



## Cloud Computing

### KEYWORDS

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**ABSTRACT** *Cloud computing is an emerging paradigm in the computer industry where the computing is moved to a cloud of computers. It has become one of the buzz words of the industry. The core concept of cloud computing is, quite simply, that the vast computing resources that we need will reside somewhere out there in the cloud of computers and we'll connect to them and use them as and when needed. Computer-based multimedia could include several forms of media-audio, text, graphics, and video or film. With computer-based training, the role of both the student and the instructor change. Students become more involved in their own learning, and instructors may no longer occupy a center-stage position in a typical classroom setting. Something similar is happening today in the world of computing. Data and programs are being swept up from desktop PCs and corporate server rooms and installed in "the compute cloud". In general, there is shift in the geography of computation.*

### Introduction

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"An emerging computer paradigm where data and services reside in massively scalable datacenters in the cloud and can be accessed from any connected devices over the internet"

Like other definitions of topics like these, an understanding of the term cloud computing requires an understanding of various other terms which are closely related to this. While there is a lack of precise scientific definitions for many of these terms, general definitions can be given.

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Computing can be described as any activity of using and/or developing computer hardware and software. It includes everything that sits in the bottom layer, i.e. everything from raw compute power to storage capabilities. Cloud computing ties together all these entities and delivers them as a single integrated entity under its own sophisticated management. Cloud is a term used as a metaphor for the wide area networks (like internet) or any such large networked environment. It came partly from the cloud-like symbol used to represent the complexities of the networks in the schematic diagrams.

### Cloud Computing

Cloud Computing is the internet-based storage for files, applications, and infrastructure. One could say cloud computing has been around for many years, but now a company may buy or rent space for their daily operations.

The cost savings in implementing a cloud system is substantial, and the pricing for use of cloud computing can easily be scaled up or down as determined by necessity.

A definition for cloud computing can be given as an emerging computer paradigm where data and services reside in massively scalable data centers in the cloud and can be accessed from any connected devices over the internet. Cloud computing is a way of providing various services on virtual machines allocated on top of a large physical machine pool which resides in the cloud. Cloud computing comes into focus only when we think about what IT has always wanted – a way to increase capacity or add different capabilities to the current setting on the fly without investing in new infrastructure, training new personnel or licensing new software. Here 'on the fly' and 'without investing or training' becomes the keywords in the current situation. But cloud computing offers a better solution. We have lots of compute power and storage capabilities residing in the distributed environment of the cloud. What cloud computing does is to harness the capabilities of these resources and make available these resources as a single entity which can be changed to meet the current needs of the user. The basis of cloud computing is to create a set of virtual servers on the available vast resource pool and give it to the clients. Any web enabled device can be used to access the resources through the virtual servers. Based on the computing needs of the client, the infrastructure allotted to the client can be scaled up or down. From a business point of view, cloud computing is a method to address the scalability and availability concerns for large scale applications which involves lesser overhead. Since the resource allocated to the client can be varied based on the needs of the client and can be done without any fuss, the overhead is very low. One of the key concepts of cloud computing is that processing of 1000 times the data need not be 1000 times harder. As and when the amount of data increases, the cloud computing services can be used to manage the load effectively and make the

processing tasks easier. In the era of enterprise servers and personal computers, hardware was the commodity as the main criteria for the processing capabilities depended on the hardware configuration of the server. But with the advent of cloud computing, the commodity has changed to cycles and bytes - i.e. in cloud computing services, the users are charged based on the number of cycles of execution performed or the number of bytes transferred.

### Characteristics of Cloud Computing

#### Multi-tenancy

With cloud computing, any application supports multi-tenancy - that is multiple tenants at the same instant of time. The system allows several customers to share the infrastructure allotted to them without any of them being aware of the sharing. This is done by virtualizing the servers on the available machine pool and then allotting the servers to multiple users.

#### Service-oriented

Cloud computing systems are all service oriented - i.e. the systems are such that they are created out of other discrete services. Many such Cloud Computing discrete services which are independent of each other are combined together to form this service. This allows re-use of the different services that are available and that are being created.

#### Virtualized

The applications in cloud computing are fully decoupled from the underlying hardware. The cloud computing environment is a fully virtualized environment.

#### Flexible

Another feature of the cloud computing services is that they are flexible. They can be used to serve a large variety of workload types - varying from small loads of a small consumer application to very heavy loads of a commercial application.

#### Need for Cloud Computing

What could we do with 1000 times more data and CPU power? One simple question. That's all it took the interviewers to bewilder the confident job applicants at Google. This is a question of relevance because the amount of data that an application handles is increasing day by day and so is the CPU power that one can harness. There are many answers to this question. With this much CPU power, we could scale our businesses to 1000 times more users. Right now we are gathering statistics about every user using an application. With such CPU power at hand, we could monitor every single user click and every user interaction such that we can gather all the statistics about the user. We could improve the recommendation systems of users. We could model better price plan choices. With this CPU power we could simulate the case where we have say 1,00,000 users in the system without any glitches. There are lots of other things we could do with so much CPU power and data capabilities. But what is keeping us back.

#### • Uses of Cloud Computing

- Rapid Service
- Secure Service
- Satisfying User Experience
- Lower Costs
- Multi-User Access
- Development Platform
- Infinite Storage

#### Speed

Use cloud computing to innovate fast. Quickly build cloud applications. [Tap into pay-for-use global cloud infrastructure.](#)

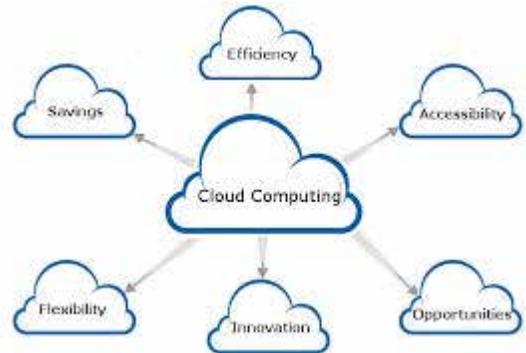
#### Empowerment

Give users [the software they need](#). Free developers to focus on apps. Enable IT to become a service provider.

#### Economics

Save time with self-service cloud. Buy just what you need. Get to market faster. Shift CAPEX to OPEX. Increase utilization.

#### Cloud Computing Application Architecture



#### Cloud Computing in the Real World Time Machine

Times machine is a New York Times project in which one can read any issue from Volume 1, Number 1 of The New York Daily Times, on September 18, 1851 through to The New York Times of December 30, 1922. They made it such that one can choose a date in history and flip electronically through the pages, displayed with their original look and feel. Here's what they did. They scanned all their public domain articles from 1851 to 1992 into TIFF files. **Conclusion**

Cloud computing is a powerful new abstraction for large scale data processing systems which is scalable, reliable and available. In cloud computing, there are large self-managed server pools available which reduces the overhead and eliminates management headache. Cloud computing services can also grow and shrink according to need. Cloud computing is particularly valuable to small and medium businesses, where effective and affordable IT tools are critical to helping them become more productive without spending lots of money on in-house resources and technical equipment. Also it is a new emerging architec-

ture needed to expand the Internet to become the computing platform of the future.

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