

CLOUD COMPUTING: A TECHNOLOGICAL TRANSFORMATION IN BANKING OPERATIONS

¹Ms. Smriti Nagaria

¹Research Scholar, (Management)

¹Osmania University, Hyderabad

¹Assistant Professor

¹St. Joseph's Degree & PG College, (Extended Campus), Hyderabad, India

Abstract : Advent of technology has changed the landscape of business operations and has become a vehicle for bringing a revolutionary change in the information age. Technology is applied in every field and has shown a progressive performance in carrying out various tasks. It is rightly quoted by Shoshana Zuboff that “**TECHNOLOGY MAKES THE WORLD A NEW PLACE**” which signifies advancement and application of technology has touched every aspect of life, making it easier, better and different. Businesses, small and big, need technology to thrive which gives organizations the strength to spread their wings. Growing businesses create employment opportunities for people and technology plays a big role in business growth. One such application of technology which has brought about drastic change in the way of carrying out business is in banking by using cloud computing. Banks have been a conservative industry with regard to adoption of newer technologies due to sensitivity of banking business. Banking industry needs to address the ever-growing data input demands and want their financial data to be secure with access. Cloud technology offers a new model for delivering innovative client experiences, effective collaboration, improved speed to market and increased IT efficiency. Cloud deployments are spreading and the technology is proving to be secure which has changed the way consumers interact with banks and have migrated to the suitable cloud computing model which offer several benefits. The paper focuses on understanding the concept of cloud computing, its features, reasons for choosing cloud computing, various models, benefits and challenges of its implementation in banking sector. The paper concludes by stating that Cloud computing has helped banks to create more agile and flexible business offerings for the competitive and growing markets by transforming their business processes. It has the potential to explore and grow into new markets and sectors which will improve their services to the customers across different geographic locations.

Key Words: Business, Drastic, Innovative, Operations and Technology.

I. INTRODUCTION

Technology is a dynamic concept which keeps on improving as one's needs and demands for it keep on changing and has become a vital part of our daily lives. Many businesses are using technology to stay competitive, to create and deliver new products and services to the customers on time and within budget. Technology is changing the way businesses operate and deliver products to consumers in many sectors. Technology has become a core tool for banks which has brought about a sea change in the way banks engage with customers. Service providers and system integrators play a crucial role in helping banks cater to customer needs and demands. Technology is central to the design and delivery of banking services. IT solutions play a strategic role in capturing, drawing and transforming data from transactions into a decision making framework for designing and administering innovative products as well as enhancing the quality of service delivery that ultimately leads to greater customization of banking products. IT also enables banks to suitably right size and optimally deploy existing human resources, especially from surplus to deficit pockets in a technology driven environment. Technology adoption has changed the phase of banking in India. Wide spread technology deployment in the banking business has also brought to the fore some new issues and challenges. The advancement in IT sector led to many drastic changes in the way of treating information. Instead of using a traditional way of storing the information many new techniques like big data, machine learning & AI have come into picture to store and operate the information directly through the internet. Banking sector is turning towards dynamic natured cloud computing as a low cost means of delivering market solutions meeting critical operations and services. Cloud computing is the delivery of computing service i.e servers, storage, databases, networking, software and analytics over the Internet. Cloud computing has become a one-stop solution for all the problems related to any kind of information. In banks, cloud computing has made many things easier like interoperability, secure storage and 24x7 uptime. Cloud storage is a new technology for storing the data over the internet. Cloud services emit revolutionary performances that empowers the banking industry to automate and manage their processes.

BANKING SECTOR

In today's time the need for earning and generating money is very important. A developed financial system of the country can ensure scope for attaining economic development and provides valuable services. The banking sector is one of the most vital sectors of the economy and is considered as the “lifeblood” of economic activity in collecting deposits and providing credit to people, households and businesses. Banking Sector in India is rapidly changing since 1990's due to technological innovation, financial liberalization with entry of new private and foreign banks and regulatory changes in the corporate sector. The banking sector has embraced the use of technology to serve its client faster and also to do more with less by changing the way of delivering services to customers. In our country, currently we are having a fairly well developed banking system with different classes of banks – public sector banks, foreign banks, private sector banks – both old and new generation, regional rural banks and co-operative banks with the Reserve Bank of India as the leader of the system. In the banking field, there has been an unprecedented growth and diversification of banking industry and banks are now utilizing the latest technologies like internet and mobile devices to carry out transactions and communicate with the masses.

LITERATURE SURVEYS

Berger (2003), the usage of information technology (IT) broadly referring to computers and peripheral equipment, has seen tremendous growth in service industries in the recent past. The most obvious example is perhaps the banking industry, where through the introduction of IT related products in internet banking, electronic payments, security investments, information exchanges, banks now can provide more diverse services to customers with less manpower.

Willcocks (1994), Information systems/information technology investment may be described as any acquisition of software or hardware which is expected to expand or increase the business benefits of an organization's information systems and render long-term benefits

Graven (2000), the banking industry believes that the adoption of new technology, banks will be able to improve the level of customer service and tie customers closer to the shore. Meanwhile, the banking sector was also looking for new ways to expand customer base and to counter the aggressive marketing efforts from traditional banks.

Bar (1986) identified three main factors that affect the rate of realization of the potential of a new technology. The first factor is the "opportunity", defined as the adequacy of the activities undertaken in the field of application users of the new technology. Of course this affects the speed at which technology is initially adopted within an industry, but more importantly in the long run, it affects the rate at which innovations in processes and products can be generated once technology has been introduced.

CLOUD COMPUTING IN BANKING

It is a method of delivering technologies for the customers by using internet servers for processing and storing data . It aims to reduce cost and helps users to focus on their core competency instead of being impeded by IT obstacles. It offers secure deployment options which helps banks to develop customers experiences ,improves speed and enable effective collaboration .Cloud computing is an option to banks to have efficient and cost effective IT strategy . Banks that take advantage of cloud computing are better positioned to respond to economic uncertainties, interconnected global financial systems and demanding customers. They can use information to enhance customer segmentation techniques and to develop more focused services that are aligned with customer needs. Banks also can optimize their channel investments and differentiate themselves through customer service excellence. Armed with new insights, banking leaders can identify and eliminate the cost of complexity in their operations and use new and existing forms of information to optimize risk.

REASONS AND KEY DRIVERS FOR ADOPTING CLOUD COMPUTING BY BANK

Reasons:

Cost

It helps in eliminating capital expenditure on buying hardware, software and IT infrastructure needed.

Speed

Vast amount of data is provided in minutes which gives flexibility to businesses.

Global scale

The right amount of IT resources are delivered at the right time when it is needed from the right geographic location.

Productivity

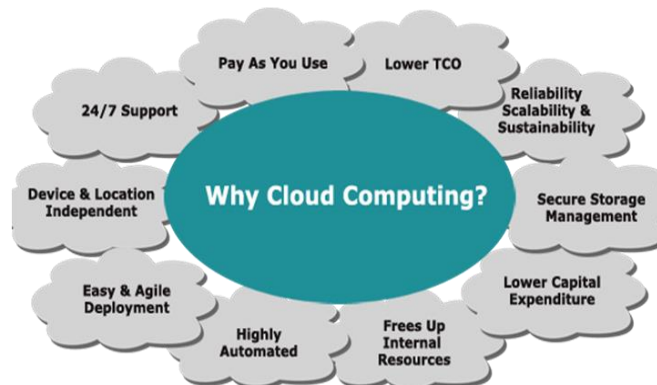
Onsite data centers typically require a lot of "racking and stacking"—hardware set up, software patching and other time-consuming IT management chores. Cloud computing removes the need for many hardware set up required for data centers which can help in spending time on achieving more important business goals.

Performance

The biggest cloud computing services run on a worldwide network of secure data centers which are regularly upgraded to the latest generation of fast and efficient computing hardware which reduces network latency for applications and greater economies of scale.

Security

Broad set of policies, technologies strengthens security posture which helps in protecting data, applications and infrastructure from potential threats.



Reasons for Adopting Cloud Computing

Key Drivers :

- ✓ Easy Expandability
- ✓ Payment as per use
- ✓ Faster Product Development
- ✓ Optimization of IT and HR resources

CHARACTERISTICS:

- ✓ Flexibility
- ✓ Cost Reduction
- ✓ Performance
- ✓ Resource pooling
- ✓ Productivity
- ✓ Security

CLOUD COMPUTING : CORE TOOL FOR BANK

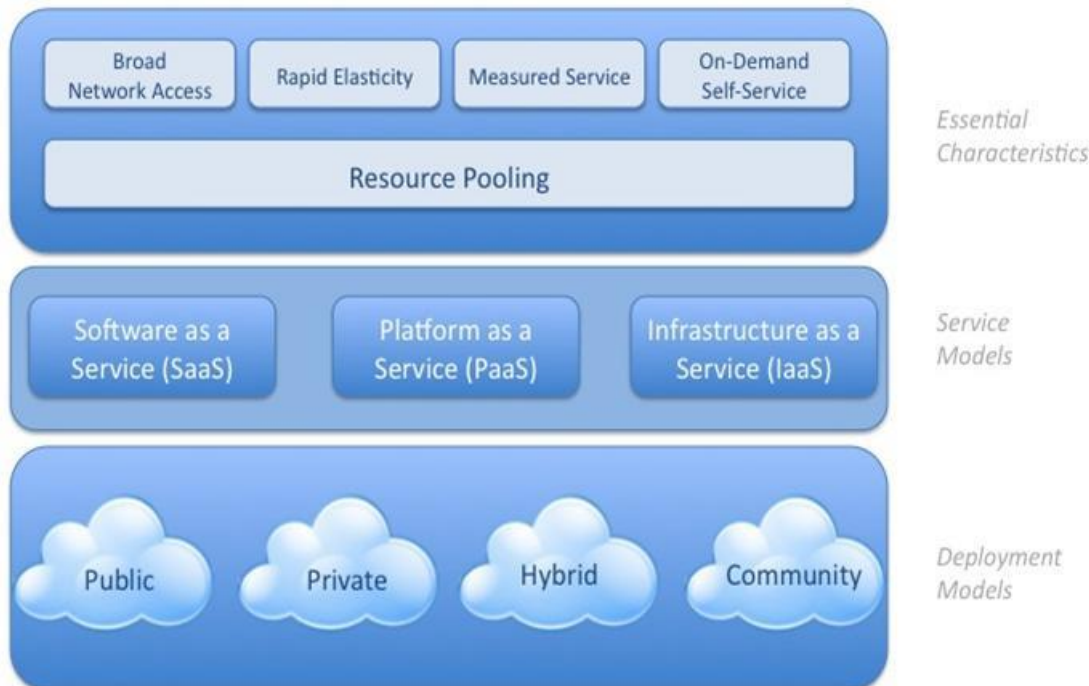
Cloud Services from Cloud Providers include:

1. **Create new applications and services**
2. **Test and build applications**
3. **Store, back up and recover data**
4. **Analyze Data**
5. **Stream audio and video**
6. **Embed intelligence**
7. **Deliver software on demand**

CLOUD COMPUTING MODELS

CLOUD SERVICE MODELS

Cloud computing offers more flexible business models to the financial institutions which lowers operational costs and it is important to select the cloud service model that best suits the core business requirements

**Business Process-as-a-Service (BPaaS)**

It is used for general processes such as payroll, billing and human resources.

Software-as-a-Service /On Demand Software (SaaS)

In this users gain access to application software and databases. Cloud providers manage the infrastructure and platforms that run the applications, Accounting, enterprise resource planning (ERP), customer relation management (CRM), human resource management, invoicing ,service desk management and content management software can be delivered using this model.

Infrastructure-as-a-Service (IaaS)

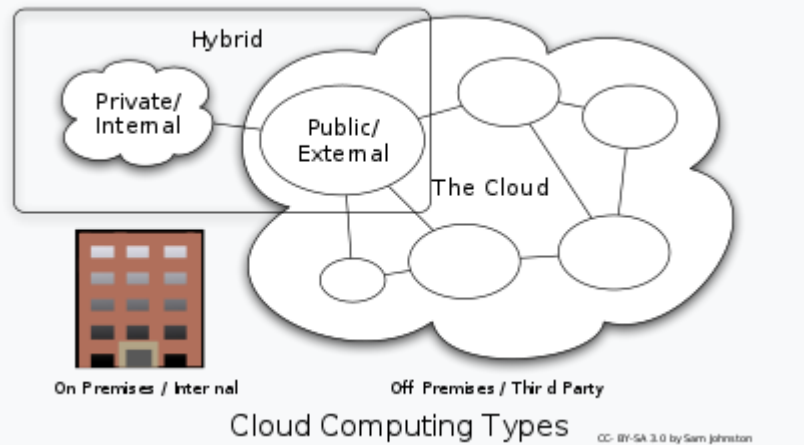
In this instead of purchasing software, servers, network equipment or data centre space, the businesses can buy these resources as fully outsourced services.

Platform-as-a-Service (PaaS)

In this model, the cloud service provider offers a complete platform for businesses to develop , run and manage their applications without engaging in the infrastructure complexities associated with application development and launch. PaaS vendors offer a developed environment to application developers. The provider typically develops toolkit and standards for development and channels for distribution and payment.

Infrastructure as a Service (IaaS)

It means online services that provide high-level Application Program Interface. IaaS-cloud providers supply these resources on-demand from their large pools of equipment installed in data centres.



There are three types of commonly deployed clouds
 There are three types of commonly deployed clouds

Private Cloud

Private cloud is operated specifically for a given company and is most secure of all options. The company may exist on or off the premises and can be managed either by the company or by a third party.

Public Cloud

In this services are rendered over a network that is open for public use which may be free. They are for large industry groups where the ownership lies with the cloud service seller.

Hybrid Cloud

Hybrid infrastructure consists of two or more public or private clouds that are linked but remain unique entities by offering the benefits of multiple deployment.

CLOUD OPERATING MODELS

Staff Augmentation - Financial firms gain cloud expertise by hiring people with the right skill sets from service vendors which allows flexibility and helps firms to choose the best resource for each specific requirement.

Virtual Captives

Virtual captives have a dedicated pool of resources or centers to help with cloud operations and meet demand.

Outsourcing Vendors

This approach uses offshore centers, facilities and people from a third party vendor to handle cloud operations. This model combines resources and investments to cater to cloud services for multiple banks.

OTHER MODELS

Community Cloud

Community cloud shares infrastructure between several organizations from a specific community with common concerns such as security, compliance and jurisdiction whether managed internally or by third-party and either hosted internally or externally.

Distributed Cloud

A cloud computing platform can be assembled from a distributed set of machines in different locations connected to a single network or hub service.

Multi Cloud

Multicloud is the use of multiple cloud computing services in a single heterogeneous architecture to reduce reliance on single vendors, increase flexibility through choice and mitigate against disasters.

High Performance Cloud

It refers to the use of cloud computing services and infrastructure to execute high-performance computing application which consume considerable amount of computing power and memory that are traditionally executed on clusters of computers.

APPLICATIONS OF CLOUD TECHNOLOGY IN BANKING

- Digitalizing the services will allow banks and financial institutions to build up an infrastructure to provide the best and appropriate service to the customers which increases the efficiency
- Elimination of attack by hackers by authenticating the data centers which are very easy through cloud computing where data stored is safe with hybrid cloud computing technology.
- Amazon web services and Microsoft's Azure are cloud providers who provide hybrid cloud computing servers to the companies.
- Cloud computing ensures confidentiality, integrity and availability of the information over the internet.
- Cloud computing ensures secure transactions and smooth customer experience in banks. Hosting over the internet with the help of web applications which ensures better speed and service to the users.
- Payment Gateways, digital wallets, online fund transfer and secure online payments are among the best examples of the cloud computing service.
- Enterprise Resource Planning (ERP) and Customer Relationship (CRM) software are the most popular software of cloud computing. These software allows the banks and financial institutions to secure the data and also provide better support to the customers.

SUCCESS STORIES OF CLOUD COMPUTING IN BANKING INDUSTRY

Adopting cloud computing for optimizing processes, reducing cost and building the capability to scale rapidly, contributory factor and cloud services were geography neutral due to availability of good telecommunication networks.

- 1) Kotak Mahindra Life Insurance, Reliance General Insurance, and India First Life Insurance have adopted virtualization solutions to help improve efficiencies of their data centers.
- 2) Dhanalakshmi Bank has opted to move all of its non-core banking applications to a virtualized solution allowing reuse of old storage boxes.
- 3) YES Bank has adopted cloud computing and has been an early adopter of cloud based services in banking with the first implementation in payments, online account opening and remittance services. Cloud computing provides the bank flexibility in faster provisioning at a low cost.
- 4) Meghdoot is an open cloud initiative of the Centre for Development of Advance Computing (C-DAC), a cloud computing environment completely based on free and open source software. The Indian Banking Community Cloud has been established using Meghdoot in the Institute for Development and Research in Banking Technology (IDRBT), Hyderabad (established by the RBI). The community cloud was inaugurated by the Governor of the RBI and currently six banks have applications ported into the Meghdoot cloud.

FACTORS FOR SUCCESSFUL CLOUD IMPLEMENTATIONS

When considering cloud solutions for financial services and banks should partner to gain cloud expertise. Cloud services providers should have:

1. A clearly defined cloud strategy
2. Demonstrable return on investment
3. Proven cloud service delivery capabilities

ROLE OF CLOUD COMPUTING IS TRANSFORMING BANKING SECTOR

Cloud makes a big hit in banking segment which is mentioned as below:

1. Reduced Costs

There is no need for additional investments in management of resources required in banking for carrying data. Cloud makes it easy to invest in required resources by eliminating the cost attached with dedicated hardware and software.

2. Improve Flexibility

Technology usage change according to the changing demands to sustain in market where cloud provides flexibility to survive and respond quickly with customer needs and market changes.

3. Improved Operational Efficiency and Business Agility

Cloud usage increases centralized management of data and reduces complexities allied with changes.

4. Efficient Client Service

Cloud will ease the activities related to banking for clients, customized and efficient solutions can be provided with faster access.

5. Business Continuity

Cloud computing services make possible to gain higher securities in data critical sector which will facilitate high level of redundancy in lower prices than it is provided with traditional recovery services.

6. Reliability

The cloud infrastructure is highly reliable by opting for private or hybrid cloud model which makes banks possible to secure their data while enjoying the speed and flexibility of the cloud.

7. Feasibility

Cloud computing services enable easy use of the data. A large amount of data in banks is feasible to use which helps the banking and financial services to manage the different demands in the banking world.

8. Productivity

Cloud computing eliminates all the unnecessary time of racking and stacking of data in the bank which increases the productivity. Every task in the bank related to the information will be taken care of by the software through cloud computing.

9. Security

Security is the prime concern which embraces new technology and many businesses are moving to the cloud to strengthen their security infrastructure. Cloud computing provides a highly resilient security architecture and goes through stringent security checks at regular intervals.

10. Storage and Big Data

Storage is one of the largest benefits of moving to the cloud. The finance industry generates unbelievable amounts of data on any given day due to millions of card transactions, stock market transactions, loans, insurance documents and payments.

11. Scalability

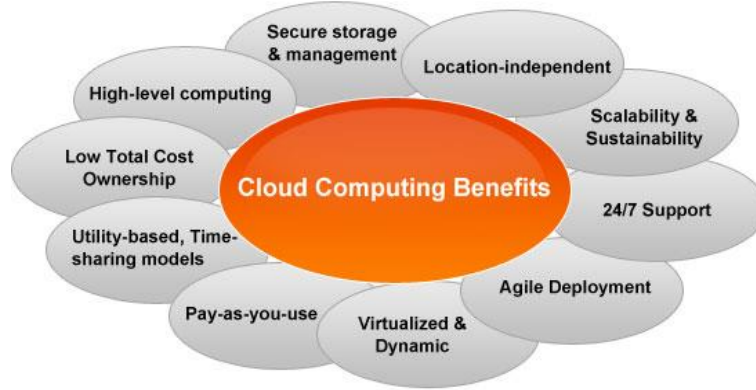
Although financial institutions have more than sufficient resources assigned for all the tasks they perform efficiently on any given day, it is possible for them to see spikes in different sectors at certain times. They may also see a spike when their respective governments announce a new or change of policies in the finance sector which challenges the efficiency of their resources. Cloud computing very easily scales resources without the requirement of any intervention to make sure the duties are performed without any glitches.

12. Compliance

Cloud vendors take very stringent measures to make sure that in joining with and offering services to finance industries, no compliances are violated by either party. Compliance bodies work with some of the major cloud vendors for monitoring purposes.

13.Mobility

Cloud computing enables employees to work on the go. They can use their personal smart phones and tablets for real-time monitoring and analysis, as well as access company emails, proprietary business applications and CRM tools when they are out of the office or outside of business hours.



Benefits of Cloud Computing

CHALLENGES**1) Cloud Computability and Availability of Service**

These applications in most cases have been customized to a greater extent which makes moving from in-house legacy applications to a cloud-based offering difficult. The typical implementation and stabilization timeframe for a core banking application is almost five years which makes it difficult for banks to switch to another vendor who offers cloud-based delivery. Only a few vendors in India offer cloud-based core banking which again is targeted for mid-size to smaller banks with a limited set of product features and offerings.

2) Data Privacy

Banks capture, store and process private financial details and demographic information about their customers.

3) Storage Issues

Finance related data should be restricted to the physical location of data.

4) Data Privacy

Data privacy and security is another challenging aspect which hinders the migration of banks onto the public cloud. Banks capture, store and process private financial details and demographic information of their customers.

5) Vendor Lock-In

Lock-in reduces the ability to customize and extend and can create dependencies on vendors and affect business continuity.

CONCLUSION

Cloud computing is a prospering technology that most financial institutions are adopting as a cost effective strategy. Many banks have begun to explore cloud's potential as a business building trust. Cloud gives banks the ability to respond to changing market customers and technological needs which is an important competitive edge. Cloud service model provides financial institutions the option to move from capital intensive to more flexible business model that covers operational cost. The key to success lies in selecting the right cloud service model to suit business needs. Hence Cloud technology is not a tool being used but a paradigm shift in entirely new business mode.

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