

Benefits and Challenges that Surrounds Around Adopting Cloud Computing in E Commerce

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Abstract: Cloud computing is a breakthrough in the information technology field and is suddenly omnivorous. It offers a realization in which IT resources are offered as services more affordable, flexible, easily and attractive to business. It helps the organization, in establishing and running a virtual business, in which most or all of its business functions are outsourced to online services. This paper strives to give brief introduction about cloud computing and analyzes the factors that are beneficial and challenges for an organization to adopt this technology.

Keywords: omnivorous, affordable, virtual, flexible, outsource

1. Introduction

The success of internet and development in the web technologies, have lead the idea of establishing and running the business on the net. This resulted with the business organization to deal with the large scale, vast amount of data and more computing power. To meet the demand, the organization need to continue its investment in hardware, software, and manpower. In order to save cost and implement the demand, the concept of cloud computing is used.

Usually the Internet is represented as cloud in the network diagram and many services such as computing, sharing, storing are delivered over the Internet. Hence, the name 'Cloud Computing' might have come up. Cloud computing is a way to increase the capacity or add capabilities dynamically without investing in new infrastructure, training new personnel, or licensing new software. It extends Information Technology's (IT) existing capabilities[1].

2. Cloud Computing

Cloud computing can be defined in many ways because the paradigm is still evolving. It is a process that offers storage, manipulation, computation and accessing users data through Internet using services provided by the service provider. According to Berkeley View, Cloud computing is the new trend of computing where readily available computing resources are exposed as a service. These computing resources are generally ordered as pay-as-you-use plans and hence have become attractive to cost conscious customers [2].

Cloud computing has been defined by NIST as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or cloud provider interaction.

In simple words, cloud computing can be viewed from two aspect, users aspect and service providers aspect. From the user aspect, User request for the required resource, he pays for what he has requested and for how much he has used. Just as we pay electricity bill, water bill, telephone bill according to units consumption. The resource may involve (some or all) infrastructure, platform, storage services for his utility. From service providers' aspect, it can be viewed as model that is responsible and ensures easily, on-demand, automatic access from a pool of resource for quality delivery of the services requested to their client.

3. Working of Cloud Computing

Front-end (Users) and Back-end (Clouds) are the two important parts of the cloud computing architecture. It is essential for the user to have internet connection so that they connect to cloud. The Internet acts as a middleware and the connection of Internet can be of point-to-point or peer-to-peer connection depending upon the type of cloud they want to access. Front-end consists of user and the application like web browser whereas

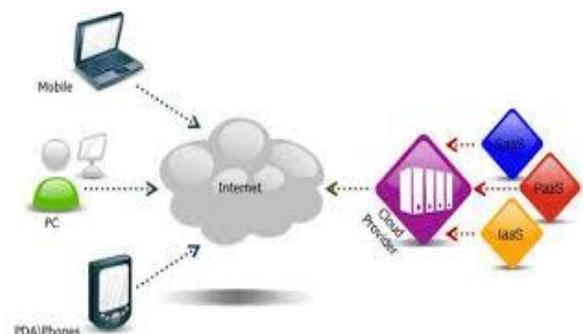


Figure 1: Cloud architecture

back-end consists of cloud services like providing virtual servers, data storage system, etc that create the "cloud" of computing services [3]. A central server administers the system, monitoring traffic and client demands to ensure

everything runs smoothly. It follows a set of rules called **protocols** and uses a special kind of software called **middleware**. Middleware allows networked computers to communicate with each other. The most common example utilizing cloud service is having an email account on web. If we have an e-mail account with a Web-based e-mail service like Hotmail, Yahoo! Mail or Gmail, then we are using the services of cloud computing. We can access our mail account from any device (laptop, desktop, mobile) having Internet connection from anywhere, anytime. We need to just log in to a web e-mail account. The software and storage for our account exist on the cloud.

4. Cloud Services

Cloud computing offers many models of services. XaaS can be denoted as the service taxonomy where X denotes 'anything or everything', S denotes 'Service', so XaaS stands for 'Anything as a Service'. Primary service model includes IAAS, PAAS and SAAS. Apart from these main service number of variations exists, namely Security-as-a-Service (SecaaS), Monitoring-as-a-Service (MaaS), Communication-as-a-Service (CaaS), Software Testing-as-a-Service (STaaS), Business Process-as-a-Service (BPaaS), IT-as-a-Service (ITaaS), Database-as-a-Service (DBaaS), and many more other variations being defined on a daily basis.

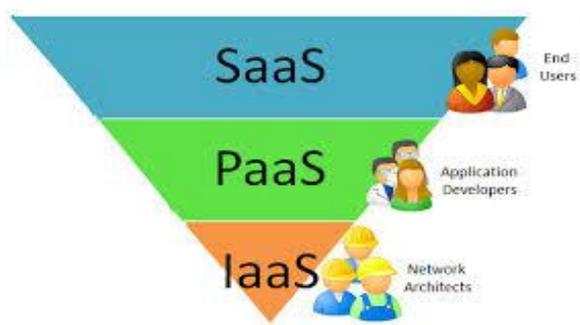


Figure 2: Layered approach of cloud services

Cloud computing enables the delivery of services through on demand service provisioning model to end-users on pay-as-you-use basis over the network such as the internet.

4.1 Infrastructure as a Service

This service model is a standard which offers resources such as processing, computation power, storage, network capabilities, firewall and other computing resources virtually to the consumer as on demand. The consumer can run any software, which can include operating systems and applications. He need not worry - how he gets the resources, where they are located, and to manage or control the underlying virtual cloud infrastructure. Services available to businesses through the IaaS model include disaster recovery, computing as a service, storage as a service, data centre as a service, virtual desktop infrastructure, and cloud bursting, which is providing peak load capacity for variable processes (Cisco, 2009). Benefits of IaaS include increased financial flexibility, choice of services, business agility, cost-effective scalability, and increased security[5].

4.2 Platform as a Service

This is one of the most important services offered by the providers where they deliver platforms and tools as services which are hosted in the cloud and accessed by clients using their web browser which enable them to develop, deploy, and manage their software applications, without requiring to install any of the platforms or support tools on their local host. The service consist of preconfigured features, the customers can choose and subscribe according to their requirement. Google Apps and Microsoft Windows Azure are the most known.

4.3 Software as a Service

This service model is the largest cloud market, the service provider deploys the software over the internet and customer uses it. The users client machines require no downloads or installations of any application specific software, - cloud applications run on the server (in the cloud). This service eliminates the need to buy, install and maintain the software at the users end.

5. Cloud Deployment Models

The organizations can get the above said services through the various deployment model. Deployment model represents a specific type of cloud environment, primarily distinguished by ownership, size, and access.

There are four common cloud deployment models:

5.1 Public Clouds

This cloud is available to all the external users through internet who can register with cloud and where the cloud resources are dynamically provided on a pay-per-use model. This cloud is less secure like private cloud because it is accessible to the internet users. Public cloud service providers like Amazon AWS, Microsoft and Google own and operate the infrastructure and offer access only via Internet

5.2 Private Clouds

This cloud delivers services to a single organization enabling them to dynamically scale up or down for resources which isn't possible with the traditional hardware centric computing environment. a private cloud is typically hosted within a organization's firewalls Or some organizations host their private cloud with an external third party provider, which allows them to use external resources on-demand basis. It allows significant cost savings over legacy hardware-based environment. It also enables far greater flexibility, and – in contrast to a public cloud – much greater security and privacy.

5.3 Community Clouds

This cloud is a hybrid form of private cloud and usually referred as shared cloud computing service which provides

service to a limited set of organizations or targeted group. The member usually have a similar cloud requirements such as similar security, privacy, performance. Community clouds are often designed for businesses and organizations working on joint projects, applications, or research, which requires a central cloud computing facility for building, managing and executing such projects, regardless of the solution rented. Simon Daykin, chief technology officer of integrator Logicalis UK, said: "the beauty of the community cloud is that it can be shaped to meet the needs and circumstances of a group, and even individual parties within that group."

5.4 Hybrid Clouds

This cloud is an integrated cloud that bounds both private and public clouds to perform distinct functions and each remaining a distinct entity within the same organization. As public cloud services are likely to be more cost efficient and scalable than private clouds, an organization can maximize their efficiencies by employing public cloud services for all non-sensitive data, and employing private cloud services for all sensitive data.

Hybrid cloud models can be implemented in a number of ways:

- We can employ separate cloud providers to provide both private and public services as an integrated service
- We can employ individual cloud providers to offer a complete hybrid package.
- Organizations' who manage their private clouds themselves can hire public cloud service which they then integrate into their infrastructure.

6. Benefits of Cloud Computing

Cloud computing offers an innovative business model for organizations to adopt IT services. Some of the benefits in using this technology are

- **Cost efficient:** Traditional desktop software costs companies a lot in terms of finance. Cloud technology on the other hand reduces investment cost, reduces operation and maintenance cost and reduces hardware and software cost, i.e. instead of purchasing expensive upgraded hardware or software applications, we can get most of what we need through cloud using pay-as-you-use mode, which makes reasonable for the Organizations.
- **Unlimited Storage capacity:** Organizations can store more data than on private desktop computer systems. Storing information in the cloud gives almost unlimited storage capacity. Hence we need not worry about running out of storage to store vast data.
- **Efficient Space utilization:** By cloud the organization can efficiently utilize software space and as well as hardware space. An organization can employ virtualization (Virtual Desktop Infrastructure) which gains greater elasticity while encouraging more effective use of IT resources.
- **Easy access to information:** Cloud end users can access the information from anywhere, where there is an Internet connection, rather than to sit in front of their desk top. This convenient feature makes to move beyond time zone and geographic location.

- **Allows to Shift Focus on core business:** organizations need not have to worry about constant server updates, application software updates, their maintenance or other computing issues. It helps the organization to focus on its core business and reacts quickly to market conditions and competitions.

7. Challenges of Cloud Computing

Cloud computing is not a "silver-bullet" technology; hence, investment in any deployment model should be made based on business requirements, the criticality of the application and the level of support required. Adopting Cloud computing has numerous challenges and some of the major challenges that need to be focused are

- **Security:** it is the biggest concern when it comes to accepting cloud computing technology. By utilizing a remote cloud services, the organization essentially gives away sensitive and confidential private data and information. To protect, maintain and retain them from any security breach, especially in multitenant environment where potential mixing of virtual machines are done, is left to service provider. So providers reliability is very crucial and so reputation of service provider depends on their reliability.
- **Privacy:** is another issue which hinders the approval of using cloud technology. It is about the protection and careful use of the personal information of customers. The attackers can use the clients account and can access the information, as this might put consumers data at risk. Data confidentiality and integrity is required to make sure that provider will not misuse customer's information deliberately or accidentally. According to Cotterill, the security of confidential and sensitive material has led to a "look before you leap" phase.
- **Data Control:** In cloud the customers data is spread all over the world. The lack of user control and ownership are important issues in trust. When we have less control over our assets then we trust the system less [9]. The customer of cloud is the owner of his information, but he has lack of control over the data, lack of visibility over the data and resources, and he is concerned about the data loss also. The customer has to trust the service provider to ensure a workable trust relationship.
- **Service Providers reputation:** Selecting the type of cloud and the service is not so easy for a customer or an organization to choose, because there are a lot of providers who allege to offer the best possible service. It would be easier to rely on the reputation of the provider, but it is difficult to determine how established a provider is in terms of security, performance, and reliability. For this reason, it's important to gather as much information as we can about a provider's reputation, which can be accomplished little bit by taking advantage of third-party evaluations.
- **Dependency on Service Provider:** This is one of the key factors that hinders the adoption of cloud. In this situation, if an organization desires to outsource some of the services to other provider, then it would be impossible or may face difficulties to migrate from the present service provider, forcing the organization to stay with provider which doesn't satisfy their need/demand. This situation is

called vendor lock-in, which leads to customer demoralization.

- **Uninterrupted Service** : The organizations data is so critical that it must be available 24x7 and reliable to support. The serious challenge faced by the service provider is to provide continuous supply of resources or services. We all know that the machines/resources breaks down, may be in the provider’s environment or customer’s environment. For provider to detect and identify the fault, and to replace it with the new instance takes time. Even the best service provider has to face the failure and downtime.
- **Data Vulnerability**: Internet is easy target for malicious attacker or for hackers, so nothing is 100% safe and secure in internet. Organization using cloud, provide sensitive and private data. Machines in the cloud interoperate with each other for computation and shares data. If a system is compromised then the sensitive private data will be public.
- **Lack of Understanding**: Though cloud computing technique is gaining popularity, the organizations migrating to it needs to understand what they are getting from it. Services should be in measurable quantity and to be measured. Suppose the service provider is not providing the backup data, and if organization’s data is corrupted in cloud, expecting backup is wrong, this is due to lack of familiarity with the cloud service operations, resulting in data loss.
- **Cross-Border Issues**: Concerns persist to linger about data movement across global boundaries and is unpredictable in terms of physical data storage, physical data processing and data accessing. Different rules and regulations for data privacy and security may be applied for the same data across the border. Because of these varying rules and regulations, politics have arisen in the adoption of cloud computing.

Now let us compare the traditional computing environment (where the organization has all the resources required for computing) with cloud computing environment. The below table shows the details.

Table 1

	Traditional	Cloud
Requirement of Computing capital investment	Huge	Very less
Requirement of technical knowledge & technical people	Must	No
Scalability of resources	Fixed	Yes
Immediate availability of upgraded software	Incurs Overhead software updation charges	Yes
Availability of services at any location and at any time	Not at all	Yes
Deployment of resources	Fixed, need to plan and buy as required	Quick
Internet connection	Not required	Required with huge bandwidth
Visibility of data	Well visible	No, It’s a concern
Concern for availability of customized services	No, built and managed accordingly	Yes

Concern for service provider	No	Yes
Degree of data control	High	No
Concern for data privacy and security	Not much	Very much
Payment mode	Fixed	Pay as you use
Requirement of metrics to measure the performance	Not required	Must, lack of standards to measure
Model	Mature	Immature

8. Conclusions

Cloud computing, though developing technology, promises to bring considerable benefits to organizations using it. But as the sensitivity and value of the data increases, the option to adopt cloud goes on decreases, because of lack of security, privacy, data control etc., however, researchers and IT organizations are trying to eliminate the challenges of cloud computing so that small, medium, and large scale organization can utilize the features of cloud. Before adopting cloud technology an organization has to analyze required service and evaluate the risk associated. It is essential for an organization to maintain data reliability, confidentiality and integrity and at the same time it is essential to maintain profit margin also, so it is beneficial to preserve sensitive information in its premises and use cloud for other services.

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