

Cloud Computing, Revolution in New Web Technology: Application and Challenges Survey

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Abstract

Data evolution is such that it can be from after water, gas and telephone utilities, as is the fifth element. In case users try to access the service based on need without regard to where it is or how it can be delivered. Experts suggest various computing systems for the needs of these users. Such as cluster computing, grid computing, and cloud computing. After 2007, Cloud computing technology acceptance among users is more than other technologies. It is a technology that uses the internet and central remote servers to maintain data and applications. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth.

Keyword: *computing systems, cluster computing, grid computing, cloud computing, technology, efficient computing*

1. Introduction

Cloud computing is delivering new capabilities to the IT Industry .Elastic computing that expands and contracts as you require enables organizations to deploy new innovative business Solutions, often at a lower cost than traditional on-premise hardware solutions. Once upon a time, it seems people were dreaming about computer as a utility. First, Computation and storage would be used as a public service provided by professionals. Second, end users would not experience the “joy” of software installation and administration. in concept cloud computing allow clients to be able to access services much more easily and quicker at potentially less cost. In addition, because this is a service provided by other organizations, clients will not necessarily have to worry about IT maintenance and associated updates[4]. a simple example of cloud computing is yahoo email or gmail etc. you don't need a software or a server to use them all a consumer would need is just an internet connection and you can start sending email. The server and email management software is all on the cloud and is totally managed by the cloud service provider yahoo; Google etc. the consumer gets to use the software alone and enjoy the benefits.

1.1 Key Infrastructure Elements for Cloud Computing

Cloud computing is an emerging computing model by which users can gain access to their applications from anywhere, through any connected

device. A user-centric interface makes the cloud infrastructure supporting the applications transparent to users. The applications reside in massively scalable data centers where computational resources can be dynamically provisioned and shared to achieve significant economies of scale. Thanks to a strong service management platform, the management costs of adding more IT resources to the cloud can be significantly lower than those associated with alternate infrastructures.

There are 4 elements that we explain:

A- Virtualization:

Virtualization is the technology used in Cloud Computing. The applications specify how these virtual components are to be configured and interconnected [5]. In fact, virtual service gives the Internet services to users. Virtualization can be viewed as part of an overall trend in enterprise IT that includes autonomic computing, a scenario in which the IT environment will be able to manage itself based on perceived activity, and utility computing, in which computer processing power is seen as a utility that clients can pay for only as needed. The usual goal of virtualization is to centralize administrative tasks while improving scalability and workloads.

B- Grid Computing:

To get cloud computing to work, you need three things: thin clients (or clients with a thick-thin switch), grid computing, and utility computing. Grid computing links disparate computers to form one large infrastructure, harnessing unused resources.

Utility computing is paying for what you use on shared servers like you pay for a public utility (such as electricity, gas, and so on) [11]. Whereas a cloud computing architecture is intended to enable users to use different services without the need for investment in the underlying architecture. Though, grid too offers similar facility for computing power, but cloud computing isn't restricted to just that. With a cloud users can avail various services such as website hosting etc.

C- Utility Computing:

Utility Computing is a cost effective way to outsource all your IT services and support, remote back-up, IT network support, server support and monitoring, data migration, data storage and more. Utility Computing can even include full IT tech support servicing such as helpdesk support and IT consulting. How the Utility Computing model works is you only pay for the services used. The model is comparable to an actual utility bill. For example, on your monthly electricity bill you are only charged for the amount of actual electricity used for the billing cycle, not the wires all the hardware involved in provided you the electricity

D- Web2.0:

As the Internet takes an increasingly central role in our communications infrastructure, Web2.0 is new technology that use for communication. Communication can be between clients, client and internet, and Internet software components. We can say that web2.0 is the most important factor in the creating of Cloud Computing.

2. Type of Service in cloud computing

Cloud computing comes in three basic flavors: software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS).

A- Infrastructure as a service(IaaS):

Traditionally in the business environment, a user's day-to-day computing are held in one server at one location .the infrastructure is fixed. With cloud computing, the infrastructure is provided to the user in an on demand manner. [12].it allows an organization to run entire data center application stacks, from the operating system up to the application, on a service provider's infrastructure. NO longer does a company have to purchase servers, software, data center space or networking equipment. So IaaS is the infrastructure of Cloud which supports hardware and software resources according to users' requirement. [6], [10]

B- platform as a service (PaaS):

this service builds on IaaS with an additional layer of capability that allows organizations to develop, build, and deploy their own applications to support their own specific business needs.[12].you may have heard of Google Doc's, any of us must have used it too. it is a platform that runs on any browser that you may be using and requires an active internet connection. Through Google docs you don't need to have a word processing application installed in your computer in order to view or modify text or spreadsheet documents, making it a very good example of cloud computing.

C- software as a service(SaaS):

SaaS allows organization to use a fully managed application, such as CRM, ERP, and e-mail/calendar, over a public or private network, without owning the software or systems required to run it.[12] a good example of this service is Flickr. Starting a website that emphasized on sharing photos it has now become a great place to store images that can be retrieved from any device anywhere around the world. Users can share photos of their vacations/parties etc without having to burn cds or carrying flash drive. So SaaS delivers software as a service over the Internet, eliminating the need to install software on customers' own computers.[6], [10]

3. Cloud Computing Layers

As you can see in Figure 1. Cloud computing consist of five layers. The layers begin with Clients at the top, followed by Application, then Platform, then Infrastructure, and finally Servers at the very bottom of the stack. Application is comprised of user interface and machine interface. Platform is comprised of components and services. Infrastructure involves storage, network and compute. Here is a look at the cloud model in depth [13]

Each of these layers presents different qualities, advantages and disadvantages. The most well know of these layer is called cloud Applications, otherwise known as SaaS (Software as a Service).

In cloud platform or pass layer consumers or businesses have more control over what they can or cannot do with the capabilities. At the bottom layer you find cloud infrastructure or IaaS (Infrastructure as a Service). This foundation layer is the building blocks for either PaaS or SaaS or anything else where the developer, programmer or IT professional needs access to raw infrastructure.

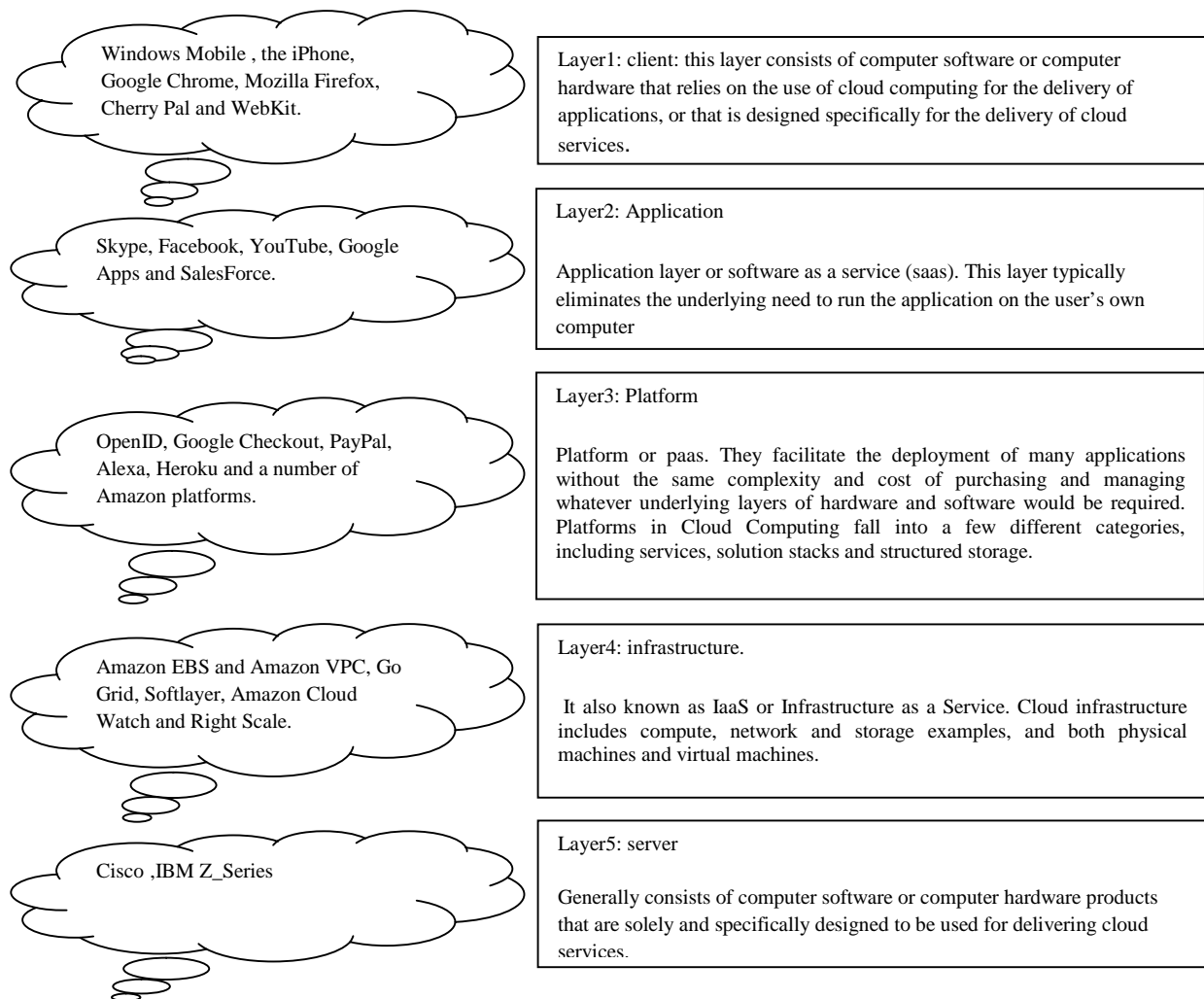


Figure 1. Layers of Cloud Computing

4. Type of cloud

Depending on the type of data cloud computing comes in three forms: public clouds, private clouds, and hybrids clouds, community clouds.

Private clouds: This type of cloud is created for boundaries of an organization .it is totally managed by an enterprise and has all the features of public cloud with a major difference that it has to take care the underlying IT infrastructure .they are more secure as they are internal to an organization and they shuffle resources according to their business needs. Private clouds may be deployed in an enterprise datacenter, and they also may be deployed at a collocation facility [7].an example of private cloud is Google service: Map Reduce, Big Table and GFS.

Public clouds: these are the clouds which are open for use by general public and they exist beyond

the firewall of an organization, fully hosted and managed by vendors like Google, Amazon, Microsoft, etc. they strictly follow "pay as you go" model which helps start ups to start small and go big without investing much in the it infrastructure. It can also call hosted cloud. Public clouds are most often hosted away from customer premises, and they provide a way to reduce customer risk and cost by providing a flexible, even temporary extension to enterprise infrastructure [7]. For example Amazone Ec2 service and Simple DB are public clouds.

Hybrids clouds: they consist of external and internal providers. Secure and critical applications are managed by an organization and the not-so-critical and secure application by third party vendor. They have a unique identity, bound by standard technology, thus enabling data and application portability. Hybrid clouds introduce the complexity of determining how

to distribute applications across both a public and private cloud. [7].Figure 2.

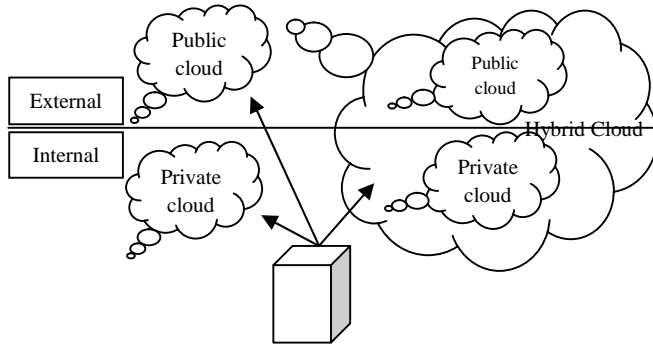


Figure 2. Public, private and Hybrid Cloud

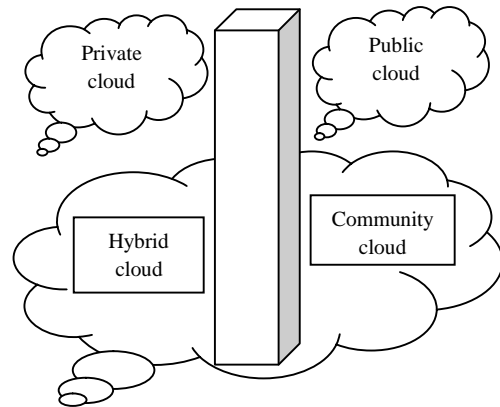


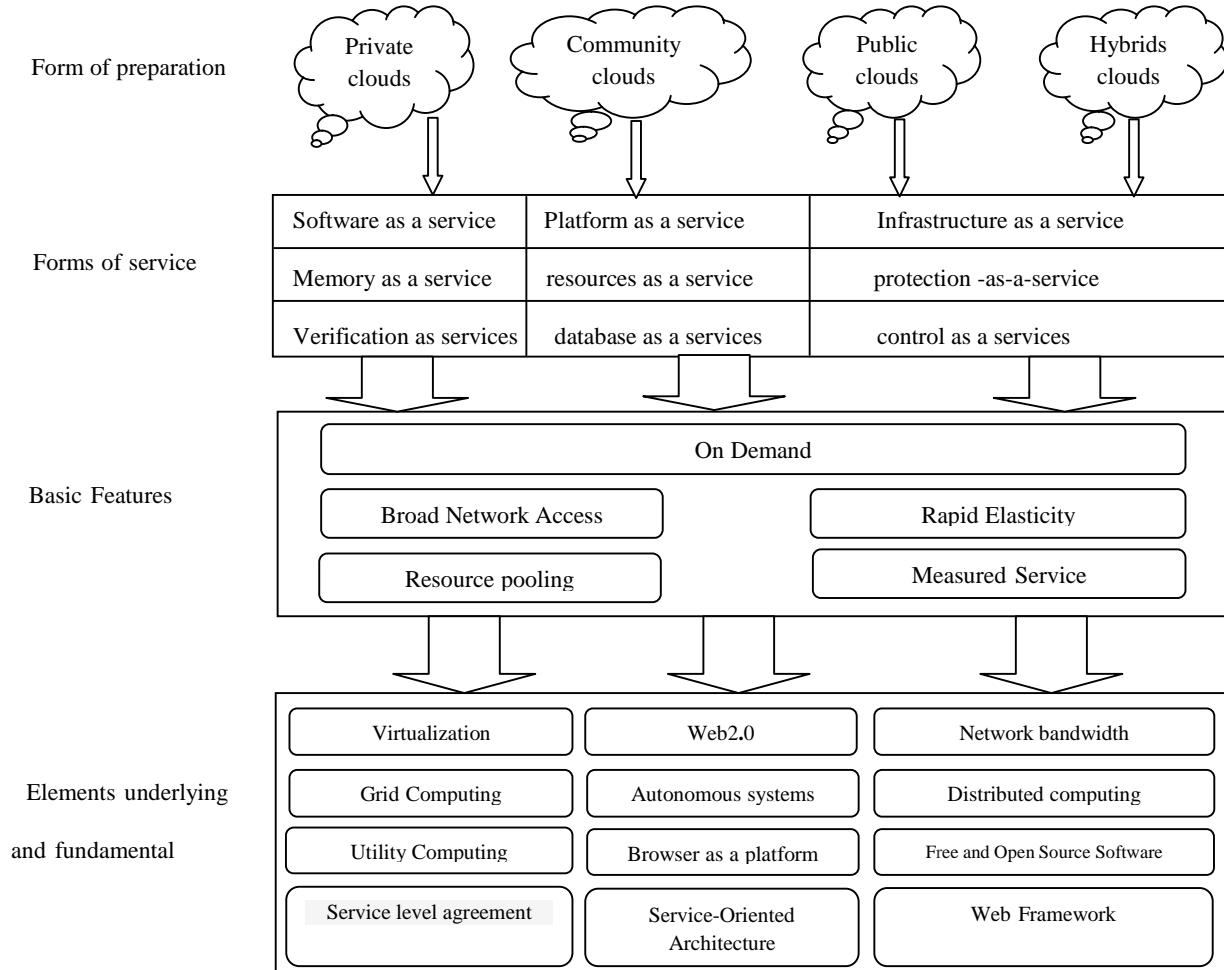
Figure 3. Community Cloud

Community clouds: In this type of cloud infrastructure is shared between multiple organizations.

And managed and secured commonly by all the participating organizations or a third party managed service provider. It can also be inside or outside of organization. Community clouds are a hybrid form of private clouds built and operated specifically for a targeted group. These communities have similar cloud requirements and their ultimate goal is to work together to achieve their business objectives [8].Figure 3.

It has the following advantages: first, easy to share resources between colleges, second, The interaction between colleges can be carried out on the internet based on community cloud computing technology, so it can be easily recorded and shared as a result of the interaction. Third, the community cloud is contracted and serviced by the third party. Fourth, decrease the IT cost as well as increase resources' effectivity. [9]

4.1. New framework for cloud computing



5. Advantage and disadvantage of cloud computing:

Advantage	disadvantage
<ul style="list-style-type: none"> • Accessibility of the application • Economic efficiency • Flexibility • Scalability • troubleshooting 	<ul style="list-style-type: none"> • The loss of control • Data privacy responsibility • Weak security system • low network speed • Observing Privacy Policy • Lesser privacy protection under the law

Control: In case something goes wrong it can be difficult to discern who has caused the problem, and, in the absence of solid evidence, it is nearly impossible for the parties involved to hold each other responsible for the problem if a dispute arises[1]

Data privacy: As a user, we lose control over physical security, how can we ensure that data will not leakage and privacy can be protected.

Responsibility: Cloud computing technology let us to save our data in the cloud and can access it anywhere and anyhow. Because data stored in the cloud, then all the people authorized of the data can access it. This raises a new problem about cloud computing security, who is the responsible about it. People can't discriminate the cloud computing results because the level of cloud computing control is essential with regard to sharing responsibly between cloud providers and cloud users.

Weak security system: weak password recovery workflows, phishing attacks, and key loggers are bigger security risk.

Network speed: Because of the current network speed, Internet access charges and other causes can not keep up in the form of the development of resource sharing.[2]

Lesser privacy protection under the law: to get to the information you have stored on a third-party's web servers, they only need a subpoena, which is easier to obtain .this kind of search can also happen without your knowledge.

Accessibility of the application: internet cloud infrastructure ensures that your application is accessible from anyplace anytime. It is not necessary to download software and data or to upgrade dynamically in the "cloud" side.[3]

Flexibility: cloud computing gives flexibility to choose multiple vendors that provide reliable and scalable business service, development environments, and infrastructure that can be leveraged out of the box and billed on a metered basis.

Scalability: businesses do not need to pay for services which are not being utilized, unlike

conventional computing where enough computing resources to meet peak requirements must be pre-purchased. [12]

Another advantage is the ease of troubleshooting. Specific software installed in the local gadget would need to have a repair from the company's tech group. But when the company uses cloud computing, any "bugs", user problems or error in function cloud be immediately looked into by its developers.

6. Conclusion

Every day more users move their computing lives from the desktop to cloud and rely on hosted web applications to store and access email, photos, and documents. There are many advantages that users would have if they would consider cloud computing as part of their business plane. Among them is ease of operations. Each user will be able to have access to the system wherever they are and they could easily update their database so that company will be informed immediately about their performance.

Cloud computing uses the power of online connectivity to handle processing request, the data could be available for every one and could be used for malicious purpose.

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