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A Survey on Scalability in Cloud Computing

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***Abstract*—** Cloud computing is a new paradigm that offers several advantages in terms of scalability, maintainability, high availability, efficiency and data processing. Cloud computing is a technique that has a great capabilities and benefits for users. Cloud characteristics encourage many organizations to move to this technology. But many consideration faces transmission process. This paper outline some of these considerations and considerable efforts solved cloud scalability Issues.

Keywords— Cloud Computing, Scalability, Vertical & Horizontal Scalability, Cloud Store.

I. Introduction

Cloud Computing aim to power the next-generation datacenter as the enabling platform for dynamic and flexible application provisioning [1].

Cloud Store is a free and open implementation of a typical web application, with some inherent scalability and performance issues related to the relational database.

The goal of Cloud Store is to serve as a relevant and standardized baseline to measure and compare different cloud providers, architectures and deployment in terms of capacity, scalability, elasticity and efficiency.

Cloud systems can be served on three different levels [3]. The first of these is Infrastructure as a Service(IaaS), which means offering hardware, storage and physical devices over the Internet. The second layer is Software as a Service (SaaS), which means offering software and hosted applications over the Internet.

Then, combining both of these, there is Platform as a Service (PaaS), which means offering the capability to deploy applications created using programming languages, libraries, services, and tools supported by the provider.

This paper surveys the area of Scalability in Cloud Computing, Cloud Scalability Types and Cloud Store.
The fig.1 below represents the sample architecture of the cloud computing.

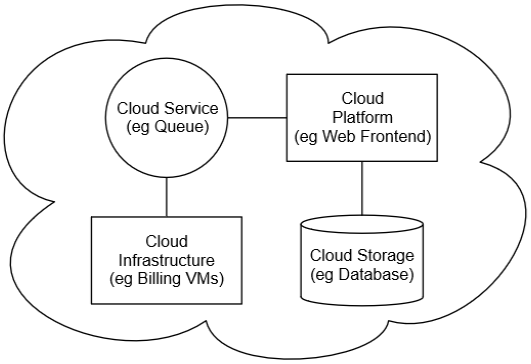

Figure: 1 Sample Architecture of the Cloud Computing

1.1 Cloud – Advantages

The use of cloud computing has significant advantages such as

- Cost reduction
- Great storage capacity
- Scalability
- Needless software installation and maintenance
- Accessibility of on-demand services or
- Applications from anywhere
- Elasticity and
- Pay-as-you-go model and energy saving.

II. Literature Survey

2.1 Layers

Once an internet protocol connection is established among several computers, it is possible to share services within any one of the following layers represented in fig2.

a) Client

Users access cloud computing using networked client devices, such as desktop computers, laptops, tablets and smart phones. Some of these devices - cloud clients - rely on cloud computing for all or a majority of their applications so as to be essentially useless without it. Examples are thin clients and the browser-based Chrome book.

b) Application

A cloud application is software provided as a service. It consists of the following: a package of interrelated tasks, the definition of these tasks, and the configuration files, which contain dynamic information about tasks at run-time.

c) Platform

Cloud platform services, also known as platform as a service (PaaS), deliver a computing platform and/or solution stack as a service, often consuming cloud infrastructure and sustaining cloud applications.

d) Infrastructure

Cloud infrastructure services, also known as "infrastructure as a service" (IaaS), deliver computer infrastructure – typically a platform virtualization environment – as a service, along with raw (block) storage and networking.

e) Server

The Layers contain both hardware and software; these are the layers on the server. Products that are specifically designed for the delivery of cloud services, including multi-core processors, cloud specific operating systems and combined offerings.

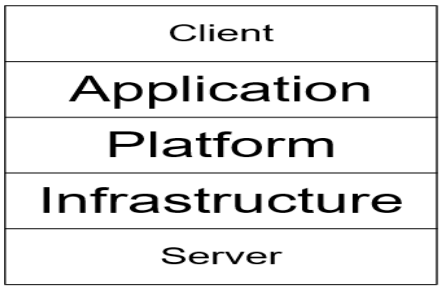

Figure 2: Layers in cloud

2.2 Cloud Scalability Issues

As cloud advantage, Cloud Computing is a scalable and easy way for users to access a large pool of virtualized resources that can be dynamically provisioned to adjust to a variable workload. But first, it is useful to define scalability term and illustrate cloud scalability among three cloud services.

'Scalability' can be defined in different ways. It can define as [3] "the ability of a particular system to fit a problem as the scope of that problem increases (number of elements or objects, growing volumes of work and/or being susceptible to enlargement)." Also can defined as [2] "Scalability of service is a desirable property of a service which provides an ability to handle growing amounts of service loads without suffering significant degradation in relevant quality attributes.

The scalability enhanced by scalability assuring schemes such as adding various resources should be proportional to the cost to apply the schemes." Another definition state that [4] "Scalability is the ability of an application to be scaled up to meet demand through replication and distribution of requests across a pool or farm of servers."

2.3 Cloud Scalability Types

2.3.1. Horizontal Scalability (Scaling out):

Horizontal cloud scalability is the ability of the system or resources to connect multiple hardware or software entities, such as servers or networks so that they work as a one logical unit. It means adding more individual units of resource doing the same job.

2.3.2. Vertical cloud scalability:

Vertical scalability is the ability to increase the capacity of existing single hardware or software by adding more resources to the same server or hardware.
For example, adding processing power to a server to make it faster.

2.4 Cloud Store

Cloud Store was the need for an open application to demonstrate the scalability tools of the Cloud Scale project, Cloud Store can equally well be used for comparing (benchmarking) different cloud and platform providers (Amazon, Google, Microsoft, and private clouds). Benchmarking is generally costly. A standardized service like Cloud Store may reduce such costs.

III. Problem Statement

3. Scalability Levels

Scalability is one of the major advantages of the cloud paradigm. More specifically, it is the advantage that distinguishes clouds from advanced outsourcing solutions. However, some important pending issues must be addressed before the dream of automated scaling of applications can be realized. The most notable initiatives towards whole application scalability in cloud environments are as follow [5]

3.1. Server Scalability

Most available Infrastructure as a Service (IaaS) clouds work with individual Virtual Machine(VM) management primitives—such as elements for adding or removing VMs—but lack mechanisms for treating applications as single entities or for managing relationships among application components. For example, relationships between VMs are often not considered, ordered deployment of VMs containing software for different tiers of an application is not automated.

3.2. Scaling of the Network

Networking over virtualized resources is typically done in two different ways: Ethernet virtualization and overlay networks and TCP/IP virtualization. Separation of user traffic is not enough for complete application scalability: the need to scale the network arises in consolidated data centers that host several VMs per physical machine. Scalability is often achieved by over provisioning resources to meet this increased demand.

3.3. Scaling of the Platform

IaaS clouds give application providers a convenient way to control the resources used by their systems. However, IaaS clouds require that the application developers or system administrators install and configure the entire software stack that the application components need. In contrast, Platform as a Service (PaaS) clouds offer ready-to-use execution environments and convenient services for applications.

Therefore, when using PaaS clouds, developers can focus on programming their components rather than on setting up the environments that the components require. However, because PaaS clouds may experience high usage PaaS providers must be able to scale execution environments accordingly.

IV. Conclusion

In this paper, we have studied several approaches to Scalability in cloud computing. Cloud computing is a recent technology trending that help companies in providing their services in a scalable manner. Hence, used this service capabilities required many procedures in order to get better performance.

This paper is discussed various sections, Introduction of cloud computing, Literature survey and problem statement. The main purpose of this work is to study the recent research done on cloud as well as to solve the Scalability Levels faced by the data owners. By this Survey We conclude that much research has been done to services offered and whole attention is being given to the most advantages feature of cloud computing paradigm i.e. Scalability Levels and its types in cloud.

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