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Security Solutions and challenges of cloud processing in line with service development

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Abstract

Experts in information technology have provided many computational systems to meet the needs of the users one of which is cloud processing. cloud processing is a model concerned with providing easy and pervasive access to common computational resources.in cloud processing ,capabilities dependent on information technology are provided as services that can be accessed without accurate knowledge to technologies of infrastructure and the least possible effort. The main idea of cloud processing can be describes as follows: providing software and hardware services to users and organizations in all the levels.in cloud processing the space of the user on the data and transferring information from computer to internet, so that users can have access to the data and information easily at any time and place. In this regard, one of the important issues is to focus on the security challenges of modern technologies.in this paper ,the issue of cloud computerization is investigated and related security solutions and challenges are analyzed in line with development of electronic services.

Keywords: could processing, security solutions and challenges, level of service, coding

Introduction:

Among the founders of cloud processing is the amazon company that for the first time in 2007 provided services in this field and other companies such as Google and Microsoft following amazon, entered this field.

According to the theory of Kevin max in Google, the term “cloud processing" is adopted form “the early days of internet". [1]

National institute of standard and technology (NIST) has provided cloud processing as a model to give easy access according to the request of the user, through connecting a network to a set of changeable and configurable computational resources such as networks, resources or the need to direct interference of the provider. [2]

Cloud processing means development and use of computer technology according to the internet.in fact computer capabilities are provided to the user in the form of an internet service. [2]

The model of cloud computing is managed in the form of virtual infrastructure combined by professional providers and it services [3]

- Elements of cloud infrastructure

  2.1 virtualization: virtualization is one of the technologies used in the cloud computing.in fact providing services to users through internet is done by virtual service. Visualization is the part of providers of the infrastructure resources by making an abstract layer on all the physical resources and servers, provides the possibility of managing the dynamics of the physical resources, so in this condition, users are related to servers and virtual resources.[3]

  2.2 grid computing. Technology of cloud computing is created in the continuation of developing grid systems. Therefore in some of the cloud systems, grid technology is also used. Despite this, grid computations are so different from cloud computing. Grid computing is used in many of the cloud computing implementations. Additionally, many of the grid computing can be considered as examples of cloud computing. But cloud computing is not necessarily dependent on the grid.it means there are clouds that their software infrastructure and their soft wares do not use the grid networks.[3]

  2.3 utility computing. Useful computations are a kind of processing and saving services in which the user pays according the amount of used services and does not own the infrastructure to provide services (such as water, electricity and urban gas) so according to the definition utility computing is one of the infrastructure elements of the cloud computing.[4]

  Web 2.0: advancements in the internet has caused the creation of a new advanced technology in the heart of the web called web 2.0. It is the advanced form of relationship between users and between the users and the internet and finally between the parts of the software internet, in a set that in short is called web 2.0. It is considered the most important factor the formation of cloud

computing and most important motivation in the implementation of the cloud computing. Cloud processing apparently is one of its component and web 2.0 is also a part of the cloud processing. [4]

- Classification of cloud processing.

The first cloud technology was formed by a combination of layers of TCP/IP in which the equipment of a network interacts with other networks by the TCP/IP protocol. The latest generation of the cloud processing is a combination and integration of infrastructure including servers . Soft wares for practical data are different and heterogeneous platforms for software and hard wares. Improvement and increase in the usage of the internet and especially the national internet in the improvement of the e-government can be designed in other parts too. An aspect of that are very important issues in engineering the knowledge ,searching the data and the related issues that have no systemic relation with cloud processing.[6]cloud processing is usually based on the model of providing services or based on the their level of development and improvement .it shows the form of a cloud model based on the defined framework of NIST. Models of locating the cloud processing of the private ,public ,group and combined cloud are classified.

3.1. private cloud: an organization is the owner of the private cloud or it is rented to it. All the main resources for the private use belongs to the organization. An example of this cloud processing Is the practical financial and business soft wares that includes vital an sensational information about the organization.[7]

2.3 public cloud. Service providers own the public cloud and its resources are sold. The final users can rent some parts of the resources and are usually able to manage their resources according to the needs.

Amazon, goggle and micro soft are among the providers of the public cloud.[7]

3.3 group cloud. Group cloud is similar to private cloud but in group cloud, cloud resources are located among the members of a group or different private organization with data sharing. Media cloud is an example of the group cloud provided by zimens company .group cloud can also be implemented by a third party.[7]

3.4 combined cloud: this cloud is a combination of one or many the infrastructure cloud that can be private, public or group cloud. The main purpose of this cloud is usually to allocate extra resources in the high demands including migration of some tasks from the private cloud to public cloud.[8]

Figure 2: cloud models based on the defined framework of NIST [1]

- Security challenges of cloud processing

Advantages of cloud processing are diverse, according to IDS , the most important aspect of using of a cloud are fast and easy implementation of payment model and reducing the costs in the organization.

Despite this the issue of security has to be considered while using the cloud processing .in this section, important security issues are classified in the form of new and traditional challenges of the cloud.

1.4 traditional security challenges

The security of traditional communication systems can be used in cloud, despite this, applying the cloud processing has been the start of many attacks in such a way that has increased and facilitated them. [10]

A change might be necessary in the practical soft wares of privacy and authentication in the business environments.

Another challenge in the security is the virtual machine and the supervisor of the virtual machine(s).these are used by cloud providers and can have weaknesses among others we can mention xen[11]

2.4 security challenges of clouds

When end users use the final could services and save their data in the infrastructure provided, the most important security challenges are the privacy issue and anonymity. End users want to know where their data are being saved, who have access and control over their data and they need a guarantee that even service providers don not have an illegal access to their important and sensitive data[12]

Other important security challenges related to cloud services used include:

1.2.4 The location of the resources: end users make use of the services provided by the cloud service providers without knowing the location of the resource. When a security incident happens this problem can potentially go beyond the control of the service cloud providers.

Data saved by the service providers are effected by the policy of the service providers and the laws of the country. Users have to agree with the requirements and the conditions when using the services according to which they grant the right of revealing the information of the user by accepting the rules and the request to enforce the law.[12]

2.2.4 the issue of multiple rent. This issue shows a challenge for protection of data of users against unauthorized access of the process done by the users on the other similar physical servers.

This challenge was also present in the previous hosting services of sharing web. Despite this, wide use of the cloud processing beside the fact that it saves the more important data in the cloud needs a serious investigation.[12]

3.2.4 identification and trusting the information :when important data are located in the infrastructure, they can be used without the permission of the user.

Changed data can be recovered and be processed by the owner to make fundamental decisions[12]

4.2.4 observing the system and event logging .When practical business soft wares are transferred to the cloud, customers might a request a registration of more monitoring and event logging related to the customer. When the results of the observation and event logging includes sensitive infrastructure information and they are used by the service provider parts of the common data can be implemented for the customers or third party investigator [13]

5.2.4 cloud standards: these standards need standards of organizational development to its migration towards the cloud in line with increasing the stability and security in the organization [13[.

* agreements in the level of services for security of the cloud

In many cases, cloud processing is concerned with out sourcing many of the resources and even in many conditions it out sources saving equipment to others. Some of the out sourcing that are controlled by agreements at the level of the services shows the least performance in the 3 aspects of the security. For example during the year cloud system has the availability of of 99/999 percent. Despite this, agreements might not cover security aspects such as trustworthiness and universality of the data .for example in a business center that uses the cloud processing it is not reasonable to expect that all the providers would be able to provide all customers with the same level of security. Despite this ,a cloud provider can propose services with different level of the security according to the needs and the payments for the services.[14]security agreements frequently follow process to be followed by the providers and when the user wants to use the cloud, he has to confirm the related agreement .in all the sections of the cloud services. This agreement has to be obtained, confirmed and implemented.

- Trusted sharing the data on the resources of the saving untrusted clouds.

cloud sharing out sources in most of the IT infrastructure, two conclusions are reached according to this:

- Owners of the data are limited only to the IT infrastructure,there for they have to make arrangements so that implementation of the policies would provide the security to guarantee the anonymity and universality of the data B) providers of the cloud services have more privileges that allows them to have more control and manipulation of the data and IT systems of the users.[15]

one of the requirements and tools of sharing secure data including the data present in the cloud Is to code them in order to maintain the privacy and universality of the data. These can be done by homophormic coding or incremental coding.[16]

homophormic coding is a coding plan in which deterministic structures are applied on the given data and a code is produced. This method allows multiple users to produce coded data,whithout knowing about the early uncoded data of others they are working on.[16]incremental coding allows for the processing of the final code data based on the first coded text and provides changes in the raw data.[17]rong and collegues suggested an incremental coding plan based on the Elliptic **curve** coding which is the basic idea of coding data before the saving in the cloud. In the field of sharing, coded data are recoded without the initial decoding.

Then recoded data, will be available only for the authorized users using identification tools.

- Responsibilities of cloud service providers toward the users

Since solutions to avoid leaking data of users and maintaining the privacy and anonymity of the users are considered a goal for the cloud service providers, their responsibilities toward the users is also increased.it is clear that until huge data need cloud processing ,there is no way to do that without the permission of the providers of the cloud services that needs the raw data.[18]

Pearson and colleagues argue that lack of suitable transparency in the cloud,prevents to make use of its advantages.according to pearson main issues regarding the providers of the cloud services include main responsibilities of the providers of the cloud services, availability,transparency,responsiveness ,garantees, and commitments to the compensate the possible loses. He also asserted that the need to development and tasks to implement policies are done to in order to prevent the undesirable events.

- Conclusion

Cloud processing is a very inspiring technology that helps to reduce the operational tasks and increase the efficacy. Although we are experiencing wide spread use of cloud processing in different fields,but the issue of security is still one of the early stages and needs more reseach.current paper is concerned with security challenges of cloud processing and provding solutions to improve its security.for this purpose a review of cloud processing and its classifications are done,then security challenges in new models of cloud processing was investigated .this classification also included traditional challenges.soltions of mutual trust between providers of cloud services and organizations were provided.this solutions provide security and privacy in a public cloud.

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