models

Cloud	Advantages	Disadvantages
Public	-Efficient of use of hardware -No need to buy hardware	-Data is stored outside premise
Private	-High cost -Control over hardware -Control over data	-Hardware has to be bought or leased -Hardware for peak load
Hybrid	-Maximization of Cost-efficiency -Business critical information can stay in-house	-Less efficiency than a public solution.
Community	-More efficient use of hardware	-Less efficient than a public cloud

Source: Eamonn, 2013

3. Financial benefit of Cloud implementation

With CC enterprises have the chance to reduce the level of investment in the IT sector and thus create free capital that can be allocated to other IT innovative projects. Consumption-based billing is in direct relation with business requirements, which means that IT services are purchased on the basis of operating demand. With this fact over-sized hardware purchases and unused capacities can be avoided.

The cost-effectiveness of the CC introduction and use depends on a case-by-case, i.e. from the given preconditions and requirements that the given company has. There are no general recommendations, but certain regularities related to the financial viability of introducing CC can be defined.

Overall factors affecting the financial cost of CC are shown in the Table 2:

Table 2: Overall factors affecting the financial cost of cloud computing

Expenses that can be monetarily expressed	Small or no investment costs for hardware, software and computing centers
	There is no investment in the pre-dimensional capacities, based on the "peak demands"
	There is no cost of replacing existing investments (hardware, software ..)
	Reduction of existing personal and running costs
	The provider performs software upgrades and takes care of new releases
	The provider maintains IT systems and bears all the costs
	There is no "waiting" through a self-service service
	Energy costs reduction
	High level of standardization
	Small costs of introducing new applications
	Low staff training costs
	Price model "Pay per Use"
	Increased transparency of costs
	Improved IT security through professional Security-Management
	Flexible availability of additional resources
	High technical flexibility
	Using the installed Backup/ Restore process of the service provider
Costs that can not be monetized	Enterprise concentration on primary activity
	Further sourcing options
	Development of new business models
	Reducing the IT management process complexity
	IT processes simplification
	Potentially higher consumer satisfaction (external and internal)
	Potential faster market access (Time-to-Market)
	A significantly shorter time to make additional IT resources available
	Accelerate business processes through IT

On the one hand, a company can determine the rate of using CC's virtual servers, while on the other it has to estimate the cost of purchasing a given server. After a certain number of months it can become more convenient for a company to own and maintain a server in the enterprise itself. Therefore, if it is expected that the server or software will be in circulation for a number of months or years, then in any case it is suggested that the server be purchased and maintained in the company itself. According to Hugos and Hulitzky, hardware costs are for short-term projects up to two years lower using CC, rather than buying their own. For a system that needs to operate for more than two years, it's better to buy it and maintain it in the company itself. If there is a need for the existing hardware to upgrad after three years, there is no savings or advantage in owning it. In this case it's easier to use cloud services. If an IT manager spends most of his time on a personal policy of maintaining hardware operability, building a computer center and database, it would be costly and time-consuming, so it is better to invest in new technology to achieve better product sales or reduce current costs (Hugos and Hulitzky, 2010).

Although some years ago there was a controversy about whether the cloud computing concept was without any practical significance and usable value for the company, today there is already a differentiated view of the CC subject. The share of cloud in world IT traffic is constantly growing. For example, only in Germany there was an investment of about 7 billion euros in the cloud business in 2014. Three years later, the amount increased to 18.5 billion euros, which is an increase of 167% (Pauly et al, 2015; Bitkom, 2017).

Graph 1: Investments and Expenses in Cloud Computing in Germany 2012-2017
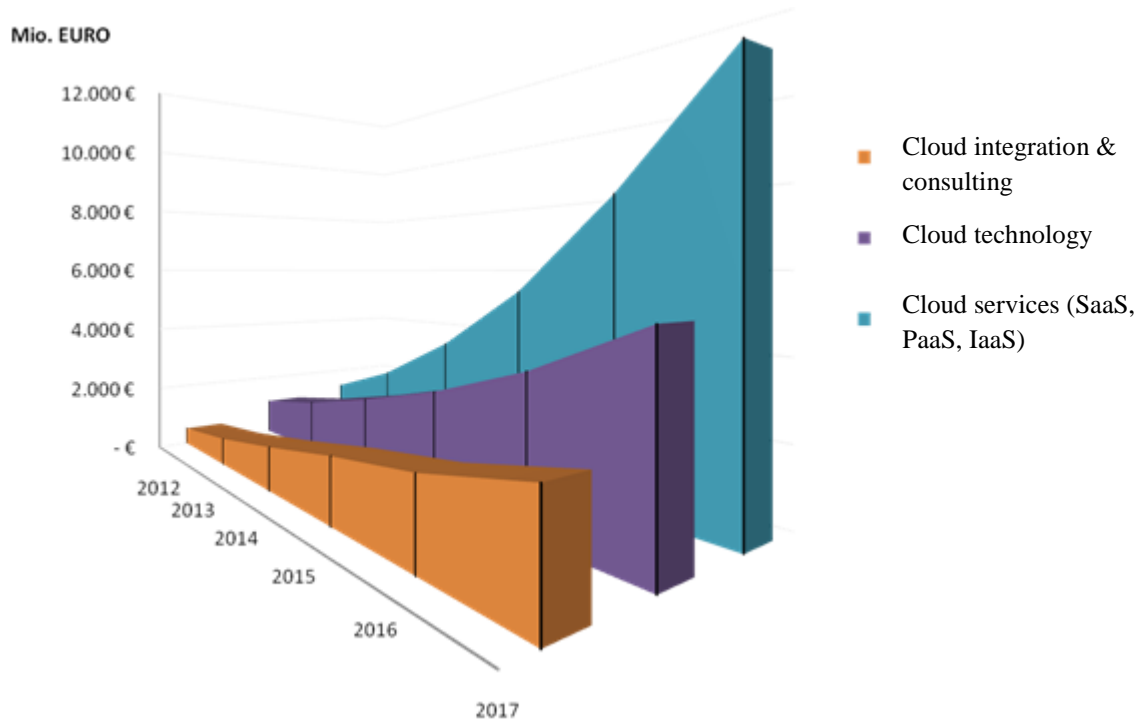
Source: Pauly et al, 2015

Today, when choosing a cloud service, shades decide. The estimated revenue of the world's largest cloud-based companies, according to Gartner, is shown in the following table (in billions of dollars):

Table 2: Estimated revenue of the world's largest cloud-based companies

| Company	Solution	Yearly revenue
Microsoft	Commercial cloud (Azure, Office365, Microsoft365)	21,2
Amazon	AWS	20,4
IBM	/	10,3
Oracle	/	6.1
Google	Google Cloud Platform, G Suite	4,0
Alibaba	/	2,2

Source: Gartner (n.d.)

Considering exclusively revenue, IBM and Oracle are corporations that have been running computer world-class for many years now, and have a significant role in the cloud computing world, as well, making comparison over i.e. Google and Chinese Alibaba. However, the question of the maturity of the offered individual solutions and the location of these solutions in the wider context of cloud computing are very different in the offerings of these companies. Some of the service providers (i.e. IBM) have infrastructure and platforms and applications, while others (Amazon) are mainly located in the world of infrastructure. On the other hand, the dominant part of Microsoft's revenue comes from Office365 that does not have a competitor other than Google Suite.

4. Magic Quadrant methodology

Gartner's Magic Quadrant is a methodology and tool for visualizing and evaluating the progress and position of companies in specific technology markets. This methodology is aimed at examining the market from a broader perspective, and analyzing the relative positions of competitors of the internal market, which facilitates understanding of positions, changes and results of efforts in the evolution of markets and solutions.

Gartner chose a two-dimensional matrix display by dividing competitors into four different quadrants based on the Completness of Vision and Ability to Execute parameters. This way, Gartner recognizes the efforts of technology companies to come up with innovative solutions, but also to demonstrate progress in implementing innovation, without which it is not possible to get a competitive advantage.

Graph 2: Magic Quadrant
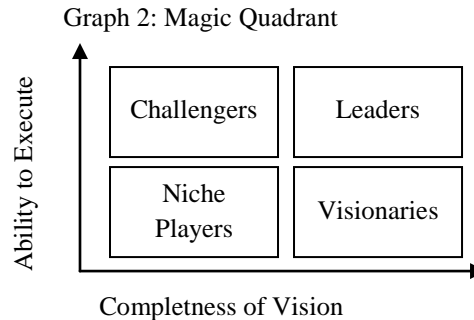
Source: Gartner (n.d.)

The differences exist in the magic quadrant when it comes to IaaS between 2017 and 2018. In the analysis of 14 companies by Gartner, Google has entered the leaderboard. The effort of this company has been obviously recognized in order to offer competitive solutions, first of all in the areas of artificial intelligence and machine learning.

The cloud computing market is in a big swing. Gartner estimates that with 260 billion US dollars in the previous year, the total value of this segment will jump to over 410 billion by 2020. Microsoft has recently been engaged in a hybrid cloud, or a combination of servers located in customer data centers and those that are under the control of the US company. Oracle is still strong in this domain when it comes to supply, although the big question is whether the hybrid cloud will succeed in future. It seems that most companies, motivated by savings in capital investment, will overtake complete dependence on clouds. There is "a golden fever" in the world of clouds, and those who find the correct measure of topics, such as machine learning, artificial intelligence, serverless architecture and service accuracy, as well, can expect the next year to be in the focus of Gartner research.

The growth of Alibaba's cloud supply is particularly interesting. Morgan Stanley's latest research suggests that Alibaba is worth almost twice as much as before (from $ 39 to $ 68 billion), and predicts that cloud computing will bring this Chinese corporation nearly $ 30 billion by 2024. Alibaba holds almost half (47.5%) in Alibaba's domestic market, with plans other than the internationalization of its offer, especially to Europe and North America, related to the countries of Asia, such as Indonesia, where their latest center has been recently opened data. Alibaba is investing heavily in the IoT sphere, with a focus on smart cities smart homes. The first Alibaba smart city project outside the territory of China, called Smart City Brain, is being implemented in Kuala Lumpur. The core of this project is the artificial intelligence and a large number of different sensors working on the Alibaba infrastructure in the cloud. The aim of the project is to reduce inefficiency in the management of the city ecosystem, primarily in the traffic area (Technode, 2018).

5. Conclusion

Companies need an IT infrastructure that would allow them to operate more efficiently and given data literally follow changes in future business. Companies have come to a point where they have to overcome the previous internal focus on maximizing the use of IT resources and switch to an external focus, i.e. on external support and new product development with cloud technology. Companies become web-oriented using SaaS applications, combining them with internal applications that support collaboration with other companies to achieve economic growth. This is possible because cloud and SaaS providers become tools, which offer reliable computing power and basic operations such as mail, Enterprise Resource Planning (ERP), Customer relationship management (CRM), and a growing number of applications in the industry. Over the years, providers have developed such economies of scale and expertise to offer at much lower prices than any company could offer internally. For this reason, companies in the coming years will increasingly buy basic IT operations in order to reduce

costs. This in turn will allow companies to devote their time and attention to create new value for their products and to stand out in customers' eyes.

Many SaaS providers and CC providers are focused on creating a user-friendly interface, which would be easy to use. They continuously integrate with mobile devices such as Blackberries, iPhones, netbooks, electronic book readers and iPads.

When it comes to providers' point of view, Gartner's methodology seems to be very convenient for a relative comparison of the efforts of the most successful companies in order to fully implement the powerful innovations to which each other is motivated. At the center of the next stage of growth will be the spheres of artificial intelligence and machine learning.

Literature

[1] Bitkom. (n.d.). IT-Sicherheit, Cloud Computing und Internet of Things sind Top-Themen des Jahres in der Digitalwirtschaft. Retreived 10.4.2018. from https://www.bitkom.org/Presse/Presseinformation/IT-Sicherheit-Cloud-Computing-und-Internet-of-Things-sind-Top-Themen-des-Jahres-in-der-Digitalwirtschaft.html

[2] Eamonn. (2013). What's The Difference Between SaaS, PaaS, IaaS? [Blog post]. Retrieved 15.4.2018. from https://www.computenext.com/blog/when-to-use-saas-paas-and-iaas/

[3] Gartner. (n.d.). Retreived 15.5.2018. https://www.gartner.com/technology/research/methodologies/research_mq.jsp

[4] Hugos, M.,Hulitzky, D. (2010). *Business in the Cloud: What Every Business Needs to Know About Cloud Computing* .Wiley.

[5] Langović, Z., Pažun, B., Langović-Milićević, A. (2011). Razvoj poslovnih sistema i informaciona tehnologija - mrežna infrastruktura i računarstvo u oblaku, Naučna konferencija sa međunarodnim učešćem "AGROBIZ 2011" 10. oktobar, 2011, Novi Pazar, Srbija – organozovana koferencija u okviru projekta "Bolja saradnja za bolju budućnost", podržanog od strane Delegacije Evropske Unije u Srbiji i Crnoj Gori; izdavači Univerzitet u Novom Pazaru i Fakultet za menadžment u saobraćaju i komunikacijama, Berane pg. 312-321 - ISBN 978-86-84389-25-3.

[6] Pauly, M., Reti, M., Munzl, G. (2015). *Cloud Computing ALS Neue Herausforderung Fur Management Und IT*, Springer-Verlag Berlin and Heidelberg GmbH & Co. KG, Germany.

[7] Sultana, A. (2014). Cloud Computing- How much you know of it (Part-2). Retrieved 15.4.2018. from http://blog.sysfore.com/cloud-computing-introduction-part2/

[8] Technode. (n.d.). Retreived 20.5.2018. from https://technode.com/2018/05/10/alibaba-cloud-q1-2018-results/

[9] Techtarget. (n.d.). Retreived 28.04.2018. from https://searchcloudcomputing.techtarget.com/definition/SPI-model