USE OF CLOUD COMPUTING IN LIBRARIES

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Abstract: *Cloud computing is a new trend in ICT due to its implied advantages such as lower cost, accessibility from anywhere at any time, as well as its pliability and inflexibility. This essay describes cloud computing, including its definition, key traits, paradigm, constituent parts, benefits, and drawbacks. It also discusses Cloud computing in libraries.*

Keywords: *Cloud Computing, SaaS, PaaS, IaaS, Components of Cloud, Models of Cloud Computing, Libraries and Cloud.*

Introduction : By using the cloud, it is now feasible to divide the work of creating a service provisioning infrastructure from that of offering end-user services. People now have a method to share distributed resources and services that belong to various businesses or websites thanks to cloud computing. Through the network, distributed resources are shared in an open setting by cloud computing. It is an online virtual pool of computing capabilities. People can share distributed resources and services that pertain to various Organizations or sites thanks to cloud computing. Numerous businesses, including Amazon, Google, Microsoft, and others, have sped up the development of their Cloud Computing systems and the improvement of their services to accommodate more customers. Three categories can be used to categorise cloud computing: "programme"

Libraries use computers to operate online resources like Integrated Library Management Software (ILMS), websites, portals, university repositories, etc. Either the library staff or the computer staff of the parent group maintains these. To maintain these services, perform backups, and upgrade when new software versions are published, it requires spending money on hardware, software, and personnel.

Most of the time, library professionals find it challenging to carry out some of these tasks without the assistance of IT employees from within or outside the organisation because they are not educated in server maintenance. In the world of libraries, cloud computing has recently become a new buzzword, which is a gift in disguise for running various ICT services without too many issues as third-party

What is Cloud Computing : Many businesses and people are implementing the new technology model for IT services known as cloud computing. Cloud computing offers libraries the chance to broaden their reach by changing how systems are created and services are provided. The term "cloud computing" refers to internet-based computing where virtual shared servers offer users pay-as-you-use access to software, infrastructure, platform devices,

and other resources. In the cloud computing model, all the data that a digital system has to give is made available as a service. Users can utilise the services offered by the "Internet Cloud" without any prior knowledge of resource management.

Definition of Cloud Computing : The National Institute of Standards and Technology (NIST) states that "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources" (such as networks, servers, storage, applications, and services) that can be quickly provisioned and released with little management effort or service provider interaction.

Cloud computing is "a style of computing in which massively scalable and elastic IT-enabled capabilities are provided as a service to external customers using Internet technologies," according to the Gartner Group.

"A pool of abstracted, highly scalable, and managed compute infrastructure capable of hosting end-customer applications and billed by usage," is how Forrester defines cloud computing.

In contrast to traditional computing, cloud computing depends on sharing computing resources.

Essential Characteristics of Cloud Computing : Cloud computing possesses five essential characteristics, according to NIST: service on demand, wide network access, pooling resources, rapid elasticity, and measured service There are five main characteristics of cloud services that show how they relate to and differ from traditional computing methods:

Self-service on-demand: Without the need for human interaction with a service provider, a consumer can unilaterally and automatically provision computing capabilities like server time and network storage as needed.

Access to the vast network: Through standard mechanisms, capabilities can be accessed over the network by heterogeneous thin or thick client platforms (such as mobile phones, laptops, and personal digital assistants) as well as other traditional or cloud-based software services.

Pooling of resources: Using a multitenant model, the provider's computing resources are pooled to serve multiple customers, with various physical and virtual resources dynamically assigned and reassigned in response to customer demand. The customer generally has no control over or knowledge of the precise location of the provided resources, so there is a degree of location independence. However, the customer may be able to specify location at a higher level of abstraction (for example, country, state, or data center). Storage, processing, memory, network bandwidth, and virtual machines are all examples of resources. Even private clouds often share resources with other parts of the same company.

Ease of elasticity: In some cases, capabilities can be automatically and rapidly provisioned to scale out quickly; and quickly released to scale in quickly. The capabilities that are available for provisioning frequently appear to be indefinite and can be purchased at any time.

Service that is rated: Utilizing a metering capability at some level of abstraction appropriate to the kind of service (such as storage, processing, bandwidth, or active user accounts), cloud systems automatically control and optimize resource use. Utilization of resources can be tracked, controlled, and reported, providing transparency for both the service provider and the end user.

Various Tenacity: The Cloud Security Alliance supports this as the sixth characteristic of cloud computing. It refers to the requirement of service levels, chargeback/billing models, policy-driven enforcement, segmentation, isolation, governance, and service levels for various consumer constituencies. It is essential to acknowledge that virtualization technologies enable cloud services in some cases but not all of the time. There is no necessity, in any case, that attaches the deliberation of assets to virtualization advancements and in numerous contributions virtualization by hypervisor or working framework holder isn't used

Cloud Computing Models

Cloud Providers offer services that can be grouped into three categories.

SaaS (software as a service): A complete application is provided to customers as a service on demand in this model. The service is provided to multiple end users by a single cloud-based instance. Customers do not need to make an initial investment in servers or software licenses, and providers save money because only one application needs to be hosted and maintained. Companies like Google, Salesforce, Microsoft, Zoho, and others provide SaaS today.

PaaS, or Platform as a Service, is A layer of software or development environment is encapsulated and offered as a service here, enabling the construction of additional higher levels of service. The customer is free to create his own applications that run on the infrastructure of the provider. PaaS providers provide a predefined combination of operating systems and application servers, such as the LAMP platform (Linux, Apache, MySql, and PHP), restricted J2EE, Ruby, and so on, to meet the applications' requirements for manageability and scalability. Popular PaaS examples include Force.com, Google's App Engine, and others.

IaaS, or infrastructure as a service, is IaaS provides standard services over the network that provide fundamental computing and storage capabilities. equipment for networking, servers, storage systems, data centers, etc. are pooled and made available for workload management. Typically, the customer would use his own software to install on the infrastructure. Examples include Amazon, GoGrid, 3 Tera, and others.

There are a number of deployment models for cloud computing, each of which has its own advantages and disadvantages for organizations migrating applications to the cloud. The cloud deployment models are defined as follows by NIST:

Cloud private: The cloud infrastructure is only used by one company. It can be on or off-premise, managed by the organization or by a third party.

Cloud of community: The cloud infrastructure is shared by a number of organizations and serves a particular community with common concerns (such as mission, security requirements, policy, and compliance considerations). It can be managed by the organizations themselves or by a third party, and it can be on or off-premise.

Cloud public: An organization that sells cloud services owns the cloud infrastructure, which is made available to the general public or a large industry group.

Cloud hybrid: The cloud infrastructure is made up of two or more clouds—public, community, or private—that remain distinct entities but are linked by standard or proprietary technology that enables the portability of data and applications (such as cloud bursting for load balancing between clouds).

Components of Cloud : A Cloud system consists of three major components such as clients, data centre and distributed servers. Each element has a definite purpose and plays a specific role.

Clients: A cloud computing architecture's clients resemble those of a typical local area network (LAN). These are the computers that the end users have sitting on their desks. The front-end applications are installed in this location. They could be PDAs, mobile phones, laptops, or tablets. In short, clients are the user-facing devices used to manage client data. The client falls into one of the three categories outlined in the physical specification.

• Mobile: PDAs, tablets, and smart phones are examples of mobile devices.

• Thin: These dump terminals don't have any hard drive space and let the servers do all the processing. It merely displays the data.

• Thick: This kind of client is a regular computer that connects to the cloud using a web browser like Firefox or Internet Explorer.

Center for data: The collection of servers in the data center houses the subscription-based applications. It is possible to virtualize a data center server so that the software can be installed on the main physical server while the user sees a different server identity. On a single physical server, one can run half a dozen virtual servers.

Libraries and Cloud :

We live in the information age of today. Information technology plays a crucial role in the collection, storage, organization, processing, and analysis of information dissemination of library resources. The profession of librarianship is confronted with numerous difficulties as a result of information technology applications. In order to simplify library procedures and meet the requirements of the knowledge society, new ideas and technologies are being added. Libraries have become automated as a result of the development of information technology. This is the fundamental requirement for advancement, followed by networks and greater focus on virtual libraries. The advancement of the library profession is caused by the development of digital libraries, internet usage, web tools applications for libraries, and consortium practices. After the PC and the internet, cloud computing is a brand-new IT

technology that has been dubbed the third IT revolution. Utilizing cloud computing for a variety of purposes and to reduce costs in library operations is a recent technology trend in library science. Professionals ought to be aware of cloud computing and its use in library science because it is a new and important field.

Conclusion ;

Presently, libraries are adopting cloud computing technology and utilizing cloud-based services, particularly for digital libraries, social networking, and information communication. As a result, it is time for libraries to seriously consider integrating cloud-based technologies into their services and offering users fast, dependable services. In this virtual era, LIS professionals also play the role of developing cloud-based services as a reliable medium for disseminating library services to users in an easy-to-use and time-saving manner.

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