A Brief Study To Cloud

Subham Chakraborty, Dept. of CSE
Mallabhum Institute of Technology
Bishnupur, West Bengal, India
scmit@yahoo.in

Sayan Das, Dept. of CSE
Camellia Institute of Technology
Madhyamgram, West Bengal, India
sayantamali@gmail.com

Syamal Patra, Dept. of CSE
Camellia Institute of Technology
Madhyamgram, West Bengal, India
cit.syamalpatra@yahoo.com

Abstract— Cloud Computing is a versatile technology that can support a broad-spectrum of applications. The low cost of cloud computing and its dynamic scaling renders it an innovation driver for small companies, particularly in the developing world. Cloud deployed enterprise resource planning (ERP), supply chain management applications (SCM), customer relationship management (CRM) applications, medical applications and mobile applications have potential to reach millions of users. In this paper, we explore the different concepts involved in cloud computing. Leveraging our experiences on various clouds, we examine clouds from technical, and service aspects. We highlight some of the opportunities in cloud computing, underlining the importance of clouds and showing why that technology must succeed. Finally, we discuss some of the issues that this area should deal with.

Keywords— Cloud Computing, SaaS, Paas, IaaS.

Introduction *(Heading 1)*

I. INTRODUCTION

Cloud computing is a recently developing paradigm of distributed computing. Though it is not a new idea that emerged just recently. In 1969 L. Kleinrock anticipated, "As of now, computer networks are still in their infancy. But as they grow up and become more sophisticated, we will probably see the spread of 'computer utilities' which, like present electric and telephone utilities, will service individual homes and offices across the country." His vision was the true indication of today's utility based computing paradigm. One of the giant steps towards this world was taken in mid 1990s when grid computing was first coined to allow consumers to obtain computing power on demand. The origin of cloud computing can be seen as an evolution of grid computing technologies. The term Cloud computing was given prominence first by Google's CEO Eric Schmidt in late 2006 (may be he coined the term). So the birth of cloud computing is very recent phenomena although its root belongs to some old ideas with new business, technical and social perspectives. From the architectural point of view cloud is naturally build on an existing grid based architecture and uses the grid services and adds some technologies like virtualization and some business models.

II. ESSENTIAL CHARACTERISTICS

In this section we describe the essential characteristics that a cloud must possess. Any cloud is expected to have these five characteristics that are being described below.

A. On-demand self-service

A consumer can unilaterally provision computing capabilities, such as server time and network storage, as needed automatically without requiring human interaction

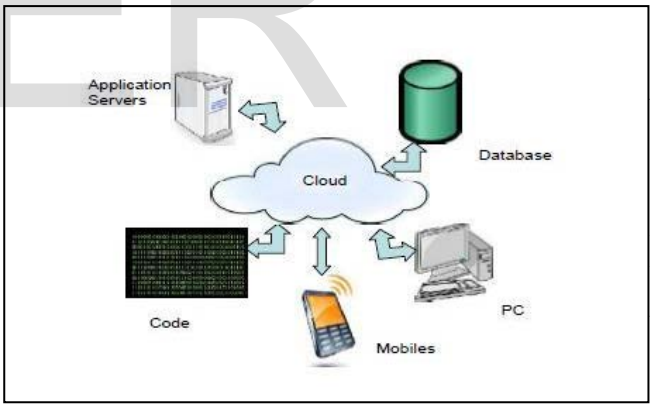

Fig. 1. A Cloud Computing Environment

B. Broad network access

Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms (e.g., mobile phones, laptops, and personal digital assistants (PDAs)).

C. Resource pooling

The provider's computing resources are pooled to serve re multiple consumers using a multi-tenant model, with

different physical and virtual resources dynamically assigned and

reassigned according to consumer demand. There is a sense of location independence in that the subscriber generally has no control or knowledge over the exact location of the provided resources but may be able to specify location at a higher level of abstraction (e.g., country, state, or data centre). Examples of resources include storage, processing, memory, network bandwidth, and virtual machines

D. Rapid elasticity

Capabilities can be rapidly and elastically provisioned, in some cases automatically, to quickly scale out and rapidly released to quickly scale in. To the consumer, the capabilities available for provisioning often appear to be unlimited and can be purchased in any quantity at any time.

E. Measured Service

Cloud systems automatically control and optimize resource use by leveraging a metering capability at some level of abstraction appropriate to the type of service (e.g., storage, processing, bandwidth, and active user accounts). Resource usage can be monitored, controlled, and reported providing transparency for both the provider and consumer of the utilized service.

III. CLOUD DEPLOYMENT STRATEGIES

This section explains the basic cloud deployment strategies. A cloud can be deployed using any of the below mentioned strategies

A. Public Cloud

In simple terms, public cloud services are characterized as being available to clients from a third party service provider via the Internet. The term "public" does not always mean free, even though it can be free or fairly inexpensive to use. A public cloud does not mean that a user's data is publicly visible; public cloud vendors typically provide an access control mechanism for their users. Public clouds provide an elastic, cost effective means to deploy solutions.

B. Private Cloud

A private cloud offers many of the benefits of a public cloud computing environment, such as being elastic and service based. The difference between a private cloud and a public cloud is that in a private cloud-based service, data and processes are managed within the organization without the restrictions of network bandwidth, security exposures and legal requirements that using public cloud services might entail. In addition, private cloud services offer the provider and the user greater control of the cloud infrastructure, improving security and resiliency because user access and the networks used are restricted and designated.

C. Community cloud

A community cloud is controlled and used by a group of Organizations that have shared interests, such as specific security requirements or a common mission. The members of the community share access to the data and applications in the cloud.

D. Hybrid Cloud:

A hybrid cloud is a combination of a public and private cloud that interoperates. In this model users typically outsource non business-critical information and processing to the public cloud, while keeping business-critical services and data in their control.

IV. CLOUD DELIVERY MODELS

This section of the paper describes the various cloud delivery models. Cloud can be delivered in 3 models namely SaaS, PaaS, and IaaS.

A. Software-as-a-Service (SaaS):

In a cloud-computing environment. SaaS is software that is owned, delivered and managed remotely by one or more providers and that is offered in a pay-per-use manner [8]. SaaS in simple terms can be defined as "Software deployed as a hosted service and accessed over the Internet." [9] . SaaS clouds provide scalability and also shifts significant Burdens from subscribers to providers, resulting in a number of opportunities for greater efficiency and, in some cases, performance. The typical user of a SaaS offering usually has neither knowledge nor control about the underlying infrastructure [10]

B. PLATFORM-AS-A-SERVICE (PAAS):

This kind of cloud computing provides development environment as a service. The consumer can use the middleman's equipment to develop his own program and deliver it to the users through Internet and servers. The consumer controls the applications that run in the environment, but does not control the operating system, hardware or network infrastructure on which they are running .The platform is typically an application framework. 4.3.

Infrastructure-as-a-Service (IaaS):

Infrastructure as a service delivers a platform virtualization outsourced service. The consumer can control the environment as a service. Rather than purchasing servers, software, data center space or network equipment, consumers instead buy those resources as a fully operating system, storage, deployed applications and possibly networking components such as firewalls and load balancers, but not the cloud infrastructure beneath them.

V. OPPORTUNITIES:

In this section we explain the vast opportunities the cloud computing field offers to IT industry. Cloud Computing is concerned with the delivery of IT capabilities as a service on three levels: infrastructure (IaaS), platforms (PaaS), and software (SaaS). By providing interfaces on all three levels, Clouds address different types of customers [11]:

A. End consumers

These consumers mainly use the services of the SaaS layer over a Web browser and basic offerings of the IaaS layer as for example storage for data resulting from the usage of the SaaS layer.

B. Business customers

These consumers access all three layers - the IaaS layer in order to enhance the own infrastructure with additional resources on demand, the PaaS layer in order to be able to run own applications in a Cloud and eventually the SaaS layer in order to take advantage of available applications offered as a service.

C. Developers and Independent Software Vendors

Independent Software Vendors that develop applications that are supposed to be offered over the SaaS layer of a Cloud. Typically, they directly access the PaaS layer, and through the PaaS layer **i**ndirectly access the IaaS layer, and are present on the SaaS layer with their application. In general, for all different kinds of Cloud customers, a Cloud offers the major opportunities known for X-as-a-Service offerings. From the perspective of the user, the utility-based payment model is considered as one of the main benefits of Cloud Computing. There is no need for up-front infrastructure investment: investment in software licenses and no risk of unused but paid software Thus, capital expenditure is turned licenses, and investment in hardware infrastructure and related maintenance and staff. into operational expenditure. Users of a Cloud

service only use the volume of IT resources they actually need, and only pay for the volume of IT resources they actually use. At the same time, they take advantage of the scalability and flexibility of a Cloud. Cloud computing enables easy and fast scaling of required demand computing resources on demand.

VI. **CHALLENGES & ISSUES**

In this section we explain the challenges & issues cloud computing has to face. As a lot of economics is tied to this field it will be better that these issues are resolved as early as possible. Fig. 2 depicts the summary of the survey conducted by us on the basic issues of primary concern is taken in to account. Hence only the percentage of 4, 5 is being shown. The following are the issues that a cloud computing environment has to still resolve:

A. Security

When using cloud-based services, one is entrusting their data to a third-party for storage and security. Can one assume that a cloud-based company will protect and secure ones data (Cloud computing presents specific challenges to privacy and security. back it up, check for data errors, defend against security breaches) if one is using their services at a very low cost? Or often for free? Once data is entrusted to a cloud based service, which third-parties do they share the information with? Cloud-sourcing involves the use of many services, and many cloud based services provide services to each other, and thus cloud-based products may have to share your information with third parties if they are involved in processing or transferring of your information. They may share your information with advertisers as well. Security presents a real threat to the cloud

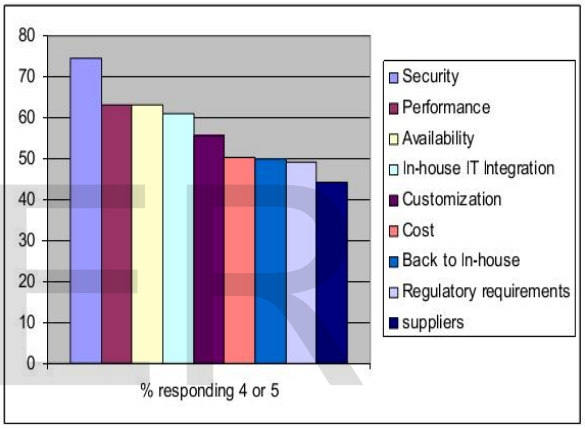

Fig 2. Graph depicting the concerns of clients on cloud computing issues

TABLE1
ECONOMY IMPACT TABLE DUE TO CLOUD OUTAGES

	Total (Hour)	Average (Hour)	Availability	Cost (USD)
Amadeus	1	0.167	99.998	89,000
Facebook	3	0.500	99.994	600,000
ServerBeach	4	0.667	99.992	400,000
Paypal	5	0.833	99.990	1,125,000
Google	5	0.833	99.990	1,000,000
Yahoo!	6	1.000	99.989	1,200,000
Twitter	7	1.167	99.987	1,400,000
Amazon	24	4.000	99.954	4,320,000
Microsoft	31	5.167	99.941	6,200,000
Hostway	72	12.000	99.863	7,200,000
BlackBerry	72	12.000	99.863	14,400,000
Navisite	168	28.000	99.680	16,800,000
OVH	170	28.333	99.667	17,000,000
Total	568	94.667	99.917	71,734,000

B. Performance

Cloud computing Suffers from severe performance issues. The cloud provider must ensure that the performance of the service being provided remains the same all through. There may be peak time break downs, internal flaws, and technical snags arising. Load balancer, data replicators, high end servers must me installed when needed.

C. Availability

Even though cloud promises to be a 24*7*365 service, cloud outages occur frequently. Outages can be scheduled or unscheduled. Table 1 provides details about the downtime in hours and the economic impact of cloud outages of various cloud providers from 2007 to 2012.

D. Cost:

Cloud computing can have high costs due to its requirements for both an using large amounts of data back in-house.

E. Regulatory requirements

What legislative, judicial, regulatory and policy environments are cloud-based information subject to? This question is hard to ascertain due to the decentralized and global structure of the internet, as well as of cloud computing. The information stored by cloud services is subject to the

legal, regulatory and policy environments of the country of domicile of the cloud service, as well as the country in which the server infrastructure is based. This is complicated by the fact that some data in transit may also be regulated.

F. Bandwidth, quality of service and data limits

Cloud computing requires “b speed” Whilst many websites-broadband connections or slow broadband connections; cloud-based applications are often not usable. Connection speed in

Kilobyte per second (or MB/s and GB/s) is important for use of cloud computing services. Also important are Quality of Service (QoS) ; indicators for which include the amount of time the connections are dropped, response time (ping), and the extent of the delays in the processing of network data (latency) and loss of data (packet loss).

G. Major suppliers

Only handful providers are available in the market which is still holding back many SME’s to join a cloud.

VII. **CONCLUSION**

We have at look the basics of cloud. There are interests and concerns in the cloud. From a technology point of view, there are interesting technical problems to solve. From a service or consumer point of view, there are essential usability, stability, and reliability problems to solve. We are at a crossroads with cloud technology. On one hand, there are many stories of problems with clouds, from data loss, to service interruption, to compromised sensitive data. To stay relevant, to remain meaningful, to grow in the service space, the cloud providers must step up their game and produce robust cloud implementations. On the other hand, the world is poised to explode with a billion new devices that will be desperate for the very technology that clouds almost offer today. It is possible that the wave of users, applications and demand will just wash over the cloud landscape, regardless of how robust they are. If the cloud providers are too slow to provide safe, secure, reliable data storage and application services, they “always on” connection, as well may miss one of the greatest opportunities of this century.

VIII. **FUTURE SCOPE**

The issues that are highlighted in this paper will be a hot spot for researchers in future. Areas like security, Load balancing , Standardization will be the major research topics.

REFERENCES

[1] "NIST Cloud Computing Definition", NIST SP 800- 145]
[2] P. Garbacki and V. K. Naik, “Efficient Resource virtualization and sharing strategies for heterogeneous Grid environments,” inProc. IFIP/IEEE IMSymp., 2007, pp. 40–49.
[3] R. Buyya, C. S. Yeo, and S. Venugopal, “Market oriented Cloud computing: Vision, hype, and reality for delivering IT services as computing utilities,” inProc. IEEE/ACM Grid Conf., 2008, pp. 50–57.
[4] R. Aoun and M. Gagnaire, “Towards a fairer benefit distribution in Grid environments,” inProc. IEEE/ACS AICCSA Conf., 2009,pp. 21– 26.
[5] R. Aoun, E. A. Doumith, and M. Gagnaire, “Resource provisioning for enriched services in Cloud environment,” in Proc. IEEE CloudCom Conf., 2010, pp. 296 – 303.
[6] R. Buyya, C. S. Yeo, and S. Venugopal, “Market-oriented Cloud computing: Vision, hype, and reality for delivering IT services as computing utilities,” inProc. IEEE/ACM Grid Conf., 2008, pp. 50–57.
[7] [R. Aoun and M. Gagnaire, “Towards a fairer benefit distribution in Grid environments,” inProc. IEEE/ACS AICCSA Conf., 2009,pp. 21– 26
[8] Mertz SA, Eschinger C, Eid T, Pring B (2007) Dataquest Insight: SaaS Demand Set to Outpace Enterprise Application Software Market
[9] Growth. Gartner RAS Core Research Note, 3 August 2007 Moxie
Marlinspike, "New Tricks for Defeating SSL In Practice," 2009.
[10] Frederick Chong and Gianpaolo Carraro, "Architecture Strategies for

Catching the Long Tail," Microsoft Corporation, April 2006. http://msdn.microsoft.com/en-us/library/aa479069.aspx.
[11] Eymann T (2008) Cloud computing. Enzyklopädieder Wirtschaftsinformatik. Accessed: 10 June 2009
[12] Shyam Patidar Dheeraj Rane "A Survey Paper on Cloud Computing" 2012 Second International Conference on Advanced Computing & Communication Technologies.
[13] http://netseminar.stanford.edu