Uncloud the Cloud of Cloud Computing

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***Abstract* - Cloud Computing has become a scalable service consumption and delivery platform in the modern IT infrastructure. Cloud Computing is a style of computing which must cater to the following computing needs: Dynamism, Abstraction and Resource Sharing. In this paper, architecture, types of cloud, barriers to cloud, and creating an instance in Amazon has been discussed. Besides, the usage of Traditional Enterprise Datacenter Utilization, Virtualized Enterprise Datacenter Utilization and Cloud Enterprise Datacenter Utilization are compared.**

***Keywords* - Cloud Computing, Dynamism, data center, cloud types**

I. INTRODUCTION

Cloud Computing is the fifth generation of computing after Mainframe, Personal Computer, Client-Server Computing and Web. Cloud computing is relatively a new technology that changes the way IT services are delivered to the organizations[1][2]. This platform supports redundant, self-recovering and highly scalable programming models that allow workloads to recover from many inevitable hardware/software failures. It is the fastest growing part of IT.

Characteristics of cloud includes but not limited to accessibility, agility, flexibility, capacity, elasticity, resource pooling, on-demand self service, user metering, virtualization, multi-tenancy, shifts from CapEx to OpEx, tremendous cost cutting, improved automation, focus on core competency and physical consolidation.

Fig 1.0 Cloud Computing – An Overview

II. CLOUD COMPUTING ARCHITECTURE

The cloud computing architecture leverages the benefit of the Service models SaaS, PaaS and IaaS.

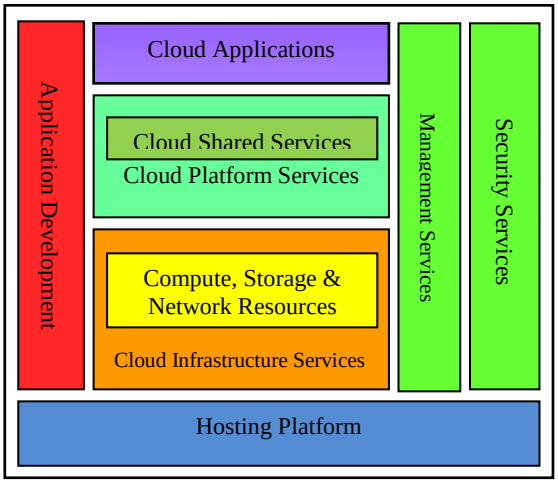

Fig 1.1 Cloud Computing – Architecture

One can develop, deploy and manage applications in an internet-accessible virtual environment without the necessary hardware, software, storage and networking resources[3].It allows paying only for the time, resources, and capacity used while scaling up to accommodate the changing business needs.

Different cloud architectures exist such as Open Stack from Rackspace Hosting and NASA, Windows Azure from Microsoft, where as Google and Amazon have their own architectures. Most of the Open Source clouds are based on those parts of Amazon and Xen for cloud architecture.

III. TYPES OF CLOUD

The classification of Cloud computing is based on either the location of cloud computing or the types of service offered.

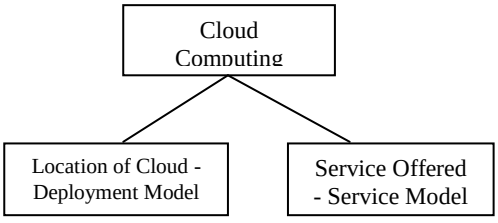

Fig 1.2 Cloud Computing – Classification

A. Deployment Models

The classification based on the location of cloud computing has four deployment models.

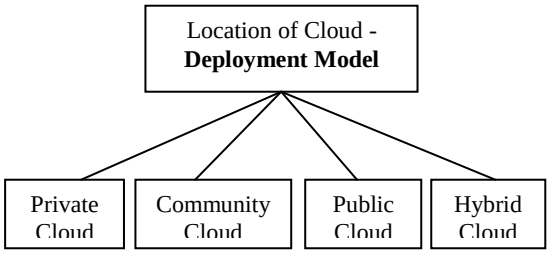

Fig 1.3 Cloud Computing - Deployment Model

1. Private Clouds

The services and infrastructure are maintained on a private network for a specific organization. Private clouds may be off-premise or on-premise. These clouds offer the greatest level of security and control but require the organization to have the cloud exclusively for the organization. It could be purchased and maintained on their own or they can exclusively avail these from a thirty party vendor which makes this cloud very expensive. Example: eBay

2. Community Cloud

The services and infrastructure are provided to several organizations under a specific community that shares a common goal. This can be provided off-premise or on-premise. Example: Zimory, Rightscale

3. Public Cloud

The services and infrastructure are provided off-premise over the Internet to the public or a large group of industries. Example: Amazon, Google Apps

4. Hybrid Cloud

A hybrid cloud is an aggregation of two or more public, private and / or community cloud with multiple providers. Example: IBM, Juniper.

B. Service Model

The classification based on the services offered has three models namely SaaS, PaaS and IaaS.

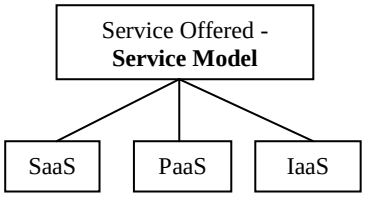

Fig 1.4 Cloud Computing - Service Model

1. SaaS:

Software as a Service (SaaS) is software that is deployed over the Internet, available to the end user as and when wanted. Hence, it's also known as "software on demand". Payment can either be as per usage on a subscription model or even free if advertisement is part of the equation. Examples: Google Docs, Salesforce.com, email cloud.

2. PaaS:

Platform as a Service (PaaS) is a combination of a development platform and a solution stack, delivered as a service on demand. It provides infrastructure on which software developers can build new applications or extend existing ones without the cost and complexity of buying and managing the underlying hardware and software and provisioning hosting capabilities. Examples: Google App Engine, Force.com

3. IaaS:

Infrastructure as a Service (IaaS) d**e**livers computer infrastructure – typically a platform virtualization environment – as a service. This includes servers, software, data-center space and network equipment, available in a single bundle and billed as per usage in a utility computing model. Examples: Amazon S3, SQL Azure

IV. DATA CENTER

The cornerstone of the cloud computing is the Data Center which provides infrastructure convergence and resource sharing over the internet. Data Center runs the applications that handle the core businesses and operational data of the organization [1] [4]. It includes resources such as servers, storage, networking, backup power supplies and redundant data communication connections to meet the demand of huge enterprises.

Data center requires billion dollars of investment, cooling management, high electricity consumption, disaster recovery and high safety measures to safeguard the data and IT resources.

V. COMPARISON OF DATA CENTER UTILIZATION

The data center utilization is considerably increased with cloud computing when compared to the traditional datacenter utilization and Virtualized Enterprise Datacenter Utilization.

The traditional enterprise data center utilization is often below 20 %.

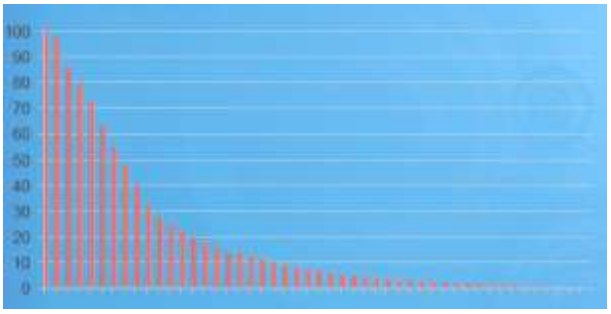

Fig 1.5 Traditional Enterprise Data Center Utilization

The virtualization significantly improves the average server utilization.

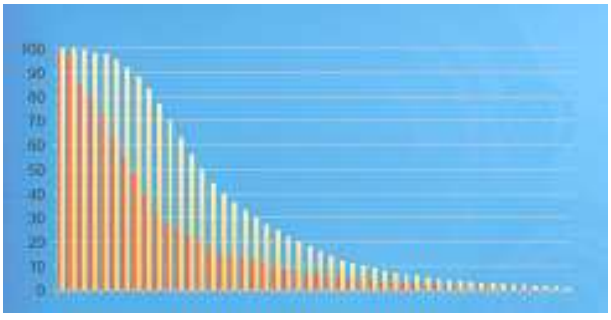

Fig 1.6 Virtualized Enterprise Data Center Utilization

The cloud computing further increases average server utilization.

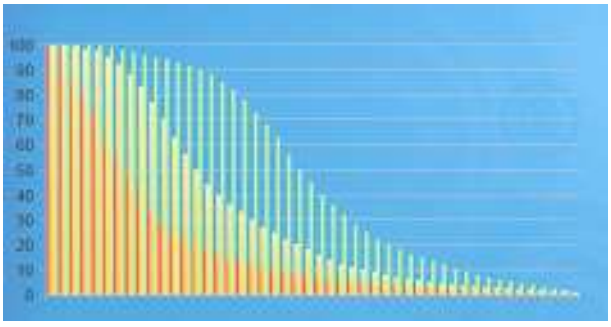

Fig 1.7 Cloud Enterprise Data Center Utilization

Traditional Enterprise Datacenter Utilization

Virtualized Enterprise Datacenter Utilization

Cloud Enterprise Datacenter Utilization

VI. Creating Instance Using Amazon

Following are the steps involved in the creation of instance using Amazon web services to avail the benefits of SaaS, PaaS and IaaS [8].

Step1: The website http://aws.amazon.com/ has to be opened and Sign up Now has to be clicked.

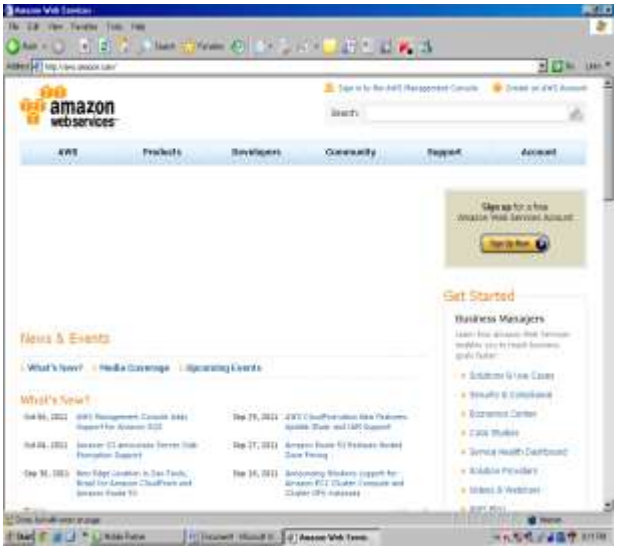

Fig 1.8 Logging in amazon.com

Step 2: As a new user the login credentials, contact information and credit card information for payment has to be given. Login will be created for the new user.

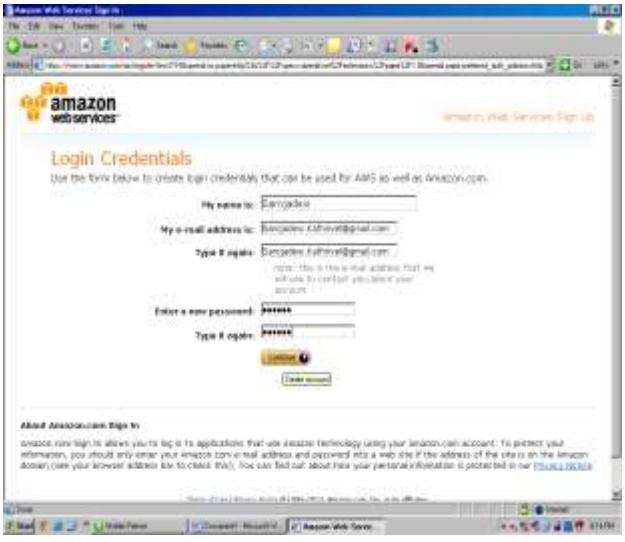

Fig 1.9 Login Credentials

Step 3: AWS Service pricing can be viewed and the required resource can be utilized for which one need to pay as they use.

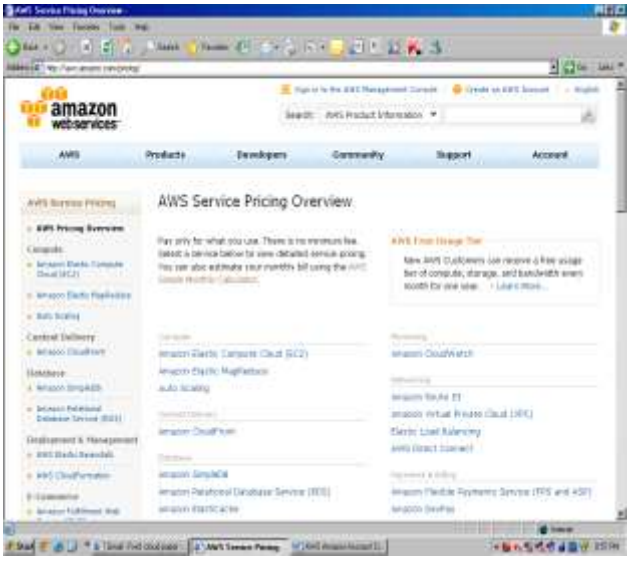

Fig 1.10 AWS Service Pricing Overview

VII. SERVICE PROVIDERS

Providing cloud services is an expensive one as it requires more infrastructures.

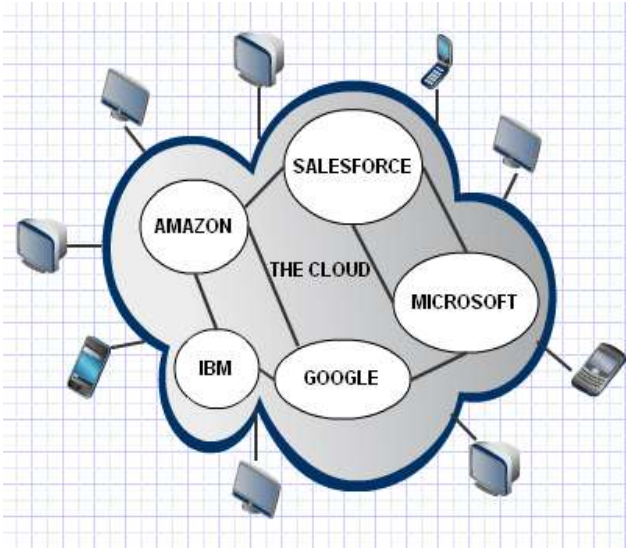

Fig 1.11 Cloud Computing Service Providers

Amazon, Salesforce, Google, Microsoft and IBM are the major cloud computing service providers. Following table gives the list of cloud computing service providers.

TABLE I
CLOUD COMPUTING SERVICE PROVIDERS

Cloud Computing Service Providers		
Google	Amazon	Microsoft
OrangeScape	Wolf Frameworks	RightScale
Cynapse India	eVapt	Joyent
Netmagic Solutions	Enomaly	IBM
Synage	GoGrid	NetSuite
Salesforce.com	ImpelCRM	3Tera
Rackspace	ReliaCloud	Kaavo
VMware	Intalio	EMC
AT&T	CloudSwitch	CloudWorks
Cloudscale	iCloud	Online Tech
Citrix	enStratus	Oxygen Cloud
Commensus	TeamWox	Layer7 Technologies
CloudSwitch	EazeWork	Proxios

VIII. BARRIERS IN CLOUD COMPUTING

As cloud computing is a new technology it has growing pains which are

- Only a handful of major players (Amazon, Microsoft, Google and IBM) can build the massive infrastructure required for data centers.
- Not many software written to take the advantage of cloud infrastructure.
- Many customers don't wish to trust their data to "the cloud". As the data is in motion some control over the data is lost. Data must be locally retained for regulatory reasons.
- The cloud can be many milliseconds away and it is not suitable for real-time applications.
- It is tough to switch from existing legacy applications. Equivalent cloud applications do not exist.

IX. FUTURE OF CLOUD COMPUTING

As the consumers of cloud computing requires only web browser and a minimal hardware it foster the development of more mobile applications and in future most of the PC applications will be replaced by mobile applications. More applications has to be written to reap the full benefits of cloud computing. High measures

have to be taken to provide security and to increase the reliability and applicability.

X. CONCLUSIONS

The concept of cloud computing and how virtualization enables it offers so many innovations but also presents new challenges. The innovation will continue and massive value will be created for customers over the coming years. Most technologists are sold on the fundamentals of cloud computing and it's a realization of the last twenty years of architecture development.

ACKNOWLEDGEMENT

We thank Radha R and the anonymous reviewers for the input and feedback to improve the quality of the paper.

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