

A Seminar report
on
Cloud Computing



A seminar report submitted in partial fulfillment for the awarded of degree

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By
B.YASHWANTH (08UK1A0525)

Under the guidance of

G.Rajanikar

Department of Computer Science Engineering
VAAGDEVI ENGINEERING COLLEGE

(Affiliated To JNTU)

Bollikunta, Warangal

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VAAGDEVI ENGINEERING COLLEGE

(Affiliated To JNTU)

Bollikunta, Warangal



CERTIFICATE

This is to certify that the seminar report entitled “**Cloud Computing**” is prepared and submitted by **B.YASHWANTH (08UK1A0525)** in the partial fulfillment for the award of the degree of Bachelor of technology in Computer Science and Engineering carried out by the supervision and guidance.

C.LOKNATH REDDY

(Head Of The Department CSE)

G.Rajanikar

Assoc.professor in CSE



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ABSTRACT

Cloud computing is a technology that uses the internet and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing storage, memory, processing and bandwidth.

A simple example of cloud computing is Yahoo email, Gmail, or Hotmail 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 emails. The server and email management software is all on the cloud (internet) and is totally managed by the cloud service provider Yahoo, Google etc. The consumer gets to use the software alone and enjoy the benefits. The analogy is, *'If you need milk, would you buy a cow?' All the users or consumers need is to get the benefits of using the software or hardware of the computer like sending emails etc. Just to get this benefit (milk) why should a consumer buy a (cow) software/hardware?*

Cloud computing is broken down into three segments: "application" "storage" and "connectivity." Each segment serves a different purpose and offers different products for businesses and individuals around the world. In June 2011, a study conducted by Version One found that 91% of senior IT professionals actually don't know what cloud computing is and two-thirds of senior finance professionals are clear by the concept, highlighting the young nature of the technology. In Sept 2011, an Aberdeen Group study found that disciplined companies achieved on average an 68% increase in their IT expense because cloud computing and only a 10% reduction in data center power costs

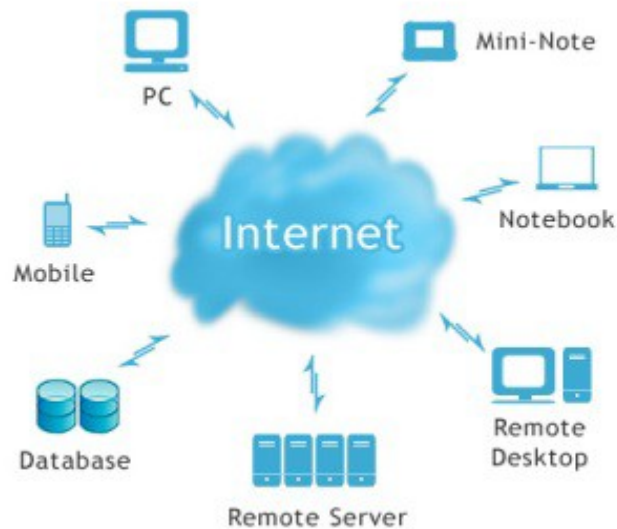
Cloud computing provides the facility to access shared resources and common infrastructure, offering services on demand over the network to perform operations that meet changing business needs. The location of physical resources and devices being accessed are typically not known to the enduser. It also provides facilities for users to develop,



deploy and manage their applications ‘on the cloud’, which entails virtualization of resources that maintains and manages itself.

Some generic examples include:

- **Amazon’s Elastic Computing Cloud (EC2)** offering computational services that enable people to use CPU cycles without buying more computers .
- Storage services such as those provided by Amazon’s Simple Storage Service (S3)
- Companies like *Nirvanix* allowing organizations to store data and documents without adding a single on-site server
- SaaS companies like Salesforce.com delivering CRM services, so clients can manage customer information without installing specialized software.



CLOUD COMPUTING

INTRODUCTION

Cloud Computing,” to put it simply, means “**Internet Computing.**” The Internet is commonly visualized as clouds; hence the term “cloud computing” for computation done through the Internet. With Cloud Computing users can access database resources via the **Internet** from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. Besides, databases in cloud are very dynamic and scalable.

Cloud computing is unlike grid computing, utility computing, or autonomic computing. In fact, it is a very independent platform in terms of computing. The best **example** of cloud computing is **Google Apps** where any application can be accessed using a browser and it can be deployed on thousands of computer through the Internet.



NEED OF CLOUD COMPUTING

The need of cloud computing can be explained with the help of an example. The following graph shows the number of users who log on to the Australian Open web page.

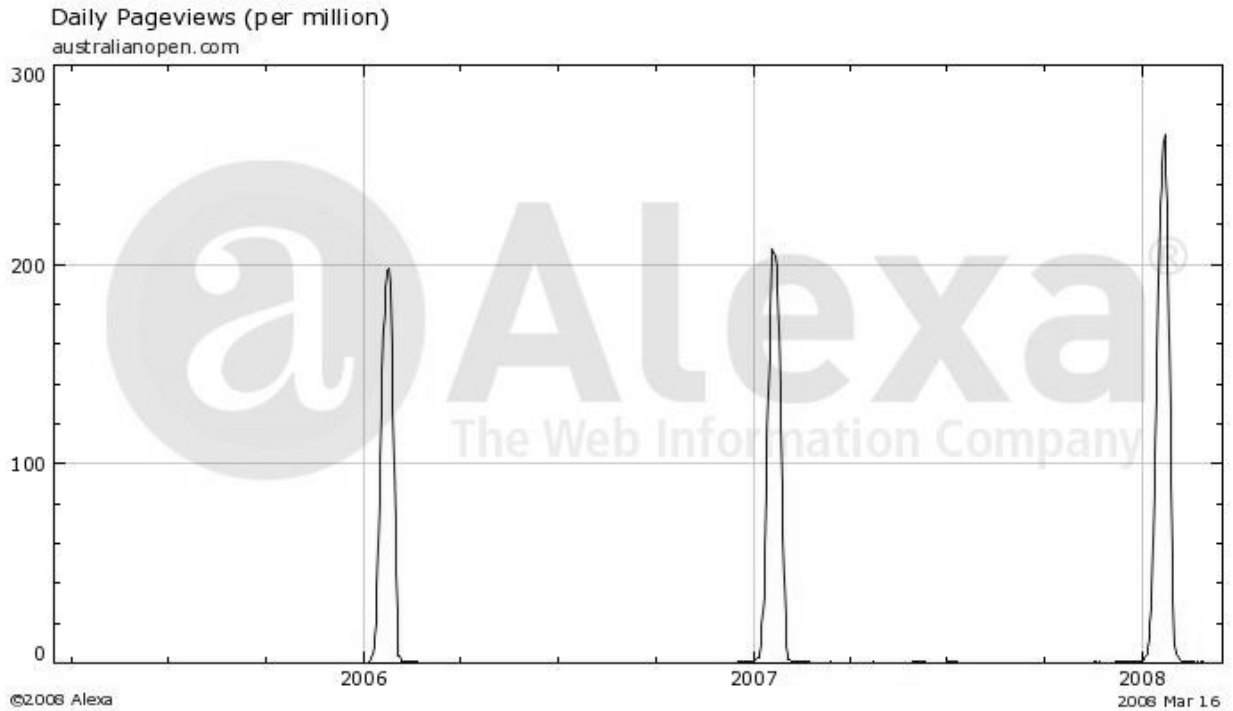


fig 1:monthly page views of australian open official website

The spikes correspond to the month of January during which the tournament is going on. The site remains almost dormant during the rest of the year. It would be wasteful to have servers which can cater to the maximum need, as they won't be needed during the rest of the year. The concept of cloud computing comes to the rescue at this time. During the peak period, cloud providers such as Google, Yahoo, Microsoft etc. can be approached to provide the necessary server capacity.

In this case, Infrastructure is provided as a service(IaaS) through cloud computing. Likewise,cloud providers can be approached for obtaining software or platform as a service. Developers with innovative ideas for new Internet services no longer require large capital outlays in hardware to deploy their service or human expense to operate it . Cloud computing offers significant benefits to IT companies by freeing them from the low-level task of setting up basic hardware and software infrastructures and thus enabling focus on innovation and creating business value for their services.

SOFTWARE AS A SERVICE(SAAS)

SaaS is a model of software deployment where an application is hosted as a service provided to customers across the Internet. SaaS is generally used to refer to business software rather than consumer software, which falls under Web 2.0. By removing the need to install and run an application on a user's own computer it is seen as a way for businesses to get the same benefits as commercial software with smaller cost outlay.

SaaS can alleviate the burden of software maintenance and support but users relinquish control over software versions and requirements.

Other terms that are used in this sphere include *Platform as a Service* (PaaS) and *Infrastructure as a Service (IaaS)*.

CLOUD STORAGE

Over time many big Internet based companies (Amazon, Google...) have come to realise that only a small amount of their data storage capacity is being used. This has led to the renting out of space and the storage of information on remote servers or "clouds". Information is then temporarily cached on desktop computers, mobile phones or other internet-linked devices. Amazon's Amazon Elastic Compute Cloud (EC2) and Simple Storage Solution (S3) are the current best known facilities.

Data Cloud

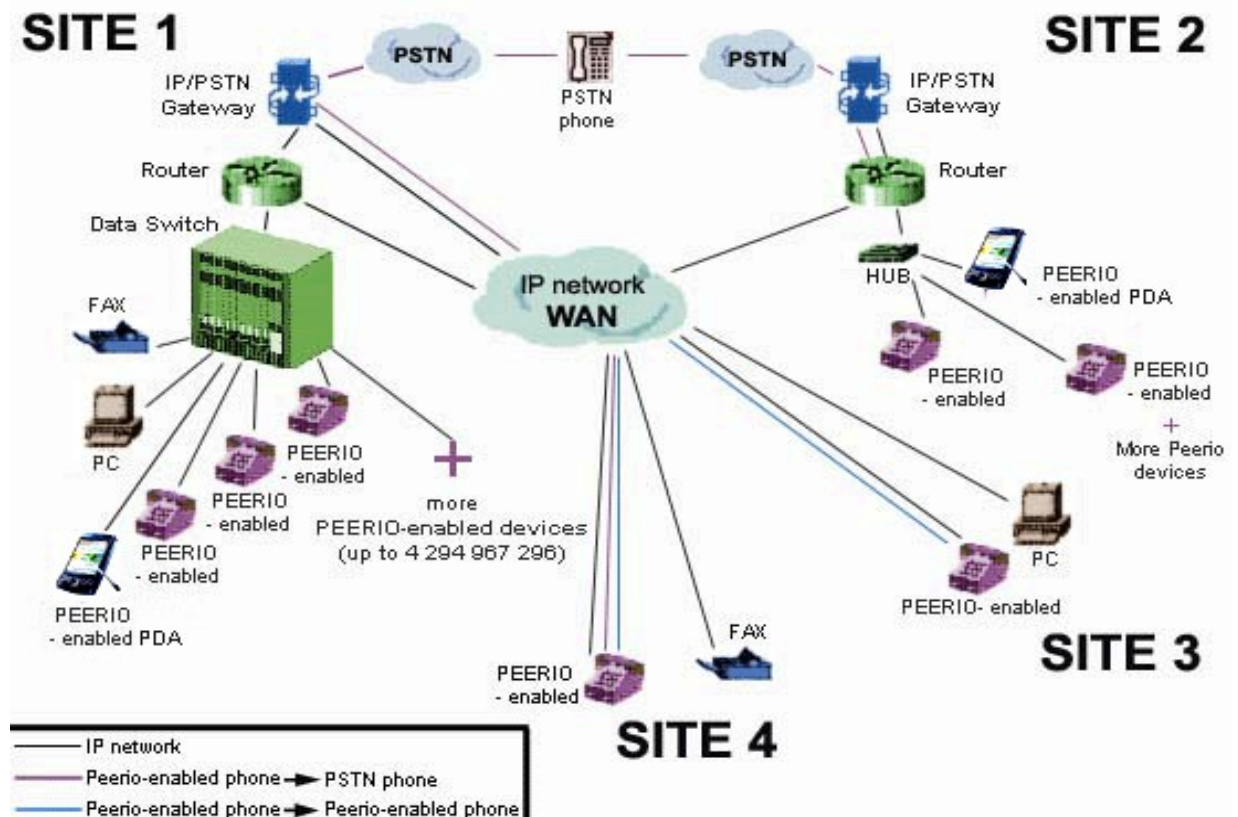
Along with services the cloud will host data. There has been some discussion of this being a potentially useful notion possibly aligned with the Semantic Web, though it could result in data becoming undifferentiated



CLOUD COMPUTING ARCHITECTURE

Cloud computing architecture, just like any other system, is categorized into two main sections: Front End and Back End. Front End can be end user or client or any application (i.e. web browser etc.) which is using cloud services. Back End is the network of **servers** with any computer program and data storage system. It is usually assumed that cloud contains infinite storage capacity for any software available in market. Cloud has different applications that are hosted on their own dedicated server farms. Cloud has centralized server administration system. Centralized server administers system, balances client supply, adjusts demands, monitors traffic and avoids congestion. This server follows protocols, commonly known as middleware. Middleware controls the

communication of cloud network among them.

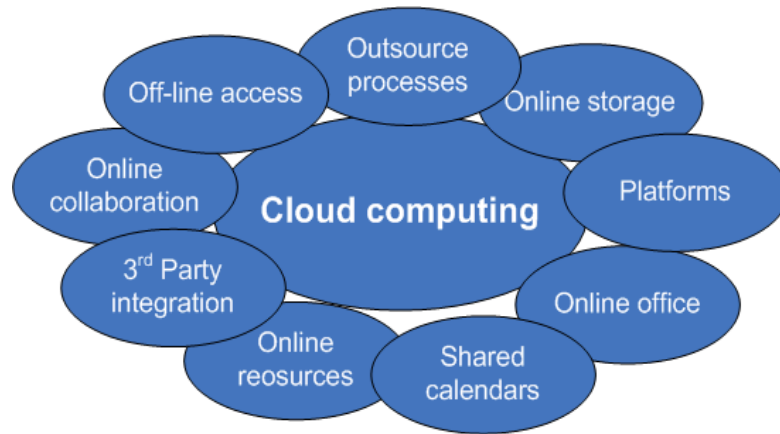


ARCHITECTURE OF CLOUD COMPUTING

Cloud Architecture runs on a very important assumption, which is mostly true. The assumption is that the demand for resources is not always consistent from client to cloud. Because of this reason the servers of cloud are unable to run at their full capacity. To

avoid this scenario, server virtualization technique is applied. This astoundingly increases the **data storage** to multiple times in cloud compared with a regular system. Redundancy of data is crucial, which is a must-have attribute of cloud computing

CHARACTERISTICS OF CLOUD COMPUTING



Cloud computing, typically entails:

- **High scalability**

Cloud environments enable servicing of business requirements for larger audiences, through high scalability

- **Agility**

The cloud works in the ‘distributed mode’ environment. It shares resources among users and tasks, while improving efficiency and agility (responsiveness)

- **High availability and reliability**

Availability of servers is high and more reliable as the chances of infrastructure failure are minimal.

- **Multi-sharing**

With the cloud working in a distributed and shared mode, multiple users and applications can work more efficiently with cost reductions by sharing common infrastructure

- **Services in pay-per-use mode**

- SLAs between the provider and the user must be defined when offering services in pay per use mode. This may be based on the complexity of services offered

- Application Programming Interfaces (APIs) may be offered to the users so they can access services on the cloud by using these APIs
- **Support for all service oriented applications**

COMPARISON WITH RELATED TECHNOLOGIES



Several technologies are related to cloud computing, and the cloud has emerged as a convergence of several computing trends. It seeks to address certain key aspects that may have been lacking in each of these trends, individually. The features of each of these related technologies and how they compare with cloud computing has been outlined in the table.

TYPES OF CLOUD COMPUTING ENVIRONMENTS

The cloud computing environment can consist of multiple types of clouds based on their deployment and usage.

Public clouds

This environment can be used by the general public. This includes individuals, corporations and other types of organizations. Typically, public clouds are administered by third parties or vendors over the Internet, and services are offered on pay-per-use basis. These are also called provider clouds. Business models like SaaS (Software-as-a-Service) and public clouds complement each other and enable companies to leverage shared IT resources and services.

• Example

New York Times archive project which used 100 Amazon EC2 instances and 5.5TB of S3 storage to generate PDFs of 11 million articles for the paper's archives, at a small fraction of traditional costs

- Public clouds are widely used in the development, deployment and management of enterprise applications, at affordable costs
- Allows organizations to deliver highly scalable and reliable applications rapidly and at more affordable costs

Private clouds

This cloud computing environment resides within the boundaries of an organization and is used exclusively for the organization's benefits.

These are also called internal clouds. They are built primarily by IT departments within enterprises who seek to optimize utilization of infrastructure resources within the enterprise by provisioning the infrastructure with applications using the concepts of grid and virtualization.

• Advantages



They improve average server utilization, allow usage of low-cost servers and hardware while providing higher efficiencies; thus reducing the costs that a greater number of servers would otherwise entail High levels of automation, reducing operations costs and administrative overheads

- **Limitations**

IT teams in the organization may have to invest in buying, building and managing the clouds independently

Security is a significant concern in public clouds

External clouds

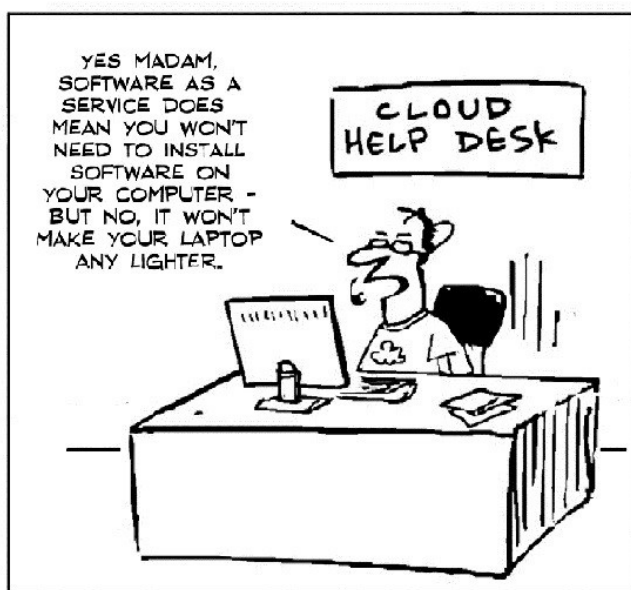
This cloud computing environment is outside of the boundaries of the organization, though it is not necessarily a public cloud. Some external clouds make their cloud infrastructure available to specific other organizations, but not to the general public.

Hybrid clouds

This is a combination of both private (internal) and public (external) cloud computing environments.

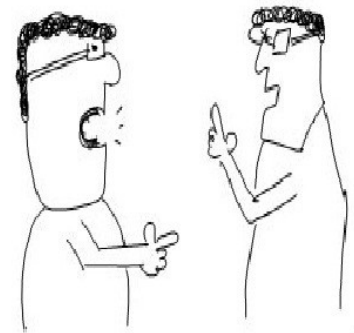
ADVANTAGES





WHERE THE HECK
IS MY DATA?

ITS THERE, UP
IN THE CLOUDS.



Brainstuck.com

- Clients would be able to access their applications and data from anywhere at any time. They could access the cloud computing system using any computer linked to the [Internet](#). Data wouldn't be confined to a hard drive on one user's computer or even a corporation's internal network.
- It could bring hardware costs down. Cloud computing systems would reduce the need for advanced hardware on the client side. You wouldn't need to buy the [fastest computer](#) with the most [memory](#), because the cloud system would take care of those needs for you. Instead, you could buy an inexpensive computer terminal. The terminal could include a [monitor](#), input devices like a [keyboard](#) and [mouse](#) and just enough processing power to run the middleware necessary to connect to the cloud system. You wouldn't need a large hard drive because you'd store all your information on a remote computer.
- Corporations that rely on computers have to make sure they have the right s/w in place to achieve goals. Cloud computing system give these organizations company wide access to computer applications. The companies don't have to buy a set of software or software licenses for every employee. Instead, the company could pay a metered fee to a cloud computing company.



- Servers and digital storage devices take up space. Some companies rent physical space to store servers and databases because they don't have it available on site. Cloud computing gives these companies the option of storing data on someone else's hardware, removing the need for physical space on the front end.
- Corporations might save money on IT support. Streamlined hardware would, in theory, have fewer problems than a network of **heterogeneous** machines and [operating systems](#).
- If the cloud computing system's back end is a grid computing system, then the client could take advantage of the entire network's processing power. Often, scientists and researchers work with calculations so complex that it would take years for individual computers to complete them. On a grid computing system, the

client could send the calculation to the cloud for processing. The cloud system would tap into the processing power of all available computers on the back end, significantly speeding up the calculation.

INFRASTRUCTURES

- **Salient features**

- Known also as IaaS (Infrastructure-as-a- Service), acknowledged as the most potent cloud
- Provides access to shared resources on need basis, without revealing details like location and hardware to clients
- Provides details like server images on demand, storage, queuing, and information about other resources, among others
- Vendors who provide this type of service enable cloud platforms and cloud applications. Some may even leverage others within the space to provide competitive viability as well
- Offers full control of server infrastructure, not limited specifically to applications, instances and containers



- **Example**

Amazon's EC2, through which users can request Linux Virtual Machine instances that are created on the fly and billed based on actual usage

- **Limitations**

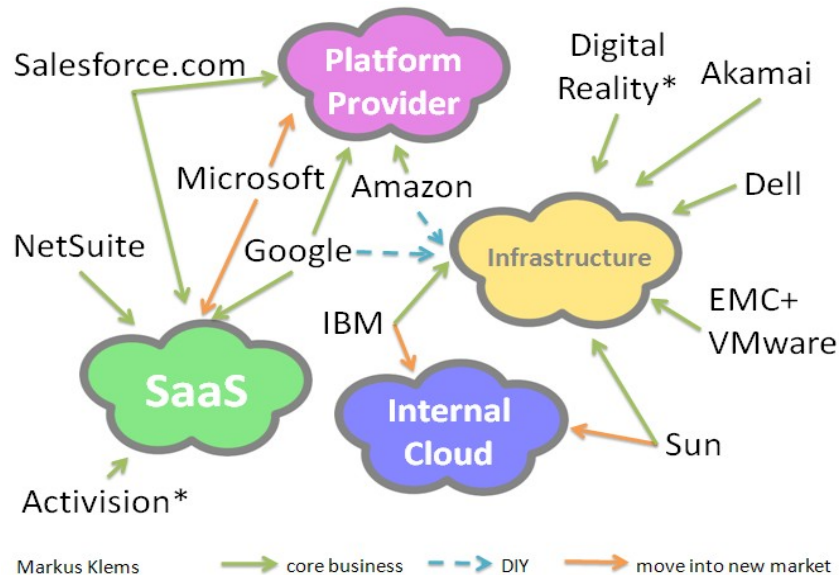
- Service providers may demand higher prices for services offered

- Issues pertaining to resource and server down time

PLATFORMS:

- **Salient features**

- Known also as PaaS (Platform-as-a-Service)
- Empowers developers to deploy, deliver and manage their applications. They can build applications, upload (deploy) the same into the cloud platform and simply run and test them
- Developers can also leverage additional benefits like authentication and data access provided by the platform
- This cloud takes away the concept of servers, while providing an application centric environment
- While creating this kind of cloud computing platform, a vendor “builds a cloud platform first and then develops applications that run on it” (OR) “develops a hostable application and then plugs it into the cloud”. But considering the advantages and disadvantages, the latter would be the better approach .



Limitations

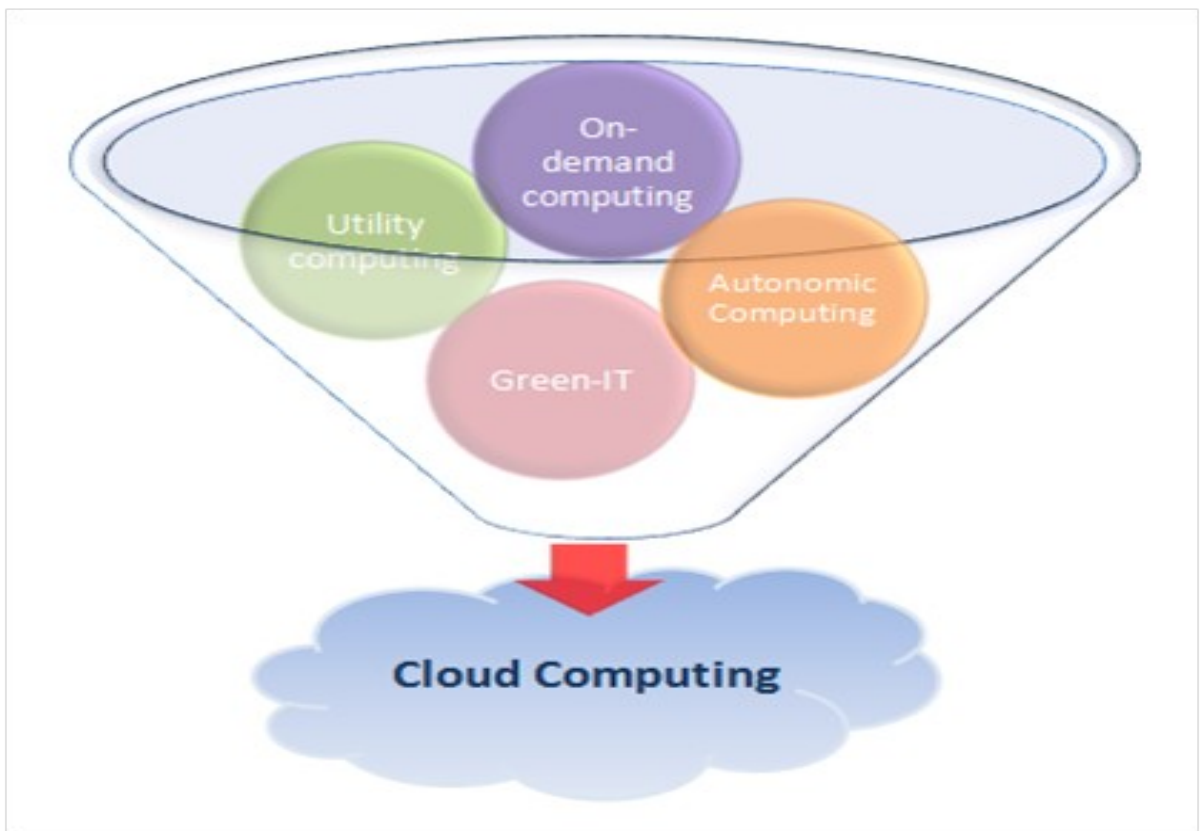
Significant dependency on cloud infrastructure providers

APPLICATIONS:

The applications of cloud computing are practically limitless. With the right middleware, a cloud computing system could execute all the programs a normal [computer](#) could run. Potentially, everything from generic word processing software to customized computer programs designed for a specific company could work on a cloud computing system..

Salient features

Companies host applications on the Internet and users sign up and use them, without concerning themselves about its maintenance and whereabouts. This is also called as SaaS (Software-as-a-Service)



CONCLUSION



COMPANIES FOLLOWING CLOUD

After so many years, Cloud Computing today is the beginning of “network based computing” over Internet in force. It is the technology of the decade and is the enabling element of two totally new computing models, the Client - Cloud computing and the Terminal-Cloud computing. These new models would create whole generations of applications and business. Our prediction is that it is the beginning to the end of the dominance of desktop computing such as that with the Windows.

It is also the beginning of a **new Internet based service economy**: the Internet centric, Web based, on demand, Cloud applications and computing economy.

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