Cloud Computing: Review

[1]Jijo S. Nair, [2]Mukesh Kumar
Dept. of Computer Science &InfoTech
MANIT-Bhopal

Abstract-
Cloud computing is the acclaimedword in Information Technology's world. It is becoming very famous day by day. It is the fifth generation of the internet. Cloud computing helps IT business to transform power of computing in a smart, efficient, high performance way to solicit with their business solution. In this paper we analyze and highlight the concept of the cloud computing like service model, virtue of cloud computing, contingency of cloud and application. This paper will help in better understanding of cloud computing and explain how it works. It also discusses the different application that use in computing model as a platform for execution

Introduction

Cloud is an extend of gridcomputing, distributed computing, and parallel computing where everything will be serve as service [1]. Information Technology is migrating to cloud computing as it is diminishing their capital investment, data center space and also helps them to concentrate mainly on their resource utilization activities as cloud computing provide resource as a service to their customers not as a product or software. The fundamental

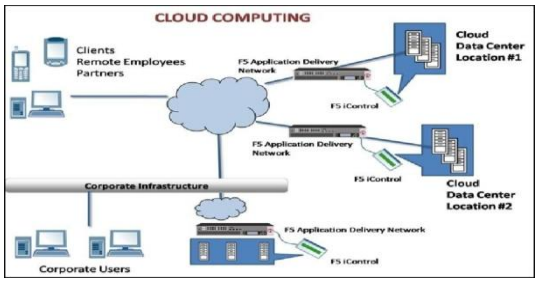

Fig - 1

Concept of cloud computing is that the computing is "in the cloud". It refers to accessing software and storing data in the "cloud" representation of the Internet or a network and using associated services [2]. Cloud computing is 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 service provider interaction.[3]. The Fig-1shows the basic cloud's diagram[10]. The basic idea of cloud computing is simple: centralized service organizations maintain and support IT services, freeing users from nearly all operational and administrative burdens These service organizations are often subdivided based on whether they provide software-as-a-service, platform-as-a-service, and infrastructures-a-service (Fig2), but their need for standards appears similar [4]. Cloud computing can have three types of clouds Public (not proprietary architecture subscribed by any organization), Private (proprietary architecture subscribed by an organization) and Hybrid Clouds (limited and well defined number of parties).

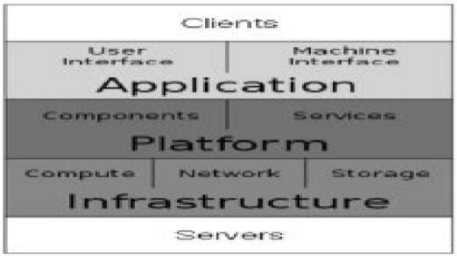

Fig - 2

Background

Cloud computing consists of three models namely software-as-a-service (SaaS), platform-as-a-service (PaaS), and Infrastructures-a-service (IaaS) (Fig 3).

(A) SaaS

It provides the client to use theapplication which is running on the cloud computing service provider infrastructure client have to

purchase only the license of the application required by him and service provider make available it to the client. Client can access those applications through network (browser, PDA). These applications are provided to the client on demand dynamically. High bandwidth is given to client so it starts rapidly and client does not need to worry about maintains and up gradations of its software.

(B) PaaS

PaaS layer lies between SaaS andIaaS. It eradicates the costs of buying, configuring, engineering the hardware and software needed for the customer application. PaaS development tools are loaded into the cloud and the customer can get those services from the PaaS vendor by availing services from the PaaS provider. the difference between SaaS and PaaS is that SaaS only hosts completed cloud applications whereas PaaS offers a development platform that hosts both completed and in-

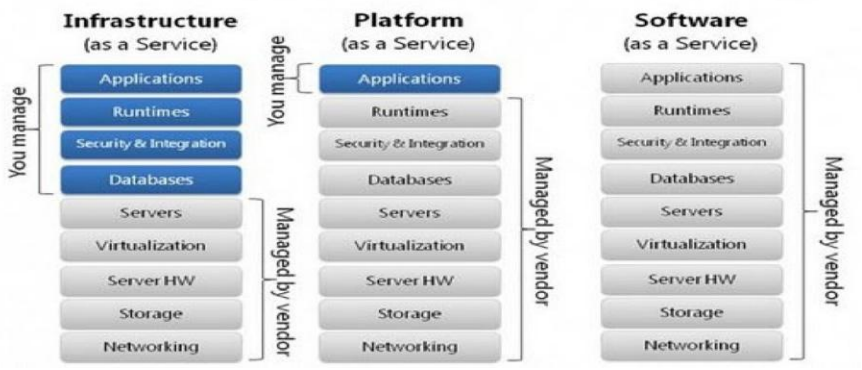

Fig.3

Progress cloud applications. This requires PaaS, in addition to supporting application hosting environment, to possess development infrastructure including programming environment, tools, configuration management, and so forth. An example of PaaS is Google AppEngine

(C) IaaS

Infrastructure as a service deliversbasic storage and compute capabilities as standardized services over the network [5]. IaaS is the base layer of cloud stack, it is also sometimes referred to as Hardware as a Service (HaaS). IaaS customer can use infrastructure such as storage, hardware, servers, networking components and other fundamental computing resources provided by IaaS vendors. IaaS is mostly preferred by customers as billing is done on hourly, monthly bases or as per the consumption of infrastructure by the company. Notice that this strategy is different from the multi-tenancy model, which aims to transform the application software architecture so that multiple instances (from multiple cloud consumers) can run on a single application (i.e. the same logic machine). An example of IaaS is Amazon's EC2 [6].

Cloud Computing Application

A famousone is Google application which offers email, calendar, document editing and more in the cloud. Even Microsoft, which arguably benefited most from local computing, is increasing its focus on cloud computing services now. The applications of cloud computing a limitless. With the right middleware, a cloud computing system could execute all the program a normal computer could run. Potentially, everything from generic word processing software to customized computer programs designed for a specific company could work on a cloud computing system.

Virtue of Cloud Computing Cloud computing technology having different characteristics to attract Info.Tech. Sector.

(1) Business benefit - Businesses can instantly obtain the benefits of the enormous infrastructure without having to implement and administer it directly.
(2) Scalability - Little s/w and h/w customization needed on the client end.
(3) Mobility of Information – Independent to the location.
(4) Increased Utilization - Pay only for what is used.
(5) Transparency of Costs - Usage can easily be metered and assigned back to users
(6) Low Maintenance - Traditional, resource intensive maintenance activities are shifted to the provider. Removes IT as a Bottleneck: Once contracts are established, users can purchase directly from providers without the need for IT intervention
(7) Conduit for Innovation - Providers continuously upgrade capabilities without the need for internal IT
(8) Potential for Increased Security - Providers can leverage state of the art tools, employ talented staff, and maintain

compliance with standards and regulations more effectively than individual IT shops
(9) Potential for Increased Reliability - Providers can spread their operations over multiple, redundant sites.
(10) Support for Remote Users - Cloud architecture easily accommodates off-campus users without client-side intervention
(11) Refocus on the Mission - IT staff can be focused on supporting the mission of the institution, rather than on installing and maintaining hardware and software.
(12) Rapid Start Up - On demand services allow customers to gain nearly instant access to services, increasing speed to value
(13) Lower Start up Costs - Customers don't need to purchase, install, and test hardware and software.
(14) Shifting Cost Model - Costs are shifted from capital expenses to operational expenses [7]

Contingency

The contingency of cloudcomputing includes the following:

1) Dynamic scalability - The compute nodes are scaled up and down dynamically by the application according to the response time of the user's queries. The scheduling delays involved are real concern which leads to the need of effective and dynamic load management system.
2) Multi-tenancy - When the number of applications running on the same compute node increases, it will reduce the amount of bandwidth allocated to each application which may lead to performance degradation.
3) Querying and access - Scalable provenance querying and secure access of provenance information are open problems for both grid and cloud environment.
4) Standardization - As every organization has their own APIs and protocols used which makes the user data or vendor lock-in. Thus integration and interoperability of all the services and application is a challenge.
5) Reliability and fault-tolerance - Tools for testing the application against fault tolerance and compute failures are required which help in developing a reliable system.
6) Debugging and profiling - Parallel and remote debugging has always been a problem for developing HPC programs and is an issue in cloud computing also.
7) Security and Privacy - The user has no idea where data is stored and who will use it as there are more hackers than developers.
8) Power - Though cloud computing offers many type of services finally to meet the needs of users, enormous amount of power is consumed. An autonomic energy aware resource management is very much required [8].

Conclusion and Future work

In this paper we have describe cloud computing and its services, quality, advantages and we found that cloud computing is beneficial, convenient and economical for the IT industry. But still few company have some fear to adopt cloud due to some threats like lock-in so future work is exploring the security challenges. The future scope of cloud

1-Trend of Large Vendors Entering Cloud Computing Will Accelerate
2- All Major IDEs Will Offer Cloud Deployment Options
3- Platform-as-a-Service Will Take Its First Steps into the Mainstream
4- A Next-Generation of "Middleware for the Cloud" will Rise in dominance over Traditional J2EE Application Servers
5- System Administration & Configuration and Network Management Will Become a Sexy Field Bursting with Innovation [9].

References

[1] Sameer Rajan, ApurvaJairath "Cloud Computing: The Fifth generation of Computing" 2011 International Conference on Communication Systems and Network Technologies.
[2] M.Malathi"Cloud Computing Concepts". [3]http://csrc.nist.gov/groups/SNS/cloud-computing/cloud-computingv25.ppt.
[4] Nathaniel Borenstein and James Blake "Cloud Computing Standards".
[5] PeeyushMathur, Nikhil Nishchal "Cloud Computing: New challenge to the entire computer industry" 2010 1st International Conference on Parallel, Distributed and Grid Computing
[6] Tharam Dillon, Chen Wu and Elizabeth Chang "Cloud Computing: Issues and Challenges" 2010 24th IEEE International Conference on Advanced Information Networking and Applications [7]www.nercomp.org/data/media/Cloud%20Overview1.pdf John Voloudakis.
[8] NaidilaSadashiv, S. M Dilip Kumar "Cluster, Grid and Cloud Computing: A DetailedComparison" The 6th International Conference on Computer Science & Education (ICCSE 2011) August 3-5, 2011. SuperStar Virgo, Singapore
[9] GEV APERRY, GM of Cloud Computing, Giga Spaces. [10]http://devcentral.f5.com/weblogs/macvittie/archive/2008/11/03/cloud-computing-its-the-destination-not-the-journey-that-is.aspx