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CLOUD COMPUTING IN LIBRARIES

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Abstract: Technological development has brought a dramatic change in every field. These changes also impacted to the libraries.. Cloud computing is currently usually accustomed describe the delivery of package, infrastructure and storage services over the web. Libraries are updating towards cloud computing technology for upgrading digital libraries. This article provides brief information about the basic concept of cloud computing and how its enhanced to the library services.

Key Words: Cloud computing, Models, Libraries, Technology, Service

Introduction:

Computing itself, to be thought of completely virtualized, ought to computers to be engineered from distributed parts like process, storage, data, and software system resources. Technologies such as cluster, grid, and now, cloud computing, have all geared toward permitting access to massive amounts of computing power in a very totally virtualized manner by aggregating resources and offering a single system view. Utility computing describes a business model for on-demand delivery of computing power; consumers pay providers based on usage (“payas-you-go”), the same as the means within which we have a tendency to presently get services from traditional public utility services such as water, electricity, gas, and telephony.

Cloud computing has been coined as an associate degree umbrella term to class of subtle on-demand computing services at the start offered by business suppliers ,like Amazon, Google, and Microsoft. It indicates a model on which a computing infrastructure is viewed as a “cloud,” from that businesses and peoples access applications from anywhere in the world on whenever required . The main principle behind this model is giving computing, storage, and software “as a service.”

What is cloud computing?

The cloud image is often accustomed represent the web.. Cloud computing is now commonly used to describe the delivery of software, infrastructure and storage services over the web. Users of the cloud will like different organizations delivering services related to their information. software and other computing needs on their behalf, without the need to own or run the standard physical hardware (such as servers) and software (such as email) themselves. Cloud computing is that future stage inside the evolution of the cyberspace , it provides the means through which everything — from computing power to computing infrastructure, applications and business processes---are often delivered to you as a service where and whenever you need them.

Benefits of Cloud Computing

Pay-per-use – Each client has unlimited access to the cloud services and that we ought to acquire solely what we have used.

Better security – The Cloud Service Providers (CSPs) have higher security professionals than US agency we might-rent additionally the CSPs perform frequent security checks.

Easily manageable – The corporate US agency opted for cloud needn't worry regarding the management of the cloud system result of the because the CSPs beware of it

Elasticity – The method of adding and reducing the amount of needed services from the CSP might be simply altered in step with the demand.

Migration flexibility – Sure employment are often captive to and from the cloud by the shoppers to completely different cloud platforms This is done to induce value savings or use new services as and after they emerge.

Easier disaster recovery – It is terribly straightforward to line up and manages a cloud based disaster recovery system. Instead of dawdling on backing up and re-uploading once information is lost,, the cloud automates the entire process ensuring fast and error-free data recovery.

Self-service provisioning – It is additionally referred to as cloud self-service wherever users will in a very Cloud Computing atmosphere setup and launch applications and services.

Workload resilience – Often outages happen on the data in a data center of a region but good CSPs store the copies of the same dataset in varied geographic regions to ensure availability. So albeit the employment concerning a cloud client gets destroyed then from the opposite regions this same information is retrieved.

Components of Cloud computing

Cloud computing consists of various components. Each of these components have to be optimized for a secured and well-functioning application for cloud computing.

Application

The service is often thought as the application. Although it is partly correct given the fact that it provides the functions, the application is completely different as a result of it is through the application that the service is realized. This is where the software developers have to focus in terms of making certain the applying can work of course. Optimization of the application is based on the actual coding of developers. Through extensive testing on load handling, security and functionality, the application can work as expected.

Platform

In regular websites or applications that do not deal with cloud computing, the application is directly connected to the server. In cloud computing, the appliance continues to be launched to a different application referred to as the Platform. The platform sometimes comes because the programming language such as Ajax (Asynchronous JavaScript and XML) or Ruby on Rails. At this point, those who opt to seek cloud computing providers will have to follow the set programming languages that would be run within the platform. Although most programming languages could be launched in different platforms, a powerful application with real time updating capability is a must for cloud computing.

Storage

Everything that the application knows and the functions that could be provided by the service are possible through storage. The storage holds pertinent data and information on how they will be implemented. Optimization on storage is based on how the storage facility is protected from different attacks and the availability of back-up. Cloud Computing is always

about consistency and accessibility of service which is able to naturally need the storage to be available all the time.

Infrastructure

Each function, service and the ability of storage to provide the needed data is only possible through optimized infrastructure. This could be thought about the platform behind the storage because infrastructure helps the storage subsume load issues. The infrastructure is a platform wherein it weighs the ability of the storage against the number of requests. The infrastructure has the ability to make some changes by load balancing and smooth management.

Types of Cloud Computing

Public cloud

This type of cloud computing is that the ancient model that everyone thinks of once they envision cloud computing. In this model, vendors dynamically allocate resources (hard drive space, RAM, and processor power) on a per-user basis through net applications.

Unlimited access- As long as you have net access and a compatible device like a smart phone or laptop personal computer, you can access your data anywhere.

Unlimited knowledge capacity- Public cloud computing is versatile to satisfy your business' growing data storage and processing needs.

Hybrid cloud

This model combines business' hardware with cloud computing. Generally, one of the business applications like as Exchange Server 2007 or Microsoft Dynamics can act with a vendor-hosted service. For example: Cisco, traditionally recognized for networking hardware, offers IronPort Email Security as their hybrid resolution and Google, known for hosted solution, offers Postini email archiving.

- **Hardware:** Hybrid cloud computing requires that you have or purchase hardware to interact with the hosted solution.

- **Software:** In addition to hardware requirements, business will need to have or purchase the software to manipulate and store data.

Private cloud

Also referred to as "internal cloud computing", Private cloud computing is the next generation

of virtualization. While kind of like virtualization at the server, workstation and application levels, private cloud computing has increased options that charm to several businesses. Two examples of private cloud solutions are VMware vCloud and Citrix VDI.

- **Increased data security**-The business' are in control of security since data never leaves the network.

- **Simple compliance enforcement**- Depending upon the vertical market, government regulations may prohibit business' from using traditional or hybrid cloud computing. Private cloud computing permits to take advantage of cloud computing features while keeping all regulated data onsite and secure.

- **Customized IT network control**- By keeping the cloud private, they are free to customize their network to meet their specific business needs.

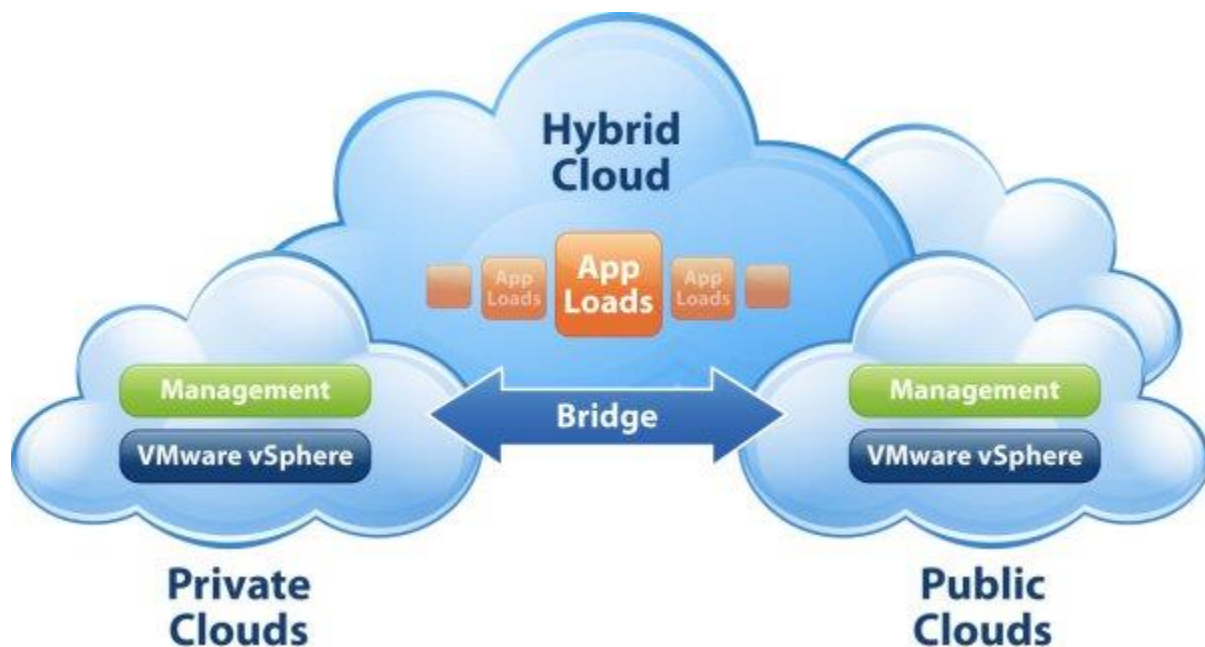


Fig .01 Types of Cloud computing.

CLOUD MODELS

Cloud computing entrust remote services with the user's data, software and computation.

It is separated into two distinct sets of models according to widely accepted NIST demarcation:

Deployment models (four types):- Private, Community, Public and Hybrid, the four types of deployment models refers to location and management of cloud's infrastructure

Service models (three types): – SAAS, PAAS and IAAS the three different service models taken together are known as SPI Models of cloud computing. These consist of the particular types of services that can be accessed on a cloud computing platform.

Deployment Models

Private cloud. The cloud infrastructure is operated for exclusive use by a single organization comprising multiple consumers. It may be present either on or off premises and owned, managed, and operated by the organization, or a third party, or some combination of them.

Community cloud. Community clouds are stipulated for exclusive use by a particular community of consumers from organizations that have shared issues.

Public cloud. An tutorial, government, or business organization, or a combination of them can own and operate a Public cloud. It exists on the premises of the cloud provider and is opened for the use of general public.

Hybrid cloud. A hybrid cloud is a combination of public, community or private cloud. It is also known as combined cloud. In hybrid cloud, non public and public clouds retain their distinctive identities but are bound together by standardized or proprietary technology that enables data and application portability. An example of hybrid cloud is Google Apps.

Service Models:

SaaS: Computer as a Service For SaaS, the service supplier hosts the computer code therefore you don't got to install it, manage it, or obtain hardware for it. All you got to try and do is connect and use it. SaaS examples in embrace customer relationship management (CRM) as a service; email; supply computer code order management software; payroll software; and other

software that is hosted on the web and not physically installed on your computer. Software as a Service (SaaS) is wherever most businesses begin their journey to cloud computing; generally beginning with the remote delivery of email and online backup of business data. Software as a Service has its roots within the Nineteen Sixties with ASPs (Application Service Providers) UNA hosted and managed specialized business applications. They reduced cost through central administration.

PaaS: Platform as a Service Platform as a Service is where your operating system (such as Windows, Android, BSD, iOS, Linux, Mac OS X and IBM z/OS) is hosted “in the cloud”, instead of being physically put in on your own hardware. The PaaS layer offers normal remote services with that developers will build applications on high of the PC infrastructure. This may embrace developer tools that area unit offered as a service from that to create services, data access and database services, or billing services.

IaaS: Infrastructure as a Service IaaS is wherever physical server house is rented and unbroken at a vendor’s information warehouse. As the customer, you can install any legal software to the server and allow access to your staff and clients as you see fit. The IaaS layer offers storage and computer resources that developers and IT organizations can use to deliver business solutions. Infrastructure as a Service is the most simple variety of cloud. Users rent space for storing, firewalls, and any other forms of hardware and software. As the client, you are responsible for every aspect of the hardware from the operating system (OS) through to the applications that are built and run on it. Applications area unit developed either by the client, or by another vendor. There are different packages offered by vendors of cloud services, offering differing levels of integration. The most basic supply simply the hardware, such as server space, whilst more comprehensive offerings include service maintenance.

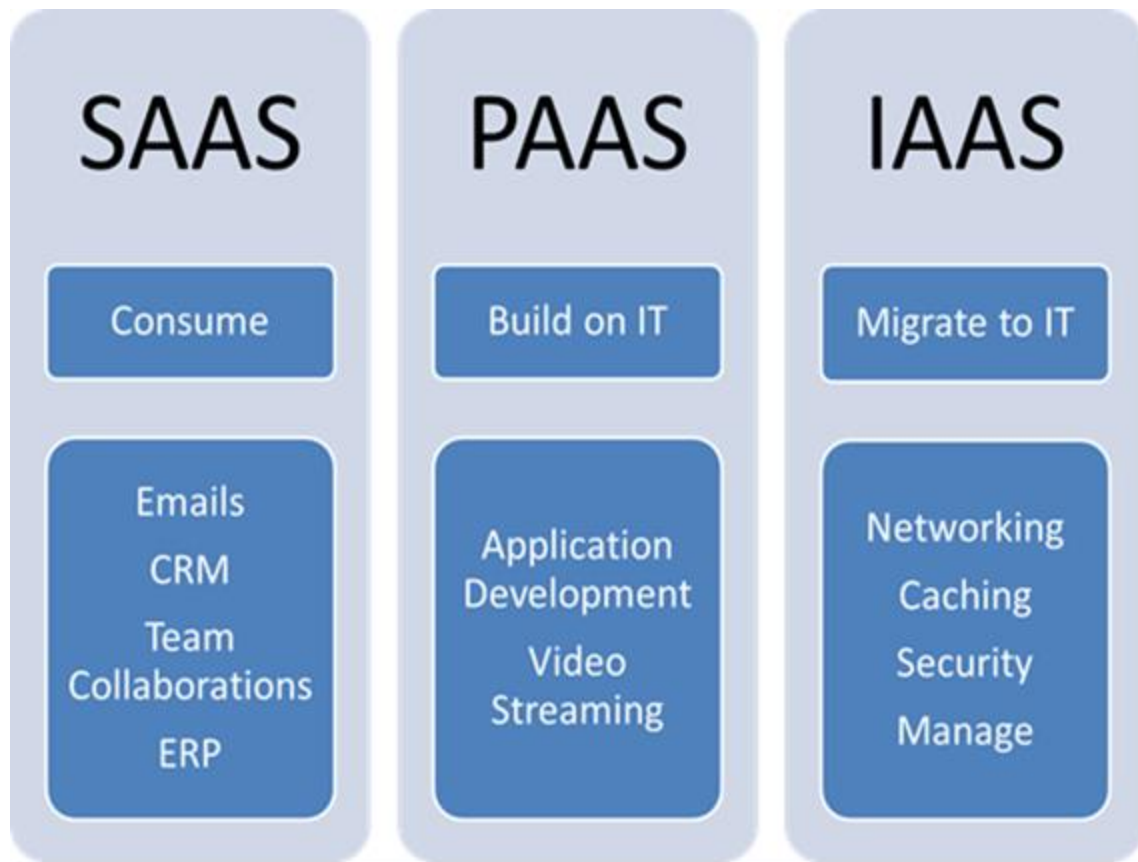


Figure No. 2 Cloud Models

Advantages of Cloud Computing

Cloud-based computer code offers corporations from all sectors variety of advatages, including the ability to use software from any device either via a native app or a browser. As a result, users can carry their files and settings over to other devices in a completely seamless manner. Cloud computing is way quite simply accessing files on multiple devices. Thanks to cloud computing services, users can check their email on any computer and even store files using services such as Dropbox and Google Drive. Cloud computing services also make it possible for users to backup their music, files, and photos, ensuring those files are immediately available in the event of a hard drive crash.

It also offers big businesses huge cost-saving potential. Before the cloud became a viable various, companies were required to purchase, construct, and maintain costly information

management technology and infrastructure. Companies will swap expensive server centers and IT departments for quick net connections, where employees interact with the cloud online to complete their tasks.

The cloud structure permits peoples to save lots of cupboard space on their desktops or laptops. It conjointly lets users upgrade computer code additional quickly as a result of computer code corporations offers their products via the online instead through additional ancient, tangible methods involving discs or flash drives. For example, Adobe customers can access applications in its Creative Suite through an Internet-based subscription. This allows users to transfer new versions and fixes to their programs simply.

Disadvantages of Cloud Computing

With all of the speed, efficiencies, and innovations associate with cloud computing, there square measure naturally risks. Security has continuously been a giant concern with the cloud particularly once it comes to sensitive medical records and financial information. While rules force cloud computing services to shore their security and compliance measures, it remains associate degree in progress issue. Encryption protects important info, but if that encryption key is lost, the data disappears

Servers maintained by cloud computing firms could fall victim to natural disasters, internal bugs, and power outages, too. The geographical reach of cloud computing cuts each ways: A blackout in golden state may paralyze users in New York, and a firm in Texas could lose its data if something causes its Maine-based provider to crash.

As with any technology, there is a learning curve for both employees and managers. But several peoples accessing and manipulating info through one portal, inadvertent mistakes can transfer across an entire system.

Applications of Cloud Computing In Libraries

Libraries square measure shifting their services with the attachment of cloud and networking with the facilities to access these services anyplace and anytime. In the libraries, the following possible areas were identified where cloud computing services and applications may be applied:

Building Digital Library/Repositories : In the gift state affairs, every library needs a digital library to make their resources, information and services at an efficient level to ensure access via the network. Therefore, each library is has a digital library that developed by mistreatment any digital library computer code. In connection to cloud based digital library software, Duraspace is having two software's namely Dspace and Fedora Commons but Dspace is widely used for building digital libraries/ repositories relative to Fedora Commons. Dura cloud provides complete solutions for developing digital libraries/ repositories with standard interfaces and open source codes for the both software.

Searching Library Data : OCLC is one of the simplest example for creating use of cloud computing for sharing libraries information for years along. For instance, OCLC World Cat service is one of the popular service for searching library data now is available on the cloud. OCLC is offering numerous services pertain to circulation, cataloguing, acquisition and other library related services on cloud platform through the web share management system. Web share management system facilitates to develop an open and collaborative platform in which each library can share their resources, services, ideas and problems with the library community on the clouds. On the opposite hand, the main aim of web- scale services is to provide cloud based platforms, resources and services with value profit and effectiveness to share the infomation and building the broaden collaboration in the community.

Website Hosting :Website hosting is one of the earliest adoptions of cloud computing as several organizations as well as libraries most liked to host their websites on third party service suppliers instead of hosting and maintaining their own servers Google Sites serves is associate in nursing example of a service for hosting websites outside of the library's servers and leaving for multiple editors to access the site from varied locations. Searching Scholarly Content Knimbus is cloud primarily based analysis platform facilitates to find and share the bookish content. Knimbus stands for information cloud that is devoted to information discovery and cooperative are for researchers and scholars. Knimbus was started its journey in 2010 by the entrepreneurs Rahul Agarwalla and Tarun Arora to address challenges faced by researchers in searching across and accessing multiple information sources. Knimbus is currently used in over 600 tutorial establishments and R&D labs by students, researchers and scientists additionally as over 50,000 researchers. Knimbus is a cooperative platform for researchers to find and share information with

peers and facilitates to search out and access immeasurable journal articles, patents and e-books, for the users tagging, sharing and discussing of these contents with their peers. At present, Knimbus planned a free offer to get registered to empower the libraries for dynamic looking out and additionally for single purpose search interface, maximizes the usage of all e-resources, customized search across selected sources reduces noise and highlights relevant content and tools to support the whole analysis lifecycle. Currently, Information and Library Network (INFLIBNET) Centre (<http://www.inflibnet.ac.in>) has been incorporated Knimbus cloud service into its UGC INFONET Digital Library Consortium in order to search and retrieve scholarly contents attached therein.

File Storage :To access any files on the net, cloud computing gift range of services such as Flickr, Dropbox, Jungle Disk, Google Doc, Sky Drive and so on. These services virtually share the files on the web and provide access to anywhere and anytime without any special software and hardware. Therefore, libraries will receive advantages of such cloud primarily based services for varied functions . For instance, LOCKSS (Lots of Copies Keeps Stuff Safe), CLOCKSS (Controlled LOCKSS) and Portico tools are extensively used for digital preservation purpose by libraries and other organizations.

Library Automation: For library automation purpose, Polaris provides variant cloud based services such as acquisitions, cataloguing, process system, digital contents and provision for inclusion of cutting edge technologies used in libraries and also supports various standards like as MARC21, XML, Z39.50, Unicode and so on which directly related to library and information science area. Apart from this, these days several of the software vendors like as Ex-Libris, OSS Labs also are providing this service on the cloud and third party services providing hosting of this service (SaaS approach) on the cloud to save lots of libraries from finance in hardware for this purpose. Besides cost-benefit, the libraries are free from taking maintenance viz. software updates, backup and so on

Conclusion:

Cloud computing is an approach for this move into the future libraries. It can bring several advantages for libraries and give them a different way of knowledge. Cloud computing solutions can simplify the way in which your library operates, particularly in terms of hardware needs. Through a cloud solution you are able to connect and access the identical data – however currently you will connect from anyplace and luxuriate in a lot of efficient technology installation,

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