International Journal of Research in Engineering, Science and Management
Volume-1, Issue-5, May 2018
www.ijresm.com

Recent Case Study on Cloud Computing and Cloud Deployment Strategies

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***Abstract*—Cloud computing is the delivery of computing services, servers, storage, databases, networking, software, analytics and more over the Internet ("the cloud"). Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage, similar to how you are billed for water or electricity at home. Cloud computing is a new computational model which is primarily based on grid computing. Cloud computing are often outlined as a computing surroundings wherever computing wants by one party are often outsourced to a different party and once would like be arise to use the computing power or resources like information or emails, they will access them via web. This paper is for anyone who will have recently detected regarding cloud computing and desires to grasp a lot of regarding cloud computing. During this paper, we described Cloud Computing, Characteristics of Cloud Computing, and different Services and Deployment model of Cloud Computing.**

Index Terms—cloud computing, cloud deployment strategies, cloud services,

I. Introduction

This section gives an introduction to Cloud computing. Cloud Computing provides a surroundings for resource sharing in terms of ascendance frameworks, middleware's and application development platforms, and business applications.

The operation models of cloud computing grasp free infrastructure services with value another platform services, subscription-based infrastructure services with supplemental application services, and free services for sellers but sharing of revenues generated from shoppers [1].

Cloud computing has emerged as a popular solution to provide cheap and easy access to externalized IT (Information Technology) resources. An increasing number of organizations (e.g., research centers, enterprises) benefit from Cloud computing to host their applications.

Through virtualization, Cloud computing is able to address with the same physical infrastructure a large client base with different computational needs. In contrast to previous paradigms (Clusters and Grid computing), Cloud computing is not application-oriented but service-oriented.

It offers on demand virtualized resources as measurable and billable utilities the remainder of this paper deals with characteristics, opportunities, issues and challenges of cloud Computing. At the end we discuss about the future scope of Cloud.

The term Cloud Computing has been out lined in some ways by analyst corporations, academics, business practitioners and IT corporations. Clouds is an oversized pool of simply usable and accessible virtualized resources. These resources may be dynamically reconfigured to regulate to a variable load (scale), permitting additionally for an optimum resource utilization.

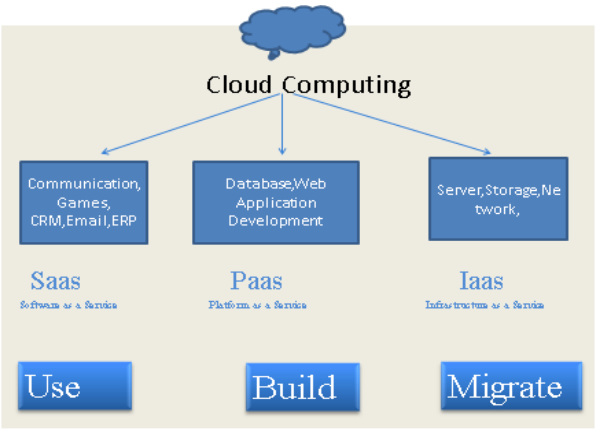

Fig. 1. Cloud computing

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 [2].

In this paper explores 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.

A. Essential Characteristics

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

1. 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 with each service's provider.

2. Broad network access Capabilities: These 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).

3. Resource pooling: The provider's computing resources are pooled to serve multiple consumers using a multi-tenant model, with different physical and virtual resources dynamically assigned .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.

4. Rapid elasticity capabilities: It 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.

5. 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 [3].

B. Uses of Cloud Computing

You are probably using cloud computing right now, even if you don't realize it. If you use an online service to send email, edit documents, watch movies or TV, listen to music, play games or store pictures and other files, it is likely that cloud computing is making it all possible behind the scenes. The first cloud computing services are barely a decade old, but already a variety of organizations from tiny start-ups to global corporations, government agencies to non-profits are embracing the technology for all sorts of reasons.

Here are a few of the things you can do with the cloud:

- Create new apps and services
- Store, back up and recover data
- Host websites and blogs
- Stream audio and video
- Deliver software on demand
- Analyze data for patterns and make predictions.

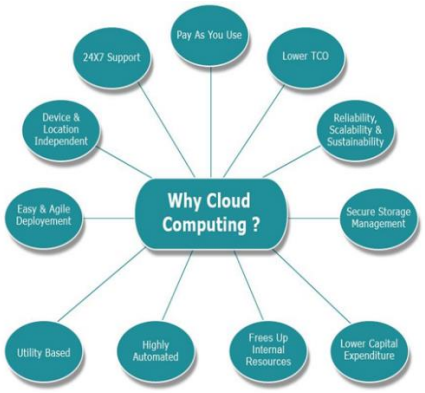

Fig. 2. Why cloud computing

Cloud computing is a big shift from the traditional way businesses thinking about IT resources. Here are 6 common reasons organizations are turning to cloud computing services:

Cost: Cloud computing eliminates the capital expense of buying hardware and software and setting up and running on-site datacenters—the racks of servers, the round-the-clock electricity for power and cooling, the IT experts for managing the infrastructure. It adds up fast.

Speed: Most cloud computing services are provided self service and on demand, so even vast amounts of computing resources can be provisioned in minutes, typically with just a few mouse clicks, giving businesses a lot of flexibility and taking the pressure off capacity planning.

Global scale: The benefits of cloud computing services include the ability to scale elastically. In cloud speak, that means delivering the right amount of IT resources—for example, more or less computing power, storage, bandwidth—right when its needed and from the right geographic location[4].

Productivity: On-site datacenters typically require a lot of "racking and stacking"—hardware set up, software patching and other time-consuming IT management chores. Cloud computing removes the need for many of these tasks, so IT teams can spend time on achieving more important business goals.

Performance: The biggest cloud computing services run on a worldwide network of secure datacenters, which are regularly upgraded to the latest generation of fast and efficient computing hardware. This offers several benefits over a single corporate datacenter, including reduced network latency for applications and greater economies of scale [10].

Reliability: Cloud computing makes data backup, disaster recovery and business continuity easier and less expensive, because data can be mirrored at multiple redundant sites on the cloud provider's network.

II. Types of Cloud Services: IaaS, PaaS, SaaS

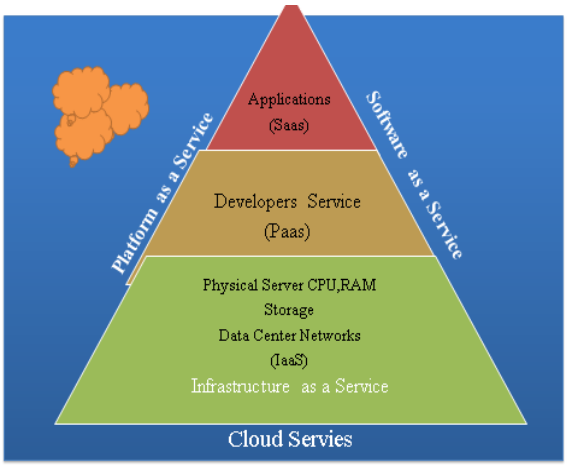

Fig. 3. Cloud services

Most cloud computing services fall into three broad categories: infrastructure as a service (IaaS), platform as a service (PaaS) and software as a service (Saas). These are sometimes called the cloud computing stack, because they build on top of one another. Knowing what they are and how they are different makes it easier to accomplish your business goals.

A. Infrastructure as a Service (IaaS)

The most basic category of cloud computing services. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems—from a cloud provider on a pay-as-you-go basis.

IaaS is easily used for Website hosting, where a web server and operating system stack are put on VM's, where they can easily take advantage of cloud features such as easy scaling, global availability, managed environment, geographical load balancing, special content delivery front-end or infrastructure Disaster Recovery preparedness, where a running server snapshot is made (including in memory image) which can be reconstituted in the event of a disaster Test and Development where easy to create VM's can be used eliminating the need for creating test environment which may require complex infrastructure for testing new products under stress load. Actually any kind of Short-term collaborative projects, requiring a lab on demand.

B. Platform as a Service (PaaS)

Platform-as-a-service (PaaS) refers to cloud computing services that supply an on-demand environment for developing, testing, delivering and managing software applications. PaaS is designed to make it easier for developers to quickly create web or mobile apps, without worrying about setting up or managing the underlying infrastructure of servers, storage, network and databases needed for development [8].

C. Software as a Service (SaaS)

Software-as-a-service (SaaS) is a method for delivering software applications over the Internet, on demand and typically on a subscription basis. With SaaS, cloud providers host and manage the software application and underlying infrastructure and handle any maintenance, like software upgrades and security patching. Users connect to the application over the Internet, usually with a web browser on their phone, tablet or PC.

III. Cloud Deployment Services

Types of cloud deployments: public, private, hybrid. Not all clouds are the same. There are three different ways to deploy cloud computing resources: public cloud, private cloud and hybrid cloud. This section explains the basic cloud deployment strategies.

A cloud can be deployed using any of the below mentioned strategies.

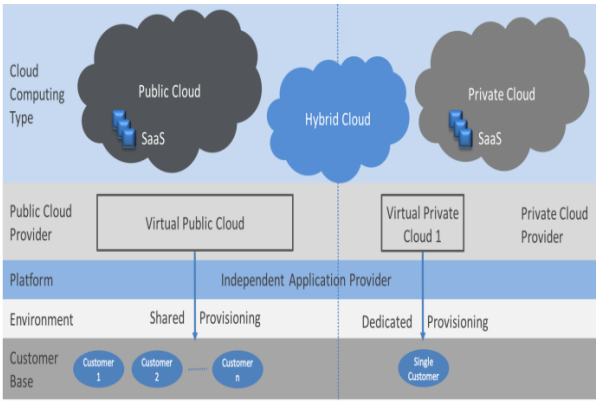

Fig. 4. Cloud deployment strategies

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.

Fig. 5. Public cloud

Public clouds are owned and operated by a third-party cloud service provider, which deliver their computing resources like servers and storage over the Internet. Microsoft Azure is an example of a public cloud. With a public cloud, all hardware, software and other supporting infrastructure is owned and managed by the cloud provider. You access these services and manage your account using a web browser.

B. Private Cloud

A private cloud refers to cloud computing resources used exclusively by a single business or organization. A private cloud can be physically located on the company's on-site datacenter. Some companies also pay third-party service providers to host their private cloud. A private cloud is one in which the services and infrastructure are maintained on a private network.

Private clouds are a choice for companies that already own datacenter and developed IT infrastructure and have particular needs around security or performance. They are a better choice for the company datacenter than Legacy servers in so many ways, bringing many benefits derived from virtualization and automation. However they also provide Challenges and disadvantages, mostly in that the enterprise needs to migrate or re-factor applications to take advantage of the Cloud automation [7].

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.

Private clouds will be chosen if there is a requirement for High data I/O and low network latency: disk intensive processes, wide sensor network, or process control. There are Legacy applications and in some cases special equipment requirements. There are Specialty hardware or configuration requirements, e.g. VM with 32+GB for in-memory data processing and governance or regulatory requirements.

Fig. 6. Private cloud

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. Hybrid Cloud

Hybrid clouds combine public and private clouds, bound together by technology that allows data and applications to be shared between them. By allowing data and applications to move between private and public clouds, hybrid cloud gives businesses greater flexibility and more deployment options.

Use cases for Hybrid clouds covers where a company combines both private and public clouds. For example, the Private cloud hosts regular workload and master processes, also security and compliance critical applications/tasks. The Public cloud hosts non-critical and not regular but computing intensive workload. This scenario requires compatibility between private and public cloud platforms. Hybrid cloud supports the notion of Cloud bursting – term widely used by businesses to describe a situation when workload is temporarily migrated to cloud, extending and replicating the private cloud resources and VMs (using formula "buy the base, rent a spike").

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 [11].

D. 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.

Fig. 7. Community cloud

IV. Future Scope

The issues that are highlighted in this paper will be a hot spot for researchers in future. Now a day cloud computing plays an important role in internet era due to the successive mobile applications. Cloud computing becomes more important because it is the ultimate solutions for mobile application.

Cloud computing opens a new era for computing technology presently there are various web services through the different clouds some notable services are, Amazon web services, elastic compute cloud, Google cloud (dope box).Areas like Iaas, Public cloud will be the major research topics.

V. Conclusion

In this paper we have looked at the basics of cloud. From a technology point of view, there are interesting technical problems to solve. Cloud systems have become very cost effective, comparatively, and also have been able to scale much larger sizes than any of the biggest grids or supercomputers. As a result, scientists and researchers have been experimenting with using clouds as a platform for high performance computing.

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