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SPECIALTIES OF CLOUD COMPUTING

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1 Introduction

What does definition of "cloud computing" really mean? Actually it does not mean that you are sitting in the plane 10 km under the Earth with your laptop and then you are in the cloud computing. Every user is connected to the so called «Cloud» and he/she does not care what is in the cloud. That is the main advantage of the Cloud. Network is the main extent of the intercommunication in Cloud. We just connect to the net, find what we want and «cloud hides from us what is between» [1].

«If you need software – it is not cloud computing, if you need hardware it is not cloud computing. Basically all of the activity you want to do should take place on a remote server elsewhere and all you should have is the Internet connection,» - states Maggie Fox, founder of Social Media Group. Usually Cloud Computing is associated with everything from software-as-a-service, to hardware-as-a-service and a platform-as-a-service.

Cloud Computing is IT-related capabilities which are provided «as a service», allowing users to access technology-enabled services from the Internet without knowledge of, expertise with, or control over the technology infrastructure that supports them. All the workload in the Cloud is policy driven. Cloud Computing contains two forms: utility computing (using it as-a-service) and platform-as-a-service. Let's consider the most powerful and useful form of Cloud Computing [2].

Cloud Computing also contains a form when it presents Platform-as-a-Service (PaaS). The infrastructure of Cloud platform is different from the Grid Infrastructure. It consists of 4 layers (fig.1) are integrated according to their functions. The layers are: infrastructure Component,

Governance Component, Workflow Component and Self Service Component.

2 Platform-as-a-Service

Infrastructure Component stays at the lowest point. It is the basis for any cloud computing platform which includes hardware, networks, operating systems, storage and standardized platform services such as images of J2EE/JEE application servers which often host java based applications and services, encompass infrastructure monitoring and provisioning tools. The layer contains all resources and standard services. It is also a layer of monitoring and provisioning that are autonomic activities within the cloud. Infrastructure component provides a resource pool for deployment.

Governance Component supports management and control of resource consumption and allocation, provides a framework for policy enforcement and access control to underlying resources, provides policy and access control to these resources. Governance thus also becomes an important security focal point in cloud administration.

Workflow Component is a higher layer of the Cloud Computing. Workflow component provides the workflow management and integration with existing workflow and governance components. This component can be seen as the processes involved in governing the use of resources provided by cloud computing platform. The workflow component provides the processes required to navigate the enterprise approval process. Workflow provides the essential front end control mechanism for all of back end resources.

The highest point of infrastructure is Self Service Component. It provides a critical management service to true cloud computing environment. Self service is exposed in the form of a rich user interface in the form of a cloud portal or a web application, and tied with back end resources such as asset repositories and infrastructure resources. The portal acts as a primary interface for end users, components owners and cloud administrators alike, to participate in cloud management activities

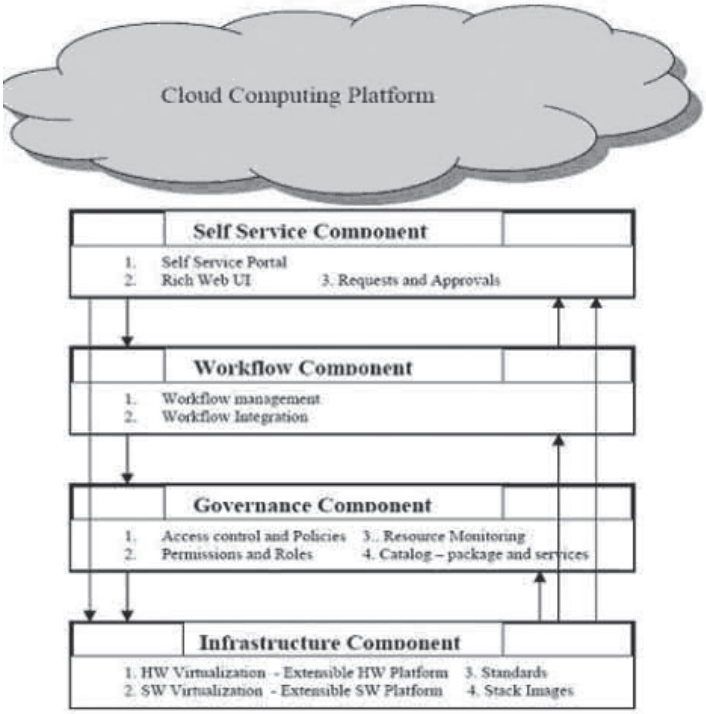

Figure 1 – Structure of Cloud Computer Plartform

such as requests, approvals, resource usage and chargeback data. This component is different from those of the grid because comparing to Grid infrastructure there is no component that provides rich and convenient user interface [3].

3 Cost

Often Cloud Computing providers stress the possibility to save money and decrease expenses for IT in business using Cloud. The approach to payment is so called pay-for-use. So a user has to pay just for the time and for the resources that he/she has used. McKinsey and Company group analyzed this issue. The results of the investigation were dividing into parts. McKinsey group have found that using Cloud as a

Service does not give much savings. The level of savings depends on power of Enterprises' Data Centers and counts as a delta between how efficient datacenters are vs. those that Cloud runs. Talking about large, well-managed datacenters it's plausible that savings are not significant. And it also needs some work to deploy services on to Cloud.

Comparing saving on the next level of Cloud as a Platform McKinsey and Company found significant savings. Using Amazon, for example, as a Platform they found savings of over 30% on operating costs. Using PaaS business gets freed from 22% maintenance and costly upgrades every 3-5 years [4].

4 Cloud Computing vs. Grid

Some experts argue that Cloud Computing is a progress of the Grid Computing Technology. Cloud inherited a lot of functionality and infrastructure but also with its own features. E.g., both computing types involve multitenance and multitask, meaning that many customers can perform different tasks at the same time. Both technologies are scalable [2].

But they also have some different features. While the storage computing in the grid is well suited for data-intensive storage, it is not economically suited for storing objects as small as 1 byte. In a data grid, the amounts of distributed data must be large for maximum benefit. A computational grid focuses on computationally intensive operations. Amazon Web Services in cloud computing offers two types of instances: standard and high-CPU. The grid is used for batch-style job execution, such as a scientific calculation, whereas the cloud serves long-lasting services [5].

All cloud different features can be split in two groups: advantages and disadvantages. One and the most influential advantage of clouds over grids is usability. There is no such handy interface in the grid world (e.g. interfaces REST, BitTorrent and EC that is used in Cloud Computing). The EGEE authors put it this way: "In the medium term, the greatest potential benefit of cloud, as proposed by Amazon, is probably not the

service itself, but its interfaces and usage patterns" [6].

More accessible entry level equipment can be added to the Cloud advantages. Now many companies are starting to produce netbooks. They are gaining popularity because they are of low weight and inexpensive comparing to laptops and desktops. Since you have everything in the cloud you are not dependent on the machine. You can access all your necessary information via any computer with an internet connection. Location independence is now possible using Cloud Computing.

Cloud Computing has its disadvantages as well which must be considered. Mike Gunderloy from WebWorkerDaily wrote an article about different policies of GoogleDocs, Zoho, and Acrobat.com. In the article, he mentions some interesting points such as the lack of a backup guarantee and the fact that they can terminate your account whenever they see fit. This proves that we can see that it is not always safety.

Internet connectivity isn't completely stable and reliable – even in the US. For cloud computing to be completely accessible anywhere, we'll probably need to wait a few more years for the internet service providers to step up to the plate. That means cloud is dependent on Internet connection. However, online app developers are aware that users can't be online all the time, which is why some of them have developed ways to make their programs usable even offline (such as GoogleGears). This is a good workaround, but not all online apps have this feature.

5 First experiments on the cloud

First example of successful usage of cloud computing can be The Times case. The Times used Amazon Cloud EC2 (Elastic Cloud Computing) and S3 (Simple Storage Service) converting the format of the documents. The aim was to put all 11 million articles published from the newspaper's founding in 1851 through 1989 to make a then available through the Web Search Engine. First all papers were simply scanned and were put to S3. The size of all documents was around 4TB. Then using EC2 computing platform of Amazon all the documents were converted

Table 1

Comparing of EGEE Grid and Amazon Cloud

	EGEE Grid	Amazon Cloud
Target Group	Scientific community	Business
Service	short-lived batch-style processing (job execution)	long-lived services based on hardware virtualization
SLA	Local (between the EGEE project and the resource providers)	Global (between Amazon and users)
User Interface	High-level interfaces	HTTP(S), REST, SOAP, Java API, BitTorrent
Resource-side middleware	Open Source (Apache 2.0)	Proprietary
Ease of Use	Heavy	Light
Ease of Deployment	Heavy	Unknown
Resource Management	probably similar	
Funding Model	Publicly funded	Commercial

Summary of „An EGEE Comparative Study: Grids and Clouds Evolution or Revolution" by Markus Klems

from TIFF to PDF format. It would take months of work on personal computer. But it took just one day by EC2. Using EC2 the Times get 1.5 TB of converted articles. There were 100 Linux computers that processed this job. And the most unbelievable thing is that it cost just $240. This case shows wide availability and usability of cloud computing systems not only for scientists but also for business and private use.

Conclusion

In this paper we have tried to give the general information on what Cloud Computing Technology means. Comparing to the grid it can be stated that Cloud is a progress technology of the Grid Computing and it inherits and extend its functionality and usability. Service-as-a-Service is a less powerful form of Cloud Computing usability but also

useful for the business and ordinary users. Platform-as-a-Service gives more possibilities and provides a set of necessary resources using remote access. Cloud Computing provides a lot of advantages for the user as location and power of machine independence. But it also has some problems to solve. One of the problems can be Internet connection that is not very spread all over the world. So it can be difficult sometimes to get access to your resources in Cloud comparing to laptop or desktop. Cloud Computing can also be economically profitable for the businesses and users [7].

Now Cloud Computing is trying to find its place in the IT world. By no doubt that it is the future of the IT on the whole.

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