

Cloud Computing and Virtualization in Association with IBM and Implementing in Galgotias University: An Introduction

Shamsu Zama Khan¹, Rishi Tiwari², Mohd Asif Khan³

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¹Assistant Librarian, Galgotias University, Greater Noida, Uttar Pradesh 203201, India.

²Librarian, Birla Institute of Management Technology, Greater Noida, Uttar Pradesh 201306, India. ³Senior Library and Information Officer, National Institute of Public Finance and Policy, New Delhi 110067, India.

Address for correspondence

Rishi Tiwari, Librarian, Birla Institute of Management Technology, Greater Noida, Uttar Pradesh 201306, India.

E-mail: rishi.tiwari@bimtech.ac.in

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Abstract

The reason for this article is to think about how and why Cloud Computing and virtual machines (VMs) related advancement situations based on cloud-based assets might be utilized to help and improve the innovative components of any association/Library. This paper accentuation about specialization in Cloud Computing and Virtualization data and IBM, it is especially a work in advancement as of now thus while the completely covers the essential innovations included, the historical backdrop of the cloud and its underlying foundations in administration arranged design and utility processing, it has plentiful extension to take in the quick changing models that are tossed out by distributed computing, cloud computing, frequently alluded to as basically "the cloud," is the conveyance of on-request registering assets, everything from applications to server farms, over the web on a compensation for use premise. The birth places of the expression "Cloud" can be followed to the covering idea of this current innovation's structure; the framework works for clients yet they truly have no clue the inalienable complexities that the framework uses. The "methods for correspondence among customer and cloud have been named middleware and depend particularly on development of pictures of virtual machines" (Andrew, 2012) spoke to as cloud image, a few libraries and different associations previously utilizing distributed computing administrations/devices and for the most part open source are accessible on Cloud. Cloud-based frameworks, as methods for finding out about PC frameworks, applications and organizing and accomplishing a comprehension of fundamental parts of both distributed computing and virtual machines, situations.

Keywords: Cloud Computing; Virtual Machines; Web Services; IBM; SaaS; Paas; and IaaS.

Introduction

Cloud Computing

Cloud Computing is one of the fastest creating perfect models in the IT business today, Cloud computing gives us techniques by which we can get to the applications as utilities, over the web. It empowers us to make, structure, and

re-try the business applications on the web. This article has been benefited for the LIS master to help them with understanding the principal to cut edge thoughts related to Cloud Computing. This paper will give you enough appreciation of Cloud Computing thoughts from where you can take yourself to an increasingly raised measure of fitness. Cloud Computing gives us techniques by

which we can get to the applications as utilities, over the Internet. It empowers us to make, plan, and adjust applications on the web. The term Cloud suggests a Network or Internet, figuratively speaking, we can say that Cloud is something, which is accessible at a remote region. Cloud can give benefits over the framework, i.e., on open frameworks or on private frameworks, i.e., WAN, LAN or VPN. Applications, for instance, email, web conferencing, customer relationship the board (CRM), all continue running in the cloud. "Cloud Computing suggests controlling, orchestrating, and getting to the applications on the web. It offers online data storing, system and application". Cloud Computing is one of the speediest creating perfect models in the IT business today. As indicated by the principle research firm IDC, generally spending on Cloud organizations will reach \$42 billion by 2012. In future with flexible resources scale up or scale down rapidly and viably to fulfil the need. The accompanying convergence of computing is in the Cloud increasingly associations need to get away from the multifaceted design of regulating server ranches and somewhat focus on their inside capacities. This suggests a regularly expanding number of associations will get cloud computing as an approach to manage their IT necessities which gives them the open door from ordinary organization of IT structure. We need not present a touch of programming on our local PC and this is the way by which the cloud computing beats organize dependence issues, from now on, Cloud Computing is making our business application compact and communitarian.

Basic Concepts

There are certain services and models working behind the scene making the cloud computing feasible and accessible to end users. Following are the working models for cloud computing:

Types of Cloud Computing

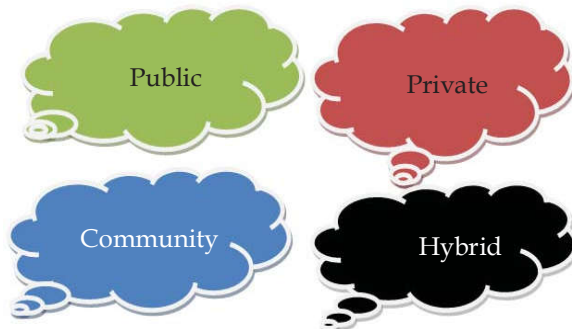


Fig. 1: Types of Cloud Computing

Types of Cloud Computing

Sending models portray the sort of access to the cloud, i.e., how the cloud is found? Cloud can have any of the four sorts of access: Public, Private, Hybrid and Community.

Public Cloud

The Public Cloud empowers systems and organizations to be successfully open to the general populace. Open cloud may be less secure because of its straight forwardness, e.g., email.

Private Cloud

The Private Cloud empowers structures and organizations to be open inside an affiliation. It offers extended security in perspective on its private nature.

Community Cloud

The Community Cloud empowers structures and organizations to be accessible by social event of affiliations.

Hybrid Cloud

The Hybrid Cloud is a mix of open and private cloud regardless; the fundamental activities are performed using a private cloud while the pointless activities are performed using open cloud.

Objectives

- To find out the concept of cloud computing..
- Find out the Models of cloud computing
- Benefits of cloud computing, SaaS, PaaS, IaaS,
- Tools of cloud computing
- Services of IBM platform.

Find out the importance of cloud computing in Libraries

Literature Review

Various study were conducted on cloud computing and library related issues such as Khan S. provide the concepts of cloud computing and emerging technology and also highlighted that how library professionals benefited to using the cloud computing technology. Pandya, investigate the implication issues of cloud computing on the basis of SOWT analysis. Mayank Yuvaraj (2017), were conducted

the research on cloud computing applications in Central Universities Libraries are using cloud computing tools in their daily library services and work. Dehmlow, Mark (2016) The article talks about the significance of successful administration of staff change in libraries in the midst of the developing pattern toward cloud or facilitated data innovation (IT) administrations. Points secured incorporate the proposition under the activity of the Office of Information Technologies of the U.S. Library Information Technology Association to move 79% of its innovation framework into the cloud and the vital methodologies created to make said progress, which incorporates preparing and venture. Before composing this article we have eluded in excess of 50 articles, we can't specify, here each article references.

Research Methodology

The birthplaces of the expression "Cloud" can be followed to the covering idea of this current innovation's structure; the framework works for clients yet they truly have no clue the inalienable complexities that the framework uses. The "methods for correspondence among customer and cloud have been named middleware and depend particularly on development of pictures of virtual machines" (Andrew, 2012) spoke to as cloud image, a few libraries and different associations.

Models of Cloud Computing

- Software as a service (SaaS)
- Platform as a service (Paas)
- Infrastructure as a service (IaaS)

Software as a service (SaaS)

Programming as a Service (SAAS) is a cloud administration giving remote access to programming and its capacities. Programming is facilitated remotely Users are not required to purchase extra equipment. Associations are not required to deal with the establishment, set-up and regular everyday upkeep and support. SAAS is regularly alluded to as programming on-request and it can be named as utilizing it on the lease as opposed to obtaining it. With conventional programming applications, it is required to buy the product bundle and introduce it on the PC before having the option to utilize it. The product is utilized to store, back-up and exchange the information. There is across the board utilization of

SAAS in light of the fact that there are generally no beginning costs included. Associations need to pay just for the measure of the extra room used. SAAS may likewise be called hosted stockpiling. Instances of SAAS are: Google, Twitter, Facebook, Flickr.

The Benefits of SaaS

No additional gear costs, pay for what you use, computerized refreshes, Accessible from any zone, you can join and rapidly start using imaginative business applications Apps and data are open from any related Personal Computer No data is lost if your PC breaks, as data is in the cloud The organization can capably scale to utilize needs

Platform as a service (PAAS) can be characterized as a processing stage in which web applications can be created quickly and effectively without the need for purchasing and keeping up the product and foundation required for it. In this equipment, working systems, storage and system limit are employed over the Internet. In PAAS, the virtualized servers and related administrations are leased by the clients to run the current applications or to create and test new applications. It is a product appropriation model in which facilitated programming applications are made accessible to clients over the Internet. With PAAS, it ends up attainable to change and update the working framework includes every now and again.

The Benefits of PaaS

Don't need to put resources into the physical framework, Teams in different areas can cooperate, Security, Adaptability.

- Create applications and get the opportunity to showcase quicker.
- Send new web applications to the cloud in minutes.
- Decrease unpredictability with middleware as an administration.
- Send and move applications to both open and private mists.

Infrastructure as a service (IaaS)

In Infrastructure as a Service (IAAS) distributed computing framework servers, stockpiling, organize and working frameworks are conveyed as an on-request administration. In IAAS, the gear used to help activities, including capacity, equipment, servers and systems administration parts. are

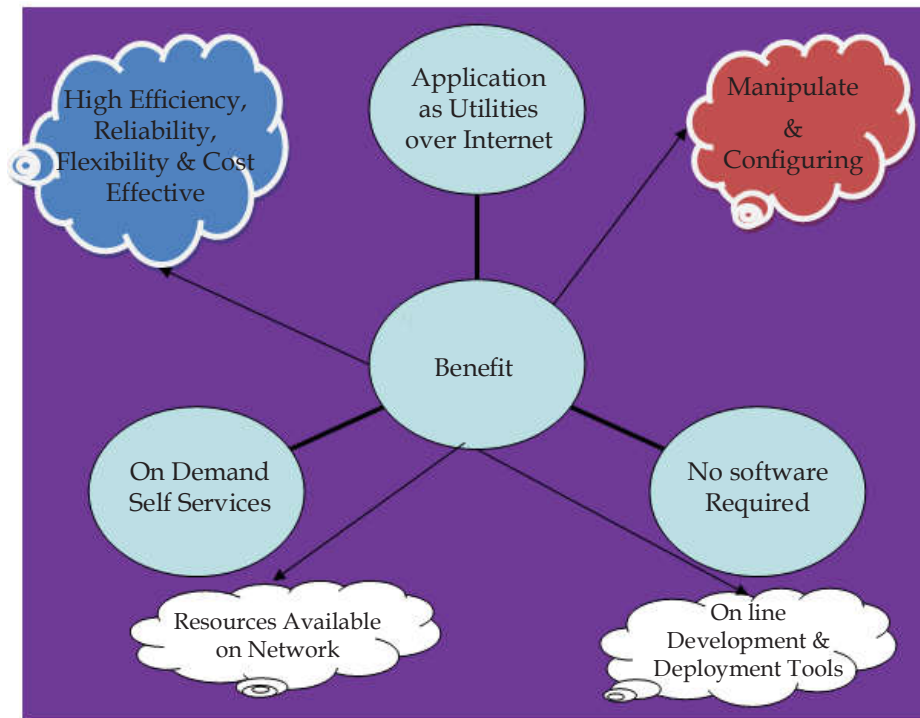


Fig. 2: Benefit of Cloud Computing

re-appropriated by associations. The hardware is claimed by the specialist organization and the duty regarding lodging, running and keeping up it additionally lies with the specialist organization. The customer commonly pays on a for each client premise. Foundation as an administration gives organizations processing assets including servers, systems administration, stockpiling, and server farm space on a compensation for every utilization premise.

The Benefits of IaaS

- No need to put resources into your very own equipment Infrastructure scales on interest to help dynamic outstanding tasks at hand
- Flexible, creative administrations accessible on interest.

Public Cloud

Open mists are claimed and worked by organizations that offer fast access over an open system to reasonable registering assets. With open cloud administrations, clients don't have to buy equipment, programming, or supporting framework, which is possessed and overseen by suppliers.

Key aspects of public cloud:

Imaginative SaaS business applications for applications going from client asset the executives (CRM) to exchange the board and information investigation

- Adaptable, versatile IaaS for capacity and PC benefits on a minute's notice.
- Ground-breaking PaaS for cloud-based application improvement and arrangement situations.

IBM public cloud

Flexibility to access the resources you need, when you need them.

Private cloud

A private cloud is establishment worked only for a single affiliation, paying little mind to whether regulated inside or by an outcast and encouraged either inside or remotely. Private clouds can adventure cloud's efficiencies, while giving more control of advantages and evading multi-residency.

Key aspects of private cloud

- A self-organization interface controls organizations, allowing IT staff to quickly course of action, allocate, and pass on-

demand IT resources.

- Highly mechanized organization of advantage pools for everything from figure ability to limit, examination, and middleware.
- Sophisticated security and organization planned for an association's specific necessities.

IBM infrastructure for private cloud

The additional level of security you want with the benefits of cloud.

Hybrid Cloud

Hybrid Cloud is a half and half cloud utilize a private cloud establishment joined with the vital combination and utilization of open cloud administrations. The fact of the matter is a private cloud can't exist in disconnection from the remainder of an organization's IT assets and the open cloud. Most organizations with private clouds will advance to oversee outstanding burdens crosswise over server farms, private clouds, and open clouds—accordingly making mixture clouds.

Key aspects of hybrid cloud

- Allows companies to keep the critical applications and sensitive data in a traditional data center environment or private cloud.
- Enables taking advantage of public cloud resources like SaaS, for the latest applications, and IaaS, for elastic virtual resources.
- Facilitates portability of data, apps and services and more choices for deployment models.

IBM Hybrid Cloud

A cross breed cloud uses a private cloud foundation united with the imperative blend and usage of open cloud organizations. The truth is a private cloud can't exist in imprisonment from the rest of an association's IT resources and the open cloud. Most associations with private mists will progress to administer remaining jobs needing to be done transversely over server ranches, private mists, and open mists—thusly making creamer mists.

Key aspects of hybrid cloud

- Allows companies to keep the critical applications and sensitive data in a traditional data center environment or private cloud.
- Enables taking advantage of public cloud

resources like SaaS, for the latest applications, and IaaS, for elastic virtual resources.

- Facilitates portability of data, apps and services and more choices for deployment models.

Cloud computing benefits

1) Flexibility (2) Efficiency (3) Strategic value

Users can scale services to fit their needs, customize applications, and access cloud services from anywhere with an Internet connection.

Efficiency

Enterprise users can get applications to market quickly without worrying about underlying infrastructure costs or maintenance.

Accessibility

Cloud-based applications and data are accessible from virtually any Internet-connected device.

Speed to market

Developing in the cloud enables users to get their applications to market quickly.

Data security

Hardware failures do not result in data loss because of networked backups.

Savings on equipment

Cloud computing uses remote resources, saving organizations the cost of servers and other equipment.

Pay structure

A "utility" pay structure means users only pay for the resources they use.

Strategic value

Cloud administrations give ventures an upper hand by giving the most creative innovation accessible.

Streamlined work

Cloud specialist co-ops (CSPs) oversee basic framework, empowering associations to concentrate on application improvement and different needs.

Regular refreshes

Specialist co-ops routinely update contributions to surrender clients the most to-date innovation.

Collaboration

Overall access implies groups can work together from broad areas.

Competitive edge

Associations can move more deftly than contenders who must give IT assets to overseeing framework.

Flexibility

Scalability

Cloud framework scales on interest to help fluctuating outstanding burdens.

Storage alternatives

Clients can pick open, private, or half and half stockpiling contributions relying upon security needs and different contemplations. Users can choose public, private, or hybrid storage offerings depending on security needs and other considerations.

Control choices

Organizations can determine their level of control with as-a-service options. These include software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS).

Tool selection

Users can select from a menu of prebuilt tools and features to build a solution that fits their specific needs.

Security features

Virtual private cloud, encryption, and API keys help keep data secure.

International Business Machines Corporation

IBM is an American worldwide innovation organization headquartered in Armonk, New York, United States, with tasks in more than 170 nations. The organization started in 1911 as the Computing-Tabulating-Recording Company (CTR) and was renamed "Global Business Machines" in 1924. IBM

fabricates and advertises PC equipment, middleware and programming, and offers to facilitate and counselling administrations in zones going from centralized server PCs to nanotechnology. IBM is likewise a noteworthy research association, holding the record for most licenses produced by a business (starting at 2017) for 24 back to back years. Developments by IBM incorporate the mechanized teller machine (ATM), the floppy plate, the hard circle drive, the attractive stripe card, the social database, the SQL programming language, the UPC standardized tag, and dynamic arbitrary access memory (DRAM). Nicknamed Big Blue, IBM is one of 30 organizations incorporated into the Dow Jones Industrial Average and one of the world's biggest managers, with (starting at 2016) almost 380,000 representatives. Known as "IBMer", IBM workers have been granted five Nobel Prizes, six Turing Awards, ten National Medals of Technology and five National Medals of Science. IBM has a huge and different arrangement of items and administrations. Starting in 2016, these contributions fall into the classifications of cloud computing, psychological computing, business, information and examination, Internet of Things, IT framework, portable, and security. IBM Cloud incorporates foundation as an administration (IaaS), programming as an administration (SaaS) and stage as an administration (PaaS) offered through open, private and cross breed cloud, conveyance models. For example, the IBM Blue blend PaaS empowers designers to rapidly make complex sites on a compensation as-you-go model. IBM Soft Layer is a committed server, oversaw facilitating and cloud computing supplier, which in 2011 revealed facilitating in excess of 81,000 servers for in excess of 26,000 clients. IBM likewise offers Cloud Data Encryption Services (ICDES), utilizing cryptographic part to verify client information. IBM likewise has the business wide cloud computing and versatile advances meeting Inter Connect every year. Research has been a piece of IBM since its establishing, and its sorted out endeavors follow their foundations back to 1945, when the Watson Scientific Computing Laboratory was established at Columbia University in New York City, changing over a revamped society house on Manhattan's West Side into IBM's first lab. Presently, IBM Research comprises the biggest mechanical research association on the planet, with 12 labs on 6 mainland's. IBM Research is headquartered at the Thomas J. Watson Research Center in New York, and offices incorporate the Almaden lab in California, Austin lab in Texas, Australia lab in Melbourne, Brazil lab in São Paulo and Rio de

Janeiro, China lab in Beijing and Shanghai, Ireland lab in Dublin, Haifa lab in Israel, India lab in Delhi and Bangalore, Tokyo lab, Zurich lab and Africa lab in Nairobi. As far as speculation, IBM's R&D spend sums a few billion dollars every year. In 2012, that consumption was around \$6.3 billion USD. Ongoing assignments have included \$1 billion to make a specialist unit for Watson in 2014 and \$3 billion to make a cutting edge semiconductor alongside \$4 billion towards developing the organization's "vital objectives" (cloud, investigation, versatile, security, social) in 2015.

IBM Services

| | |
|--|---|
| <i>Mobility Services</i> Plan your methodology, ménage gadgets and end clients applications and related system foundation. Get some answers concerning Mobility Services | <i>Networking Services</i> Design, implement and manage integrated communications and networking environments ➤ Find out about Networking Services |
| <i>Resiliency Services</i> Flexibility Services Keep up business applications no issues the conditions Get some answers concerning Mobility Services | <i>Systems services</i> Construct and deal with the exceptionally effective foundation to react to change and drive development ➤ Get some answers concerning Systems Services |
| <i>Technology Support Services</i> Disentangle the executives and streamline upkeep of IBM and multi-seller conditions • Get some answers concerning Technology Support Services | <i>Outsourcing and management Services</i> Designing your business for advancement and development while driving primary concern benefits • Get some answers concerning Outsourcing and the executives Services |

Research

Acclaimed creations and improvements by IBM incorporate the Automated teller machine (ATM), Dynamic arbitrary access memory (DRAM), the electronic keypunch, the money related swap, the floppy circle, the hard plate drive, the attractive stripe card, the social database, RISC, the Saber carrier reservation framework, SQL, the Universal Product Code (UPC) standardized tag, and the virtual machine. Also, in 1990 organization researchers utilized a checking burrowing magnifying instrument to mastermind 35 singular xenon iota's to illuminate the organization abbreviation, denoting the main structure amassed one molecule at any given moment. A noteworthy piece of IBM look into is the age of licenses. Since

its first patent for a traffic flagging gadget, IBM has been one of the world's most productive patent sources. In 2017, the organization holds the record for most licenses created by a business, stamping 24 continuous years for the accomplishment.

Five IBMers have received the Nobel Prize

1. *Leo Esaki*, for the work of semiconductors in 1973.
2. *Gerd Binnig and Heinrich Rohrer*, checking burrowing magnifying instrument.
3. *Georg Bednorz and Alex Müller*, for research and intensive work in superconductivity.
4. Several IBMers have also won the Turing Award, including the first female recipient Frances E. Allen.

Virtualization is a procedure, which permits sharing single physical occurrence of an application or asset among numerous associations or occupants (clients). It does as such by doling out a legitimate name to a physical asset and giving a pointer to that physical asset when requested. In software engineering, full virtualization is a virtualization system used to give a particular sort of virtual machine condition, to be specific, one that is a finished recreation of the basic equipment. Full virtualization necessitates that each remarkable element of the equipment be reflected into one of a few virtual machines including the full guidance set, input/yield activities, intrudes on, memory get to, and whatever different components are utilized by the product that keeps running on the uncovered machine, and that is planned to keep running in a virtual machine. In such a domain, any product equipped for execution on the crude equipment can be kept running in the virtual machine and, specifically, any working frameworks. The conspicuous trial of full virtualization is whether a working framework planned for remain solitary use can effectively keep running inside a virtual machine.

Salient Benefits

Create, test and emphasize at speed with Dev Ops.

Open existing information and applications through half breed incorporation.

Concentrate further understanding by getting to amazing information and examination.

Fabricate comprehension and learning with intellectual arrangements.

Put the correct remaining burden in the perfect

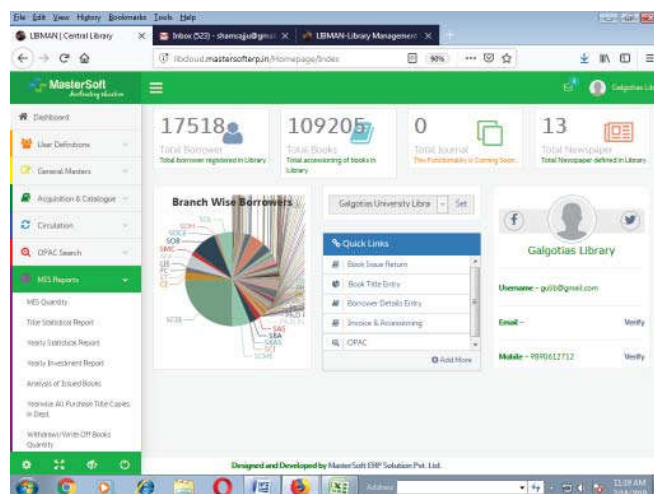


Fig. 3: Library cloud (Mastersoft Libman Library Management Systems)

spot with decision and consistency.

IBM Cloud ensures seamless integration into public and private cloud environments. The infrastructure is secure, scalable and flexible, providing customized enterprise solutions that have made IBM Cloud the hybrid cloud market leader.

Galgotias University, (Master Soft) Cloud Library management system software, these are the following modules of library management systems

- Acquisition and Cataloguing
- Serial Control
- Circulation
- MIS Reports
- OPAC
- M-OPAC

The most ideal approach to keep up, compose and handle incalculable books methodically is to actualize a library the board framework programming. This framework totally computerizes all your library's exercises. We can discover books in a moment, issue/reissue books rapidly and deal with every one of the information proficiently and efficient utilizing this framework. It likewise gives moment and exact information with respect to a book, in this way sparing a great deal of time and endeavors.

This screenshot shows that all the information relating to the library is displayed on the screen, we can say that it's a library at glance, when we enlarge the picture, we find out the numbers of books available in the library, number of issued books in left hand top corner, total number of news papers subscribed by the library in right hand top corner apart from this we

can find out the branch wise borrowers details in the centre of the screen and left hand side of drop box, point wise shows the Dashboard, User Definitions, general masters, Acquisition and cataloguing, circulation, OPAC, MIS reports,

LIB-MAN: is a profoundly incorporated, easy to understand and perfect framework for complete computerization of all the in-house tasks of any size or kind of library. The library the board programming is natural, proficiently and consistent. Lib-Man is installed with multilingual text styles, Barcode and QR Code textual styles. The product created in meeting with productive senior library experts is right now being utilized by upwards of 500 libraries. The customer server rendition of Lib-Man is installed with free Devanagari Fonts. It underpins all the most recent advances which incorporate cloud facilitating, cell phone, tablets, SMS, email, UHF RFID, instalment passage, and so forth.

Salient Features of Library Management Software

Hundred percent affirmation for import of other library programming information into LIB-MAN

- Mark standard information import/send out
- Book information bringing from ISBN site and Google API spares information passage time
- Supports EBook transferring and perusing
- Follows all library most recent norms, for example, Marc 21, library congress principles, AACR2
- Fully verified and support free

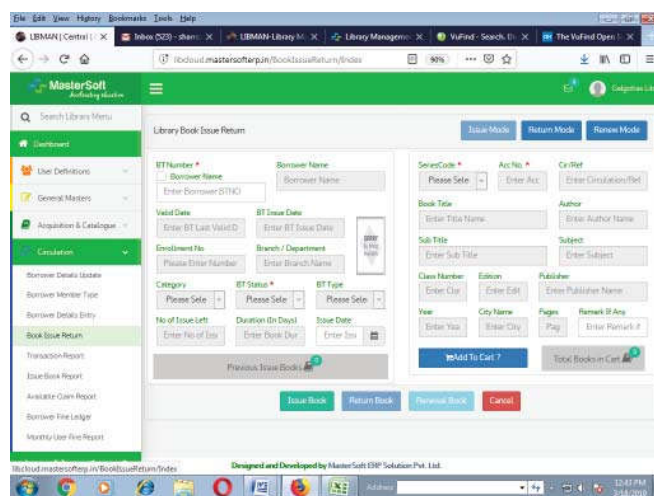


Fig. 4: Library cloud Circulation (Master soft Libman Library Management Systems)

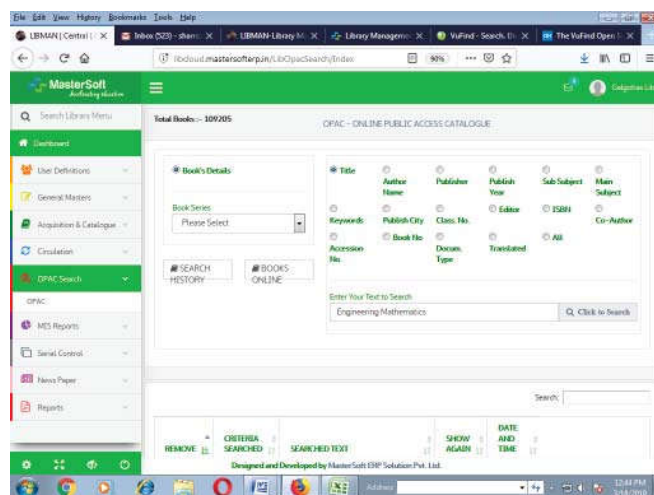


Fig. 5: Library cloud OPAC (Master soft Libman Library Management Systems)

- Best on location preparing and administration support
- Fully recorded client manual
- Best reinforcement and recuperation
- Reports/information fare to word, exceed expectations, PDF, content
- No duplication of work
- No limitations and no shrouded expenses
- No maximum breaking points on number of reports/Journals and passages
- Reports on laser/inkjet printers
- User characterized benefits

An Online Public Access Catalog (OPAC) is the best case of distributed computing innovation utilized in the present day or computerized libraries.

OPAC gives the total bibliographic subtleties of the accumulation of a library to its clients. A client can recover the reports from the OPAC via looking through the name of creator, title, call number, or ISBN and so on. In the basic inquiry, the alternative client can look through the record either by giving the definite key or the initial couple of letters of the hunt key. A blend of inquiry terms is additionally conceivable with the utilization of Boolean administrators. Moreover, the OPAC gateway may incorporate different highlights for clients like data about obtained reports changing their location subtleties, paying fines, reservations, and so forth, in addition nowadays very much popular, M-OPAC, today benefactors are required to visit a library and utilize manual Kardex or OPAC terminal to seek book subtleties. Not very many libraries offer web-based OPAC - BookSearch. Additionally, benefactors

gain admittance to information about just a single Library where he is enlisted. So there is no basic stage where every single overall library can impart their information to supporters and a worldwide web crawler for benefactors to look for books from everywhere throughout the world. Understudies today anticipate quick, individual, simple access to data in regards to things accessible in the library on their cell phones. They need versatile access to library frameworks and then some. To fulfill these needs, M-OPAC of portable upgrades explicitly intended to meet the one of kind needs of Patrons/ Students/Libraries.

Conclusion

This investigation gives cloud computing ideas and ramifications of cloud-based applications in libraries so as to improve their administrations in a progressively effective way. Presumably, libraries are moving towards cloud computing innovation present in time and exploiting cloud-based administrations particularly in structure advanced libraries, interpersonal organization and data correspondence with complex adaptabilities however a few issues identified with security, protection, dependability and legitimate issues were as yet not completely settled. In this manner, it is the ideal opportunity for libraries to think genuinely before clubbing libraries administrations with cloud-based innovations and give solid and fast administrations to their clients. Another job of LIS experts in this virtual period is to make cloud-based administrations as a solid medium to spread library administrations. These days LIS experts directing gatherings or workshop on Digital Libraries, Virtual Libraries they are utilizing cloud-based administrations.

Cloud computing offers such propelled cell phones that have rich Internet media experience and require less taking care of, less impact. In term of Mobile Cloud Computing, planning is done in the cloud, data is secured in the cloud. Likewise, the phones fill in as a media for the exhibit. Today propelled cells are used with rich cloud benefits by planning applications that eat up web organizations. These web organizations are sent in the cloud. There are a couple Smartphone working structures open, for instance, Google's Android, Apple's iOS, RIM BlackBerry, Symbian, and Windows Mobile Phone. All of these stages support outcast applications that are sent in cloud.

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