BANKING AND FINANCIAL SECTOR WITH CLOUD COMPUTING

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Abstract :The evolution of Cloud computing makes the major changes in computing world as with the assistance of basic cloud computing service models like SaaS, PaaS, and IaaS an organization achieves their business goal with minimum effort as compared to traditional computing environment. In this paper, we aim to pinpoint the future and scope of Cloud computing in banking and fin tech. We first discuss two related computing paradigms - Service-Oriented Computing in banking and financial sectors, and their relationships with Cloud computing. We then identify several models used from the Cloud computing adoption perspective. This document provides a beneficial insight into how cloud computing can be used in the banking industry, various business models associated with it and the problems faced by the banking industry in adopting this technology.

Keywords:**Cloud computing, Banking, Business model, Hybrid cloud.**

I. INTRODUCTION

Cloud computing today encompasses every vertical in the market across sectors. Organizations are adopting innovative cloud apps to support their everyday business operations. To drive growth and innovation in banking, it is increasingly necessary to dramatically leapfrog the competition using IT and business model transformation. The dramatic changes taking place in banking require new ways to maximize profitability and returns. Cloud technology offers secure deployment options that can help banks develop new customer experiences, enable effective collaboration and improve speed to market—all while increasing IT efficiency. Banks that take advantage of cloud computing are better positioned to respond to economic uncertainties, interconnected global financial systems and demanding customers. Cloud computing has become a one-stop solution for all the problems related to any kind of information. In case of banking and Finance, sector cloud computing made many things easier like interoperability, secure storage, 24×7 uptime, etc. This advancement in IT sector led to many drastic changes in a way of treating information. Instead of using a traditional way of storing the info many new techniques like big data, machine learning & AI, ITcame into the picture to store and operate the information directly through the internet.

II. CLOUD COMPUTING

Cloud computing, in short, "Cloud storage", is a new technology for storing the data over the internet. It's a hybrid technology of computing various services like servers, software, networking, storage, databases, analytics and many more over the internet. Simply put, cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics and more – over the Internet ("*the cloud*"). Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage, similar to how you are billed for water or electricity at home. Cloud services are delivered on demand via the internet with pay-as-you-go pricing.

III. TYPES OF CLOUD COMPUTING

Cloud computing has three main types that are commonly referred to as Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). These are sometimes called the cloud computing stack because they build on top of one another.

3.1Software as a Service (SaaS)

Software-as-a-service (SaaS) is a method for delivering software applications over the Internet, on demand and typically on a subscription basis. SaaS provides you with a completed product that is run and managed by the service provider. In most cases, people referring to Software as a Service are referring to end-user applications. SaaS licenses are typically provided through a pay-as-you-go model or on-demand. A common example of a SaaS application is a web-based email where you can send and receive email without having to manage feature additions to the email product or maintaining the servers and operating systems that the email program is running on.

Accounting, enterprise resource planning (ERP), customer relationship management (CRM), human resource management, invoicing, and service desk management and content management software can be delivered using this model.

3.2 Infrastructure as a Service (IaaS)

IaaS is the basic building blocks for cloud IT and typically provide access to networking features, computers (virtual or on dedicated hardware), and data storage space. With IaaS, you rent IT infrastructure—servers and virtual machines (VMs), storage, networks, operating systems through IP-based connectivity as part of an on-demand service.

3.3 Platform as a Service (PaaS)

PaaS is the cloud computing services that supply an on-demand environment for developing, testing, delivering and managing software applications. PaaS removes the need for organizations to manage the underlying infrastructure (usually hardware and operating systems) and allow you to focus on the deployment and management of your applications.

Among the three layers of cloud-based computing, PaaS is considered the most complex. PaaS shares some similarities with SaaS. The major difference being that instead of delivering software online, it is actually a platform for creating software that is delivered via the internet.

IV. BANKING ON THE CLOUD

Banking industry needs to address the ever-growing data input demands, and there is a need to explore the systems that do not rely on like-system migration so that infrastructure can be modified without any disruption. Banks have been slow in adopting cloud computing as there are apprehensions regarding lack of control and environment sprawl which can lead to reliability issues and security risks. Banks also want their financial data to be secured with controlled access. Public clouds come with the issues such as location, regulation, recoverability and liability, and this has led to slow adoption and deployment of cloud computing in the banking sector.

However, cloud computing can change the way consumers interact with banks, and migration to the suitable cloud computing model offer several benefits. Understanding the migration and entire process of migration can be quite beneficial in the long-term. The first step for the banking firms towards cloud computing adoption is opting for the private cloud as it gives banks more control, increased flexibility and reduced complexity. The banks can also alter their resource configuration to match the changes in the demand of their services. The risk of security breach in the private cloud is minimized as it is deployed within the firewall of the organisation. Using VPN (Virtual Private Network), the IT infrastructure of the company can be easily and quickly moved over a single private network. Using private clouds, banks can operate at high transaction volumes without slowing the processes and without overloading the network. The services become more efficient due to dedicated resources of each unit, improving the customer experience. Private clouds offer safety and affordability as the resources are rented, and not purchased. The total cost of ownership is reduced as the capital expenditure is converted to the operating expenditure. Private clouds are safe, affordable and enable easy transition in banking leading to long term success. Banking sector applications are very critical, private clouds provide increased security to ensure that the data is not misplaced or lost. Public clouds offer economies of scale, cost benefit and ROI, whereas private cloud offers high levels of security.

Given the concerns regarding control and security, banks can opt for incremental approach which involves using cloud computing to the non-core operations initially, and gradually move more and more operations and processes to the cloud depending on the benefits. Banks need to work on cloud reference architecture, and try to achieve business agility for business model transformation.

As there is no one-solution-fits-all option available, banks need to consider few key aspects. It is essential to thoroughly evaluate all the challenges and advantages associated with cloud computing with respect to their complete range of services- core and non-core. Additionally, geographic regulations, penalty clauses, business criticalities, interoperability and interface impact, audit requirement mandates, and technology are some of the aspects that must be thoroughly assessed. Choice of the cloud model must be evaluated based on the control of the governance and support provided by the service vendor. Non-core banking applications that do not need strict governance and stringent monitoring are suited for SaaS model, whereas IaaS is more suitable for the business critical applications that need to be closely monitored. Banks must keep in mind that the vendor must provide transparency in the security procedures and policies.

V. Benefits of Cloud Computing in Banking

5.1 Cost-effective

Cloud computing reduces all the capital expense of buying and setting up hardware and software at data centers. This makes the banks to focus more on banking functions.

5.2 Feasibility

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

5.3 Reliability

Cloud infrastructure is highly reliable. Cloud computing gives a complete data backup to information. Data can also be accessed at multiple redundant sites with utmost ease. Hybrid cloud models give the utmost security to the data. The data saved in the cloud is encrypted well to eliminate all kinds of security threats in banks.

5.4 Productivity

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

VI. TYPES OF MODELS

There are three basic types of cloud models which can work differently for different industries.

1. Public cloud
2. Private cloud
3. Hybrid cloud

6.1 Private cloud

Public cloud is the cloud whose infrastructure is solely made for the use of the bank itself. It is up to a bank if they make it for a third party like IBM or something but this cloud con compute all the changes and resources which are shared by the employees, internal departments such as IT and marketing resources. Private clouds mainly enable the bank to maintain and standardize its services which are directly linked with the customers. A bank gets much more customization access than the local public clouds.

6.2 Public cloud

The public cloud is totally managed by the organization which is providing the network of cloud technology and that is made public. In this model, all the computing services and such as standardized business processes and applications are operated by multiple clients via pay-per-use method.

6.3 Hybrid cloud

Hybrid cloud is the combination of both the public and private cloud characteristics. The bank only uses the public cloud for general computing services and applications while the other customer data is kept in the private cloud for the purpose of security. The remaining portion of the public cloud is used by the cloud provider company as well.

VII. LIMITATIONS

Every technology has positive and negatives aspects that are highly important to discuss before implementing it. Aforementioned points highlight the benefits of using cloud technology and following discussion will outline the potential cons of Cloud Computing-

7.1Security issues – At time storing data in cloud may pose serious challenge of information theft in front of the company. Though advanced security measures are deployed on cloud, still storing a confidential data in cloud can be a risky affair.

7.2 Low bandwidth – At times the bandwidth is low as many users are accessing cloud at the same time which causes its bandwidth to go down. With less speed the benefits of cloud computing cannot be realized.

7.3 Flexibility issues – The cloud services run on remote servers which make it hard for the companies to have control over software and hardware. The services at times do not run the way it should.

7.4 Incompatibility – Since entire infrastructure gets virtualized, incompatibility issues may arise at times that may pose serious challenges on the way of smooth running of services.

VIII. CONCLUSION

Continued advancement of cloud computing within the banking sector will require vendors and banks to overcome its challenges together. When planning cloud computing initiatives in the near future, banks should choose service and delivery models that best match requirements for operational flexibility, cost efficiency, and pay-as-you-use models. Banks should adopt a progressing evolutionary approach towards cloud computing services, examining 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. In the long term banks will have an application portfolio mix of on-premise and cloud-based services delivered across a combination of private, hybrid, and public cloud- based deployment models with the share of cloud services gradually increasing in the service mix. Private clouds are expected to increasingly become the deployment model for cloud services among banks, giving financial institutions full control through ownership and operations of their cloud systems.

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