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Efficient Computing With Cloud

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Abstract:-Today, more and more industry companies and organizations recognize the value and benefit when using cloud computing services. Reducing cost and maintaining scale and high availability are essential for the business to keep its continuity. Cloud computing has elevated IT to newer limits by offering the market environment data storage and capacity with flexible scalable computing processing power to match elastic demand and supply, whilst reducing capital expenditure. It describes the advance of many existing IT technologies and separates application and information resources from the underlying infrastructure. However the opportunity cost of the successful implementation of Cloud computing is to effectively manage the security in the cloud applications. It is an emerging technology that allows user to use IT services over the internet on rent basis where consumer pays per usage of services. The fundamental concept of cloud computing is that the computing is "in the cloud". The "cloud" is the process through which consumers and businesses can use the applications that are not installed in-house. Thus, specific files, data, and software all can be accessed from any computer with internet access. Cloud computing refers to accessing software and storing data in the "cloud" representation of the Internet or a network and using associated services. It is now bringing enormous impact to the human society, especially the business world. In this paper, the basic concepts and the development of cloud computing were introduced, and then the current situation and development of cloud computing research from two aspects of technology and business were illustrated. Finally future trends of cloud computing were discussed.

Keyword:- SaaS, PaaS, Grid, Cloud

1.0 INTRODUCTION

Cloud computing is a new and emerging information technology that changes the way IT architectural solutions are put forward by means of moving towards the theme of virtualization: of data storage, of local networks (infrastructure) as well as software. A cloud computing platform dynamically provisions, configures, reconfigures, and de-provisions servers as needed. Servers in the cloud can be physical machines or virtual machines. Advanced clouds typically include other computing resources such as storage area networks (SANs), network equipment, firewall and other security devices. Cloud computing also describes applications 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. Anyone with a suitable Internet connection and a standard browser can access a cloud application. Cloud computing is a concept put forward by Google, which is a new way to play with computer and Internet. It is a kind of computing which is based on the internet. Shared information is provided to computers and other devices on demand, like the electricity grid.

2.0 CLOUD COMPUTING MODULES [1]

Cloud computing have a major decision is to decide on the type of cloud to be implemented. Currently there are three types of cloud deployment models offered, namely, a hybrid, private and public cloud. These, together with their security implications will be discussed below. Within this paper vendors are referred to as cloud providers, or companies specializing in providing a tailor made cloud solution. Cloud architecture typically involves multiple cloud components communicating with each other over application programming interfaces, usually services. Complexity is controlled and the resulting systems are more manageable than their monolithic counterparts. The two most significant components of cloud computing architecture are known as the front end and the back end. The front end is the part seen by the client, i.e. the computer user. This includes the client's network (or computer) and the applications used to access the cloud via a user interface such as a web browser. The back end of the cloud computing architecture is the „cloud“ itself, comprising various computers, servers and data storage devices.

- **Hybrid Cloud:** A hybrid cloud is a private cloud linked to one or more external cloud services, centrally managed, provisioned as a single unit, and circumscribed by a secure network. It provides virtual IT solutions through a mix of

both public and private clouds. Hybrid Clouds provide more secure control of the data and applications and allows various parties to access information over the Internet. It also has an open architecture that allows interfaces with other management systems. The cloud deployment model, networking, platform, storage, and software infrastructure are provided as services that scale up or down depending on the demand.

- **Public Cloud:** A public cloud is a model which allows users' access to the cloud via interfaces using mainstream web browsers. It's typically based on a pay-per-use model, similar to a prepaid electricity metering system which is flexible enough to cater for spikes in demand for cloud optimization. This helps cloud clients to better match their IT expenditure at an operational level by decreasing its capital expenditure on IT infrastructure. Public clouds are less secure than the other cloud models because it places an additional burden of ensuring all applications and data accessed on the public cloud are not subjected to malicious attacks. Therefore trust and privacy concerns are rife when dealing with Public clouds with the Cloud SLA at its core. A key management consideration, which needs to be, answered within the SLA deals with ensuring that ample security controls are put in place.
- **Private Cloud:** Private cloud is infrastructure operated solely for a single organization, whether managed internally or by a third-party and hosted internally or externally [8]. It is easier to align with security, compliance, and regulatory requirements, and provides more enterprise control over deployment and use. In the private cloud, scalable resources and virtual applications provided by the cloud vendor are pooled together and available for cloud users to share and use. It differs from the public cloud in that all the cloud resources and applications are managed by the organization itself, similar to Intranet functionality.

3.0 DELIVERY MODEL: [2]

Delivery model or the Service model of cloud computing defines how cloud services are provided to consumers. It includes:

- **Infrastructure as a Service (IaaS).** The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. This model lets users lease compute, storage, network, and other resources in a virtualized environment. The user doesn't manage or control the underlying cloud infrastructure but has control over the OS, storage, deployed applications, and possibly certain networking components. Amazon's Elastic Compute Cloud (EC2) is a good example of IaaS. At the cloud infrastructure level, CSPs can enforce network security with intrusion-detection systems (IDSs), firewalls, antivirus

programs, distributed denial-of-service (DDoS) defenses, and so on. This is the most basic cloud service model, providing the on-demand resources for the IT needs. It is usually provided and paid by users on an as-needed basis. For example, the customers pay for the use of the virtual machines, storage capacity and network bandwidth, not to hold the entire physical servers, storage equipment and network devices. They share the cloud providers' infrastructure with other customers. The price depends on the resources and the time requested, it also depends on the deployment model, public or private, for example.

- **Platform as a Service (PaaS).** The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages and tools supported by the provider. On the top of IaaS, PaaS provides the capability to build or deploy the applications, like the Microsoft based (i.e. Windows, .NET, IIS, and SQL) or an open source based (i.e. Linux, Apache, MySQL, and PHP). Cloud platforms are built on top of infrastructure service with system integration and virtualization middleware support. Such platforms let users deploy user-built software applications onto the cloud infrastructure using provider-supported programming languages and software tools (such as Java, Python, or .NET). The user doesn't manage the underlying cloud infrastructure.

- **Software as a Service (SaaS).**[3] The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. A SaaS provider offers the complete IT cloud services to the customers who do not need to install or manage the IT infrastructure. Usually the users use the interfaces to access the resources via the Internet. For example, users use a Web browser to access Gmail and Microsoft Windows Live. This service employs browser-initiated application software to serve thousands of cloud customers, who make no upfront investment in servers or software licensing. From the provider's perspective, costs are rather low compared with conventional application hosting. Software service as heavily pushed by Google, Microsoft, Salesforce.com, and so on — requires that data be protected from loss, distortion, or theft. Transactional security and copyright compliance are designed to protect all intellectual property rights at this level. Data encryption and coloring offer options for upholding data integrity and user privacy.

4.0 CLOUD COMPUTING BENEFITS [4]

Cloud computing provides compelling savings in IT related costs including lower implementation and maintenance costs; less hardware to purchase and support; the elimination of the cost of power, cooling, floor space and storage as resources are moved to a service provider; a reduction in operational costs; and paying only for what is used (measured service). Cloud computing also enables organizations to become more

competitive due to flexible and agile computing platforms, providing for scalability and high-performance resources and highly reliable and available applications and data. Through cloud computing, IT departments save on application development, deployments, security, and maintenance time and costs, while benefiting from economies of scale. ‘Going green’ and saving costs are a key focus point for organizations. Cloud computing helps organizations to reduce power, cooling, storage and space usage and thereby facilitates more sustainable, environmentally responsible data centers. Moving to the cloud further frees up existing infrastructure and resources that can be allocated to more strategic tasks.

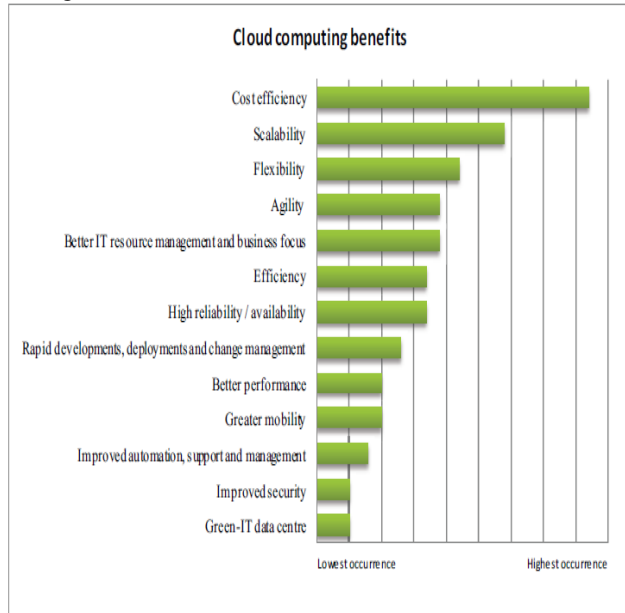


Figure 4.0 Cloud computing benefits.[4]

5.0 ADVANTAGES OF CLOUD COMPUTING [5]

If used properly and to the extent necessary, working with data in the cloud can vastly benefit all types of businesses. Mentioned below are some of the advantages of this technology. Cost Efficient Cloud computing is probably the most cost efficient method to use, maintain and upgrade. Traditional desktop software costs companies a lot in terms of finance. Adding up the licensing fees for multiple users can prove to be very expensive for the establishment concerned. The cloud, on the other hand, is available at much cheaper rates and hence, can significantly lower the company's IT expenses. Besides, there are many one-time-payment, pay-as-you-go and other scalable options available, which makes it very reasonable for the company in question. Almost Unlimited Storage Storing information in the cloud gives you almost unlimited storage capacity. Hence, you no

more need to worry about running out of storage space or increasing your current storage space availability.

- **Backup and Recovery:-** Since all your data is stored in the cloud, backing it up and restoring the same is relatively much easier than storing the same on a physical device. Furthermore, most cloud service providers are usually competent enough to handle recovery of information. Hence, this makes the entire process of backup and recovery much simpler than other traditional methods of data storage.
- **Automatic Software Integration:-** In the cloud, software integration is usually something that occurs automatically. This means that you do not need to take additional efforts to customize and integrate your applications as per your preferences. This aspect usually takes care of itself. Not only that, cloud computing allows you to customize your options with great ease.
- **Easy Access to Information:-** Once you register yourself in the cloud, you can access the information from anywhere, where there is an Internet connection. This convenient feature lets you move beyond time zone and geographic location issues.
- **Quick Deployment:-** Lastly and most importantly, cloud computing gives you the advantage of quick deployment. Once you opt for this method of functioning, your entire system can be fully functional in a matter of a few minutes. Of course, the amount of time taken here will depend on the exact kind of technology that you need for your business.
- **Device & Location Independence:-** Cloud computing is already enabling greater device independence, greater portability, and greater opportunities for interconnection and collaboration. With applications and data located in the cloud it becomes much easier to enable users to access systems regardless of their location or what device they are using. Tele workers can be quickly brought online, remote offices can be quickly connected, temporary teams can be easily set up on site, mobile access can be easily enabled. With the growing use of smart phones, net books and other hand-held devices there is also an increasing need for data access on the go.



Figure 5.0 Cloud Overview from users point of View

6.0 DISADVANTAGES OF CLOUD COMPUTING [5]

In spite of its many benefits, as mentioned above, cloud computing also has its disadvantages. Businesses, especially smaller ones, need to be aware of these cons before going in for this technology.

- **Technical Issues:-** Though it is true that information and data on the cloud can be accessed anytime and from anywhere at all, there are times when this system can have some serious dysfunction. You should be aware of the fact that this technology is always prone to outages and other technical issues. Even the best cloud service providers run into this kind of trouble, in spite of keeping up high standards of maintenance. Besides, you will need a very good Internet connection to be logged onto the server at all times. You will invariably be stuck in case of network and connectivity problems.
- **Security:-** The other major issue while in the cloud is that of security issues. Before adopting this technology, you should know that you will be surrendering all your company's sensitive information to a third-party cloud service provider. This could potentially put your company to great risk. Hence, you need to make absolutely sure that you choose the most reliable service provider, who will keep your information totally secure.[6]
- **Prone to Attack:-** Storing information in the cloud could make your company vulnerable to external hack attack and threats. As you are well aware, nothing on the Internet is completely secure and hence, there is always the lurking possibility of stealth of sensitive data.

CONCLUSION:-

Cloud Computing is essentially on-demand access to a shared pool of computing resources. It helps consumers to reduce costs, reduce management responsibilities and increase business agility and the competitive edge. For this reason, it is becoming a popular paradigm and increasingly more companies are shifting toward IT Cloud Computing solutions. Advantages are many but there are also challenges and inherent issues. These relate to data governance, service management, process monitoring, infrastructure reliability, information security, location of data, data integrity and business continuity. This paper presents, in some detail, the deployment approaches, the benefits, the issues and challenges and also suggests a way forward to utilize the Cloud provisions. The aim of this work is to provide some general information for enterprises wishing to integrate their existing IT processes and system with Cloud infrastructures available outside their organizations.

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