Research on Cloud Computing

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ABSTRACT

This paper is an introduction to the terms, characteristics, and services associated with network-based computing, commonly referred to as cloud computing. Cloud Computing is a technology that uses the network and central remote servers to maintain data and applications. Cloud computing allows consumers and businesses to use applications without installation and access their personal files at any computer with network access. This technology allows for much more efficient computing by centralizing data storage, processing and bandwidth. The primary business service models being deployed (such as software, platform, and infrastructure as a service) and common deployment models employed by service providers and users to use and maintain the cloud services (such as the private, public, community, and hybrid clouds) are discussed.

KEYWORDS: *Architecture, Shared infrastructure, Network access, managed metering, Service models, Deployment models, Software as a Service (SAAS), Platform as a Service (PAAS), and Infrastructure as a Service (IAAS).*

I. INTRODUCTION

Cloud computing describes the approach, abstracted IT infrastructures (computing capacity, data storage, network capacity, or even finished software) dynamically adapted to the needs of a network to provide. From the user point of view, provided abstracted IT infrastructure seems distant and obscure, hidden in a "cloud" to happen. Supply and utilization of these services take place exclusively via defined technical interfaces and protocols. The range of cloud computing as part of services offered covers the complete spectrum of information technology and includes, among other things, infrastructure (such as processing power, disk space), platforms and software. In simplified terms one can follow the concept can be described as: A part of the IT environment (in this context, such as hardware such as data center, data storage and software) is on the user side not operated or be provided locally, but with one or more providers hired as a service usually located geographically far away. The applications and data are no longer on the local machine or in the corporate data center, but in the (metaphorical) cloud. The design element of an abstract outline of clouds in network diagrams often used to represent an unspecified part of the Internet.

The access to the remote systems of a network, such as that of the Internet is in use. But there are also companies in the context of so-called private clouds, where provision of a corporate intranet is done. Most providers of cloud solutions leverage the pooling effects that arise from the sharing of resources for their business model.

II. ARCHITECTURE

Cloud reference architecture model, which portrays the architectural layers, connected via APIs and repositories. If we study the framework more closely, the following aspects can be articulated. At the foundation of this framework is the data center technology architecture, which consists of three salient blocks of network, compute, and storage. This layer hosts all the services that are delivered to a cloud consumer or subscriber. This layer will be discussed in more detail in later sections of this paper. The next important layer is the security layer. The key takeaway in this layer is that security is blanketed as an end-to-end architecture across all aspects of the framework. Security is considered as one of the key challenges to be solved in a cloud framework; hence, it has to be accounted for in a comprehensive sense. This layer will be discussed in more detail in later sections of this paper.

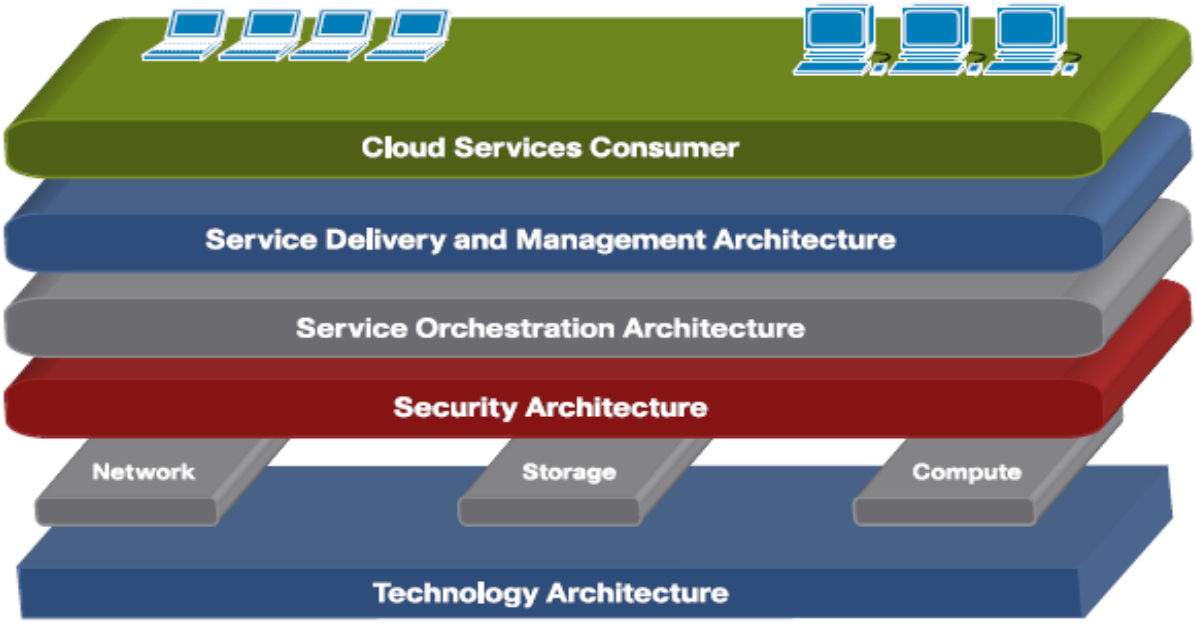

Fig1. Cloud Reference Architecture Framework

Following the technology and security layer is the Service Orchestration layer, which is implemented with configuration repository enablers. The configuration repository stores key information such as service catalogue, asset inventory, and resource-to-service mappings. This layer is an important layer because it maps the technology components to the service components and serves as a reference point during service provisioning. The service orchestration layer is the "glue" that integrates the lower layers to create a service for delivery.The next layer is also where infrastructure and service management function take place.The topmost layer is the consumer-facing layer, usually exposed via a portal-like solution.This is the layer where service is defined, requested, and managed by the consumer.

Let's walk through a use case scenario where this framework is utilized.

1 Consumer logs on to a cloud portal and verifies/updates credentials and information.
2 Based on the consumer entitlement, a selected a set of services are identified and presented for definition.
3 The end user selects the service for consumptions and triggers a service-provisioning request.
4 Resources are marked as reserved for service, and a new request is created for services provisioning.
5 The individual domains of compute, network, and storage are configured and provisioned, with requested security and service-level agreements (SLAs), for service delivery.

III. CHARACTERISTICS

Cloud computing has a variety of characteristics, with the main ones being.

3.1 Shared Infrastructure

Shared infrastructure uses a virtualized software model, enabling the sharing of physical services, storage, and networking capabilities. The cloud infrastructure, regardless of deployment model, seeks to make the most of the available infrastructure across a number of users.

3.2 Dynamic Provisioning

Dynamic provisioning allows for the provision of services based on current demand requirements. This is done automatically Using software automation, enabling the expansion and contraction of service capability, as needed. This dynamic scaling needs to be done while maintaining high levels of reliability and security.

3.3 Network Access

Network access needs to be accessed across the internet from a broad range of devices such as PCs, laptops, and mobile devices, using standards-based APIs (for example, ones based on HTTP). Deployments of services in the cloud include everything from using business applications to the latest application on the newest smart phones.

3.4 Managed Metering

Managed metering uses metering for managing and optimizing the service and to provide reporting and billing information. In this way, consumers are billed for services according to how much they have actually used during the billing period. In short, cloud computing allows for the sharing and scalable deployment of services, as needed, from almost any location, and for which the customer can be billed based on actual usage.

IV. SERVICE MODELS

Cloud computing refers to both the applications delivered as services over the Internet and the hardware and systems software in the data centers that provide those services. The services themselves have long been referred to as Software as a Service (SaaS). Some vendors use terms such as IaaS (Infrastructure as a Service) and PaaS (Platform as a Service) to describe their products, but we eschew these because accepted definitions for them still vary widely.

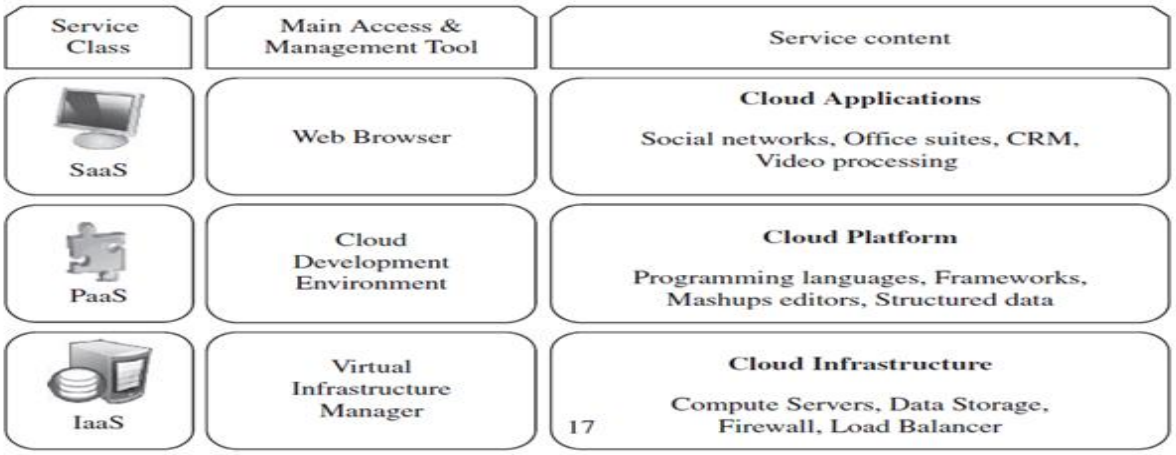

Fig2. The cloud computing stack

Once a cloud is established, how its cloud computing services are deployed in terms of business models can differ depending on requirements. The primary service models being deployed (see Figure 2) are commonly known as.

4.1 Software as a Service (SaaS)

Consumers purchase the ability to access and use an application or service that is hosted in the cloud. A benchmark example of this is Salesforce.com, as discussed previously, where necessary information for the interaction between the consumer and the service is hosted as part of the service in the cloud. Also, Microsoft is expanding its involvement in this area, and as part of the cloud computing option for Microsoft Office 2010, its Office Web Apps are available to Office volume licensing customers and Office Web App subscriptions through its cloud-based on-line services.

4.2 Platform as a Service (PaaS)

Consumers purchase access to the platforms, enabling them to deploy their own software and applications in the cloud. The operating systems and network access are not managed by the consumer, and there might be constraints as to which applications can be deployed.

4.3 Infrastructure as a Service (IaaS)

Consumers control and manage the systems in terms of the operating systems, applications, storage, and network connectivity, but they do not control the cloud infrastructure. Also known are the various subsets of these models that may be related to a particular industry or market. Communications as a Service (CaaS) is one

such subset model used to describe hosted IP telephony services. Along with the move to CaaS is a shift to more IP-centric communications and more SIP trucking deployments. With IP and SIP in place, it can be as easy to have the PBX in the cloud as it is to have it on the premise. In this context, CaaS could be seen as a subset of SaaS.

V. DEPLOYMENT MODELS

Deploying cloud computing can differ depending on requirements, and the following four deployment models have been identified, each with specific characteristics that support the needs of the services and users of the clouds in particular ways. Although cloud computing has emerged mainly from the appearance of public computing utilities, other deployment models, with variations in physical location and distribution, have been adopted. In this sense, regardless of its service class, a cloud can be classified as public, private, community, or hybrid based on model of deployment as shown in Figure

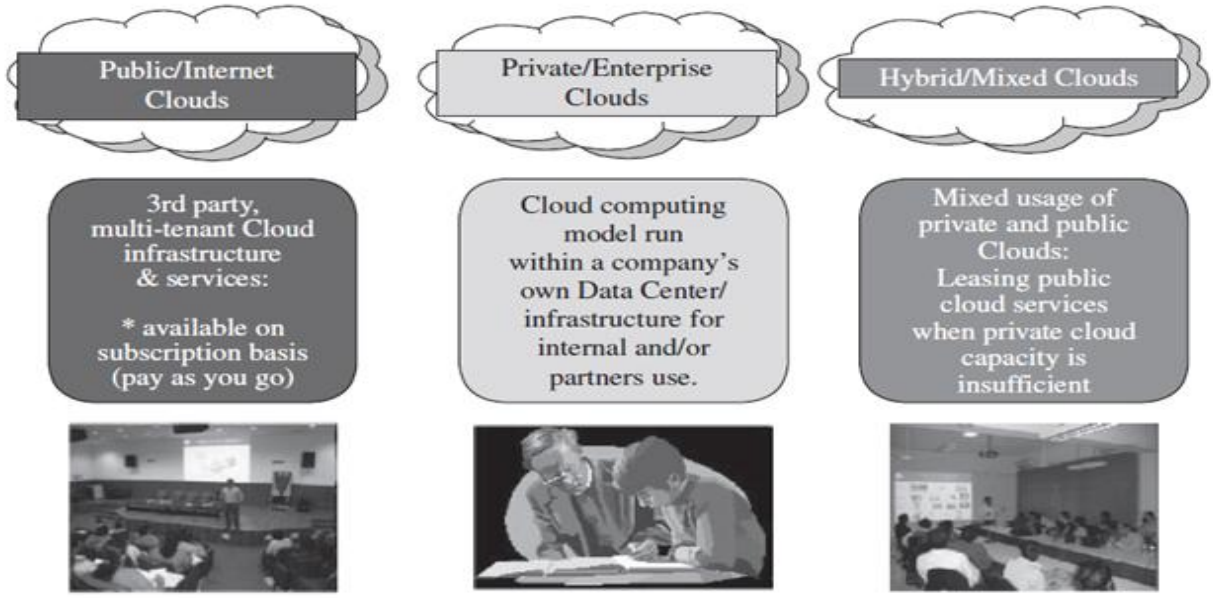

Fig3. Types of clouds based on deployment models.

5.1 Private Cloud

The cloud infrastructure has been deployed, and is maintained and operated for a specific organization. The operation may be in-house or with a third party on the premises.

5.2 Public Cloud

The cloud infrastructure is available to the public on a commercial basis by a cloud service provider. This enables a consumer to develop and deploy a service in the cloud with very little financial outlay compared to the capital expenditure requirements normally associated with other deployment options.

5.3 Hybrid Cloud

The cloud infrastructure consists of a number of clouds of any type, but the clouds have the ability through their interfaces to allow data and/or applications to be moved from one cloud to another. This can be a combination of private and public clouds that support the requirement to retain some data in an organization, and also the need to offer services in the cloud.

VI. UNDERLYING TECHNOLOGIES

Virtualization, Clustering and Grid computing are simply some types of underlying technologies for implementing cloud computing.

6.1 Virtualization

Internet, it is a large collection of networks where resources are globally networked, In internet cloud computing plays a major role In order to share the data and one of the important technology in the cloud computing is virtualization. Mainly it is used to maintain the collection IT resources which are used by the cloud

providers. The main aim of the virtualization is ability to run the multiple operating systems on a single machine buy sharing all the resources that belong to the hard ware. In this paper our main goal is to provide the basic knowledge about the virtualization technology in cloud computing and how it acts in the cloud computing environment. And we also discuss about, how to maintain the virtualized environment with the optimized resources.

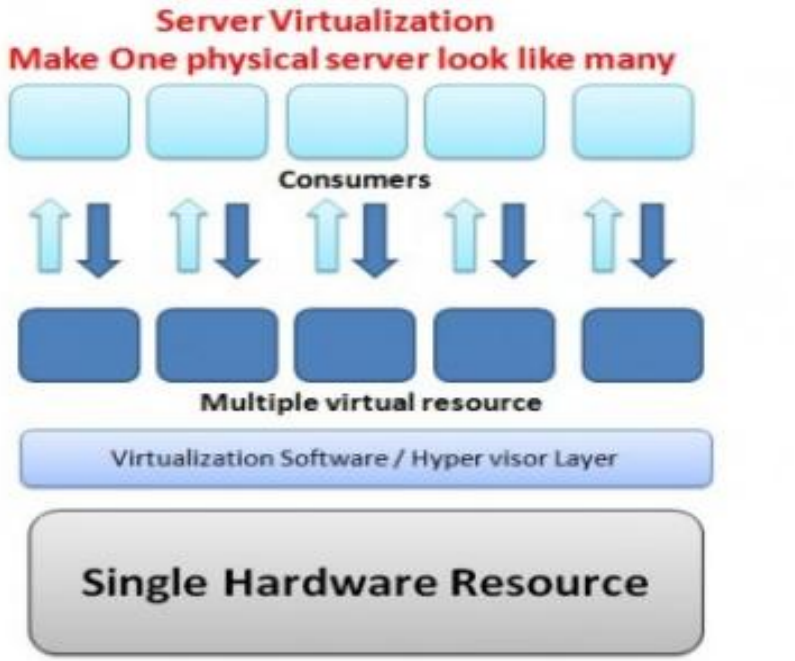

Fig4. Server Virtualization

In virtualization, cloud back end layer which holds the key access to physical resources are bind with hyper-visor layer and the technique of virtualization is performed at that time, virtualization breaks the one physical resource into the multiple virtual resources and controls the access limit and utilization to single physical resource.These multiple virtual resources are then allowed to be shared across different consumers. This brings the optimum resource utilization.

6.2 Clustering

On the other hand if demand increases by the consumer where he requires more the potential of existing physical resource and does not really have the time to do the remodeling of resource sharing, cloud comes with benefits of scalability, now to use this effectively engineers uses the concept of sharing called clustering, this is grouping or binding the two or more physical resources in such a way that pool of availability never dries out. On top it makes it look like a single virtual entity to design to satisfy the operational requirement.

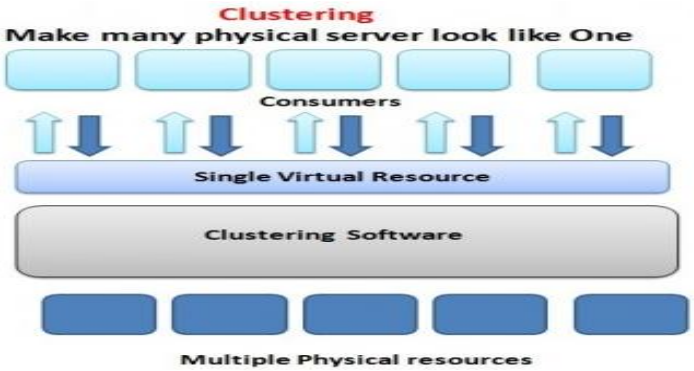

Fig5. Clustering

6.3 Grid Computing

Grid computing is the federation of computer resources from multiple locations to reach a common goal. The grid can be thought of as a distributed system with non-interactive workloads that involve a large number of files. What distinguishes grid computing from conventional high performance computing systems such as cluster computing is that grids tend to be more loosely coupled, heterogeneous, and geographically dispersed. Although a single grid can be dedicated to a particular application, commonly a grid is used for a variety of purposes. Grids are often constructed with general-purpose grid middleware software libraries. Internet, it is a large collection of networks where resources are globally networked, In internet cloud computing plays a major role In order to share the data and one of the important technology in the cloud computing is virtualization. Mainly it is used to maintain the collection IT resources which are used by the cloud providers. The mainaim of the virtualization is ability to run the multiple operating systems on a single machine buy sharing all the resources that belong to the hard ware. In this paper our main goal is to provide the basic knowledge about the virtualization technology in cloud computing and how it acts in the cloud computing environment. And we also discuss about, how to maintain the virtualized environment with the optimized resources.

VII. CONCLUSION

Among the most popular cloud services now are social networking sites (the 500 million people using Face book are being social in the cloud), webmail services like Hotmail and Yahoo mail, micro blogging and blogging services such as Twitter and Word Press, video-sharing sites like YouTube, picture-sharing sites such as Flick, document and applications sites like Google Docs, social-bookmarking sites like Delicious, business sites like eBay, and ranking, rating and commenting sites such as Yelp and Trip Advisor.A simple example of cloud computing is Yahoo email, Gmail, or Hotmail etc. All you need is just an internet connection and you can start sending emails. The server and email management software is all on the cloud (internet) and is totally managed by the cloud service provider Yahoo, Google etc. The consumer gets to use the software alone and enjoy the benefits.

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