A Proposed Model for Campus Based Community Cloud(CBCC) for Higher Education in Jusuit College Libraries in TN using Load Balancing Techniques

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Abstract— The usages of cloud computing application in libraries is a relatively new way where can have lot of applications in school and higher education in India. Libraries are moving towards cloud computing implementation to use its services and features to make their infrastructures user friendly and fast services. This article discusses the new proposed model for Campus Based Community Cloud (CBCC) in jusuit college libraries in tamil nadu and tells the best practices for the implementation of cloud computing in the library environment to get the maximum benefit of it and reduce the operational cost. Load balancing techniques uses at high user satisfaction and usage of library resource ratio by guaranteeing a proficient and reasonable allocation of each computing resource.

Keywords— Load balancing, capital cost, operational cost, Higher education library, Library as a service (Laas). Campus Based Community Cloud (CBCC).

I. INTRODUCTION

Information technology and cloud computing applications play vital role in library science in collecting, storing, organization, processing, analysis of information related to library. Library filed facing many new challenges in implementing its profession due to applications of information technology. With the invent of Information technology, libraries have become more automated which is the basic need towards advancement followed by networks and more effort are towards virtual libraries. The emergence of e-publications, digital libraries, internet usage, web tools applications for libraries, consortium practices leads to the further developments in library profession. The latest technology trend in library science is use of cloud computing for various purposes and for achieving economy in library functions. "Cloud" in cloud computing is nothing but a metaphor used for Wide Area Network (WAN) or any other large network environment which are interconnected to provide networked services. When they are diagrammatically represented, they can be represented in cloud like shape and are used to represent the complexities of the networks components like cables, routers, servers, data centers and all such other devices [1]. There are two main components of cloud computing and they are Software and Hardware.

I. CLOUD MODEL USED FOR DEPLOYMENT

Cloud Computing can be deployed based on different models as per requirement.

A. Public Cloud:

Cloud service on a public network providing local or public support i.e. the virtualized resources & data centre is transparent to the end user. Public access of shared resources is provided in this deployment.

B. Private Cloud:

In this public cloud services are made dedicated to certain users only making it private to them. Using this model, organizations being the sole owner of particular section can more efficiently manage their corporate data. The data is considered to be more secure this way as the information is on a private cloud accessed by the dedicated user only.

C. Community Cloud:

Requirements specific to a particular set of users is gathered and deployed on a common cloud making a community. It could be considered as a public cloud service designed for researchers working on a joint venture.

D. **Hybrid Cloud:**

It combines the different deployment models to form a dynamic and more efficient way of sharing resources. This approach is generally considered by organizations during outsourcing data.

II.   SERVICES PROVIDED BY CLOUD COMPUTING

A. **Infrastructure as a Service (Iaas):**

This model provides the entire necessary infrastructure like computers, hard-disks, networks-storage, computing resources etc. to a company in the virtualized form. User can access the resources; run software's & performs deployment without bothering about the management of Infrastructure. The service provider is solely responsible for the maintenance and management of equipments on-service.

B. **Platform as a Service (Paas):** This model provides a platform to run different applications. It could be considered as the most important model of cloud computing as it is intermediate between the IaaS & SaaS.Software as a Service (Saas): This Model enables the use of different software applications by the end user over the internet. All the management & cost factors related to software like licensing, updates etc are handled by the service provider only.

C. **Library as a Sevice (Laas):**

This model enables the uses of varies library services to the end user over the internet. All the services management and cost factors related to software and hardware update etc are managed by the community.

III.   CLOUD SERVICES IN LIBRARY SYSTEM

Cloud computing uses the concept of centralizing the data on the internet further making it available to user, anytime anywhere. Virtualized shared resources allow multiple users to access the resources simultaneously. It reduces the dependency of installation, maintenance, failure of ICT infrastructure etc. Web repositories like E-journals & digital libraries etc are created so that users can access the global resources, helping the researchers/educational professionals.

IV.   APPLICATION OF CLOUD COMPUTING IN LIBRARIES

The library system along with cloud computing helps in saving time and money while amplifying its power on the web. The services of cloud computing to be applied on the following areas:

A. **Building Digital Library:**

An efficient way to manage resources, information and library related services is to maintain a digital library. The user may be facilitated access via network. Many open source software are providing a platform to digital libraries by hosting them locally. Duraspace uses digital library services using SaaS approach eliminates the need of maintaining a separate server, taking backups and software updates for the same.

B. **Searching Library Data:**

This could be provided with the help of collaborative platform to help connect more easily. It may include a repository, Innovation as well as a discussion platform where resources, ideas and problems may be shared for better decision making.

C. **Library Automation:**

This helps in saving the cost of maintenance and investment on hardware and software resources. Libraries don't have to worry about software updates backup etc. This all may be taken care by a centralised cloud service like SaaS.

D. **Search Services:**

Many open source solutions are providing services in this regard. They use context-sensitive links to jump from citation in an abstract or indexed database to complete text. Open URL providers is such a key service on the cloud.

E. **Website Hosting:**

In spite of maintaining their own server many library including organizations consider to host their websites outside library server so that editors from varied geography may access the site.

D. **Searching Scholarly Content:**

Researchers may take great benefit from this service as sharing of knowledge with peers along with discussions is made easy by this. A widespread range of articles, journals, e-books, patents and scholarly content may be accessed with ease.

E. **File Storage:**

The virtual sharing and accessing of files makes the real life easy. Cloud computing makes possible the uploading and downloading of information from anywhere anytime by offering no maintenance, no-cost storage space. This further helps in easy sync of documents across multiple devices and elaborated work over the web in a collaborative way more effective.

F. Building Community Power:

This benefits not only the library related individuals but also provides a medium to connect the information seekers on a global level. More intellectual conversations along with innovative ideas may be shared and implemented in a powerful approach. The community cooperation further helps in decision making, recognition, and providing timely and efficient solutions for dynamic knowledge. [3], [4].

V. LOAD BALANCING TECHNIQUES

Load balancing is one of the major issues in cloud computing[6] i.e., When one or more components of any service failed, load balancing helps in continuation of the services by implementing provisioning and de-provisioning of instances of applications without fail. Thus, Load Balancing is a mechanism for distributing the dynamic local workload evenly across all the nodes in the whole cloud. It will also avoid the situation where some nodes are heavily loaded while others are idle or doing little work. Load balancing increases the overall performance of the system along with its resource utilization property. This working principle of load balancing helps to achieve high user satisfaction. By increasing overall performance of the system efficient distribution of every resources can be done [7].
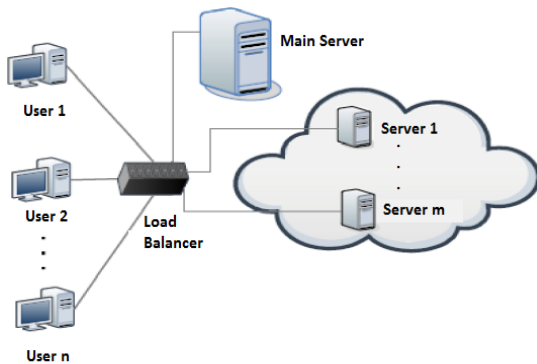

Fig.1: Distribution of Load Balancing Technique

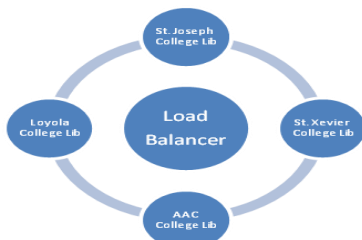## VI. IMPLEMENTATION OF LOAD BALANCING TECHNIQUES IN LIBRARY

Fig.2: Campus Based Community Cloud Implementation Diagram

Fig.2 Shows that the implementation of load balancing techniques in various Jesuit College Libraries in tamil nadu.

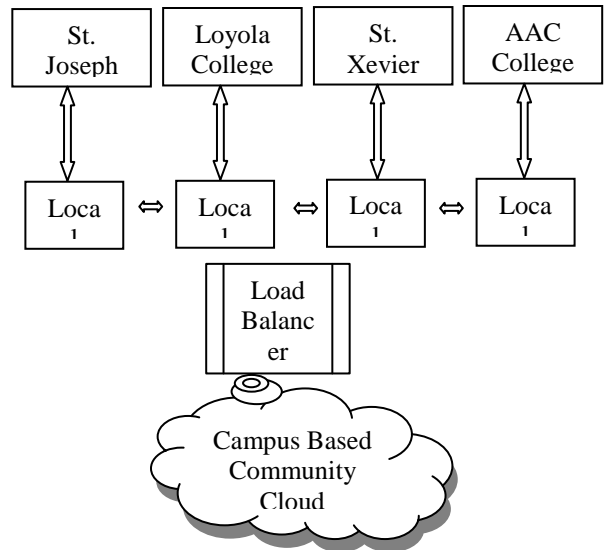## VII. CAMPUS BASED COMMUNITY CLOUD IMPLEMENTATION DIAGRAM

Fig.3: Campus Based Community Cloud Implementation Diagram

Fig.3: Depicts the proposed campus based community cloud model for Jesuit college libraries in tamil nadu. Each college library has its own local server to store data, all local server connected via load balancer to campus based community cloud server.

VIII. PROPOSED PROCEDURE FOR IMPLEMENTING CBCC

Start
Getting data from Loyola Lib & store in local server
&
Getting data from St. Joseph'c Lib & store in local server
&
Getting data from St. Xavier Lib & store in local server
&
Getting data from AAC Lib & Store in local server
&
Load Balancer
To
CBCC(Campus Based Community Cloud)
End

IX. RESULT AND ADVANTAGES OF CBCC IMPLEMENTATION

The following advantages of campus based community cloud.
- The CBCC Server is located within the campus

- Server will be controlled by the local administrator
- Intra net server will provide services in case of internet failure
- Need not depends on any services providers
- All kinds of operations can be done within the campus
- Can give 100% security for data

X. CONCLUSION & FUTURE DIRECTION

We know that library is not only a knowledge ocean; its ultimate aim is to provide satisfactory services for all the people. So in the new era, library should improve itself constantly by adopting many new IT technologies. In this paper, we attempted to propose a new model for Campus Based Community Cloud (CBCC) for Jusuit College Libraries in tamil nadu to improve current user service model by Cloud Computing using load balancing techniques.In future this CBCC model will be under gone with case studies by using all real libraries source and implement Jesuit communities.

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