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A survey on cloud computing

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Abstract

Cloud computing is named as such because the information being accessed is found remotely in the cloud or a virtual space. Companies that provide cloud services enable users to store files and applications on remote servers and then access all the data via the Internet. This means the user is not required to be in a specific place to gain access to it, allowing the user to work remotely. Cloud computing takes all the heavy lifting involved in crunching and processing data away from the device you carry around or sit and work at. It also moves all of that work to huge computer clusters far away in cyberspace. The Internet becomes the cloud, and voilà—your data, work, and applications are available from any device with which you can connect to the Internet, anywhere in the world. The term "moving to cloud" also refers to an organization moving away from a traditional CAPEX model (buy the dedicated hardware and depreciate it over a period of time) to the OPEX model (use a shared cloud infrastructure and pay as one uses). Proponents claim that cloud computing allows companies to avoid upfront infrastructure costs, and focus on projects that differentiate their businesses instead of on infrastructure. Proponents also claim that cloud computing allows enterprises to get their applications up and running faster, with improved manageability and less maintenance, and enables IT to more rapidly adjust resources to meet fluctuating and unpredictable business demand. Cloud providers typically use a "pay as you go" model. This can lead to unexpectedly high charges if administrators do not adapt to the cloud pricing model. The present availability of high-capacity networks, low cost computers and storage devices as well as the widespread adoption of hardware virtualization, service-oriented architecture, and autonomic and utility computing have led to a growth in cloud computing. Companies can scale up as computing needs increase and then scale down again as demands decrease. Cloud vendors are experiencing growth rates of 50% per annum.

Keywords: cloud computing security, mobile cloud computing, vendor, virtualization

Introduction

Cloud computing is the delivery of different services through the Internet. These resources include tools and applications like data storage, servers, databases, networking, and software. Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database. As long as an electronic device has access to the web, it has access to the data and the software programs to run it. Cloud computing is a popular option for people and businesses for a number of reasons including cost savings, increased productivity, speed and efficiency, performance, and security.

Cloud computing can be both public and private. Public cloud services provide their services over the Internet for a fee. Private cloud services, on the other hand, only provide services to a certain number of people. These services are a system of networks that supply hosted services. There is also a hybrid option, which combines elements of both the public and private services.

The origin of the term cloud computing is unclear. The expression cloud is commonly used in science to describe a large agglomeration of objects that visually appear from a distance as a cloud and describes any set of things whose details are not inspected further in a given context. Another explanation is that the old programs draw network schematics surrounded the icons for servers with a circle, and a cluster of servers in a network diagram had several overlapping circles, which resembled a cloud. In analogy to above usage the word cloud was used as a metaphor for the Internet and a standardized cloud-like shape was used to denote a network on telephony schematics and later to depict the Internet in computer network diagrams. With this simplification, the implication is that the specifics of how the end points of a network are connected are not relevant for the purposes of understanding the diagram.

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The cloud symbol was used to represent the Internet as early as 1994, in which servers were then shown connected to, but external to, the cloud. References to cloud computing in its modern sense appeared as early as 1996, with the earliest known mention in a Compaq internal document. The popularization of the term can be traced to 2006 when Amazon.com introduced the Elastic Compute Cloud.

Since 2000 cloud computing has come into existence. In early 2008, NASA's Open Nebula, enhanced in the reservoir European Commission-funded project, became the first open source software for deploying private and hybrid clouds, and for the federation of clouds. In the same year, efforts were focused on providing quality of service guarantees (as required by real-time interactive applications) to cloud-based infrastructures, in the framework of the IRMOS European Commission-funded project, resulting in a real-time cloud environment. By mid-2008, Gartner saw an opportunity for cloud computing "to shape the relationship among consumers of IT services, those who use IT services and those who sell them" and observed that "organizations are switching from company-owned hardware and software assets to per-use service-based models" so that the "projected shift to computing ... will result in dramatic growth in IT products in some areas and significant reductions in other areas." Microsoft Azure became available in late 2008. In July 2010, Rackspace Hosting and NASA jointly launched an open-source cloud software initiative known as Open Stack. The Open Stack project intended to help organizations offer cloud-computing services running on standard hardware. The early code came from NASA's Nebula platform as well as from Rackspace's Cloud Files platform. On March 1, 2011, IBM announced the IBM Smart Cloud framework to support Smarter Planet. Among the various components of the Smarter Computing foundation, cloud computing is a critical piece. On June 7, 2012, Oracle announced the Oracle Cloud.

Types of cloud services

Regardless of the kind of service, cloud computing services provide users with a series of functions including:

- Email
- Storage, backup, and data retrieval
- Creating and testing apps
- Analyzing data
- Audio and video streaming
- Delivering software on demand

Cloud computing is still a fairly new service but is being used by a number of different organizations from big corporations to small businesses, nonprofits to government agencies, and even individual consumers.

Deployment Models

There are various types of clouds, each of which is different from the other. Public clouds provide their services on servers and storage on the Internet. These are operated by third-party companies, who handle and control all the hardware, software, and the general infrastructure. Clients access services through accounts that can be accessed by just about anyone.

Private clouds are reserved for specific clientele, usually one business or organization. The firm's data service center may host the cloud computing service. Many private cloud computing services are provided on a private network.

Hybrid clouds are, as the name implies, a combination of both public and private services. This type of model allows the user more flexibility and helps optimize the user's infrastructure and security.

Newer forms of cloud computing services include the community cloud, the big data cloud, and the multicloud.

Types of cloud computing

Cloud computing is not a single piece of technology like a microchip or a cellphone. Rather, it's a system primarily comprised of three services: software-as-a-service (SaaS), infrastructure-as-a-service (IaaS), and platform-as-a-service (PaaS).

1. Software-as-a-service (SaaS) involves the licensure of a software application to customers. Licenses are typically provided through a pay-as-you-go model or on-demand. This type of system can be found in Microsoft Office's 365.

2. Infrastructure-as-a-service (IaaS) involves a method for delivering everything from operating systems to servers and storage through IP-based connectivity as part of an on-demand service. Clients can avoid the need to purchase software or servers, and instead procure these resources in an outsourced, on-demand service. Popular examples of the IaaS system include IBM Cloud and Microsoft Azure.

3. Platform-as-a-service (PaaS) is considered the most complex of the three layers of cloud-based computing. PaaS shares some similarities with SaaS, the primary difference being that instead of delivering software online, it is actually a platform for creating software that is delivered via the Internet. This model includes platforms like Salesforce.com and Heroku.

4. Private Cloud

Private cloud is the phrase used to describe a cloud computing platform that is implemented within the corporate firewall, under the control of the IT department. A private cloud is designed to offer the same features and benefits of public cloud systems, but removes a number of objections to the cloud computing model including control over enterprise and customer data, worries about security, and issues connected to regulatory compliance. A private cloud implementation aims to avoid many of the objections regarding cloud computing security. Because a private cloud setup is implemented safely within the corporate firewall, a private cloud provides more control over the company's data, and it ensures security, albeit with greater potential risk for data loss due to natural disaster. The downside is private cloud ROI (return on investment): The organization implementing the private cloud is responsible for running and managing IT resources instead of passing that responsibility on to a third-party cloud provider. Companies initiate private cloud projects to enable their IT infrastructure to become more capable of quickly adapting to continually evolving business needs and requirements.

5. Public Cloud

A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model. A public cloud is one based on the standard cloud computing model, in

which a service provider makes resources, such as applications and storage, available to the general public over the Internet. Public cloud services may be free or offered on a pay-per-usage model.

The main benefits of using a public cloud service are:

1. Easy and inexpensive set-up because hardware, application and bandwidth costs are covered by the provider.
2. Scalability to meet needs.
3. No wasted resources because you pay for what you use

6. Hybrid Cloud

Hybrid cloud is a composition of two or more clouds (private, community or public) that remain distinct entities but are bound together, offering the benefits of multiple deployment models. Hybrid cloud can also mean the ability to connect collocation, managed and/or dedicated services with cloud resources. Gartner, Inc. defines a hybrid cloud service as a cloud computing service that is composed of some combination of private, public and community cloud services, from different service providers. A hybrid cloud service crosses isolation and provider boundaries so that it can't be simply put in one category of private, public, or community cloud service. It allows one to extend either the capacity or the capability of a cloud service, by aggregation, integration or customization with another cloud service.

Some varied use cases for hybrid cloud composition are existed. For example, an organization may store sensitive client data in house on a private cloud application, but interconnect that application to a business intelligence application provided on a public cloud as a software service. This example of hybrid cloud extends the capabilities of the enterprise to deliver a specific business service through the addition of externally available public cloud services. Hybrid cloud adoption depends on a number of factors such as data security and compliance requirements, level of control needed over data, and the applications an organization uses.

Another example of hybrid cloud is one where IT organizations use public cloud computing resources to meet temporary capacity needs that cannot be met by the private cloud. This capability enables hybrid clouds to employ cloud bursting for scaling across clouds. Cloud bursting is an application deployment model in which an application runs in a private cloud or data center and "bursts" to a public cloud when the demand for computing capacity increases. A primary advantage of cloud bursting and a hybrid cloud model is that an organization only pays for extra compute resources when they are needed. Cloud bursting enables data centers to create an in house IT infrastructure that supports average workloads, and use cloud resources from public or private clouds, during spikes in processing demands.

Advantages of cloud computing

Cloud-based software offers companies from all sectors a number of benefits, including the ability to use software from any device either via a native app or a browser. As a result, users can carry their files and settings over to other devices in a completely seamless manner.

Cloud computing is far more than just accessing files on multiple devices. Thanks to cloud computing services, users can check their email on any computer and even store files using services such as Dropbox and Google Drive. Cloud

computing services also make it possible for users to back up their music, files, and photos, ensuring those files are immediately available in the event of a hard drive crash.

It also offers big businesses huge cost-saving potential. Before the cloud became a viable alternative, companies were required to purchase, construct, and maintain costly information management technology and infrastructure. Companies can swap costly server centers and IT departments for fast Internet connections, where employees interact with the cloud online to complete their tasks.

The cloud structure allows individuals to save storage space on their desktops or laptops. It also lets users upgrade software more quickly because software companies can offer their products via the web rather than through more traditional, tangible methods involving discs or flash drives. For example, Adobe customers can access applications in its Creative Cloud through an Internet-based subscription.⁸ This allows users to download new versions and fixes to their programs easily.

Disadvantages of the cloud

With all of the speed, efficiencies, and innovations that come with cloud computing, there are, naturally, risks.

Security has always been a big concern with the cloud especially when it comes to sensitive medical records and financial information. While regulations force cloud computing services to shore up their security and compliance measures, it remains an ongoing issue. Encryption protects vital information, but if that encryption key is lost, the data disappears.

Servers maintained by cloud computing companies may fall victim to natural disasters, internal bugs, and power outages, too. The geographical reach of cloud computing cuts both ways: A blackout in California could paralyze users in New York, and a firm in Texas could lose its data if something causes its Maine based provider to crash.

As with any technology, there is a learning curve for both employees and managers. But with many individuals accessing and manipulating information through a single portal, inadvertent mistakes can transfer across an entire system.

Characteristics of cloud computing

There are basically 5 essential characteristics of Cloud Computing:-

(1) On-demand Self-services

The Cloud computing services does not require any human administrators, user themselves are able to provision, monitor and manage computing resources as needed.

(2) Broad Network Access

The Computing services are generally provided over standard networks and heterogeneous devices.

(3) Rapid Elasticity

The Computing services should have IT resources that are able to scale out and in quickly and on as needed basis. Whenever the user require services it is provided to him and it is scale out as soon as its requirement gets over.

(4) Resource Pooling

The IT resource (e.g., networks, servers, storage, applications, and services) present are shared across multiple applications and occupant in an uncommitted

manner. Multiple clients are provided service from a same physical resource.

(5) Measured Service

The resource utilization is tracked for each application and occupant, it will provide both the user and the resource provider with an account of what has been used. This is done for various reasons like monitoring billing and effective use of resource.

Conclusion

So, while cloud computing is really great and you're probably already using it, either for business or for personal means, here's what we've learned from taking a look at the pros and cons:

Cloud computing is a really cheap way for companies to have all the resources they need in one place. It's a much better way to spread your resources, and it becomes easier to access things from longer distances.

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