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Cloud Computing Technology in Libraries

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ABSTRACT

This review article explores the transformative impact of cloud computing technology on libraries, examining how this innovative approach enhances library services, management, and accessibility. As libraries evolve to meet the digital demands of the 21st century, cloud computing has emerged as a pivotal tool, revolutionizing data storage, collaboration, and resource accessibility. Cloud computing is a distributed enhancement of computers, multi-computing, grid computing, and distributed databases. This will encourage libraries and their users to participate in a network and community of libraries by enabling them to reuse information and socialize around the information. This paper discusses the components, characteristics, and usage of cloud computing.

KEYWORDS: Components of Cloud Computing, Characteristics of Cloud Computing, Automation, Information Technology, Library Digitization, Library Automation, Types of Cloud Computing.

INTRODUCTION

Cloud computing is a New computer technology is called the third revolution after computers and the Internet in computing. To be more precise, Cloud computing is a distributed enhancement Computing, Parallel Computing, Grid Computing, and Distributed databases. The basic principle of cloud computing perform distributed tasks in large numbers of distributed computers, but not on local computers or remote servers. In other words, a large collection the amount of information and resources stored in PCs, mobile phones, and more equipment, cloud computing can integrate them and host them in the public cloud for maintenance users. The set of servers, networks, connections, applications and resources is called "cloud". In other words, it means Internet-based computing in which large groups of remote servers are networked in a way that allows the sharing of data processing tasks, centralized data storage, and online access to computing services or resources. It acts like a resource pooling technology to access infinite computing services and resources based on user demand and can be compared with pay-per-use models or with utility models the same as those used for using mobile services and electricity consumption.(Wada, 2018)

Definition of Cloud Computing

U.S. National Institute of Standards and Technology (NIST) defines “Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks,

servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. This cloud model promotes availability and is composed of five essential characteristics, three service models, and four deployment models".

Buyya5 defined "Cloud computing as a parallel and distributed computing system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on Service Level Agreements (SLA) established through negotiation between the service provider and consumers".

Basic Components of Cloud Computing

To deal with cloud computing, the following elements, or what can be called cloud computing components are:

- **User:** A user or customer who uses this technology and benefits from its services using a personal computer or mobile phone
- **Platforms:** Platforms are the donors of this service by providing giant servers in their storage capacities and the speed of data processing such as Google and Apple.
- **Infrastructure:** The infrastructure of the cloud - infrastructure as a service (IaaS), which is reliable in providing the service, including the availability of personal computers and the Internet and storage space for information.
- **Applications:** These are software applications that can be operated by the user in the cloud, including word processing, presentation, spreadsheet, and informationtransfer and sharing services.
- **Service:** A service used by the cloud. The subject is more related to the term Software as a Service (SaaS), which is the process of converting computer products into services

Characteristics of Cloud Computing

- Resources are distributed to users. It works very fast in a distributed computingenvironment
- By sharing a common infrastructure, it provides an efficient multi-user and multi-application experience. This reduces the cost of services
- Cloud computing is characterized by the fact that users can access it from anywhere inthe world simply by connecting to the Internet

These apps are easy to maintain compared to individual apps as they are installed on acommon platform and are available from different locations

- A cloud computing environment is a fully virtual environment
- Cloud computing systems are service-oriented. Systems are created by other separate services. Many of these separate and independent services are combined to create this service. This makes it possible to reuse the different services available and created.
- Infrastructure is unlikely to fail, so servers are more reliable and available
- Because the company does not have to install its infrastructure, paid resourcesreduce costs

Types of Cloud Computing

Infrastructure as a Service (IaaS)

This service model includes a variety of features, Services, and resources that support building a virtual network computer infrastructure. Organizations can be the entire infrastructure developed as needed. E.g. Amazon Web Services, Rack space, Savvis, HP, IBM, Sun, and Google base.

Platform as a Service (PaaS)

The Platform-as-a-Service model helps generate the IT platforms on which software and other tools run the Internet without managing software and hardware at the end of the user page. Amazon Elastic Cloud, EMC Atmos, Aptana and Go Grid are examples ofPaaS templates that Provide platforms to users for maintenance and support of their IT infrastructure without spending a lot of money on it Purchase of related hardware, software, and technology.

Software as a service (SaaS)

In this model, users can take advantage of the opportunities to access and use any software available from cloud providers. However, this is not required by users to purchase, install, and run the software, or maintenance of applications on their servers. In the cloud, users do not need to manage cloud infrastructure and the platform on which the application is running. This service model provides online messaging applications, free services, unlimited storage, and remote access from any computer or device with an internet connection. The below figure shows how Cloud Computing works simply.

Advantages of Cloud Computing

Cloud computing allows Libraries to operate more efficiently almost anywhere. Some benefits of cloud computing are:

- Flexibility/scalability. Cloud computing provides greater flexibility for Libraries of all sizes. Whether they need additional bandwidth, processing power, or storage space, they can seamlessly increase or decrease their processing power depending on their needs and budget.
- Safety. Data security is one of today's key business concerns. Cloud service providers provide authentication, access control, data encryption, etc. to ensure that sensitive data is processed and stored securely in the cloud. It provides advanced security systems such as.
- Mobility: Cloud computing allows users to access information from any device, anywhere, anytime using the internet. With the right information, users can stay on top of their studies.
- Improved collaboration: Cloud applications allow businesses to securely share and access information seamlessly, making collaboration easy and free. Cloud computing allows multiple users to transparently purchase documents or work on files simultaneously.
- Disaster recovery: Data loss and downtime can cause irreversible damage to Libraries of all sizes. The largest cloud computing providers are well equipped to support unexpected disruptive events such as hardware and software failures, natural disasters, and power outages to maintain high application availability and business continuity.

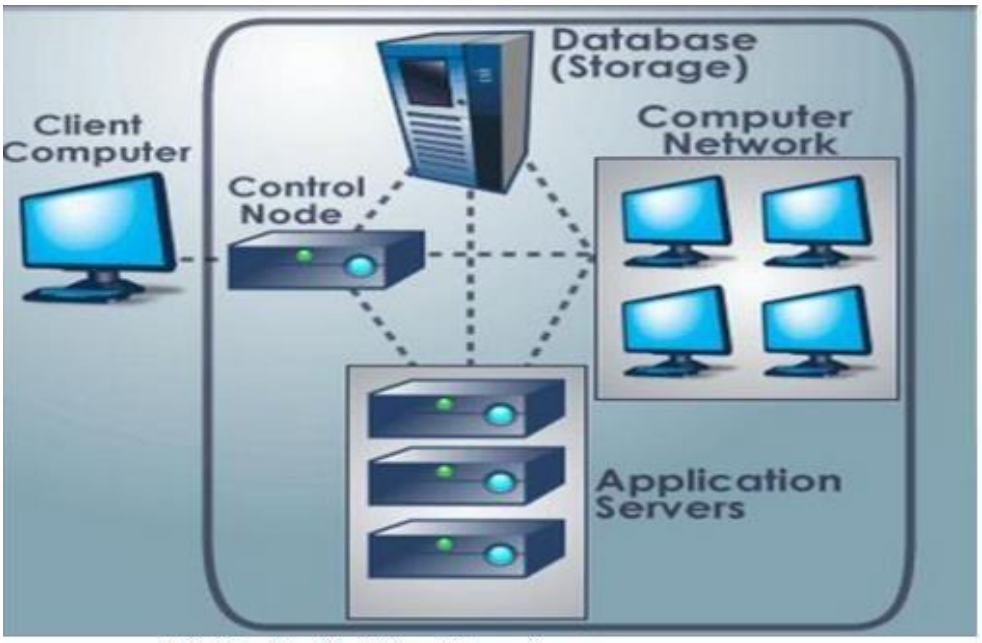
Automatic updates: The IT department will need a lot of valuable time to manually organize a wide variety of software. But with cloud computing, service providers are regularly upgrading and updating their services with the latest technologies to provide Libraries with the latest software, latest servers, and increased computing power.

Disadvantages of Cloud Computing

- Data security and privacy: The biggest challenge in cloud computing is security and privacy. If a proper security model is not yet in place, data stored in the cloud is prone to viruses, theft, etc. can be exposed and become vulnerable to attacks. Additionally, since the services are provided over the Internet, fitness assessment is quite difficult. It is difficult to verify the location and security of servers and software. There is also the risk of Data loss due to improper backup and system crash.

- Network connectivity and bandwidth: Since cloud computing is offered over the Internet, if the connection is interrupted for any reason, organizations will lose the data connection to some extent. This service also requires a lot of bandwidth as it may not work on low-speed Internet connections.

- Dependence on external agencies: Since cloud services are offered by third-party services over the Internet, it is practically difficult to control the maintenance levels and frequency. It is also difficult to assess the service provider's emergency procedures regarding backups, updates, recovery and disaster recovery. Migration to another service provider is also a problem if the host country does not follow uniform standards.



Working Model of Cloud Computing

Cloud Computing Initiative

Amazon has many cloud computing initiatives. They offer a wide range of cloud computing services for organizations, businesses, and individuals, including Amazon Web Services, Google Apps, and Microsoft Windows Azure and for Library:

- OCLC Web-scale
- Ex-Libris Cloud
- Duraspace's DuraCloud – Repository solutions like dspace
- Open source software like Koha, dspace, Greenstone
- Moodle for LMS
- Drupal for content management

Libraries and Cloud

Today we live in the information age. Information technology plays an important role in providing libraries with capabilities for collecting, storing, organizing, processing and analyzing information. The library sector faces many professional challenges due to IT applications. New ideas and technologies have been added to advance library practice and meet the information needs of the community. With the advent of IT, libraries became automated. This is a basic need for the development of networks and more virtual library services. This is due to the emergence of digital libraries, the use of the Internet and the use of library social media. For further development of the library profession. Cloud computing is a completely new IT technology that is spreading. Third IT revolution after PCs and Internet. A recent technological trend in science librarianship is the use of the cloud To achieve economies of data processing and library capacity suitable for various purposes. As cloud computing is a new and important field, professionals should familiarize themselves with cloud computing and its applications in libraries.

CONCLUSION

Information technology plays a very important role in library resource management, including collecting, storing, organizing, processing, and disseminating information. The cloud computing model will encourage libraries and their users to participate in a network and community of libraries by enabling them to reuse information and socialize around the information. This technology has certain advantages that certainly help organizations as libraries in the management of their services, which Extract employees from the server management library. It can make libraries more sustainable by sharing computing power and reducing their carbon footprint. You can also create a powerful unified presence for libraries on the web and provide users with local, group, and global access. this article aims to serve as a valuable resource for librarians, information professionals, and researchers seeking to understand the evolving landscape of library services in the digital era.

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