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An Outlook of cloud computing

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Abstract— In this paper we explore the cloud computing and their components along with the stack. Basically the cloud computing is helping big enterprises and Small Medium Enterprises (SME) to create new, cost-effective business models. It has opened a world of opportunities for Indian IT companies. In future many computing activities would be provided through utilities. There seems to be galore of opportunities for Indian IT companies. How the Small Medium Enterprises are going adopt cloud computing in India. Indian IT giants cloud computing initiatives to tap the opportunity. Cloud, in general, is fluid and can easily expand and contract giving it a sense of complete elasticity. This applies to the "cloud" in cloud computing as well. The elasticity allows clients to request for additional resources or to dispose the few resources they no longer need as per their current requirements. In this survey paper the components of cloud is well explained along with the deployment models currently available world over.

Index Terms-cloud computing, Resource allocation, profit model, priority algorithm

I INTRODUCTION

In the recent years, as technology advances and more and more people have their own personal computers, cloud computing has become more popular than ever. Products like Windows 8 using cloud computing and many companies likeAmazon and Google making use of cloud computing. This paper here discuss the key concepts of cloud computing, The cloud service delivery model, type of clouds and the concept of "pay as you go" of the utility computing.

II CLOUD COMPUTING

The concept means delivering useful functions while hiding how their internals work. Computing itself, to be considered fully virtualized, must allow computers to be built from distributed components such as storage, data, processing, and software resources. Cloud computing has many different characteristics that define it. Some of the most prominent characteristics are elasticity and scalability, pay-per use, on demand, resiliency, multitenancy and workload movement. Elasticity and scalability refer to being able to expand and improve the cloud as time goes on. Pay-per use and on demand mean that users can choose when they want to use a service and only pay for it when they use it.

Utility Computing : Computing may someday be organized as a public utility just as the telephone system is a public utility..The computer utility could become the basis of a new and important industry." Discussed by John McCarthy, 1961.

Cloud computing is a large-scale distributed computing paradigm that is driven by economies of scale, in which a pool of abstracted, virtualized, dynamically scalable, managed computing power, storage, platforms, and services are delivered on demand to external customers over the Internet.".

What this means is the ability for end users to utilize parts of bulk resources and that these resources can be acquired quickly and easily.

Fig.1 General cloud architecture

Figure 1 gives a general view of a cloud and its clients: the cloud's computing resources are depicted as a grid of computer systems where clients access a cloud over network connections.. Similarly, a cloud maintains a pool of hardware and software resources that it manages to maximize services and minimize costs.

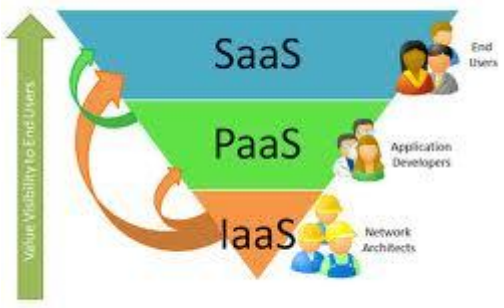

Fig. 2 Cloud Computing Stack

The commercial cloud marketplace offers a wide range of cloud services that vary in complexity and value. Fig. 2 organizes this marketplace into a general set of service categories layered in a notational stack, with foundational offerings towards the bottom and more complex offerings toward the top. What this means is the ability

for end users to utilize parts of bulk resources and that these resources can be acquired quickly and easily.

A. Software as a Service (SaaS)

Software as a Service (SaaS) is a model of software deployment where an application is hosted as a service provided to customers across the Internat. By eliminating the need to install and run the application on the customer's own computer. SaaS alleviated the customer's burden of software maintenance, ongoing operation, and support. Conversely, customers relinquish control over software versions or changing requirements; moreover, costs to use the service become a continuous expense, rather than a single expense at time of purchase.[2]

Fig. 3 Saas Provider for different geographical locations.

Figure 3 shows a schematic diagram of the SaaS Model, Some examples of SaaS include SalesForce.com Customer Relationship Management (CRM) product, however e-mail, financial management, customer service and expense management have also gotten good uptake via SaaS.

B. Platform as a Service (SaaS)

Platform as a Service (PaaS) brings the benefits that SaaS bought for applications, but over the software development world. PaaS can be defined as a computing platform that allows the creation of web applications quickly and easily and without the complexity of buying and maintaining the software and infrastructure underneath it. Paas is analogous to SaaS except that, rather than being software delivered over the web, it is a platform for the creation of software, delivered over the web.

Some examples of PaaS include Google App Engine, Microsoft Azure Services, and the SalesForce.com platform.

C. Infrastructure as a Service (IaaS)

Some vendors provide the infrastructure to build solutions, and you rent the hardware such as servers, load balancers ,a firewall, and cables. You then configure these remotely and install your solutions on them. You can scale up by requesting more servers and reconfiguring the load balancer without purchasing more hardware. You can scale down at any time by reconfiguring the infrastructure you rented from the cloud service provider. This vendor approach is called Infrastructure as a Service (IaaS) because a customer can rent the infrastructure without having to forecast and provision for the highest possible demand in advance. In this approach, you are responsible for correctly configuring the rented infrastructure.

Generally IaaS can be obtained as public or private infrastructure or a combination of the two. "Public Cloud" is considered infrastructure that consists of shared resources, deployed on a self-service basis over the Internet. By contrast, "Private Cloud" is infrastructure that enables some of cloud computing features, like virtualization, but does on a private network. Additionally, some hosting providers are beginning to offer a combination of traditional dedicated hosting alongside public/private cloud networks. This combination approach is generally called "Hybrid Cloud".
Some examples of IaaS include Amazon EC2 (Elastic Compute Cloud) and Rackspace to more regional players.

III. CLOUD DEPLOYMENT MODELS

The NIST definition defines four deployment models and they are Public cloud, Private Cloud, Community clopud and Hybrid cloud. A schematic of cloud taxonomy is presented in figure 4 below.

A. Public Cloud
A public cloud can be accessed by any subscriber with an internet connection and access to the cloud space.

B. Private Cloud
A private cloud is established for a specific group or organization and limits access to just that group.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..

C. Community Cloud
A community cloud is shared among two or more organizations that have similar cloud requirements. This type of cloud is shared among several organisations and is mostly hosted externally but also can be internally hosted by one of the shared organizations

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.

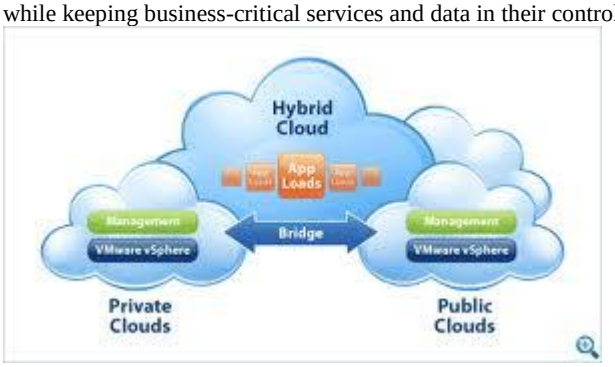

Fig. 4 Schematic of Cloud Taxonomy [4]

Several studied related to cloud services are studied by the researchers like resource allocation model for cloud computing [5], Cloud computing versus grid computing [6], evolution of Cloud Computing [7], the Client/Server architecture[8],[9],[10] etc.

IV. CLOUD SERVICE PROVIDERS IN INDIA

Now in India several cloud providers are there, in this section we present some of the major cloud owners and their capabilities in cloud computing with the details of the cloud environment.

A. Amazon

As a developer and Cloud computing strategist, Amazon offers everything from VM (EC2) to CDN (CloudFront) as a service on subscription.
Type of Cloud: Public Cloud
Type of Service: IaaS
Key Offerings: EC2, S3, SimpleDB and MapReduce

B. Google

This is 100% pure Cloud company – so they want their browser to be the operating system. Google plays in two areas i) Software as a Service (SaaS) ii) Platform as a Service (PaaS). They are currently targeting SME segment.
Type of Cloud: Public Cloud
Type of Service: SaaS and PaaS
Key Offerings: Google Apps and Google App Engine

C. IBM

IBM mainly focuses on the Private Cloud, still they also working on Public Cloud as a pilot study.
Type of Cloud: Private Cloud
Type of Service: SaaS and PaaS
Key Offerings: Lotus Live and IBM WebSphere CloudBurst Applicance

D. Microsoft

Microsoft is slowly unfolding its Cloud strategy in India. As they planned to gracefully transition from packaged software to the services world, they also need to help the ecosystem go through a smooth transition.
Type of Cloud: Private and Public Cloud
Type of Service: SaaS, PaaS, and IaaS
Key Offerings: Online Services, Windows Azure Platform and Windows Server Hyper-V

E. Salesforce.com

As frontrunner in the space of SaaS, Salesforce.com has high expectations from Indian market. They started on the right note by targeting SME segment.
Type of Cloud: Public Cloud
Type of Service: SaaS, and PaaS
Key Offerings: Salesforce.com CRM and force.com

F. VMware

This is the pioneer in the Cloud Computing segment. Having positioned it as a strong Virtualization platform, they became the natural choice of Private Cloud for many customers in India. With its partnership with EMC, VMware is all set to conquer the Indian Private Cloud market.
Type of Cloud: Private Cloud
Type of Service: IaaS
Key Offerings: VSphere

IV. CONCLUSIONS

Cloud computing can significantly reduce the cost and complexity of owning and operating computers and networks. If an organization uses a cloud provider, it doesnot need to spend money on information technology infrastructure, or buy hardware or software licences. Cloud services can often be customized and flexible to use, and providers can offer advanced services that an individual company might not have the money or expertise to develop..

Some of benefits from cloud computing:
- Reduce capital and/or operating costs
- Simplify software management
- Improve service levels
- Enable business process improvement
- Pay As you Go.
- Speed implementation
- 24*7/avaialibilty across geographical locations.
- Reduced cost
- Reduced maintainence.

Some of the challenges in cloud computing :
- Ensuring adequate performance.: The inherent limitations of the Internet apply to cloud computing. These performance limitations can take the form of delays caused by demand and traffic spikes, slowdowns caused by malicious traffic/attacks, and last mile performance issues, among others.
- Ensuring adequate security :Many cloud-based applications involve confidential data and personal information. Therefore, one of the key barriers cloud providers have had to overcome is the perception that cloud-based services are less secure than desktop-based or datacenter-based services

- Ensuring the costs of cloud computing remain competitive.

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