

Универзитет Привредна академија у Новом Саду
University Business Academy in Novi Sad

Факултет за примењени менаџмент, економију и финансије Београд
Faculty of Applied Management, Economics and Finance Belgrade

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MEFKON20

International Scientific & Professional Conference

МЕЂУНАРОДНА НАУЧНО-СТРУЧНА КОНФЕРЕНЦИЈА

INNOVATION AS AN INITIATOR OF THE DEVELOPMENT

ИНОВАЦИЈЕ КАО ПОКРЕТАЧ РАЗВОЈА

INNOVATIONS AS THE KEY TO BUSINESS SUCCESS
ИНОВАЦИЈАМА ДО ПОСЛОВНОГ УСПЕХА

INTERNATIONAL CONFERENCE PROCEEDINGS

ЗБОРНИК РАДОВА СА МЕЂУНАРОДНОГ СКУПА

INNOVATIONS

December 3rd
Belgrade, 2020

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Факултет за примењени менаџмент, економију и финансије Београд

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„Иновацијама до пословног успеха“

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“Innovations as the Key to Business Success”

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ПРЕДГОВОР

И ове године, као и пет претходних, иновације су наш покретач развоја и повод да дамо нови допринос овој неисцрпној и изазовној теми. Неговање традиције императивно обавезује да за сваку нову конференцију будемо бољи и по квалитету радова, њиховој бројности и ширини. Истовремено, измењене животне околности намећу актуелност тренутка. Иновације и означавају и генеришу будућност, али почињу у садашњости која мора бити осветљена, анализирана и разматрана. Факултет за примењени менаџмент, економију и финансије у циљу друштвено одговорног пословања и бриге за здравље због пандемије је организовао ове године конференцију само на основу пристиглих радова, без физичког присуства учесника. Међутим, аутори су показали заинтересованост и поред отежане ситуације и ширења вируса *Covid 19*, а и број пристиглих радова је потврда тога. Управо су утицај и последице ширења вируса елаборирани и истраживани у више радова и то из различитих углова: туризма, дигиталне трансформације рада и радног окружења, пољопривреде, иновативног сектора, затим са медицинског аспекта који је иманентан епидемији. Поред тога, анализирани су социо-економске последице вируса, утицај на менаџмент, али и на трговински биланс у Европској унији, као и комуникацију у малопродаји. Овај списак у тематском смислу допуњују и луксузна индустрија и технологија индустрије 4.0. Овако свеобухватан тематски аспект је доказ да се иде у корак са временом. То даље имплицира да су иновације свуда око нас.

Та парадигма разноликости коју иновација носи, намеће и потенцира даљи тематски спектар који је присутан међу радовима. Дакле, није само утицај и последице корона вируса заокупљао пажњу учесника, већ су их инспирисали и други аспекти и проблематика.

Примерено теми „Иновације као покретач развоја“ и циљу научног скупа установљене су две сесије: I сесија: Иновације у функцији развоја (Тематски зборник) и II сесија: Иновацијама до пословног успеха (Зборник радова са међународног скупа). Избор теме скупа и свеprisутност иновација, као и понуђени већи број тематских области утицао је да су у овим публикацијама радови многих угледних универзитетских професора, истакнутих истраживача, експерата и научних радника, како из Србије, тако и из иностранства.

Зборници радова са међународног скупа, као резултат конференције, су у форми дигиталне едиције и биће доступни широј научној јавности. Публиковани радови у овим зборницима значајно доприносе утврђивању нераскидиве везе између иновација и развоја. Истовремено смо тиме показали да подручје иновација дефинитивно више није везано само за техничко – технолошки прогрес. У складу са тим, радови могу бити корисни како научној, тако и стручној јавности и свим заинтересованим за утицај иновација на развој.

Београд,

Децембар, 2020.

Уредници

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FOREWORD

This year, as well as the previous five, innovations are our driver of development and an occasion to make a new contribution to this inexhaustible and challenging topic. Nurturing tradition imperatively obliges us to be better for each new conference in terms of the quality of papers, their number, and breadth. At the same time, changed life circumstances impose the topicality of the moment. Innovations both mark and generate the future, but they begin in the present that must be illuminated, analyzed, and considered. Faculty of Applied Management, Economics and Finance, for the purpose of socially responsible business and health care due to the pandemic, organized a conference this year only on the basis of the submitted papers, without the physical presence of the participants. However, the authors showed interest despite the difficult situation and the spread of the Covid 19 virus, and the number of papers received is a confirmation of that. The impact and consequences of the spread of the virus have been elaborated and researched in several papers from different angles: tourism, the digital transformation of work and work environment, agriculture, innovation sector, then from the medical aspect that is immanent to the epidemic. In addition, the socio-economic consequences of the virus, the impact on management, but also on the trade balance in the European Union, as well as retail communication, were analyzed. This list is thematically complemented by the luxury industry and Industry 4.0 technology. Such a comprehensive thematic aspect is proof that we are keeping up with the times. This further implies that innovation is all around us.

This paradigm of diversity that innovation carries, imposes, and emphasizes the further thematic spectrum that is present among the articles. Thus, not only did the impact and consequences of the coronavirus capture the attention of the participants, but they were also inspired by other aspects and issues.

Appropriate to the topic "Innovation as the initiator of development" and the goal of the scientific conference, two sessions were established: Session I: Innovations in the function of development (Thematic Proceedings – Thematic Monograph) and Session II: Innovations as the key to business success (International conference proceedings). The choice of the topic of the meeting and the ubiquity of innovations, as well as the offered number of thematic areas, influenced the works of many eminent university professors, prominent researchers, experts, and scientists, both from Serbia and abroad.

Proceedings of the international conference, as a result of the conference, are in the form of a digital edition and will be available to the general scientific public. The papers published in these collections significantly contribute to establishing the unbreakable link between innovation and development. At the same time, we have shown that the field of innovation is definitely no longer related only to technical - technological progress. Accordingly, the papers can be useful to both the scientific and professional public and all those interested in the impact of innovation on development.

Belgrade,

December, 2020

Editors

Darjan Karabašević, PhD

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Security Aspects of Cloud Computing

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Abstract: Cloud computing has fundamentally changed the IT economy and taken over the world with incredible speed, introducing new opportunities, new business models and a whole new era in business. The main reason for the growing use of cloud computing is because it offers flexibility and financial benefits that have not existed with classical computing until now. Whether its infrastructure, software, applications, services, products, or even an operating system, everything moves into the cloud. As cloud usage grows, so do users' concerns about the security of their data. Given the increasing security vulnerabilities, the concern is not unfounded. Therefore, some aspects of cloud computing security will be presented in this paper.

Keywords: Cloud Computing, Security, Data Security, Security Issues

1. INTRODUCTION

Cloud computing technology has completely changed the relationship between users, resources, and data. To store data, it is enough to open an account on one of the available Cloud services and use the available resources to save and store data. In order to take advantage of various functionalities from different Cloud service providers, and at the same time maximally secure their data, users use several Cloud services. With this way of cloud computing come potential problems of resource use and management, which are solved by various management tools and platforms.

Cloud computing represents the delivery of IT resources and server resources remotely, via the Internet, telephone, or private network. The concept arose from the idea of renting IT resources (CPU, memory, storage space...), as a service that is paid based on use (<https://bvdstudio.wordpress.com/2014/02/23/cloud-computing/>). Therefore, cloud computing is a way of providing multiple shared computing resources that include applications, storage, networking, platform development, and deployment as well as business processes. Cloud computing turns traditional computing resources into shared resource databases located on the Internet.

The use of cloud computing is very widespread and growing every day due to the many benefits it brings to users, and has encouraged the increasing use of wireless technologies to access the Internet, and mobile devices (laptops, tablets, smartphones). Cloud applications simplify content sharing, collaboration and real-time communication, increased application availability, and synchronization of the data. Using cloud computing loses the need for expensive investments in hardware, software, and new infrastructure. For this reason, cloud computing is based on the scope of use of services, and payment for services based on the scope of their use. These same cloud services can be used stand-alone on-demand, using computer platforms from any location (Velte *et al.*, 2009).

Cloud computing uses an IT environment and information systems that raise the issue of security. Security is important for users of this service as their data is stored in the cloud. Therefore, cloud service providers should provide their customers with an insight into their work in this area. Within this paper, the issue of security of cloud computing use is elaborated.

Therefore, the paper is organized in the following manner: In Section 1 introductory considerations are given, in Section 2 some definitions regarding cloud computing are presented, as well as advantages and disadvantages of cloud computing are given. In Section 3 security issues in cloud computing are presented, finally, at the end of the manuscript, conclusions are given.

2. CLOUD COMPUTING

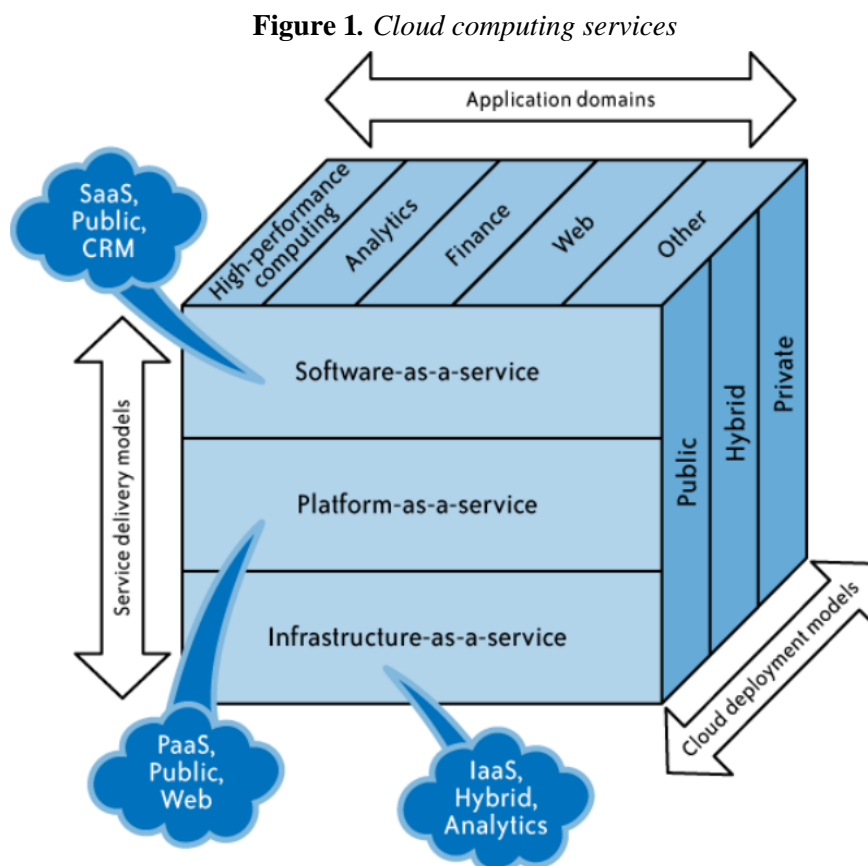
Following the National Institute of Standards and Technology (NIST), cloud computing is defined as „Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.“ (<https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf>).

This cloud model (NIST) is composed of three service models:

- Software as a Service (SaaS);
- Platform as a Service (PaaS);
- Infrastructure as a Service (IaaS).

Besides, four deployment models are (NIST):

- Private cloud;
- Community cloud;
- Public cloud;
- Hybrid cloud.



Source: Mather *et al.* (2009)

When it comes to the essential characteristics of cloud computing, it is worth mentioning (NIST):

- On-demand self-service;
- Broad network access;

- Resource pooling;
- Rapid elasticity;
- Measured service.

Mather *et al.* (2009) define cloud computing based on five attributes:

- multitenancy (shared resources),
- massive scalability,
- elasticity,
- pay as you go, and
- self-provisioning of resources.

Cloud computing represents “a pay-per-use model for enabling available, convenient, on-demand network access to a shared pool of configurable computing resources like networks, servers, storage, applications, services etc., that can be rapidly provisioned and released with minimal management effort or service provider interaction” (Teixeira *et al.*, 2013).

Cloud computing is a set of standardized IT performance delivered to users over the Internet, based on self-service and pay-per-use. Cloud computing stands out from traditional internet services with its dynamic and flexible architecture, which allows users to pay only for those services that they need (Viduka *et al.*, 2013).

2.1. Advantages and disadvantages of cloud computing

Cloud computing offers several benefits that are necessary today for organizations to do better business and save time and provide the necessary resources. Some of the advantages are (Choubey *et al.*, 2011):

- Price. The end-user does not have to own resources, but only pays for services according to their use in time and storage. This feature reduces the cost of owning the infrastructure.
- Performance. Performance has been improved because the cloud does not involve a single computer, but a large network of computers that boasts great processing power.
- Freedom from upgrades and maintenance. The cloud infrastructure is maintained and upgraded by the service provider, so that the average user is free to have the necessary knowledge to manage and maintain the cloud.
- Scalability. The user may request an increase in resources if the application grows or new functionality is added. On the other hand, if the request is reduced, the user can also request a reduction of resources.
- Speed of the implementation. Cloud application time can be in days or sometimes hours.
- Energy-saving. Cloud computing is a green technology, because it allows the sharing of resources among users, so it does not require large centers that consume a lot of energy.
- Mobility – Anytime and anywhere could be accessed to cloud services.
- Higher storage capacity. A large amount of data storage resources are available in the cloud. Another thing about storing data in the cloud is that it will be more secure, because the data in the cloud is automatically duplicated, in more places.

When it comes to the disadvantages, it could be mentioned:

- Quality of Service (QoS) in the cloud. At present the focus of cloud service providers is on cost-effectiveness and fast services, therefore QoS in Cloud Computing is an unattended area (Choubey *et al.*, 2011; Brodtkin, 2008).
- Eventual data loss. Users are responsible for the security of their data, thus in any case data may be lost (Choubey *et al.*, 2011; Hwang & Li, 2010).
- Security in the Cloud. Before adopting this technology, beneficiaries should know that they will be surrendering all their company’s sensitive information to a third-party cloud service provider. This could potentially impose a great risk to the company/end-users (Apostu *et al.*, 2013).
- Technical Issues. Though information and data on the Cloud can indeed be accessed at any time and from anywhere, there are times when the system can have some serious flaw or

malfunction. Businesses/end-users should be aware of the fact that this technology is always likely to outages and other technical issues. Even the best providers can face these problems (Apostu *et al.*, 2013).

3. SECURITY ISSUES IN CLOUD COMPUTING

The issues of security are one of the biggest obstacles hindering the widespread acceptance of cloud computing. Many companies are reluctant to fully trust cloud computing, to transfer their digital assets to the web. Many of the security risks that companies face when working with their own IT resources are also found in the cloud. With the cloud, there are no longer clearly defined boundaries between internal and external systems.

One of the most important criteria that worries current and potential future users of the Cloud service is certainly security. In contemporary corporate conditions, there is already a reduction in the clear visibility of the boundaries between security zones that separate applications and systems of different levels of confidentiality or different types of users. In terms of Cloud computing, this is even more pronounced (Janković & Samčović, 2013).

Cloud computing provides services through three basic models (SaaS, PaaS, and IaaS). These models provide the user with infrastructure resources, application platforms, and software support. Therefore, the idea of individual assessment and testing of platforms and providing individual security for each service after their differential assessment is accepted in the provision of information security (Yesilyurt & Yalman, 2016).

When it comes to cloud computing, it is necessary to pay attention to the security aspects related to it. There are three different aspects from which to look at the security of using cloud computing. These aspects relate to legislation, security controls, and the federalization of security services. Legal regulations are referred to laws and other legal acts that determine security requirements that are of higher priority than those functional and technical. When it comes to security controls, there are a number of controls that need to be practiced in the IT environment and information system, with the cloud computing environment being no exception. Security requirements can be implemented by applying the concept of federalization in the forms of trust, identity management, access management, single login and logout, audit and compliance, and configuration management (Panian, 2013).

Shaikh Rais & Dhakane Vikas (2020) propose the use of blockchain technology in cloud computing and states the following security issues regarding cloud computing:

- Privacy preservation in the cloud;
- Data integrity in the cloud; and
- Issues in cloud storage and cloud storage auditing.

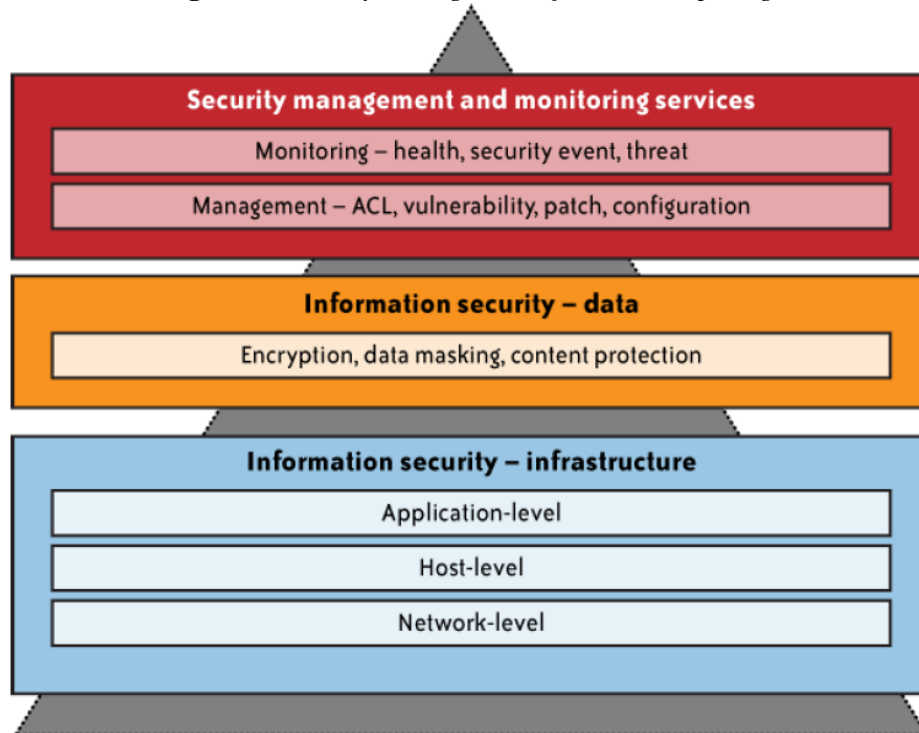
On the other side, Jensen *et al.* (2009) states technical security issues regarding cloud computing, some of them are:

- XML signature – “a well-known type of attacks on protocols using XML Signature for authentication or integrity protection is XML Signature Element Wrapping” (Jensen *et al.* 2009; McIntosh & Austel, 2005).
- Browser security and attacks on browser-based cloud authentication. The understanding of these security issues within browser-based protocols with cloud computing can be best defined using Federated Identity Management (FIM) protocols (Jensen *et al.*, 2009; Munir *et al.*, 2015).
- Flooding attacks – in this context it is worth mentioning direct denial of service, indirect denial of service, accounting and accountability.

Mather *et al.* (2009) state that cloud users should recognize the permanence of trust boundaries for cloud services. Accordingly, it should be noted interface with the cloud services (network, host, application, database, storage, and web services including identity services). Also, it is important to

understand the scope of IT system management and monitoring responsibilities, including access, change, configuration, patch, and vulnerability management (see figure 2.)

Figure 2. Security management of Cloud computing



Source: Mather *et al.* (2009)

CONCLUSION

Cloud computing is currently a notably interesting dynamic area in the IT industry. Cloud computing is well-positioned for cost-effectiveness, flexibility, efficiency, and scalability. Nevertheless, as interest in cloud computing increases, so do concerns about security issues. It is the flexibility and openness of the cloud computing model that has created several potential security issues. To achieve comprehensive cloud security, data and infrastructure must be protected from potential attacks at all costs. It should have in mind that the number of attacks increases exponentially every year. It should certainly be noted that the uniformity and standardization of this segment are of great importance for cloud security. The full potential of cloud services has not yet been fully realized, primarily due to user concerns about the security and safety of their data. Undoubtedly, with the increase in the security and reliability of this segment, it will affect the increasing use of cloud computing.

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