

THE CLOUD COMPUTING BENEFITS AND CONCERNS FOR SMEs

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Abstract - *The Cloud computing is a new Internet-based technology and its adoption in developing countries will not be an easy process. The lack of knowledge what the Cloud is and what benefits it brings to businesses makes this process even harder than it is usually the case with new idea and technology adoption. The only name "Cloud", as something unsteady and mystical, brings additional suspect in this technology, which will for sure become the newest and most revolutionary utility service. This paper gives short history of Cloud computing and presents in brief some facts derived from several studies conducted in high developed countries and European Union relating to adoption of Cloud services, its economic impact to business creation as well as the main benefits and concerns it brings to SMEs.*

1. INTRODUCTION

The Cloud computing is an innovative Internet technology which offers high computational power on distant processors, storage of information in provider's servers and Data centres and variety of services and applications to users, based on pay-as-you-grow manner. With this revolutionary concept the companies, especially small and medium ones (SMEs), are in position to adopt the latest applications and services on demand, avoiding high up-front costs that are in a current traditional way unavoidable for ICT equipment and software. Cloud computing reduces ICT cost structure and strengthens production and market abilities of SMEs.

The EU recognized positive impact of Cloud computing for creation of small and medium businesses and economy as whole. The e-Business Watch of the European Commission (2008) stressed this aspect clearly (1, p. 2): "*SMEs form significant industry segments in the EU and account for the majority share in EU employment. Thus, they require specific policy attention. While their strength lies in the flexibility with which they can adjust to changing market conditions, their small size makes them less able to face high up-front costs*" (p. 53).

Cloud computing brings numerous positive effects and speed of adoption is crucial. The study which has been done by Federico Etro (1) showed that Cloud computing adoption will contribute to GDP growth in European countries in the range between 0.05% in the short run under slow adoption and up to 0.3% in the medium run under fast adoption.

The policymakers in developing South-East European (SEE) countries must follow the EU policy and promote

as much as possible a rapid adoption in all business areas with special attention and help devoted to SMEs. The governments should promote the benefits of Cloud computing, adopt an appropriate legislative to reduce security and privacy concerns and partially finance the cost of Cloud services for SMEs in the initial phase in order to encourage them for faster Cloud adoption. Smaller countries would be able to obtain larger gains from similar policies at least in the initial phase, because they would easily attract foreign investments from the larger countries (1, p.18).

2. THE HISTORY OF CLOUD COMPUTING

Although Cloud computing in its today's forms such as Software as a Service (SaaS) or Platform as a Service (PaaS) is relatively new concept or a business of the 21st century, the idea of similar global shared computer network was introduced in 1969 by J.C.R. Licklider, who was responsible for enabling the development of ARPANET. His vision was that everyone in the world should be interconnected and have possibility to access and use programs and data at any time, at any site, from anywhere. The similar vision, which also dates back to sixties, had John McCarthy who predicted that this way of global computation will be a new public utility, similar to the other utility services such as electricity, gas, telephone, water or heating.

Since its beginning, cloud computing has developed in a variety of forms with Web 2.0 as one of the latest evolution. The popularity of Cloud computing is in line with the development and dissemination of telecommunications broadband access networks and technologies. The global economic downturn seems to have no negative impact on its expansion.

One of the first companies in Cloud computing business was Salesforce.com started in 1999 with SaaS. This company was offering business applications in a simple and economic way via website. Amazon Web Services, which were introduced in 2002, were providing cloud-based data storage and computation. Amazon's Elastic Compute cloud (EC2) service was commercially launched in 2006 through the Amazon Mechanical Turk (MTurk) and it was the first commercial service, which was offering human intelligence as web service. In 2009 Google started offering Web 2.0 browser-based enterprise applications and services with Google Apps, as a good example.

The most important contribution to Cloud computing have the emergence of popular "killer applications" which

have been introduced in last two years by Microsoft and Google. These applications have a huge impact to the market and IT industry as whole, attracting consumers by its simplicity and reliability. Some other factors such as: the maturing of virtualisation technology, the development of universal high-speed bandwidth networks and standardization in the field of software interoperability also have a big positive impact to Cloud computing industry.

The SMEs started with Cloud computing in 2008 but at the beginning most of them didn't have enough confidence in this technology and the lack of awareness that the businesses is going to run well on Cloud is still evident. Below we present some indicators, which are mainly derived from recent researches conducted in the Europe by The European Network and Information Security Agency (ENISA) (2) and by OpinionMatters, an independent pan-European market research company from the UK (3), commissioned by Easynet Connect.

It is very interesting to see how seriously SMEs were taking the cloud at the beginning i.e. in 2008 and how their interest changed in two following years. The results showed the significant increase of interest in the Cloud computing. At the end of 2008, more than half SMEs which were included in this research, said they would never adopt the cloud, but the interest in the cloud started to grow throughout 2009 and 2010 and the attitudes have significantly changed.

3. ADOPTION OF THE CLOUD COMPUTING SERVICES BY SMEs

The research conducted by Opinion Matters from UK, showed that at the end of 2008, 53% of SMEs included in the survey said they would never use the Cloud computing and remaining 47% said they would do it within five following years. Some fifteen months later the situation significantly changed and only 27% said they would never use the cloud, while 73% said they would use it within next five years.

The survey conducted by ENISA (3) was composed of nine questions related to: Company size, Company location, Drivers or reasons for SMEs engagement in the Cloud Computing, Cloud models, Cloud types, Use of multiple providers, Disaster recovery options, Cloud services and SME's main concerns. The survey participants were 74 SMEs from 16 EU member states, India, Canada and USA with different size, e.g. number of employees: 27 SMEs or 36.5% with 1 to 9 employees, 12 SMEs or 16.2% with 10 to 50 employees, 14 SMEs or 18.9% with 50 to 250 employees and 21 SMEs or 28.4% with more than 250 employees.

The main drivers for SME's engagement in Cloud computing were:

- Elimination of capital expenditure in hardware, software, IT support, and information security (68.1%);
- Flexibility and scalability of IT resources (63.9%);

- Better Business Continuity and Disaster recovery capabilities (52.8%);
- Increased computing capacity and business performance (36.1%);
- Feasibility and profitability of new services in the Cloud (29.2%);
- Optimization of IT infrastructure through automated management of virtual machines (25%).

The SMEs don't have a similar and clear attitude what Cloud model or solution is most suitable for them and they expressed almost the same interest for Public Cloud (24.7%), Partner Cloud (27.4%) and Federation Clouds (31.5%) provided by various sources (partner, private, etc), with only 15.1% of those who consider a privately owned and managed Cloud most suitable solution for them.

Software as a service, e.g. individual software packages would be the most popular Cloud service for SMEs (34.2%), than Platform as Service (28.8%) and a pure infrastructure services such as storage, processor power or network capacity (24.7%). Since SMEs are still concerned about security and privacy, only 9.6% said they would perform security services in the Cloud.

SMEs would rather choose an outsourcing to multiple providers (73.6%) than to the single one (26.4%) expecting a better reliability working with more providers. This attitude is mostly based on their previous experiences gathered from cooperation with network infrastructure operators.

Considering the disaster recovery plan almost half of SMEs (48.6%) would like to fully outsource disaster recovery to Cloud providers and ensure better business continuity while the others (51.4%) would rather keep internal IT resources used before the Cloud. Additionally some 15% said they would like to have both options for disaster recovery regardless of the costs.

Regarding the services which SMEs would like to outsource to the Cloud, list is as follow: CRM and Sales Management (52.8%), Application development (44.4%), Project management (41.7%), Payroll (38.9%), Accounting and Finance (30.6%), Data analysis (29.2%), Human resources (19.4%) and Procurements (16.7%).

4. THE MAIN BENEFITS OF CLOUD COMPUTING

IT professionals in the developed world have recognized the benefits of cloud computing, mainly in terms of unlimited storage, flexibility and cost reduction but some concerns still remain mainly related to the security and privacy of data transferred and stored in the cloud. Once the security and privacy concerns are solved the cloud computing can bring enormous benefits for IT users, mostly through enhanced flexibility, a wider choice of computing resources and scalable capacity on demand. The significant cost savings is also a very important factor for decision makers within SMEs in order to adopt Cloud services.

As we already have mentioned SaaS is the most popular type of Cloud services for SMEs and they started to use web-based applications such as: email, office applications, data backup and data sharing. These applications are maintained in online data centres and users steadily gain awareness of their numerous benefits that are obvious but not easily quantified. We will here mention some of them.

- Reduced IT Costs: Since the SaaS applications are performed on the hardware situated in large data centres SMEs transfer all maintenance and support associated with that equipment to Cloud providers which as result should have reduced maintenance costs compared to the one they previously had for the hardware in their ownership.

- Easier Access to New Services: SMEs are in position to use a variety of rich services that in the past were exclusive privilege of large enterprises who had their own and expensive IT infrastructure.

- Higher resilience: Since the users no longer depend on in-house based hardware their business applications can be accessed from anywhere using Internet. Users now have a high degree of freedom and flexibility since they can work from the home or whilst commuting.

- Reduced investment and better Cash Flow: Since the Cloud computing users usually works on subscription based schemes, payment in installments without the need for high upfront capital investment is of huge importance for SMEs particularly for those smaller ones.

- Security: Although security and privacy matters are still the main concerns for SMEs, the data centers in the Cloud are exceptionally secured and protected because the income and reputation of Cloud providers directly depends on how customer's data and applications are safe and protected from attacks.

- Easy software upgrades: Cloud services are mostly based on subscription model and user receive the latest upgrades on time without need to pay for them in advance as it was the case when they have used it on their own computers. Working in the cloud user always has the latest version of software and services.

- Flexibility and scalability: The scalability is one of distinguishing benefits of Cloud based services. The user's applications can now be expanded in line with ongoing business demands. Using Cloud based services, customer pay only for what they use or need and it is significantly less then with applications performed on their own IT infrastructure.

5. THE MAIN CONCERNS OF CLOUD COMPUTING

According to Opinion Matters (2) the confidentiality of corporate data, data privacy and integrity of services are the main concerns for SMEs, whilst they are the least

concerned about cost and difficulties of migration to the Cloud and the clearness of the pay per use scheme offered by Cloud providers. Average concerns rating of different security aspects for SMEs (in the range from 1 to 5) is as follow: Confidentiality of corporate data (3.59), Privacy (3.36), Integrity of services and/or data (3.28), Availability of services and/or data (3.17), Lack of liability of providers in case of security incidents (3.03), Loss of control of services and/or data (2.98), Repudiation (2.67), Intra-clouds (vendor lock-in) migration (2.63), Uncontrolled variable cost (2.62), Inconsistency between transnational laws and regulations (2.52), Unclear scheme in the pay per use approach (2.37), Cost and difficulty of migration to the cloud (legacy software etc...) (2.33).

6. THE ECONOMIC IMPACT OF CLOUD COMPUTING

In his Study (1, p.13-17), using rather conservative approach, Federico Etro has estimated that Cloud computing diffusion over five years can contribute to the rise of the annual growth rate in the range from 0.05 to 0.3%, depending on how fast will be the Cloud adoption. Even more he has stated that fast adoption can generate several hundred thousand of small and medium enterprises and create almost million new jobs across European Union. This effect is going to be stronger in countries with relatively higher contribution of SMEs in total economy, especially for those more IT oriented and with rapid IT adoption. According to this Study the highest number of new small and medium size enterprises is expected in Italy (about 81,000) in the medium run under fast adoption followed by Spain (55,000), France (48,000), Germany (39,000), UK (35,000), Poland (32,000), Portugal, Greece and Czech Republic (18,000), Hungary and Sweden (12,000) etc.

Such positive economic effects of Cloud computing need a fast adoption and dissemination of this new technology which is not possible without highly developed broadband infrastructure, strong state policy interventions and appropriate regulatory support.

Since Cloud computing is an Internet based technology relying on infrastructure (data centres, servers etc). located in different countries, data will inevitably cross the borders of states with different regulations and privacy laws. Such situation demands appropriate international standardization regarding free flow of data as well as an independent international auditing and technical standardization for equipment, protocols, software etc.

7. CONCLUSION

The Cloud computing era started few years ago and it will inevitably spread all over the world in this decade. In order to provide faster Cloud adoption and ensure all its benefits to the customers, Cloud providers have to demystify Cloud to the customers because most of them never heard of Cloud or don't have enough information

what "the cloud" means. *"It's not just consumers and lay people who struggle with the cloud, it's experienced IT people who struggle with it,"* says Gartner analyst David Smith. *"The whole idea from a consumer perspective is ... it's supposed to be a magical cloud in the sky"* (5).

Demystification is a precondition but Cloud providers and IT specialists have to eliminate SMEs decision maker's concerns regarding security of company's data and applications in Cloud. From regulatory point of view the introduction of public auditing or third party auditing for cloud data storage security will be crucial for fast adoption and Cloud spreading (4).

As far as the technical solutions are concerned, the concept of distributed Host-based Software Solutions promising to be the efficient approach to secure databases on virtual machines in Cloud environments (6).

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