A STUDY ON SECURITY IN CLOUD ADOPTION BY INDIAN BANKS

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Abstract : Banking has traditionally been a conservative industry with regard to adoption of newer technologies due to the sensitivity of the banking business. In addition, since banks deal with public money, stringent regulation and governance comes into play. Despite their conservative approach, and despite regulatory pressures, the current volatility in the market forces banks and other Financial Institutions (FIs) to look at means to reduce operational costs and bring in innovative products which would provide better market coverage and quick return on investments. IT infrastructure contributes to a significant part of the operational costs of banks. At the same time, cloud computing presents the opportunity to transform security practices and improve defenses. This White Paper provides insights so that management of various banking institutions can embrace and adopt cloud computing and exercise appropriate governance and oversight for successful business benefits realization at acceptable risk.

***IndexTerms*- Banking, Financial Institutions.**

I. INTRODUCTION

When a new product launch is planned in the banking and financial market space, apart from the business analytics and product design, there is a significant readiness required from IT. The product should be supported by core banking, and serviced by all channels. The associated knowledge management needs to be updated. Few product launches would even call for a business process change. This would mean faster development lifecycles and a faster deployment lifecycle are required. Another significant pain-point in new product launches is the predictability of growth. Although a great deal of research goes into the creation of products, most times the growth is unpredictable and can grow both toward the bank and its infrastructure, as well as toward customers. If growth is toward the bank and its infrastructure, then the return on investment is stretched for the deployed licenses and hardware.

Faster development and deployment of capabilities can be addressed by IaaS, PaaS, and SaaS cloud services. And if the bank manages unprecedented growth, then the ability of cloud services to elastically scale would help to achieve this growth without much disruption to business (whereas in a normal state such rapid growth would have triggered additional procurement, downtime, and until more capacity is built and deployed, performance would be impaired).

II ADOPTION OF CLOUD IN THE BANKING INDUSTRY – INDIA SUCCESS STORIES

There are several early success stories of banks in India adopting cloud computing for optimizing their processes, reducing their costs, and building the capability to scale rapidly. Some of the known/published references are discussed below. It is worth noting that while Urban Co-operative Banks (UCBs) and Regional Rural Banks (RRBs) have been early adopters of cloud computing, as described below, we can expect that larger banks will move towards cloud services as regulatory issues and security challenges are addressed.

Two major software solution providers[2] have provided their Core Banking Solutions (CBSs) to UCBs, RRBs, and district co-operative banks through their own data centers. Some of the major UCBs have also been providing IT support to the small UCBs while leveraging collaborative arrangements among themselves for sharing common IT infrastructures such as data centers and ATM networks. It was observed that these banks were located across India, the geographical proximity or separation was neither a constraint nor a contributory factor, and cloud services were geography-neutral due to availability of good telecommunications networks.

III THE CHALLENGES IN IMPLEMENTING CLOUD COMPUTING

Like any other large-scale platform, design and development of a cloud computing platform comes with its own challenges in different dimensions. With current matured cloud service providers most of the risks can be mitigated; however, the following are the key challenges.

3.1. Data Residency Requirements

Most central banks (including the RBI) require that core system banking data needs to physically reside within the geography. Because of this requirement, the choice of cloud computing platforms can be limited. However, some applications which handle non-core banking data such as CRM, HR, and others can still be placed on remote cloud services without data residency issues. There is also the question of how to handle data for subsidiary bank branches located overseas.

3.2. Cloud Compatibility and Availability of Services

Another key challenge faced by the banking industry is the compatibility of applications for cloud computing or options for porting them onto the cloud. The percentage of legacy applications is significant in the financial industry when compared to other industries. Moreover, 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.

3.3.Network Latency

Business process availability is key for smooth operations. Using a cloud-based model, networking adds another dimension of complexity for business availability. There are mechanisms to address this such as redundant Multi-Protocol Label Switching (MPLS) networks from multiple service providers; however, performance and availability remain a challenge. In India, banks are required to operate in rural and semi-urban environments as per RBI guidelines, and network latency can be an inhibitor in such areas.

3.4. 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 on their customers. Regulations require that banks Know Your Customer (KYC) in on-boarding new customers. In order to comply with these requirements banks need to maintain copies of KYC documents, which could be personal identification documents such as passport information or some other personal identification information. Data privacy becomes very important as any breach of privacy might cost the bank lost customers, as well as possible reputation damage, legal issues, and fines.

3.5.Vendor Lock-In

Lock-in reduces the ability to customize and extend, and can create dependencies on vendors and affect business continuity. There can also be concerns at the application and data level regarding the lack of portability between SaaS software available in the market.

Three types of possible lock-in can affect cloud service use:

Fig. 1. **Platform Lock-in**: Cloud services tend to be built on one of several possible virtualization platforms; forexample, VMWare or Xen. Migrating from a cloud service provider using one platform to a cloud service provider using a different platform could be very complicated.

Fig. 2. **Data Lock-in**: Since the cloud is still new, standards of ownership–i.e., who actually owns the dataonce it lives on a cloud computing platform – are not yet developed, which could make it complicated if cloud computing users ever decide to move data off a cloud vendor's platform.

Fig. 3. **Tools Lock-in**: If tools built to manage a cloud computing environment are not compatible with differentkinds of both virtual and physical infrastructure, those tools will only be able to manage data or apps that live in the vendor's particular cloud computing environment.

Vendor lock-in is one of the challenges in adopting cloud computing today, but the risks associated with it will be reduced as the cloud computing space becomes more mature. Lock-in risks can also be mitigated with robust SLAs, as defined and agreed with vendors.

3.6. Performance

Multiple components and hops are involved starting from the end-user desktop (interface card) to LAN: end-user router, network cloud, perimeter of provider, LAN, and ultimately the application. Business services need to be categorized accordingly for latency. Due to its multi-tenant nature and resource sharing, cloud computing must also deal with the “noisy neighbor” effect. This effect in essence indicates that in a shared infrastructure, the activity of a VM on a neighboring core on the same physical host may lead to increased performance degradation of the VMs in the same physical host, due to issues such as cache contamination.

3.7.Storage Issues

Data storage management becomes a critical issue as data, especially finance-related, will be residing in the provider’s cloud. Consumers should be able to scale data storage on an as-needed basis, restrict physical location of the data at rest (database, tapes) to handle issues of data sovereignty, ensure that proper processes for data purging and disposing of data storage hardware are followed, and administer access controls for their data.

3.8.Efficient SLAs

Creating standard contracts and SLAs where expectations are clearly enumerated from both sides is crucial for cloud adoption. For example, banks including Commonwealth Bank of Australia, Bank of America, and Deutsche Bank were part of an alliance (Enterprise Cloud Leadership Council) to create some standards to compare apples with apples when buying cloud services. In the case of IaaS cloud services, they typically operate on a shared responsibility model. The IaaS vendor generally takes responsibility for running and hosting back-office services, but the responsibility for securing the data lies with the customer. This is true for most IaaS cloud services.

IV POTENTIAL AREAS OR OPPORTUNITIES FOR CLOUD ADOPTION

This section describes potential areas in banking where cloud services can possibly be leveraged.

4.1. IT Infrastructure

Today Indian banks are finding ways to support banks’ operations through optimal investments. Towards this, the power of cloud computing is leveraged through virtualization, consolidation, etc. Since most of the banks have already made huge investments in IT infrastructures, the tendency is more towards implementing private cloud. However, for any new investments cloud computing is considered an excellent option to avoid large IT investment upfront.

4.2.Core Banking

The changes in banking and regulatory requirements have driven Indian banks today to implement a Core Banking Solution (CBS). This solution requires an IT infrastructure aligned to the bank’s business growth plan and one that meets the bank's DR requirements.

Core banking is one of the toughest workloads to migrate onto the cloud. However, within core banking there can be specific workloads which can be migrated which are mostly around the customer servicing area, such as:

- Cash management
- Know Your Customer (KYC) validation
- Credit rating business process

- Anti-money laundering check
- Regulatory and compliance reporting which is generated out of core banking

These workloads peak at specific time periods in a day and the usage remains flat most of the day. A better return on investment can be obtained by approaching this model. The core transactional engine can still remain in-house so that there is no risk involved with respect to cloud computing.

Many banking software vendors have started offering their CBSs on the cloud today. Considering the growing demands from small, mid-size, and co-operative banks the solutions offered on the cloud are going to get better and will see increased implementation on the ground.

4.3.Customer Relationship Management (CRM)

CRM is already a common candidate for cloud computing and most banks already have CRMs deployed on the cloud (e.g., Salesforce.com). The key CRM functions are as follows:

- Customer management and on-boarding
- Customer analytics
- Agent/business correspondent management
- Customer servicing

CRM is one of the least risky applications which can be migrated to the cloud. The benefits are as follows:

- Most cloud CRM vendors provide multi-channel access which can be leveraged from day one
- Time to go-live is almost zero
- Attractive pricing and advantage to use the latest trends and features which arise in the CRM space

V CONCLUSION

Infrastructure flexibility, decreased cost of ownership, and reduced time to market are some of the reasons that justify a move to the Cloud. As the adoption of cloud computing becomes more prevalent, financial institutions need to weigh the benefits and risks involved, before taking a decision. At the same time, providers of the Cloud need to work closely with financial institutions as well as regulatory agencies to better understand their requirements and implement them in an efficient manner. While there is no doubt that migrating to a cloud based infrastructure has numerous benefits, there is still a huge gap in its adoption. The cloud technology will continue to improve. As better tools around security, data protection and auditing become mainstream, we'll see a faster adoption rate by the financial institutions.

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