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CLOUD COMPUTING: INFRASTRUCTURE & ITS SECURITY ISSUES

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Abstract: ***There are So many innovations and new technologies has been developed over the past few years: cloud computing is an emerging model and is one of them, where users can access their applications from anywhere through their connected devices .Cloud computing is a Gradual development of distributed computing combined with Service-oriented architecture. The applications reside in massively-scalable data centers where compute resources can be dynamically provisioned and shared to achieve significant economies of scale. The security problem becomes more complicated under the cloud model as new dimensions have entered into the problem scope related to the model architecture. In this paper we discussed cloud computing, its advantages and also briefly discussed system architecture and we investigated the cloud deployment Model, Architecture, Infrastructure, Security issues and its solution.***

Keywords: Clouds, cloud computing security, Cloud Storage, Sass, Data Centre

1. INTRODUCTION

There is a new development – "cloud computing. "Cloud" as an acronym of "Common, Location-independent, Online, Utility that is available on-Demand." standing for computing . The term "cloud computing" has at its core a common element – in that with the cloud model, with the help of these models we delivered the services over the Internet, on demand, from a remote location, rather than residing on one's desktop, laptop, mobile device, or even your own organization's servers. The cloud can take on various forms, including: Sass (Software as a Service), Paas (Platform as a Service), and Iaas (Infrastructure as a Service). [1] Cloud computing is the delivery of computing as a service rather than a product, whereby shared resources, software, and information are provided to computers and other devices as a utility over a network . End users access cloud based applications through a web browser or a light weight desktop or mobile app while the business software and data are stored on servers at a remote location. At the foundation of cloud computing is the broader concept of infrastructure convergence) and shared services. This type of data centre environment allows enterprises to get their applications up and running faster, with easier manageability and less maintenance, and enables IT to more rapidly adjust IT resources (such as servers, storage, and networking) to meet fluctuating and unpredictable business demand[2].

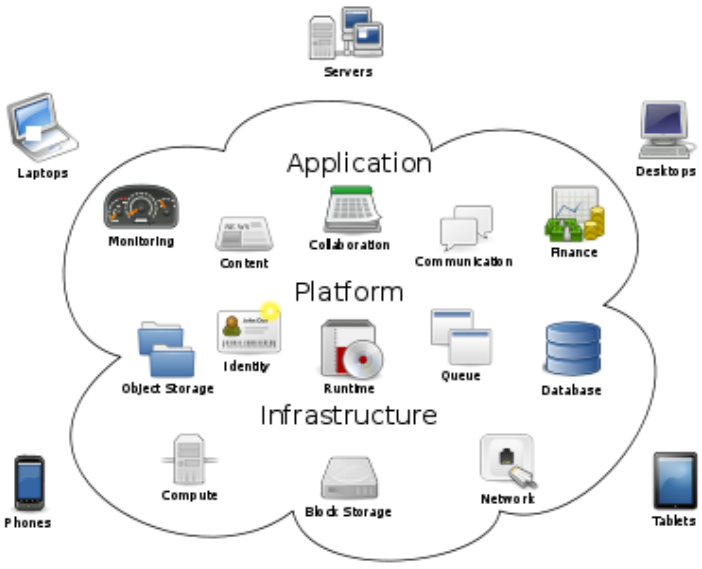

Figure 1: Cloud Computing

A cloud computing platform dynamically provisions, configures, reconfigures, and deprovisions servers as needed. Cloud applications are those that are extended to be accessible through the Internet. These cloud applications use large data centers and powerful servers that host Web applications and Web services. It describes how computer programs are hosted and operated over the Internet. The key feature of cloud computing is that both the software and the information held in it live on centrally located servers rather than on a end-user's computer. This means people can access the information that they need from any device with an Internet connection—including mobile and handheld phones—rather than being chained to the desktop. It also means lower costs, since there is no need to install software or hardware." It's called cloud computing because the data and applications exist on a "cloud" of Web servers. Cloud storage refers to saving data to an off-site storage system maintained by a third party. Instead of storing information to your computer's hard drive or other local storage device, you save it to a remote database. The Internet provides the connection between your computer and the database. [3,4] The house cloud storage systems are called data center. Creating an effective data center requires careful planning. The three big concerns every data center must be able to address are security, electric power and cooling: Physical security is just as important as network security. Data servers are valuable not only because the machines themselves are expensive, but also because the data stored on them could include sensitive information. Like all computers, data servers generate heat. Too much heat can impair or damage servers, so the data center needs an effective cooling system to prevent such problems [4].

1.1 Advantages of Cloud Computing

(i) If you store your data on a cloud storage system, you'll be able to get to that data from any location that has Internet access.

(ii) You wouldn't need to carry around a physical storage device or use the same computer to save and retrieve your information.

(iii) Cloud computing systems offer users access to not only storage, but also processing power and computer applications installed on a remote network.

1.2 Deployment models

- Public cloud

Public cloud applications, storage, and other resources are made available to the general public by a service provider. These services are free or offered on a pay-per-use model. Generally, public cloud service providers like Microsoft and Google own and operate the infrastructure and offer access only via Internet (direct connectivity is not offered).

- Community cloud

Community cloud shares infrastructure between several organizations from a specific community with common concerns (security, compliance, jurisdiction, etc.), whether managed internally or by a third-party and hosted internally or externally. The costs are spread over fewer users than a public cloud (but more than a private cloud), so only some of the cost savings potential of cloud computing are realized.

- Hybrid cloud

Hybrid cloud is a composition of two or more clouds (private, community or public) that remain unique entities but are bound together, offering the benefits of multiple deployment models.

- Private cloud

Private cloud is cloud infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally. They have attracted criticism because users "still have to buy, build, and manage them" and thus do not benefit from less hands-on management, essentially "[lacking] the economic model that makes cloud computing such an intriguing concept". [2]

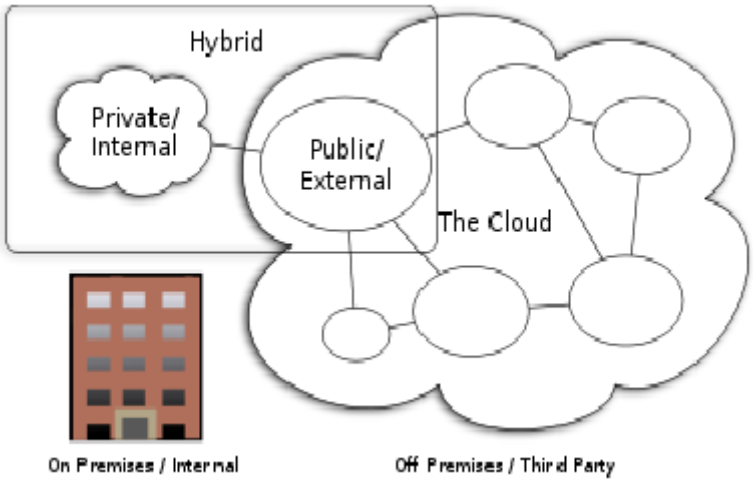

Figure 2: Deployment model

2. ARCHITECTURE OF CLOUD COMPUTING

A cloud computing system can be divided into two sections: the front end and the back end. They connect to each other through a network, usually the Internet. The front end is the side the computer user, or client, sees. The back end is the "cloud" section of the system. The front end includes the client's computer (or computer network) and the application required to access the cloud computing system. Cloud computing systems have the same user interface. Most of the time, servers don't run at full capacity. That means there's unused processing power going to waste. It's possible to fool a physical server into thinking it's actually multiple servers, each running with its own independent operating system. The technique is called server virtualization. By maximizing the output of individual servers, server virtualization reduces the need for more physical machines.

On the back end of the system are the various computers, servers and data storage systems that create the "cloud" of computing services. each application will have its own dedicated server. A central server administers the system, monitoring traffic and client demands to ensure everything runs smoothly. It follows a set of rules called protocols and uses a special kind of software called middleware. Middleware allows networked computers to communicate with each other. [4]

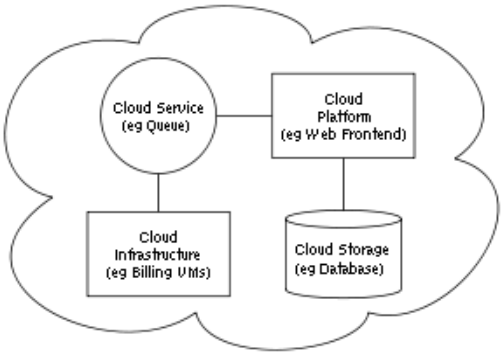

Fig 3: Cloud Computing Architecture

The systems architecture of the software systems involved in the delivery of cloud computing, typically involves multiple cloud components communicating with each other over application programming interfaces, usually web services and 3-tier architecture.

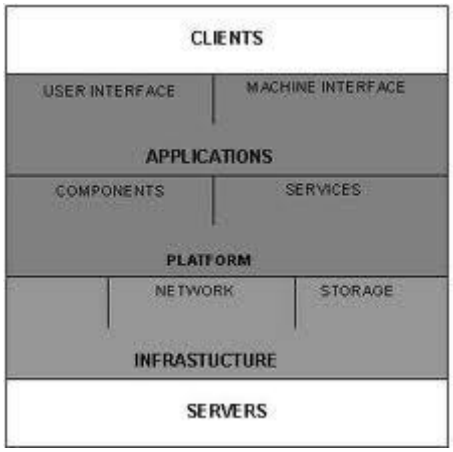

Fig 4: System Architecture

2.1 Cloud Computing Infrastructure:

Cloud computing infrastructures CIOs of the world's largest organizations. Here we describe the infrastructure of Bakbon clouds. BakboN clouds minimize the risk involved in application development and implementation. It will solve your business problems, and no more headaches. The cloud computing infrastructure also promises significant savings in administrative costs—more than 50 percent in comparison to client/server software [6]. BakboN networks Cloud computing solutions focuses on providing advanced solutions to enhance customer experience and to add value to customers by reducing their IT spending cost.

BakboN Networks provides Private Cloud services for the enterprise customers. With the BakboN cloud strategy, organizations can now move towards cloud computing models with the confidence that their existing investments in their data center are safe, and can get huge infrastructure benefits from the service. Existing applications

and services can be moved to private cloud without the need to learn any new technologies or introduce unnecessary complexities within your team.

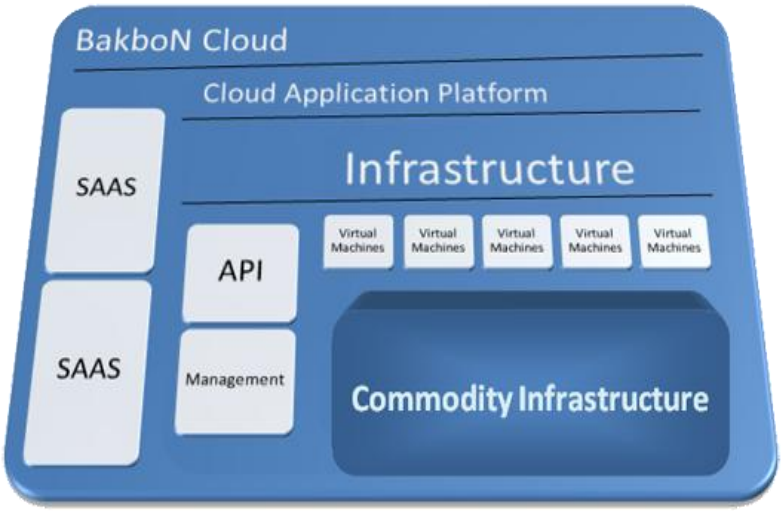

Figure 5: bakboN Cloud Network

Private Cloud service enables:

• Management of the datacenter fabric as a single pool of resources.
• Delivery of scalable applications and workloads.
• Focus on the management of the datacenter service and it's dependencies.

2.1.1 Cloud Storage

Our cloud private and public storage service provides the following features:
• Massive scalability — Providers must assemble applications and information from multiple sources to create unique experiences for the consumer.
• Global distribution — An information policy is necessary to enable the applications and information to move closer to the consumer.
• Efficiency at scale — Providers need an easy, cost-effective way to operate and manage massive amounts of unstructured information.
• High Performance on demand

2.1.2 Media Hosting

Media distribution can be an unpredictable and expensive business. Organizations looking to archive media files can incur extremely high storage requirements, far exceeding those of many other businesses. Cost-effective storage and distribution of these large files become primary concerns for making the business economics work.

2.1.3 SAAS based cloud solutions

Our cloud computing solutions enables customers to build on demand applications for their clients. Our on demand application model enables the enterprises to use licenses per usage. License can be better managed this way and thereby reducing the operation and infrastructure cost tremendously, we offer two categories of services in this section. Pre-build SAAS applications and Custom designed SAAS applications.

3. ESSENTIAL CHARACTERISTICS OF CLOUD COMPUTING

- **On demand self services**: computer services such as email, applications, network or Server service can be provided without requiring human interaction with each service provider. Cloud service providers providing on

demand self services include Amazon Web Services (AWS), Microsoft, Google, IBM and Salesforce.com. New York Times and NASDAQ are examples of companies using AWS (NIST).

- **Broad network access**: Cloud Capabilities are available over the network and accessed through standard mechanisms that promote use by heterogeneous thin or thick client platforms such as mobile phones, laptops and PDAs.
- **Resource pooling**: The provider's computing resources are pooled together to serve multiple consumers using multiple-tenant model, with different physical and virtual Resources dynamically assigned and reassigned according to consumer demand. The resources include among others storage, processing, memory, network bandwidth, virtual Machines and email services. The pooling together of the resource builds economies of Scale (Gartner).
- **Rapid elasticity**: Cloud services 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.
- **Measured service**: Cloud computing resource usage can be measured, controlled, and reported providing transparency for both the provider and consumer of the utilized service. The more you utilize the higher the bill. Just as utility companies sell power to subscribers, and telephone companies sell voice and data services, IT services such as network security management, data centre hosting or even departmental billing can now be easily delivered as a contractual service.
- **Multi Tenacity**: It refers to the need for policy-driven enforcement, segmentation, isolation, governance, service levels, and chargeback/billing models for different consumer constituencies.

4. DRAWBACK OF CLOUD COMPUTING

Physically, a computer server is a metal box that converts electricity into heat1. The temperature of the exhaust air (usually around 40-50°C) is too low to regenerate electricity efficiently, but is perfect for heating purposes, including home/building space heating, cloth dryers, water heaters, and agriculture.[7]

5. SECURITY ISSUES AND SOLUTION OF COMPUTING

Security is a significant issue facing IT executives as they have been well-publicized outages of many of the most popular public cloud services, including Gmail and Google Apps, Apple's Mobile Me service, and Amazon's S3 cloud service." Indeed, the security of cloud computing is an issue that will inevitably "blow-up" each time data breaches occur in cloud offerings and hit the media. "most of the risk and blame if something goes wrong will fall directly on the shoulders of IT — and not on the cloud computing service providers."

When a cloud provider sees a service failure occur, this calls into question the efficacy of storing files and information online, causing huge security concerns for all affected users and not just the target cloud provider, but indeed, the whole cloud computing universe, how to make cloud computing secure is one of the biggest issues As with prior shifts in information technology with the advent of the Internet and the Web, the introduction of e-mail, and the explosion of social media, their growth and adoption rates have been slowed by initial fears. cloud computing and SaaS applications are less secure and less reliable Indeed, cloud offerings may be significantly more reliable that an organization's internal offerings. large-scale cloud providers are often-times more secure than a government agency's or private sector company's internal IT operations simply because they have the "talent, resources and focus" One of the best ways to improve security is to have a single-point of access, controlled by the organization, and mandating users follow their procedures and policies for access privileges. However, while such access controls return power to the client, they may well serve to defeat some of the robust advantages for remote access fundamental to the cloud computing model. And for the concerns about security and privacy, centralizing operations in a cloud environment may not just make computing more secure, but make compliance easier – and cheaper – as well. As the cloud grows in popularity for business and consumers concerns about security, privacy, and reliability become more important. [9]

6. CONCLUSIONS

The cloud computing model is one of the promising computing models for service providers, because centralized operations in a cloud environment make computer more secure compliance easier and cheaper and we recommend that cloud computing security solutions should support integration and coordination with other security controls at different layers to deliver integrated security. Here we use Bakbon Cloud computing solutions that frees company from traditional software, hidden cost, high failure and it also minimizes the risk involved in application development and implementation and easily solve our business problem due to these qualities companies switch from client/server software solution to cloud computing and it can help your organization to survive in a tough economic climate.

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