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IN OR AFTER COVID-19 PANDEMIC IN THE WORLD**

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BANKING AND CLOUD COMPUTING

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ABSTRACT

Cloud computing is an emerging technology in future times. Business applications have become the largest market for cloud services. The biggest problem in the current scenario in banking is that the banking sector is booming and for that continues changes are occurring for that, the high cost of implementing advanced technologies and the efficient use of hardware is necessary. A large number of banks are now adopting clouds technology to fulfil their needs. This paper provides an insight into how cloud computing can be effectively used through Banking sector.

Keywords: Cloud Computing, Banking, Banking Services, Security

INTRODUCTION

In the banking industry, digitization essentially means making banking smooth and easier for customers. In recent years, use of digital banking has increased. Most private banks and public sector banks are focused on offering new technology-based services such as mobile banking, mobile banking apps and e-wallets to their customers. The biggest advantage of digital channeling in banking is its ability to provide new plan, changes and customer specific business models by analyzing the banking pattern that maximize customer value.

Indian banks are facing extensive changes in their banking processes due to rapid development of technology. Banks of all sizes in India have understood the importance of cloud based banking services and how these services can aid their issues. Earlier banks had to contact an IT personnel to provide additional applications and compute power which was very time consuming and would delay the decision making process. Therefore, these days IT will no longer be seen as a complex scenario and banks have started recognizing the opportunity and scope of cloud computing services.

OBJECTIVES

- 1) Provides overview of cloud computing in banking sector.
- 2) To know about the mechanism of cloud computing in banking sector.
- 3) Emphasizes on advantages and challenges of using cloud technologies in the banking sector.

WHAT IS CLOUD COMPUTING?

Cloud Computing is an on-demand delivery of compute, storage, applications, and other IT infrastructure with metered payment based on usage. Cloud computing is an emerging Internet-based computing technology, where a large pool of systems are connected through private or public networks, to provide dynamically scalable infrastructure for applications, data and file storage. Cloud computing is one of the most exciting technologies used these days. Its ability to reduce costs associated with

services while increasing flexibility and scalability for computer processes are well-known.

By using Cloud Computing, banks and payments institutions around the world are optimizing operations that range from customer service delivery models to risk management and construct a foundation for long-term growth and innovation. Cloud computing offers access to a wide ecosystem of consulting and technical partners and business solutions that maximize its performance. Banks can scale employee resources as needed and pay for what they used, without large upfront capital investments.

Cloud computing technology provides three fundamental services which are...

(1) Infrastructure as a Service (IaaS), (2) Platform as a Service (PaaS), (3) Software as a Service (SaaS), and which can be deployed on top of Public, Private and Hybrid cloud models.

(1) Infrastructure as a Service:

A pool of equipment including operating system, servers, virtual storage, data centers etc. AWS EC2, Rackspace, Google Compute Engine (GCE), Digital Ocean etc. are the IaaS providers.

IaaS Advantages:

Maintaining on premise IT infrastructure is costly and labor-intensive. It often requires a significant initial investment in physical hardware, and then you will probably need to engage external IT contractors to maintain the hardware and keep everything working and up-to-date.

(2) Platform as a Service:

PaaS providing computing environment as a service to the customers to develop applications so they not need to purchase any other tools, hardware and software to develop application or software which make this service more convenient for developer. Google's App Engine, Force.com AWS Elastic Beanstalk, Heroku, Windows Azure (mostly used as PaaS), OpenShift, Apache Stratos, Force.com, Magento Commerce Cloud, etc are the PaaS providers.

PaaS Advantages:

PaaS is primarily used by developers who are building software or applications. It provides platform for developers to create unique, customizable software. This means developers don't need to start from scratch when creating applications, saving them a lot of time and money on writing extensive code. PaaS is a popular choice for businesses who want to create unique applications without spending more money or taking on all the responsibility.

(3) Software as a service:

SaaS platforms make software available to users over the internet. SaaS is an "on-demand software" service where the required software is provided to the end users as an application to run on their systems through Internet. Today, SaaS is offered by companies such as Google Apps, Microsoft, Zoho, BigCommerce, Salesforce, Dropbox, MailChimp, ZenDesk, DocuSign, Slack etc.

SaaS Advantages:

With SaaS, you don't need to install and run software applications on any computer. Everything is available over the internet when you log in to your account online. You can usually access the software from any device, anytime with an internet connection. The same goes for anyone else using the software. All your staff will have personalized logins, suitable to their access level.

TYPES OF CLOUD DEPLOYMENT

Cloud deployment explains how cloud platform is implemented, how it's hosted, and who has access to it. All cloud computing deployments operate on the same principle by

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virtualizing the computing power of servers into segmented, software-driven applications that provide processing and storage capabilities.

1) **Public Cloud:**

A public cloud provides services like applications or storage to the public including individuals. Customers have no control over the location of the infrastructure. The examples of public cloud includes email, dropbox, office 365 etc.

2) **Private Cloud**

It is a cloud-based infrastructure used by stand-alone organizations. It offers greater control over security. Private clouds are perfect for organizations that have high-security requirements, high management demands, and availability requirements.

3) **Community Cloud**

It is a mutually shared model between organizations that belong to a particular community such as banks, government organizations, or commercial enterprises. Community members generally share similar issues of privacy, performance, and security. This type of deployment model of cloud computing is managed and hosted internally or by a third-party vendor.

4) **Hybrid cloud:**

A combination of both public and private clouds together is termed as Hybrid Cloud. it includes advantages of both cloud public as well as private. In the hybrid cloud, it offers applications as per the requirement of issues depending on their critical and non-critical standards. Critical applications can be confined to the private cloud and noncritical applications into the public cloud.

Cloud computing in banking in banking sector

Cloud computing provides wide range of services to bank

- Core Banking
- ATMs
- Document Management System
- Electronic Know Your Customer
- Anti-Money Laundering (AML)
- Asset Liability Management
- Applications in Banking and Insurance segment



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- **Adding to this the managed and supported services are:**

- Immediate Payment Service
- Unified Payments Interface (UPI)
- Financial Inclusion services
- Bill Payment Service
- Automated Clearing House,
- National Payments Corporation of India,
- Cheque Truncation System

- ❖ **Core Banking**

A core banking system is the software used to support a bank's most common transactions. Core banking system is a system that processes daily banking transactions and updates to accounts and other financial records. In simple terms, core banking refers to the systems that facilitate virtually every transaction for a bank.

Core banking systems typically includes

- Opening new accounts.
- Processing cash deposits and withdrawals.
- Processing payments and cheques.
- Calculating interest.
- Customer relationship management (CRM) activities.
- Managing customer accounts.
- Establishing criteria for minimum balances, interest rates, number of withdrawals allowed and so on.
- Establishing interest rates.
- Maintaining records for all the bank's transactions.

- ❖ **ATMs**

The full form of ATM is Automated Teller Machine. ATM is an electro-mechanical machine that is used for making financial transactions from a bank account. These machines are used to withdraw money from personal bank accounts. The cloud can lower the total cost of ownership of ATMs. According to NCR report NCR launched Kalpana software, an enterprise software platform that is driving ATM software and operations into the cloud. Kalpana can cut the running costs of an ATM network by up to 40 percent. For a bank with just 100 ATMs, that could mean savings of up to \$800,000 a year.

- ❖ **Electronic Know Your Customer (EKYC)**

Electronic Know your Client or e KYC is the way of resident authentication used by organization like Banks, Aadhaar allows the residents to submit it as an address proof electronically which is valid as a Xerox copy through that people can link their mobile number to their bank account their self also they open bank account without visiting bank, apply for the loan and many other service.

- ❖ **Document Management System (DMS)**

A document management system is an automated way of organizing, securing, capturing, digitizing, tagging, approving, and completing tasks with your business files. Although most document management systems store data in the cloud. The importance of DMS is to Reduced Storage Space, enhanced Security, Improved Regulatory Compliance, Easier Retrieval, Better Collaboration, Better Backup and Disaster Recovery and the Intangibles.

- ❖ **Anti-Money Laundering (AML)**

Anti-money laundering refers to a set of laws, regulations, and procedures intended to prevent criminals from disguising illegally obtained funds as legitimate income. Simply cloud security is necessary to protect financial institutions' cloud-based AML solutions from criminals and other unforeseen data-loss incidents. Practically, this means implementing a range of measures that function to conceal personal information,

withstand potential cyberattacks or unauthorized access, and maintain secure records in the cloud.

❖ **Asset Liability Management (ALM)**

Asset Liability Management system to strengthen its balance sheet, manage the risks arising from interest rate movements and liquidity as well as help in business planning and decision-making processes. ALM system make accurate and reliable decisions through sophisticated statistical analysis, well managed, auditable quality data and insightful business, economic and behavioral scenario analysis.

❖ **Applications in banking and insurance segment**

Cloud computing is a delivery model that you can use to facilitate or accelerate business transformation. The cloud represents enormous opportunities for change in the banking industry. There is a growing demand for cloud computing Cloud computing provides applications, data and IT resources to users as services delivered over a network for self service. It also offers economies of scale and flexible sourcing. With cloud computing, it is possible to manage large numbers of highly virtualized resources to deliver services.

❖ **Other manage and support services**

Through the help of cloud computing bank can offer numbers of service like IPMS, UPI, Financial Inclusion services, Bill Payment Service, Automated Clearing House, National Payments Corporation of India, Cheque Truncation System. Which is very helpful to peoples and banks to get benefit of this service in less cost also its vey time saving and convenient.

Cloud service provider also provide services which is most use full for bank which are data analytics, risk modelling for investment banks, payment fraud analytics, development and testing applications, business services, collaboration, desktop and devices and storage.

How banks determine whether cloud computing is right for their business or not?

Here is main point is consider as costs and benefits. Banks should get a complete understanding of all cloud-related expenses (e.g. hardware upgrades, monthly fees and outsourced IT consulting), and then compare with what it might cost to run the same level of computing in-house. Many companies save money through cloud computing because they do not have to revamp their infrastructure and hire additional IT staff to realise productivity gains. While moving to the cloud, apart from cost, other parameters like agility, operational efficiency, protection against infrastructure obsolescence, security posture.

Cloud Computing benefits both large and small banks. For example, smaller banks need not invest in infrastructure related to it and can start their operations quickly with faster development and deployment cycles. Larger banks will benefit from environments like High Performance Computing, Risk Management, etc. Simultaneously, CC provides small and medium-sized banks economically attractive access to professional IT operations and resources that were previously reserved for companies with much larger IT budgets.

ADVANTAGES

• **Cost Savings**

There is no needs to do heavy investments in new hardware and software. Also the unique nature of cloud computing allows financial institutions to choose and pick the services required on a pay-as you-go basis.

• **Analytics**

Integrating customer data across banking platforms to enable near real-time insights.

• **Collaboration**

Enabling employees across distributed branches to access trading and banking systems through a secure cloud infrastructure

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- **Desktops and devices:**

Using a private cloud to centralize management of desktops allows for greater remote flexibility without sacrificing control, while enabling banking employees to access the applications and data they need.

- **Development and testing:**

Enabling a bank's development teams to quickly and easily create virtual environments which increasing the agility of development and testing.

- **Infrastructure compute:**

Allowing capacity to be allocated, expanded and reallocated efficiently gives banks flexibility and agility while resolving the issues of complexity and cost increases related to scaling up traditional network models to accommodate future growth

- **Infrastructure storage:**

Providing scalable storage solutions to ensure that the real-time demands of today's trading and analytics processes are maintainable

- **Managed backup:**

Backing up a bank's critical business data to ensure that in the event of a disaster a bank can bounce back rapidly and easily.

- **Security:**

Enforcing active security and endpoint management to ensure corporate governance and banking IT policies are maintained.

- **Improve flexibility and scalability:**

The cloud gives banks the ability to respond quickly to changing market, customer and technological needs. They can scale up and scale down technology according to requirement. The ability to respond quickly will be an important competitive edge.

- **Data Virtualization:**

Data virtualization is the assimilation of data from multiple and diverse sources across the enterprise or external sources for the on demand consumption by a wide range of applications in a virtualized manner. Many mandates in context with the regulations and performance of banks require a data virtualization strategy. This strategy can be used to provide a single source of reference data, such as security master data. Also, risk and analytics calculations rely on many different types and sources of data, including relational and semi-structured XML. Combining such discordant data from public and private domains is a test. Accordingly, accessing that data from a single virtual source would drive scores of data consolidation within banks.

- **Mobility:**

Many of today's corporate world techno savvy workers want to access risk and analytics reports while they are on the move. They see the benefits of accessing the internet on their smart phones instantly even in remote locations. Likewise, they want similar interfaces for banking services-specific applications. And since a cloud facilitates users to access systems and infrastructure using a web browser or customized clients regardless of location and time, advancement of such interfaces has started taking shape.

CHALLENGES

- **Security and compliance:**

Maintain at all times the security of data, Banks need to demand stringent safety measures from suppliers and ensure new applications meet the latest and most rigorous security standards. Service Level Agreements (SLAs) are a must.

- **Recovery:**

It is very essential to recover the data when some problem occurs and creates failure. So the main question arises here is that can cloud provider restore data completely or not, this issue can cause a stalemate in security.

- **Cloud management:**

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Achieving visibility and measuring performance are harder to do, especially if, as seems likely, large banks will source cloud services from several providers and to use them for both internal or private and external, or public, services. This could result in a bank having to handle multiple security systems, and the need to ensure all parts of their business can communicate with each other and where necessary with clients, means banks will need to develop fully-fledged cloud management platforms.

- **Regulation:**

The rules governing the cloud vary from country to country. Many countries' data protection laws impose constraints on where data is kept, limiting take-up.

CONCLUSION

When planning cloud computing initiatives, financial institutions should choose service and delivery models that best match requirements for operational flexibility, cost savings, and pay-as-you-use models. Banks should adopt a gradual evolutionary approach towards cloud computing services, evaluating each project based on the type of applications and nature of the data. Lower risk projects may include customer relationship management and enterprise content management. Higher risk projects will involve core business functional systems such as wealth management or core banking.

Trust and security have prevented businesses from fully accepting cloud platforms. To protect clouds, providers must first secure virtualized datacenter resources, uphold user privacy, and preserve data integrity. Financial services organizations are starting to use cloud computing technologies in a number of areas, in particular for mobile applications, innovation testing and micro-banking. The banks need to know that this is all about 'business model transformation' and to achieve business agility for the next level of growth. The key is to ensure that each bank starts working on a cloud reference architecture, which will define its winning strategy.

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