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Article

The Role and Advantages of Cloud Technologies in Information Systems

Shermatova Khilola Mirzayevna[1] Yunusova Dilrabo Akmaljon Kizi[2]

1.   Associate Professor of the Department of Information Technologies, Fergana State University
*   Correspondence: shermatovahilola1978@gmail.com

2.   Second-Year Student of The Departement of Information System and Technologies Fergana State University
*   Correspondence: yunusovadilrabo0613@gmail.com

Abstract: In this paper we study the role of cloud tools in the field developing of modern information systems.ecce We analyze the advantages provided by cloud technologies in comparison with traditional ones and highlights their increasing relevance in terms digital transformation. Cloud computing is discussed as a new approach of providing resources (including computing resource, storage and software service) over the internet. The paper elaborates the core service models as IaaS, PaaS and SaaS and assesses their practical relevance for enterprises or institutions from different domains. I focus, in particular, on the technological underpinnings of cloud infrastructure such as virtualization, distributed computing and resource pooling. The report outlines the benefits of cloud solutions, including cost control, scalability, flexibility, availability and better security of user data. Cloud solutions facilitate dynamic provisioning of computing capabilities, and they implement a PAYG model to decrease CAPEX and to improve the OPEX efficiency. The study also discusses perceived blockers to the cloud - such as cyber security threats, data privacy and regulations. By means of descripto-analytical and comparison methods that lead one to understand that today, cloud technologies not only ameliorate IT infrastructure, but also play as a strategic devices for innovation and sustainable development. The results support the view that cloud computing is highly influential in enhancing organizational performance and maintaining long term competitiveness in a fast paced digital environment.

Keywords: Cloud technologies, cloud computing, Laas, Paas, Saas, cloud services, Cisco, IT infrastructure.

1. Introduction

Information and communication technologies (ICT) are being introduced into every aspect of our lives every day, increasing the efficiency of our professional activities. Today, we cannot live our daily lives without modern devices such as not only television, radio, but also mobile phones, computers, tablets, using which we enrich the content of our lives, simplify our tasks in work and education. In the current era, along with all other areas, the introduction of ICT capabilities in teaching various subjects in the education system is an urgent issue.[1]

Today, the computing network, which we call cloud computing, is developing rapidly. Large information technology companies such as Google (GoogleDrive), Yandex (Yandex Disk), Microsoft (OneDrive), Apple (iCloud), DropboxInc, Cisco, Oracle and many others are paying great attention to expanding the range of their cloud services.

Many services are being included in the cloud network, and users have the opportunity to get the services they need from the cloud.

The word "cloud" when used by information technology refers to the technology and infrastructure that provides services over the internet. When data is sent from one computer to another, in another country, it travels through many networks to reach the destination. In this case, the data leaves the sender's computer and goes to his provider, from the provider through his networks, through other networks, and then travels through the vast internet network and reaches the intended computer.[2]

Cloud infrastructure consists of many interconnected, various network devices, switches, routers, servers and other various devices. This entire infrastructure is collectively called the cloud. The cloud is not only used to send information, but information exchange is just one of the possibilities for using the cloud. In addition, there are special programs running in the cloud, that is, on servers located in the infrastructure. They offer cloud-based application services.[3] The most common cloud services are Dropbox - a file storage service, GoogleDocs - office applications, SalesForce - CRM and ERP systems. In most cases, to use cloud services, the user only needs an Internet connection and a browser, but sometimes special software applications are installed on the user's device to make it convenient to use this service. For example, work done in Word and Excel programs can be easily done through GoogleDocs, and it is not necessary to have office applications on the computer.[4]

2. Materials and Methods

Cloud technologies - this model presents IT to the consumer as a service via the Internet. The importance of "virtualization" technologies in the emergence of cloud computing is very great. For the first time in 1960, virtualization technologies were proposed by IBM, but after the transition from expensive mainframe computer technologies to cheap x86 processor computer servers, the term virtualization was forgotten for a long time. Starting from 2000, the situation began to change, and by these years, WMware had gained a monopoly on x86-bit virtualization. In 2005, WMware introduced virtual machines using DT for free. In 2006, Microsoft launched the Windows version of "Microsoft Virtual PC" ... "In 2006, Amazon created "Amazon Elastic Compute Cloud" by expanding virtual servers on its own devices, which was another main reason for the emergence of cloud technologies by renting virtual servers to other devices (consumers).[5]

Cloud is an innovative model (concept) of IT infrastructure organizations, consisting of separately allocated and configured hardware and network resources, software, and they are located in the data center of remote providers.

The basic principles of cloud computing are as follows:

-the user chooses the computing needs at his own discretion;

-resources are pooled into a single currency with the ability to quickly redistribute them;

-access via the data network is universal;

-services can be provided, expanded or contracted in an automated manner with almost no downtime;

- consumed resources are automatically calculated.[6]

The development of cloud computing on a global scale. Currently, cloud services are provided by companies such as Google (GoogleDrive), Yandex (Yandex Disk), Microsoft (OneDrive), Apple (iCloud), DropboxInc, Cisco, Oracle. Any user with an Internet connection can use cloud applications through a browser. [7] For example, the Gmail service allows you to use email or Google Docs office documents through a browser without installing any additional programs. Cloud data storage services also require an Internet connection and a browser. In some cases, a special client program may also be required. In this case, the user is provided with a location in the cloud. The user can save

his files to this location.[8] Amazon Web Services (AWS) is a cloud-based web services infrastructure provided by Amazon. This infrastructure provides various services. These include data storage, Amazon S3, virtual server rental, provision of computing resources, Amazon EC2.[9] Amazon S3 online web service provides storage of any amount of data and access to them at any time from anywhere in the world via the Internet. Amazon EC2, i.e. elastic computer cloud web service, provides computing power and resources in the cloud.[10]

3. Results

Cloud computing is a distributed computing technology in which computer resources are provided to the user as an Internet service.

Cloud computing is a very controversial concept. When asked to define cloud computing, it is difficult to come up with a clear, general definition. Let's look at some of the definitions of cloud computing to find out:

1) The practice of using a network of remote servers hosted on the Internet to store, manage, and process data instead of a local server or personal computer. This is one of the definitions of cloud computing.[11]

2) Cloud computing is a computing term or metaphor that emerged in the late 2000s to describe the use and consumption of computing resources. Cloud computing involves the deployment of groups of remote servers and software networks that provide centralized data storage and online access to computing services or resources.

3) Cloud computing is the concept of delivering on-demand services over the Internet, which is one of the common definitions of cloud computing. These services are divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-a-Service (PaaS), and   Software-as-a-Service   (SaaS).
4) The IEEE Standards Association (IEEE-SA) defines cloud computing in two ways. The P2302 (Cloud Profiles) draft outlines the various cloud ecosystems, including cloud vendors, service providers, and users. The P2302 (Intercloud) draft defines the topology, functionality, and governance for cloud-to-cloud interoperability.[12]

Advantages of cloud technologies

- Consumers do not look at the performance characteristics of computers. In order for computers to work at high power, they do not need to have large memory and large disks. Because all data and all programs are stored on cloud servers 35. Consumers can access the cloud through personal stationary computers, laptops, netbooks with large capacity.[13]

- Increased quality of computer performance for consumers. Consumers need to use fewer applications to make computer programs and files less loaded when running remotely. For example, Panda Cloud Antivirus is an antivirus program that can be used as a web service. Panda Cloud Antivirus allows you to remotely scan the data of powerful servers for viruses. Running this program on the consumer's computer doubles the performance load.[14]

- The efficiency of using IT infrastructure increases and the number of expenses decreases. If we take the average server load assessment for the company, it is 13%. In some cases, the company has to use its additional resources, but in some cases, computing resources remain idle and are not used. And in this case, of course, the cost of money is wasted. If the company uses computing resources from remote cloud servers, then the number of company expenses is reduced by half. Due to this, the flexibility of unstable economic production increases. When the company loses the ability to reliably store its data in other organizations, it can create its own private cloud and fully use all the capabilities of virtualization infrastructure.

- Reduce the cost of maintenance and purchasing IT. The use of cloud computing technologies on private servers is considered small in scale for a company, so they are easy to maintain. By eliminating a large number of physical servers, the problems of purchasing

IT are reduced. Since services and applications are in the cloud, consumers do not have to purchase IT.[15]

4. Conclusion

In summary, the cloud technologies are now a cornerstone in today's Information Systems and bring profound changes of how organizations create, deploy and manage IT systems. Moving away from their legacy on-premises architectures and into the cloud has allowed businesses to operate more efficiently, become more scalable, and better utilize resources. Movement to service models (IaaS, PaaS and SaaS) allows organizations to minimize capital outlays, achieve more flexible operating cost vehicles and rapidly deploy emerging digital solutions.

The results of this investigation make evident that cloud computing improves system reliability, offers data availability and business continuity through distributed architectures and automatic backups. Moreover, virtualization and its techniques for dynamic resource allocation enable to quickly react on changing workloads as well as on new market requirements. However, while such opportunities exist, we still face challenges – namely, those regarding data security, regulatory oversight and data privacy is added complexity which can seem daunting. Tackling these requirements involves the creation of holistic governance models and implementation of secure-by-design cybersecurity measures.

In summary, cloud technologies are not just a technological tool but a strategic enabler of digital change. Their attachment from information systems and servivication are rather resulting from their competitive value, agility and sustainability induction in public or privat domain. With advancements in the cloud systems such as artificial intelligence, large-scaled data processing and analysis technology, and edge computing, the importance of cloud system to the future global information infrastructure will be more prominent.

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