

# SPATIALLY LOCALIZED MANAGEMENT COMPANIES USING CLOUD TECHNOLOGY

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*Content - Business applications and software platforms crossing in the cloud environment. This paper analyses new generation of management tools in industrial production with cloud technologies. The decades ahead will be marked by a new way of communication in business environments from telecommunication field to medicine as well as industrial production and energy efficiency. Standard business applications and software with its installation and maintenance require considerable financial resources and significant spending on hardware. To address that requirement there is the need for special teams of experts to install, test and maintain the system. The new approach to cloud applications brings to this field that what is needed, a software update is automatic with an easy access to applications efficiently from anywhere on the planet and spatially are independent where you are located.*

*Keywords: Cloud environment, Cloud applications, Easy access to applications, Software, Company*

## INTRODUCTION

People from all over the world anywhere and from various computing devices at any time, can access different industrial production services and applications, with almost one hundred percent data availability, the guarantee of complete security and privacy, cheaper and more reliable system recovery in the occurrence of accidents and reduce maintenance costs for hardware as much as 70 percent. [01] Growth and development of the economy requires continuous innovation in industrial production and manufacturing processes. Development of computer networks and network protocols introduce new ideas in field of the management and monitoring of production processes. Machines and machining centers in production today provide an opportunity for networking and communication between them in a single network within the manufacturing plant.

The new dynamic and global business model forced traditional production processes to change in the sense of to be integrated in a global chain of resources and stakeholders. The agility and quick reaction to market changes is essential, and the high availability and capacity to effectively “answer” to requirements is one of the main sustainability criterion. [16]

The production process is thus possible to monitor online from anywhere in the world. Companies have the ability to stream production and manufacturing processes at the global level, from a central location that is spatially localized. On the other hand, the progress and development of new solutions in the field of production control and monitoring could be done with the help of cloud technologies.

Such a lateral thinking is considered logical and natural as manufacturing businesses in the new millennium become increasingly IT-reliant, globalized, distributed and agile demanding. [19]

Cloud technology today is a way to provide access to applications from local computer to remote servers where related applications are located. Cloud computing is a new and promising paradigm delivering IT services as computing utilities. As Clouds are designed to provide services to external users, providers need to be compensated for sharing their resources and capabilities. [02] Today's society is faced with the continuous development of products depending on the needs of consumers. On the other hand, industrial production and machinery must quickly adapt to customer demands and changes in the structure following the purpose of the products

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we produce and consume. Machines in the manufacturing process must support more features and the human factor must be trained to adapt for market needs. On Figure 1 workers must to prepare for new techniques and working procedures.



Figure 1: Machines in the production process [07]

### PRODUCTION IN CLOUD

Assessment Agency IDC provided the following results and finding from research was that for 2012 the increase from 1.5 to 1.8 percent and for 2013 the increase from 3 to 5 percent. After 2015th the Serbia expects double-digit growth rate. Serbian IT sector is now only in the early stages of cloud applications. The goal for this assessment is to locate the adequate market about U.S. \$ 1 million spending. Serbia invested in IT equipment, tablet computers, smartphones, for the amount of 900 million U.S. dollars. [01]

On the other hand, one advantage of the new technologies is that the global market now is shifting their production facilities to remote locations around the globe. Manufacturing is faced with the need for greater competition and new markets as well as the need to switch their production facilities in the new industrial countries such as Brazil, Russia, India and China. Industrial production moves to new countries where different laws, infrastructure, culture and are present all that with the goal of increasing profits.

The Cloud is the most effective way to control production in remote locations from one data center. Cloud provides a business model for IT services available through the network. [15]

On that way we know at any moment the arrival and departure of workers from their jobs at a plant located in China or India, the failure of the

machine that is in Brazil or Poland, or why we have bad he quality product that is made today in the South African Republic.

### TECHNOLOGY CONTROL

Improving the quality of management aims to accurately detect faults, detection of critical points in the production process and their correction and improvement in a short period of time. The inspection and quality control that was done by computers in the past with the help of cloud technology taking over computers, computer networks, platforms and applications its control is performed at remote location today. This process relies on maturity of services and people experience within cloud technology service providers.

Today, with the application of control technology in the form of optical, electrical and temperature sensors as well as quantitative numerical methods, it is where the cloud provides best results in a data center with help of advanced technology we can get high quality products. On Figure 2 is a spatially localized management Data Center.



Figure 2: Monitoring of production from the Data Center [09]

Cloud Technology offers a new technological base for providing software as a service. In this connection, it is possible that we will approach software services in the future as we get electricity and water, including billing based on consumption. [13]

### IMPROVING PRODUCT QUALITY

The quality of the product depends on the manufacturing process. Better quality means better managing and optimization of each phase of the product life cycle from design and development to methods of disposal and recycling.

Checking the quality of each production process quantifies the information with the help of cloud and it technologies can circulate freely and be shared between production processes through computer network from any location on the planet, all in the drive to improve the quality of operations.

Many companies are developing what pioneers like Google and Amazon offering for years, storing e-mails, photos, music, books, but in industrial production and manufacturing processes. Providers such as Amazon, Google, Salesforce, IBM, Microsoft and Sun Microsystems have begun to establish new data centers for hosting Cloud computing applications in various locations around the world to provide redundancy and ensure reliability in case of site failures. [02] The term cloud comes from the early stages of the Internet since the 1960th year. American computer pioneer and expert in artificial intelligence, John McCarthy was told back then that we would access the computers in the way that we are getting water or electricity. Above all it was not possible until the advent of the PC revolution and the advent of the Internet, where the conditions for cloud technology are available. Things began to move forward when the web bookstore Amazon has decided to modernize its data center and begin to use cloud technology.

IT professionals in the Amazon used Web services and service virtualization technology to provide users with a more efficient and flexible approach to the use of its servers.

This has made a real revolution in the field of cloud, and Amazon introduced its own Web service, including offering its server capacity data center. Take the example of Amazon S3 (Simple Storage Service), which began with March 2006th year. It is a commercial Web service for data storage, files, documents, websites, etc. and records their growth from year to year. On Figure 3 is a growth chart till the end of the third quarter of 2011, there are 566 billion (566,000,000,000) objects in Amazon S3.

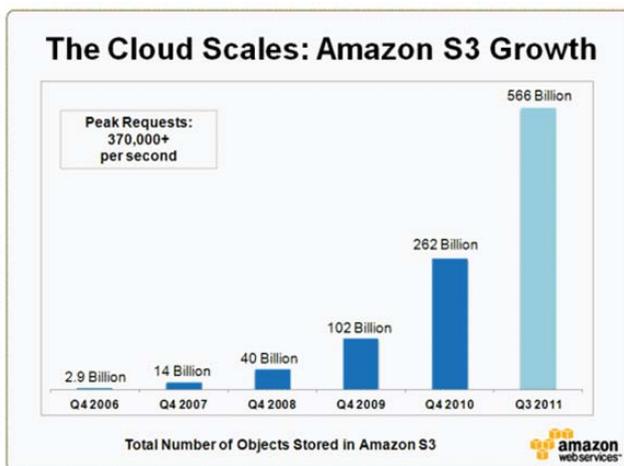


Figure 3: Growth of Amazon S3 (Simple Storage Service) [06]

## TYPES OF CLOUD SERVICES

According to data from the analyzes carried out abroad and in our country, the introduction of this technology investment costs are reduced by more than 50%, while reducing operating costs and more than 70%.

We distinguish three types of cloud services: Software as a Service (SaaS), or access the network. In this case the program, i.e. the software is not on the client computer.

An example is a technician who works in the plant, who uses the tablet computer application to access the site from any point and thus not tied to your job or office. On Figure 4 a heating company technician can use a tablet computer to access the latest maintenance program on site at any time.



Figure 4: Application access from anywhere [10]

Another type of cloud is Infrastructure as a Service (IaaS), which means “rent” computing services in the form of virtual hardware that e.g. Amazon offers.

The third type is a Platform as a Service (PaaS) where users can access a common development platform or software. PaaS can be viewed as an operating system for the entire computer data center that was able to communicate with the data center. From the aspect of hardware and software the Cloud does not have to be accessible to everyone. In this connection, there is public and private cloud. Private Cloud uses the same technology as the public, but in terms of legal issues, and security reasons, access to it is provided to a number of users.

These two cloud architecture can be combined in so-called Hybrid Cloud which is more efficient and faster access from anywhere in the world where there is Internet access, and on the other hand has better security and control of applications, platforms, software, and hardware. It can be used in situations where the client data must be processed with the help of complex software. Data warehousing is done in private environment, while the calculations performed in the public cloud.

## CLOUD SERVICES IN FUTURE

Software for monitoring the quality of operations for robot welding continuously records and analyzes data on the quality of the welds on the vehicle car. The software generates a report that alerts the management company that the robot needs to be replaced or serviced.

This type of monitoring is very expensive and difficult to maintain due to the huge amount of data that is generated. Microsoft has Azure Cloud platform which monitors these operations. Companies can significantly reduce the cost of their own infrastructure and support with the Windows Azure platform and take advantage of cloud technology. [18] On Figure 5 in some vehicle models there are millions of possible combinations of optional equipment.



Figure 5: Production monitoring over Cloud [08]

The similar service in the near future will be in medical platforms, applications, and remote diagnostics. One scenario is that the patient was sent to the hospital because the doctor suspects that he might have lung cancer.

Cloud computing represents a shift away from computing as a product that is purchased, to computing as a service that is delivered to consumers over the internet from large-scale data centers - or "clouds". [19]

Cloud systems automatically processes images and evaluated which leads to faster and more reliable diagnosis. However, small hospitals do not have their own diagnostic centers because of their high prices. In the near future, doctors may be able to rent diagnostic systems within the cloud as a Software as a Service (SaaS) services.

In this scenario, the CT images were made anonymously, and then in an encrypted form sent to the server where the cloud is automatically assessed and diagnosed. In this case, the patient receives a physician diagnosed a few minutes. On the other, the Platform as a Service (PaaS) is taking an advantage of extensive knowledge of specialists to mark and label CT scan image

made with the base that will help the software to apply and compute statistical and quantitative methods in order to make a diagnosis of patients and by using related cloud services carry out further tasks. On Figure 6 in future cloud computing could be offered by medical image-processing applications and remote diagnostics.



Figure 6: The diagnosis of the patient in the Cloud [11]

## CLOUD SECURITY

One of the biggest technological challenges within Cloud technology is to keep means costs low in order to provide services despite the fact that they will become more complex in the future.

Within the organization, demand planning and supply chain organization can be tied into a cloud-based system, allowing different parts of the organization to take a peek into the opportunities that their sales teams are working on. [17] Microchip performances will increase 500 times in the next 20 years, but it will not be sufficient to ensure the smooth functioning of the flow of data through the network in the future. The infrastructure carrying out the data has to be scalable, in order to ensure better performance, security, and operation of cloud environments. [14] The biggest challenge with security is how the important data is protected and where it is stored on the Web or on computers in the public cloud. In another very important question is what will happen if data is lost or if the server is "hacked"? Above all, how can we guarantee the security of data, if it has been transferred to someone else? In the case of a Cloud as a commercial offering to enable crucial business operations of companies, there are critical QoS parameters to consider in a service request, such as time, cost, reliability and trust/security. [02] Large companies are still reluctant to enter the cloud environment just for safety reasons. Analysts predict that Cloud technology despite security issues will undergo a boom. According to a survey conducted by Experton Group the revenues of 1.1 billion €, which had been generated by cloud technologies in 2010 will be increase to more than € 8 billion by

2015<sup>th</sup> year. The question that arises is whether the Cloud technology will be capable to make technological advances similar to the one made of computers when they began to be used in all levels of society? [05] Cloud technology will permanently change the IT world. In the near future it will be connected machines instead of people. The goal is to make the communication between the industrial machines with Internet technologies more efficient. The aim is to replace the faulty components and that re-commissioning takes place as a replacement off USB stick on a PC. The idea is that in the automotive industry executes faster replacement and reconfiguration of the production line for faster and more efficient manufacturing processes. This will result in the production of flexible products and allow manufacturers to produce small batches of products to customer instead of relying on mass production. Internet and Cloud technology will help our production to become more efficient. On Figure 7 communication between industrial machines and Internet technologies more intelligent. On the other hand, just because there are thousands of sensors that supply information applications in the Cloud, it does not mean that the system is perfect. Providing all electricity consumers in the network with unique intelligent sensors, will introduce a new system that has never been there, but at the same time the system will not be intelligent in itself. The main challenge that we face in the near future will be that machines will become so intelligent that they can react to changes in real time. The biggest task is to ensure that the system has sufficient dynamic that could adapt to the new situation at the moment. It requires a tremendous amount of computing and processing power. This type of software works on the basis of statistical models and experience with hundreds of experts in each area. [04]



Figure 7: Production flexibility [12]

## CONCLUSION

The global market is functioning today on the need for consumers to change their daily habits and requirements. This leads to the need for more complex and more diverse products with short life cycle. Production has to be more flexible and to adapt to new customer needs.

If companies successfully led the fight to the competition, their production systems to adapt to the global market, in order to make them more efficient and dynamic but the same time to make them better, safer and more energy efficient. We are the witnesses of new economy and industrial standards in it.

Manufacturers should always have a reputation as an innovator in the field of permanent new technologies and a leader in the field of new and more advanced ways of industrial production.

Since the beginning of the industrial revolution and constant innovation in it, we have seen the continuous development in product quality and competitiveness in the market as well as the continued progress in the field of innovation and new solutions in industrial production followed by the efficiency and productivity of the main requirements in the industrial production.

Today's market demands the quality, safety and environmental protection, and they are the foundation for lasting success on a global scale.

In this regard, Cloud technology is one of the methods to introduce more efficient production processes in the industry, causing a higher quality of that can equally participate in the competition at the global level.

Development of computer networks and constant innovation in the field of information transfer in them will influence the development of industrial production and new technologies in the years to come. The aim of this paper is to point to new directions in the management of companies that are spatially localized and the need for research and development of cloud technologies in Serbia.

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*Paper sent to revision: 19.02.2013.*

*Paper ready for publication: 17.05.2013.*