Applications of Cloud Computing

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Abstract

In our days, the nature of the Internet is dramatically changing. In the past, it was extensively used to surf the Web but now its main usage is to run software applications. Cloud computing is a paradigm that incorporates the concept of software as a service. This means the software and data are stored on servers that can be accessed over the Internet. Simply speaking, the cloud means the Internet. The term is derived from the way in which the Internet is represented into the network diagrams. Google Apps, for example, is a free service that can be used to make the first step to the cloud.

Keywords: *cloud computing, Internet, software services, applications.*

Internet trends

Today, we can easily notice how the nature of the Internet is changing from a place used to read web pages to an environment that allows the users to run software applications.

At the very beginning, we had the Web 1.0 level, the basic one, used to create almost static pages, like personal websites, newspapers, shopping applications and so on. The dot-com bubble, that took place in 2001, was a turning point for the Internet and web pages, so the Web 2.0 appeared – the publishing becomes participation, the websites turn into blogs and the blogs were aggregated together into large collections. Interactivity and collaboration are now very common for the web content.

The future belongs to the Web 3.0, also called *the intelligent Web*, which is the next stage of the Internet evolution based on the services for data mining, artificial intelligence, independent agents, speech recognition and new computing models (distributed, grid and cloud).

An interesting analogy, introduced by *Nova Spivack* [1], describes the evolution of the Web in the following terms:

- Web 1.0 was seen as *read-only*;

- Web 2.0 introduced the *read-write* content;

- Web 3.0 will allow the *read-write-execute* operations, so the content will become *executable web*.

The WEB 3.0 can be seen as a new way of creating and using applications [2] that can run on different devices, like mobile phones or PDAs and having the data stored into the cloud.

Cloud Computing

Simply speaking, the cloud means the Internet. The term is derived from the way in which the Internet is often represented into the network diagrams.

Cloud computing represents a new paradigm of the Internet computing in which the software is seen as a service and the applications and data are stored on multiple servers that can be accessed from the Internet.

Cloud computing is totally different than grid computing that tries to create a virtual computer by joining together a cluster of computers. The aim of a grid computing architecture is to solve large tasks by using the advantage of concurrency and parallelism.

The current cloud computing architecture (Fig. 1) involves the existence of data centers that are able to provide services to the clients located all over the world. In this context, the cloud can be seen as un unique access point for all the requests coming from the customers/clients.
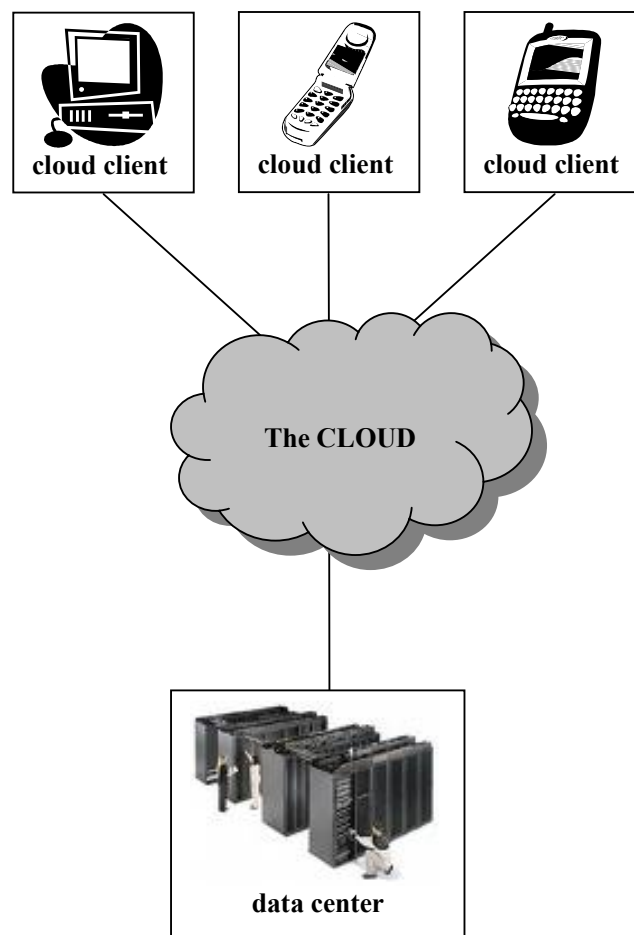
Fig. 1 – Cloud Computing Architecture

A mobile phone or PDA can successfully play the role of the cloud client. For this reason, the mobile device should run on the Android or iPhone platforms. Also, a web browser, like Google Chrome, can be a cloud client without any problem.

The cloud clients could be regular PCs, mobile phones, PDAs or any other similar devices. Basically, the client is renting or simply accessing the processing capacity needed from the data center. The quality of the service becomes a crucial factor of the cloud computing success.

It is important to notice a client could be a hardware device and/or a software application, like a browser, for example.

Cloud computing allows to move the processing effort from the local devices to the data center facilities. In such a way, any phone, for example, could be able to solve complex differential equation systems by simply passing the specific arguments to a data center service that will be capable to give back the results in a very short time. In these conditions, the security of data and applications becomes a very major issue.

The main advantages of the cloud computing are the following:

- there is no need to download or install a specific software;

- the cost is low or even free, in some cases;

- if the client computer crashes, there is almost nothing lost because everything is stored into the cloud;

- there is no need to update the local system when some new fix packs are released;

- cloud computing can be used on clients having minimal hardware requirements, like mobile phones or PDAs;

- the problem of licensing different software packages is moved to the data center level;

- no costs (or very small ones) for hardware upgrades;

- the users are not dependent by their personal computer because they can use any other device having an Internet connection and minimum software requirements.

Of course there are some disadvantages as well, like:

- an Internet connection is required in order to be able to access and use the cloud and this Internet dependence the offline mode impossible. On the other hand, some applications require a high speed Internet connection so the traffic speed may affect the overall performances;

- on a long term basis, the subscription fee may be more expensive than buying the hardware, for example;

- a very big concern is the data security because the data and the software are located on remote servers that can crash or disappear without any additional warnings. In this context, the service quality becomes crucial and the need of the backups is vital.

The major players in field of the cloud computing are Google, Microsoft, Amazon, Yahoo, and some traditional hardware producers like HP, IBM, Intel.

Applications of Cloud Computing

Today, cloud computing applications are already present on the market, trying to help companies and individuals to stretch resources and work smarter by moving everything to the cloud.

We will try to make a short review of the most known cloud computing applications dedicated to small business.

One of the first approaches belongs to the Amazon [3] and it is called AWS (Amazon Web Services), launched in 2002. AWS is a collection of remote services intended for client applications or web sites. According to the Amazon news, there are almost 500.000 developers that subscribed to the AWS.

The Amazon Web Services suite includes a component called Amazon Elastic Compute Cloud (or EC2), that allows to the users to rent from Amazon processing power to be used to run their own applications. Basically, the users are paying some fees and they receive virtual machines. The cloud is an elastic one just because the user can start, stop and create the virtual machines through the web service. There are three predefines sizes for the virtual machines that can be rented: small, medium and large, depending on the physical hardware performances.

The main advantage of the AWC EC2 web service suite is the user doesn't need to install or run applications on the local computer, so there is no need of hardware support and maintenance.

Today, EC2 is able to host Windows Server and SQL Server database. From October 2008, also Oracle is running on the EC2 platform.

Due to the fact cloud computing becomes a very interesting subject, Microsoft announced it is developing a new Windows platform, called Windows Cloud, which will be able to run cloud based applications.

One of the biggest promoters of the cloud computing is Google [4]. They already have a massive computer infrastructure (the cloud) where millions of people are connecting to. Moreover, Google joined with IBM trying to lead the cloud computing to a new stage.

The Google cloud can be accessed by using the Google Apps, intended to be a software as a service suite dedicated to information sharing and security.

There are three main categories, as the following:

1. Messaging – includes Gmail, Calendar and Google Talk;
2. Collaboration – Google Docs, Video and Sites;
3. Security – email security, encryption and archiving.

There are no costs involved by the Google Apps, no hardware or software licenses needed and the data can be accessed in a secured manner from anywhere in the world by simply using a device connected to the Internet.

Conclusions

Today, the information infrastructure is moving faster to a simple but very innovative concept called cloud computing. There are a lot of applications able to exploit the cloud and the list is expanding faster. Many devices are cloud compatible, like the traditional computers, PDAs, mobile phones and even browsers, like Google Chrome.

References

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Aplicatii ale procesării de tip cloud

În zilele noastre, natura Internetului s-a schimbat în mod dramatic. În trecut, acesta a fost pe larg utilizat pentru a naviga pe Web, dar acum rolul său principal este de a rula aplicaţii software. Cloud computing este o paradigmă care încorporează conceptul de software-ul ca serviciu. Acest lucru înseamnă că software-ul şi datele sunt stocate pe servere care pot fi accesate prin Internet. Mai simplu spus, norul (cloud) reprezintă de fapt Internetul. Termenul provine din modul în care Internetul este reprezentat în diagramele de reţea. Google Apps, de exemplu, este un serviciu gratuit care poate fi folosit pentru a face primul pas către cloud computing.