

Cloud Computing: An Overview Research

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Synopsis: A new computer paradigm known as “cloud computing” attempts to provide end users with dynamic, dependable, and QoS-guaranteed computing environments. This article examines the cloud computing paradigm from several angles, including definitions, distinguishing characteristics, and enabling technologies. This article presents the state-of-the-art in cloud computing technology and provides an overview of cloud computing.

Keywords: distributed computing, cloud computing, grid computing, cyber infrastructure

1. Overview

The term “cloud computing,” first used in late 2007, is becoming increasingly popular because of its capacity to provide dynamic, adaptable IT infrastructures, computing environments that assure quality of service, and adjustable software services.



Figure 1's

Google trends report indicates that cloud computing (the blue Grid computing 8) (the red line) and has already gone beyond it because of virtualization technology (the yellow line).

Several initiatives in both industry and academia have already commenced, such as Amazon Elastic Compute Cloud 13), IBM's Blue Cloud 10, scientific Cloud projects like Stratus 31 and Nimbus 24), and Open Nebula 26. Other examples of ongoing projects include IBM's RESERVOIR project 27. Recently, HP, Intel Corporation, and Yahoo! Inc. announced the establishment of an open-source cloud computing test bed for business, research, and education that spans many data centers globally 3).

Though cloud computing has garnered much attention, no commonly agreed-upon definitions exist. There are many causes for this circumstance:

- Researchers and engineers from various backgrounds, including database management, software engineering, and grid computing, are involved in cloud computing and approach it from many angles.
- Pre-existing computer technologies, such as Web 2.0 and Service-Oriented computers, are continually developing and advancing to allow Cloud computing. However, large-scale implementation and utilization of clouds are still lacking, which would ultimately validate the idea of cloud computing.

We want to provide the definition, functionality, enabling technology, and representative cloud computing applications in this work. This paper's remaining sections are arranged as follows. The idea of cloud computing is covered in Section 2, its functions are presented in Section 3, its unique properties are reviewed in Section 4, and Section 5 lists the enabling technologies for creating computer clouds. Section 6 concludes the work.

2: Cloud Computing

Defined Moving data and apps to a distant location, known as the "Cloud," allows users to access them quickly and widely, making cloud computing one of the newest buzzwords in the IT industry. Once again, there is a use case for central

processing. About fifty years ago, a time-sharing computer server catered to many users in a similar situation. Before the invention of personal computers twenty years ago, most data and applications were housed in local resources. The concept of cloud computing as it exists now does not reflect the past. We were forced to create time-sharing servers because of our inadequate computer resources fifty years ago. The need to develop intricate IT infrastructures has led to the popularity of cloud computing these days. Users are required to oversee the installation, setup, and upgrades of diverse software. Hardware such as computers and other devices has a short lifespan. Thus, outsourcing computing platforms is a wise way for consumers to manage complex IT systems.

Currently, cloud computing is still developing and lacks a well-recognized definition. We provide the following preliminary definition of cloud computing based on our experience:

An electronic a cloud is a collection of network-enabled services that provide easy, ubiquitous access to scalable, QoS-guaranteed, often customized, low-cost computing infrastructures on demand.

3: Utility Features of Cloud Computing

From a conceptual standpoint, users get IT infrastructures or computing platforms from computing clouds, where they execute their applications. Consequently, computing clouds provide customers with the following services to access hardware, software, and data resources, followed by an integrated computing platform as a service:

HaaS, or hardware as a service,

The term “hardware as a service” may have originated around 2006. Thanks to quick advancements in hardware virtualization, IT automation, and metering and pricing, users may purchase IT gear or an entire system.

A pay-as-you-go subscription service for the data center, HaaS is adaptable, scalable, and controllable to suit your demands.

2. Amazon EC2 (13), IBM’s Blue Cloud project (10), Nimbus (24), Eucalyptus (18), and Enomalism (17) are a few examples.

Software as a Service (SaaS) refers to providing software or applications to customers over the Internet as a hosted service. Customers may avoid installing and running the program on their PCs using this option. Because SaaS offers on-demand pricing, it relieves customers of the hassle of maintaining their software and lowers the cost of software purchases. Application Service Provider (ASP) 15 is an instance of SaaS from the beginning. Hosted or distributed online software may be subscribed to using the ASP method. Another illustration may be in Microsoft's "Software Service" (30) section, which depicts the interaction between local software and Internet services. The Chrome browser from Google (version 21) presents an intriguing SaaS scenario: it may provide a new desktop that allows programs to be delivered (locally or remotely) in addition to the standard Web surfing experience.

Data as a Service (DaaS): Users on the network may obtain data via services in various forms and from many sources. For instance, users might manipulate the data remotely like they would on a local drive or access the data semantically over the Internet.

Amazon claims that any quantity of data may be stored and retrieved at any time, from any location on the Web, using its primary Web services interface, Amazon Simple Storage Service (S3) 14. Additionally, the DaaS is available at several well-known IT services, such as Adobe Buzzword 12 and Google Docs 22. A distributed remote storage program called Elastic Drive 16 enables users to mount a distant storage resource, such as Amazon S3, as a local storage device.

In addition, cloud computing may provide consumers with Infrastructure as a Service (IaaS) based on the support of HaaS, SaaS, and DaaS. As a result, users may subscribe on-demand to their preferred computer infrastructures, complete with installation requirements for software, hardware setup, and data access needs. The link between the services is seen in The Google



Figure 2.

One intriguing instance of IaaS is App Engine 20. Using the exact scalable mechanisms that power Google apps, the Google App Engine lets users create Web applications utilizing Google's APIs and SDKs.

4. What Makes Cloud Computing Unique?

The following are some ways that cloud computing differs from previous computing paradigms, such as grid, global, and internet computing:

Interfaces focused on the user.

Cloud services should be accessible and ubiquitous. Utility computing is a notion that cloud computing accepts. Stated differently, consumers may access and use computing platforms inside computing clouds with the same ease that they can utilize a conventional public utility (like power, water, gas, or phone service). To be more specific, the Cloud services have the following

Advantages:

Cloud interfaces do not require users to alter their work surroundings or habits, such as their operating system, compiler, or programming language. Grid users must acquire new Grid commands and APIs to access Grid resources and services, which is how cloud computing differs from grid computing in this regard.

The Cloud client software is lightweight and has to be deployed locally. The Nimbus Cloud kit client, for instance around 15 MB in size.

Certain well-known interfaces, such as the Web services framework and Internet browser, may access cloud interfaces since they are location agnostic.

Supply of services as needed. Computing clouds provide consumers with on-demand resources and services. Since users often have administrative access, they may add more personalization's to their computer environments, such as network settings and program installation.

QoS assurance provided.

The computing environments offered by computing clouds, including hardware performance such as CPU speed, I/O bandwidth, and memory capacity, may guarantee QoS for users.

In general, the computing cloud provides quality of service (QoS) via handling service level agreements (SLAs), agreements between users and the service provider on availability, serviceability, performance, operation, and other aspects of the service, including pricing and penalties for SLA violations, Autonomous System.

Cloud computing is a self-contained system that is openly administered to users. Cloud-based hardware, software, and data may be automatically rearranged, coordinated, and combined to create a unified platform picture that is ultimately shown to consumers.

Flexibility and scalability.

Cloud computing's rise is driven by its scalability and flexibility. The computing platforms and cloud services provided by computing clouds may be scaled across various issues, including hardware performance, software configurations, and geographic locations. Computer systems must be adaptable enough to accommodate many user needs.

5. The Supporting Technologies for Cloud Computing

Cloud computing is made possible by many supporting technologies, including several-

Several cutting-edge methods are included here:

Technology for virtualization .Virtualization technologies provide scalable and adaptable computer systems through hardware partitioning. Virtual machine methods, such as Xen 1) and VMware 34), provide on-demand virtualized IT infrastructures. Advances in virtual networks, like VPN 7, let users access Cloud resources in a tailored network environment. Since virtualization methods provide scalable and adaptable hardware services, they form the foundation of cloud computing.

Coordination of workflow and service flow.

Computing clouds, which may consist of services housed inside the cloud, provide a comprehensive collection of service templates on demand. Thus, computing clouds must be able to automatically coordinate services of all kinds and from many sources to create a service flow or workflow that is visible and dynamic for users.

Service-oriented architecture (SOA) and web services.

Cloud computing services are often made available via Web services that adhere to industry standards like SOAP 28), WSDL 33, and UDDI 25. A service-oriented architecture (SOA) might be used to orchestrate and organize services within the cloud. Additionally, a group of cloud services may be used in an SOA application environment, enabling access to them via the Internet and across several dispersed platforms.

Web 2.0 is a term used to describe the cutting-edge developments in Web design and World Wide Web technology that seek to improve the Web's functionality, information sharing, creativity, and teamwork. Enhancing Web applications' interactivity and connectedness is the primary goal of Web 2.0. Users may now access the Web more effectively and readily thanks to the new paradigm for developing and using Web apps. Web applications that

provide desired computer capabilities on demand are the essence of cloud computing services. Thus, adopting Web 2.0 technology by cloud computing is a logical technological development. Globally distributed storage infrastructure.

A cloud storage strategy must anticipate the following: Users may lease storage capacity from a network storage system supported by dispersed storage providers (such as data centers). The data storage could be moved, combined, and transparently controlled to end users for any data format. Google File System 9) and Amazon S3 14 are two examples. A Web application (Mash up 11) aggregates data from several sources into a unified storage solution. An example of a Mash up is the digital picture-sharing website Smug Mug 29. It supports XML-based RSS and Atom feeds, enables programmers to add new features using a public API, and allows an infinite amount of photographs to be uploaded for all account kinds.

A distributed data system that offers semantically accessible data sources. Instead of using physical locations, users in a vast dispersed system might identify data sources by their logical names. VDS 32, the Virtual Data System, is a valuable resource, Programming model.

Users drive data and apps into the computer cloud. Certain cloud programming paradigms must be presented so users can adjust to the Cloud infrastructure. However, the paradigm shouldn't be too sophisticated or novel for end users to maintain the simplicity and ease of use of Cloud services.

A programming methodology and related implementation for handling and producing massive data sets across Google's global infrastructures is called Map Reduce 4.5. Applying a "map" operation to a collection of key/value pairs in certain data records is the first step in the Map Reduce paradigm. All values that share a key are subjected to a "reduce" action. Including a "merge" process, the Map Reduce-Merge 35) technique expands upon the Map Reduce paradigm. A framework called Hadoop 23) executes programs on significant clusters made of commodity hardware. It offers a distributed file system called the Hadoop Distributed File

System and puts the Map Reduce concept into practice. Yahoo! has just launched a worldwide cloud computing initiative that uses Hadoop and Map Reduce, HP and Intel 3, 19).

Conclusion

This article examines the most recent developments in cloud computing and offers our opinions on its definition, salient characteristics, and supporting technologies. The objective of the prospective study is to aid in developing the cloud computing paradigm.