

A New Era of Cloud Computing in Private and Public Sector Organization

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ABSTRACT

In an attempt to gain a competitive edge, organizations are increasingly looking for new and innovative ways to cut costs while maximizing value – especially now, during a global economic downturn. They recognize that they need to grow, but are simultaneously under pressure to save money. This has forced the realization that new ideas and methods may produce better results than the tried and tested formulas of yesteryear. Nowadays, a technique is used for gratifying these necessities, is known as cloud computing has very interesting characteristics, delivery and deployments models, applications, risks and benefits. Cloud Computing has become a scalable services consumption and delivery platform in the field of Services Computing. The cloud is virtualizations of resources that maintains and manages itself. The technical foundations of Cloud Computing include Service-Oriented Architecture (SOA) and Virtualizations of hardware and software. The goal of Cloud Computing is to share resources among the cloud service consumers, cloud partners, and cloud vendors in the cloud value chain. Due to its uniqueness, large public and private organizations (not just SMB's) are seriously considering cloud computing. This paper contains brief concept of cloud computing.

Key word:- Cloud computing, Service-Oriented Architecture.

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.



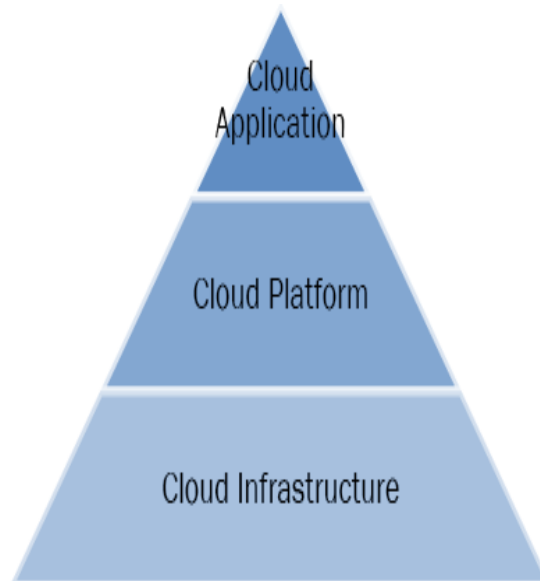
WHAT DOES IT EMBRACE?

Cloud computing can be visualised as a pyramid consisting of three sections:

CLOUD APPLICATION

This is the peak of the cloud pyramid, where applications are run and interacted with via a web browser, hosted desktop or remote client. A hallmark of commercial cloud computing applications

is that users never need to purchase expensive software licenses themselves. Instead, the cost is incorporated into the subscription fee. A cloud application eliminates the need to install and run the application on the customer's own computer, thus removing the burden of software maintenance, ongoing operation and support [1].



Cloud Platform

The middle layer of the cloud pyramid, which provides a computing platform or framework as a service. A cloud computing platform dynamically provisions, configures, reconfigures and de-provisions servers as needed to cope with increases or decreases in demand. This in reality is a distributed computing model, where many services pull together to deliver an application or infrastructure request.

Cloud Infrastructure

The foundation of the cloud pyramid is the delivery of IT infrastructure through virtualisation. Virtualisation allows the splitting of a single physical piece of hardware into independent, self governed environments, which can be scaled in terms of CPU, RAM, Disk and other elements. The infrastructure includes servers, networks and other hardware appliances delivered as either Infrastructure "Web Services", "farms" or "cloud centres". These are then interlinked with others for resilience and additional capacity[2-3].

TYPES OF CLOUD COMPUTING

• Public Cloud

Public cloud (also referred to as 'external' cloud) describes the conventional meaning of cloud computing: scalable, dynamically provisioned, often virtualised resources available over the Internet from an off-site third-party provider, which divides up resources and bills its customers on a 'utility' basis.

An example is ThinkGrid, a company that provides a multi-tenant architecture for supplying services such as Hosted Desktops, Software as a Service and Platform as a Service. Other popular cloud vendors include Salesforce.com, Amazon EC2 and Flexiscale.

• Private Cloud

Private cloud (also referred to as 'corporate' or 'internal' cloud) is a term used to denote a proprietary computing architecture providing hosted services on private networks. This type of cloud computing is generally used by large companies, and allows their corporate network and data centre administrators to effectively become in-house 'service providers' catering to 'customers' within the corporation. However, it negates many of the benefits of cloud computing, as organisations still need to purchase, set up and manage their own clouds.

• Hybrid Cloud

It has been suggested that a hybrid cloud environment combining resources from both internal and external providers will become the most popular choice for enterprises. For example, a company could choose to use a public cloud service for general computing, but store its business-critical data within its own data centre. This may be because larger organisations are likely to have already invested heavily in the infrastructure required to provide resources in-house – or they may be concerned about the security of public clouds[4-5].

SERVICES USED IN THE CLOUD

There are numerous services that can be delivered through cloud computing, taking advantage of the distributed cloud model. Here are some brief descriptions of a few of the most popular cloud-based IT solutions:

- **Hosted Desktops**

Hosted desktops remove the need for traditional desktop PCs in the office environment, and reduce the cost of providing the services that you need. A hosted desktop looks and behaves like a regular desktop PC, but the software and data customers use are housed in remote, highly secure data centres, rather than on their own machines. Users can simply access their hosted desktops via an internet connection from anywhere in the world, using either an existing PC or laptop or, for maximum cost efficiency, a specialised device called a thin client.

- **Hosted Email**

As more organisations look for a secure, reliable email solution that will not cost the earth, they are increasingly turning to hosted Microsoft Exchange® email plans. Using the world's premier email platform, this service lets organisations both large and small reap the benefits of using MS Exchange® accounts without having to invest in the costly infrastructure themselves. Email is stored centrally on managed servers, providing redundancy and fast connectivity from any location. This allows users to access their email, calendar, contacts and shared files by a variety of means, including Outlook®, Outlook Mobile Access (OMA) and Outlook Web Access (OWA).

- **Hosted Telephony (VOIP)**

VOIP (Voice Over IP) is a means of carrying phone calls and services across digital internet networks. In terms of basic usage and functionality, VOIP is no different to traditional telephony, and a VOIP-enabled telephone works exactly like a 'normal' one, but it has distinct cost advantages. A hosted VOIP system replaces expensive phone systems, installation, handsets, BT lines and numbers with a simple, cost-efficient alternative that is available to use on a monthly subscription basis. Typically, a pre-configured handset just needs to be plugged into your broadband or office network to allow you to access features such as voicemail, IVR and more.

- **Cloud Storage**

Cloud storage is growing in popularity due to the benefits it provides, such as simple, CapEx-free costs, anywhere access and the removal of the burden of in-house maintenance and management. It is basically the delivery of data storage as a service, from a third party provider, with access via the internet and billing calculated on capacity used in a certain period (e.g. per month).

- **Dynamic Servers**

Dynamic servers are the next generation of server environment, replacing the conventional concept of the dedicated server. A provider like ThinkGrid gives its customers access to resources that look and feel exactly like a dedicated server, but that are fully scalable. You can directly control the amount of processing power and space you use, meaning you don't have to pay for hardware you don't need. Typically, you can make changes to your dynamic server at any time, on the fly, without the costs associated with moving from one server to another.

BENEFITS OF USING CLOUD COMPUTING

There are many reasons why organisations of all sizes and types are adopting this model of IT. It provides a way to increase capacity or add capabilities on the fly without investing in new infrastructure, training new personnel, or licensing new software. Ultimately, it can save companies a considerable amount of money.

- **Removal / reduction of capital expenditure**

Customers can avoid spending large amounts of capital on purchasing and installing their IT infrastructure or applications by moving to the cloud model. Capital expenditure on IT reduces

available working capital for other critical operations and business investments. Cloud computing offers a simple operational expense that is easier to budget for month-by-month, and prevents money being wasted on depreciating assets. Additionally, customers do not need to pay for excess resource capacity in-house to meet fluctuating demand.

- **Reduced administration costs**

IT solutions can be deployed extremely quickly and managed, maintained, patched and upgraded remotely by your service provider. Technical support is provided round the clock by reputable providers like ThinkGrid for no extra charge, reducing the burden on IT staff. This means that they are free to focus on business-critical tasks, and businesses can avoid incurring additional manpower and training costs. IT giant IBM has pointed out that cloud computing allows organisations to streamline procurement processes, and eliminates the need to duplicate certain computer administrative skills related to setup, configuration, and support.

- **Improved resource utilisation**

Combining resources into large clouds reduces costs and maximises utilisation by delivering resources only when they are needed. Businesses needn't worry about over-provisioning for a service whose use does not meet their predictions, or under-provisioning for one that becomes unexpectedly popular. Moving more and more applications, infrastructure, and even support into the cloud can free up precious time, effort and budgets to concentrate on the real job of exploiting technology to improve the mission of the company. It really comes down to making better use of your time – focusing on your business and allowing cloud providers to manage the resources to get you to where you need to go. Sharing computing power among multiple tenants can improve utilisation rates, as servers are not left idle, which can reduce costs significantly while increasing the speed of application development. A side effect of this approach is that computer capacity rises dramatically, as customers do not have to engineer for peak loads.

- **Economies of scale**

Cloud computing customers can benefit from the economies of scale enjoyed by providers, who typically use very large-scale data centres operating at much higher efficiency levels, and multi-tenant architecture to share resources between many different customers. This model of IT provision allows them to pass on savings to their customers.

- **Scalability on demand**

Scalability and flexibility are highly valuable advantages offered by cloud computing, allowing customers to react quickly to changing IT needs, adding or subtracting capacity and users as and when required and responding to real rather than projected requirements. Even better, because cloud-computing follows a utility model in which service costs are based on actual consumption, you only pay for what you use. Customers benefit from greater elasticity of resources, without paying a premium for large scale.

- **Quick and easy implementation**

Without the need to purchase hardware, software licences or implementation services, a company can get its cloud-computing arrangement off the ground in minutes.

- **Helps smaller businesses compete**

Historically, there has been a huge disparity between the IT resources available to small businesses and to enterprises. Cloud computing has made it possible for smaller companies to compete on an even playing field with much bigger competitors. 'Renting' IT services instead of investing in hardware and software makes them much more affordable, and means that capital can instead be used for other vital projects. Providers like ThinkGrid take enterprise technology and offer SMBs services that would otherwise cost hundreds of thousands of pounds for a low monthly fee.

- **Quality of service**

Your selected vendor should offer 24/7 customer support and an immediate response to emergency situations.

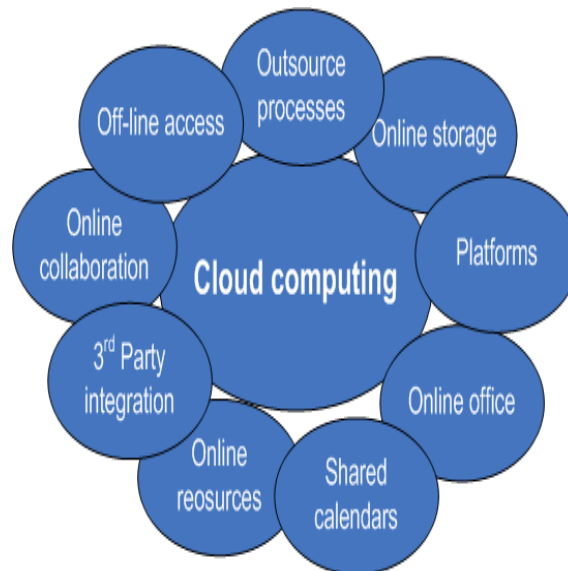
- **Guaranteed uptime, SLAs.**

Always ask a prospective provider about reliability and guaranteed service levels – ensure your applications and/or services are always online and accessible.

- **Anywhere Access**

Cloud-based IT services let you access your applications and data securely from any location via an internet connection. It's easier to collaborate too; with both the application and the data stored in

the cloud, multiple users can work together on the same project, share calendars and contacts etc. It has been pointed out that if your internet connection fails, you will not be able to access your data. However, due to the 'anywhere access' nature of the cloud, users can simply connect from a different location – so if your office connection fails and you have no redundancy, you can access your data from home or the nearest Wi-Fi enabled point. Because of this, flexible / remote working is easily enabled, allowing you to cut overheads, meet new working regulations and keep your staff happy![5-8].



- **Technical Support**

A good cloud computing provider will offer round the clock technical support. ThinkGrid customers, for instance, are assigned one of our support pods, and all subsequent contact is then handled by the same small group of skilled engineers, who are available 24/7. This type of support model allows a provider to build a better understanding of your business requirements, effectively becoming an extension of your team.

- **Disaster recovery / backup**

Recent research has indicated that around 90% of businesses do not have adequate disaster recovery or business continuity plans, leaving them vulnerable to any disruptions that might occur. Providers like ThinkGrid can provide an array of disaster recovery services, from cloud backup (allowing you to store important files from your desktop or office network within their data centres) to having ready-to-go desktops and services in case your business is hit by problems. Hosted Desktops (or Hosted VDI) from ThinkGrid, for example, mean you don't have to worry about data backup or disaster recovery, as this is taken care of as part of the service. Files are stored twice at different remote locations to ensure that there's always a copy available 24 hours a day, 7 days per week[7-9].

SECURITY SCENARIO OF CLOUD COMPUTING

Many companies that are considering adopting cloud computing raise concerns over the security of data being stored and accessed via the internet. What a lot of people don't realise is that good vendors adhere to strict privacy policies and sophisticated security measures, with data encryption being one example of this. Companies can choose to encrypt data before even storing it on a third-party provider's servers. As a result, many cloud-computing vendors offer greater data security and confidentiality than companies that choose to store their data in-house. However, not all vendors will offer the same level of security. It is recommended that anyone with concerns over security and access should research vendors' policies before using their services. Technology analyst and consulting firm Gartner lists seven security issues to bear in mind when considering a particular vendor's services:

- Privileged user access—enquire about who has access to data and about the hiring and management of such administrators

Gupta and Gupta

- Regulatory compliance—make sure a vendor is willing to undergo external audits and/or security certifications
- Data location—ask if a provider allows for any control over the location of data
- Data segregation—make sure that encryption is available at all stages and that these "encryption schemes were designed and tested by experienced professionals"
- Recovery—find out what will happen to data in the case of a disaster; do they offer complete restoration and, if so, how long that would take
- Investigative Support—inquire whether a vendor has the ability to investigate any inappropriate or illegal activity
- Long-term viability—ask what will happen to data if the company goes out of business; how will data be returned and in what format

Generally speaking, however, security is usually improved by keeping data in one centralised location. In high security data centres like those used by ThinkGrid, security is typically as good as or better than traditional systems, in part because providers are able to devote resources to solving security issues that many customers cannot afford [10-14].

CONCLUSIONS

Adopting a cloud computing strategy can help businesses conduct their core business activities with less hassle and greater efficiency. Companies can maximize the use of their existing hardware to plan for and serve specific peaks in usage. Thousands of virtual machines and applications can be managed more easily using a cloud-like environment.

Businesses can also save on power costs as they reduce the number of servers required. And with IT staff spending less time managing and monitoring the data centre, IT teams are well placed to further streamline their operations as staff complete more work on fewer machines.

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