



BANKING IN THE SPACE - THE PROSPECT OF CLOUD BANKING

Sugath Fernando

Assistant Manager
Bank of Ceylon

1.0 In search of Mr Banker

The banking industry is a key pillar in world financial eco system which affects everyday life of every individual, organization and Government. The asset base of top 30 banking giants in the world, itself account for USD 53.1 Trillion. According to the published data of research group IBIS World, the revenue of the industry is forecast to be USD 2.0 trillion in 2016 with total employment in the industry capping 6.9 million persons. How could Mr Banker exert such a massive power over the day to day life of everyone?. Where is he, Is he in US, UK European Union or any other geographical region?. Some decades ago we could have been able to point out the location of the prominent service of a specific bank. But in present day context the banks have gone limitless breaking geographical and social boundaries, to a new level. They have gone global. The phenomenal growth of information communication technology and Internet has revolutionized the banking industry landscape during the 21st century. The digitization of the service going hand in hand with the evolution of technology has redefined the banking service landscape and challenged conventional wisdom, to open doors to a dawn of a new era. The triple I- IT, Internet and Innovation has become the mantra that is preached by each and every banking guru in the world. Ever changing customer requirements backed by global flow of information coupled with intense industry competition has forced Mr Banker to quit the conventional life limited to deposits and loans. Social media has evolved to be a virtual community and reportedly has 900 million users. International trade once restricted to privileged multinational entities of rich countries has open up for individuals and small scale businesses in emerging markets through e commerce sites such as E bay, Amazon, Alibaba, and Flipkart. Research report of Mckensy & Company shows that almost 12% of global trade is conducted via e commerce. Ever increasing 360 million people are using cross border e commerce. Cross border band width usage has enhanced from 4700 gigabits per second to 21,130 gigabits per second in 2014. The forecasted global spending for IT services in 2016 is USD 3.5 Trillion with some innovations forever changing the parameters of financial playing field for banks. Some notable areas of innovation are Blockchain & Cryptocurrency, Internet of Everything (IoE), Cloud Banking and Unified Payment Interfaces (UPI-In August 2016 National Payment Corporation of India approved usage of bank applications for UPI). So Mr Banker in the global financial ring does not have much breathing space, but to push hard and hit hard,

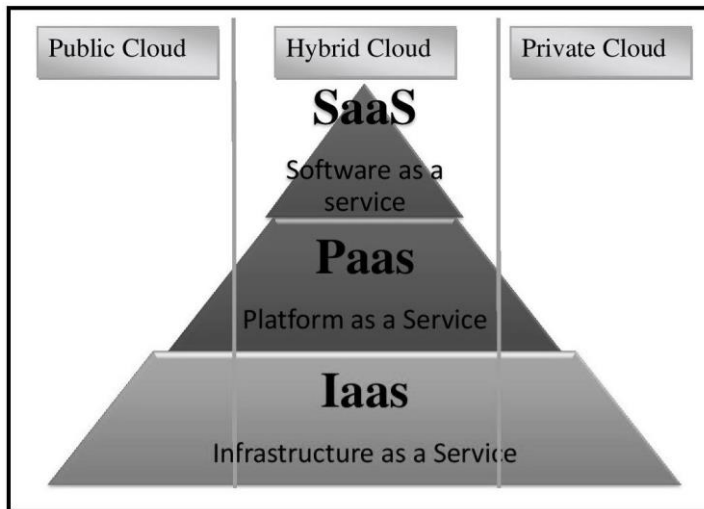


before the bell. In the pursuit of excellence bankers found a key to unlock the hidden potential, up on a cloud.

2.0 The Cloud - journey to space

Cloud technology or in common reference cloud computing is a concept which has revolutionized an array of industries in the world, with its roots running back to late 2007. Cloud computing can be defined as an internet based model which enables the usage of a collection of computing resources such as servers, applications, software development platforms to store manage and process data, on demand, pay-for- use basis. In simple words it is, a service provider undertaking all the burden of maintaining physical instruments such as servers and licensed products such as software and offer them as a service under different models for online use. If you are a client of a cloud service, you just need internet access and a PC at your home. You can access cloud and use, for instance updated and licensed Word or Excel applications in the cloud save your work there and log out. You don't need big hard drives or applications installed in your PC and even if the PC is destroyed, no worries for data loss.

The cloud model



The cloud architecture has developed on two base pillars. They are cloud deployment models and cloud service models.



2.1 Cloud deployment models

Cloud deployment models refer to how the service providers have developed the primary cloud environment. There are three deployment models namely Public Cloud, Private Cloud and Hybrid Cloud. The differentiation between each model is concentrated on factors such as ownership, access, size and purpose and nature of usage.

Public Cloud

Public Cloud is the most basic deployment structure. The ownership of the cloud infrastructure rest with the cloud service provider and it is made available to general public or to a large industry group, under pay for usage basis. The users do not have any control over the location or how the facilities are designed to serve their needs.

Private Cloud

The cloud infrastructure which is operated specifically for a company or organization is recognized as a private cloud. It can be managed by the specific company or third party assigned by the company. The distinction between public cloud and private cloud is not identified in technical terms but in security terms. Private cloud provides greater control and privacy to the user. It is also known as internal cloud due to these characteristics.

Hybrid Cloud

Hybrid Clouds represent an integration of public cloud and public cloud blended to cater security needs as well as customer service aspect. The critical data with high sensitivity are stored in private cloud segment with restricted access while non critical data are stored and allowed for access under public cloud segment.

2.2 Cloud service models

Cloud service models are differentiated based on the facilities they provide for the users. The facilities in turn reflect the client requirements and their expectations in different degrees. There are three core service models namely Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS).

Software as a Service (SaaS)

It is an online solution for software usage requirements where the service provider makes available the software in their respective clouds and the clients use them via online connectivity through their browsers. SaaS is seen as the top layer of service models. However this model lacks customization and the ownership remains with the service provider. Software such as Customer



Relationship Management, Accounting, Human Resource Management can be delivered in this method.

Platform as a Service (PaaS)

PaaS is the next level of SaaS. SaaS provides users the software developed by the service provider where as PaaS facilitates infrastructure to develop software by clients themselves. More precisely PaaS facilitates a complete lifecycle of development of applications interface and database development.

Infrastructure as a Service (IaaS)

IaaS represents the most advanced level of facilitation in cloud computing architecture. The client organization can acquire a fully fledged package of IT infrastructure covering software, servers, data center storage space, Network equipment etc. IaaS is the most recommended infrastructure for industries requiring highest level of data security and integrity.

2.3 Cloud computing industry

Cloud computing has emerged as a booming industry with the global movement towards digitization of business frameworks and models. According to the latest research data of US based research and advisory firm, Gartner Inc, the market leader in the industry is Amazon with its Amazon Web Services AWS. It was revealed that the computing power offered by AWS is more than ten times the combined computing power of next 14 providers. Other key players in the industry are Microsoft's Azure, IBM's Soft layer, Google's App engine and Rackspace and Virtustream. Cloud computing, worldwide reported a growth of 28% to USD110 Bn during 2015 within which the growth of private and hybrid clouds reported a growth of 45%. Gartner expect the worldwide public cloud market to reach USD 204 Bn in 2016 with a projected growth of 16.5%. IaaS is the prominent sector forecasted to improve during 2016, which is 38.3%.

3.0 Banking in the Cloud

The holistic approach of cloud computing has inter alia attracted banking industry to the cloud technology. The increased competition in the industry exerts continuous pressure on the bank management teams to move towards innovative methods which can deliver unique client experience. Hence the trend in the new banking landscape has embraced cloud banking as a feasible solution for the struggling industry in search of a competitive edge. However the shift towards cloud banking in banking industry has so far been a well measured slow and cautious one.



3.1 Is it a good deal?- Benefits

There are multiple aspects where banks can benefit from adopting cloud computing technology. One crucial point is cost efficiency. Bringing down current cost and controlling potential cost events is a key factor in creating a competitive edge in the market. The use of cloud services has the potential to bring down the cost of IT related activities such as purchases and maintenance of Servers, Security systems, licensing etc. Further the cost of geographical growth of the service will not be affected by the cost factor which otherwise would require massive up front capital. The pay- for- use basis can be effectively utilized as a cost management tool to avoid repetitive actions and chose key services required. A shift towards cloud banking will scale down cost function in to an ongoing operational cost management and create positive effect on return on equity of the bank.

Cloud banking can offer banks with superior business agility. It is the ability of a bank to respond effectively to changing dynamics of global financial landscape. The three cornerstones of agility, flexibility, adaptability and balance are inherent features of a cloud. The use of cloud service offer the flexibility of resource allocation expansion and reallocation based on changing business needs as it does not involve the use of physical infrastructure. The new product development will be a short life cycle which gives superior adaptability to market competition and customer needs. Hence the cloud technology will result in creating an innovative customer centric business approach focusing on core value addition of the service.

Cloud technology offers another key solution for vital regulatory and business needs being the ideal setup for managing Disaster Recovery (DR) systems and Business Continuity Plans (BCP). Further the superior analytical capability which comes hand in hand with cloud technology will turn a new chapter in Customer Relationship Management (CRM) activities focusing on unique value creation for customer segments.

The development of social business concept which is focusing on life time customer value and improving customer ladder is predominantly influenced by cloud technology. Instant messaging, e mails, communication, file sharing, web meetings, user profile maintenance; Calendar management will offer a greater customer experience.

Sustainability is another buzz word in banking industry in present day context. Green IT is the one key area of achieving sustainable development in the bank. Carbon footprint and high energy consumption and wastage which comes as by- products of the usage of physical infrastructure will be eliminated as cloud will transfer all the physical presence into a virtual environment.



3.2 The down side

The banking is unarguably the most regulated industry in the world with ever increasing regulatory reporting requirements, compliance, growing influence of new service standards such as Basel III & IFRS and legal aspects such as data secrecy laws. Hence a proper evaluation of risk factors is vital before any move towards cloud.

The primary security concerns of cloud banking can be viewed as risk of access controls, identity theft, application security and concerns over confidentiality. In cloud infrastructure model the selected data of the bank will be stored at a remote server of the service provide at an unknown location. Hence physical access to the server is not possible in banks perspective. The access to sensitive data is available to a complete third party with bank having no control over access. Hence the data is vulnerable for insider attacks. Identity theft is another key risk factor faced by banks. Broken authentications and compromised credentials may put the bank's mere existence at risk as the banking system works on public trust and confidence. If a bank selects a strategy to adopt cloud based business model they should first work out a comprehensive security risk program. The usage of stronger passwords, prudent key /certificate management, multilevel authentication and one time passwords are few prudent measures a banking institution can follow for data protection. The bank should put in place specific policies to monitor, detect and prevent unauthorized use of cloud service.

Two buzz words in modern day IT are cyber security and hackers. Threat of hackers poses a predominant threat to cloud banking. The consolidation of high value data of multiple organizations will make clouds a hotspot for hackers to launch an attack. Hence the inherent risk outlook of cloud banking infrastructure is greater than traditional in-house banking IT infrastructure. A cloud is always a shared responsibility between service provider and the client. Hence any sort of data breach will affect the bank critically. The cost of data breach study- 2015 by IBM revealed that the average cost of a data breach in 2015 amounts to USD 3.79 Mn. The projected total cost on data breaches in 2019 is USD 2.1 Trillion. Increasing use of Trojan families such as Dridex, Gootkit, Vawtrak, Rovinix in collaboration with remote administrative tools (RAT) for attacks targeting hotspots has created an ever escalating risk sentiment in cloud banking infrastructure.

The unavailability of common industry wide standard for data protection and architectural design of the cloud is also acting as a risk factor in cloud banking. Major cloud service providers such as Amazon-AWS, Google App Engine and Microsoft Azure use diverse architectural setups for their service offering.

Vendor and/or data lock in is another area which came under risk spotlight. It refers to lock in scenario which may arise as a possible with the enhanced dependence on the cloud service provider. The cost factors and contractual arrangements may cause such a scenario a reality. The



banks moving towards clouds should encompass a feasible exit mechanism and contingency arrangements as a core part of its cloud strategy.

There are varieties of other risk factors which are situational or sometimes country specific. A common issue in Sri Lankan context may be the connectivity problems. Cloud computing is entirely dependent on the viability and reliable internet connection. The drop out time caused by connectivity issues and associated cost of down time will be a threat to the development of cloud banking industry in Sri Lanka. Further in the context of big banks, cloud computing may not create cost economies as expected, surpassing current in house systems, bringing down a Return on Investment of the bank. In addition issues such as intellectual property rights (Who owns the rights for data created on the cloud) regulatory challenges pertaining to privacy laws may act as risk factors for cloud banking.

4.0 Stepping in to cloud - the future

Cloud banking has a clear potential and capability to become the driving force of digital economy in both local and global aspects. A move towards the cloud will help to re imagine the banking experience and service offering shifting customer value chain to a whole new level. However it is advisable for banks to take a cautious and measured approach towards the new trend due to its inherent risk factors. The bank management of any interested bank should approve a well documented cloud strategy specifying cloud computing options under consideration. A comprehensive risk assessment should be conducted prior to defining the cloud strategy of the bank.

What to look at in a critical risk assessment

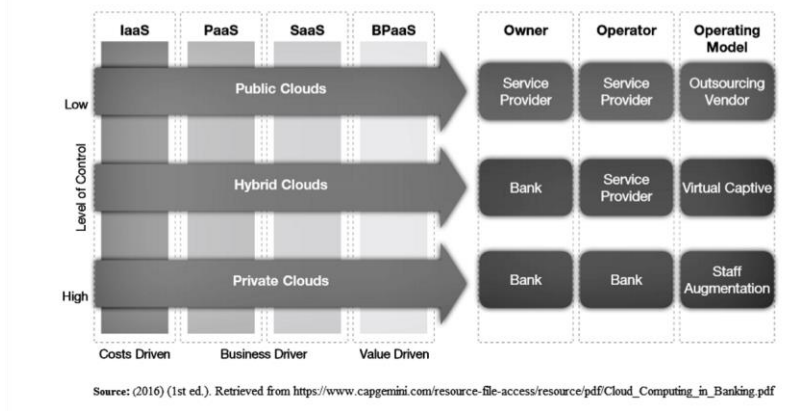


The selection of cloud deployment model and service delivery model is the most critical decision a bank should make in their drive towards a cloud architecture. As in the subsection 2.1 & 2.2 private cloud is the deployment model with highest security, which will be the focal point in deployment strategy of any bank in the initial stage. In service models possible preference would



be IaaS (Infrastructure as a Service) model. A combination like this means that banks will own and operate the cloud themselves rather than outsourcing the operations to a cloud service provider (CSP).

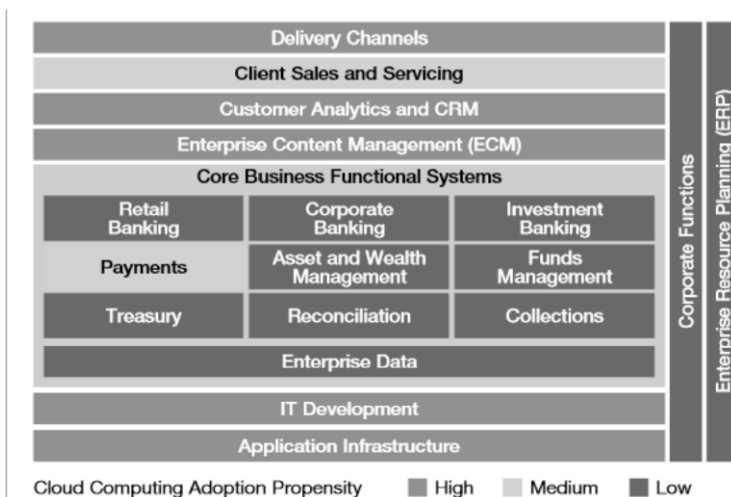
Cloud service delivery models: How much control



The precedent in banking industry towards cloud technology shows that they prefer to shift non-core, less sensitive processes in the initial stages such as Human resource management, Customer analytics, Customer relationship management, Development and testing and Enterprise content management. The core business areas such as Treasury , Retail/Corporate/Investment banking, Asset Liability Management (ALM) will be shifted into a cloud when and if the cloud banking becomes more institution friendly, catering enhanced industry specific features.



Areas best suited for cloud banking



Source: (2016) (1st ed.). Retrieved from https://www.capgemini.com/resource-file-access/resource/pdf/Cloud_Computing_in_Banking.pdf

The global banking industry has shown their potential towards cloud computing. In a recent interview with research firm McKinsey & Company, the global head of technology division of Goldman Sachs, Don Duet revealed their intention of shifting their 85% of distributed workloads to run on a cloud. Capital One Financial Corp. is another bank which has already tied up with Amazon's AWS infrastructure with the intention of cutting down its data centers from eight to three. The largest US bank in asset terms JP Morgan has also expressed their interest, with Amazon and Google, towards moving into a cloud. Banks with smaller capacity have already moved their core systems into cloud infrastructure speeding up the journey towards clouds. In May 2016, the Oak North Bank of UK became the first ever UK bank to shift its core banking to a cloud. Some other banks that have shifted their core banking into cloud are US based Independence National Bank, Global Japanese bank (uses Cloud desktop), Central Europe Bank, Australia's Me Bank and Spanish bank Bankinter.

5.0 Regulatory measures

Regulators worldwide have expressed their interest in guiding and regulating the area of web based transactions, cloud computing and cyber security. The majority of these directives has a direct effect on Cloud banking industry. On August 2016, European Union issued their first comprehensive legislation on Cyber Security, namely Directive on Security of Network and Information Systems (NIS Directive). Netskope, a leading cloud access security broker revealed that more than 75% of cloud applications in EU region are not ready to fulfill the requirements of this directive.



Another game changing piece of regulation was approved by European Commission on April 2016 with the name General Data Protection Regulation (GDPR) .It inter alia looks into the export of personal data outside the EU making cloud computing an uphill battle.

Financial Conduct Authority of UK issued their guidelines affecting clouds in November 2015 (Guidance for the firms outsourcing to the cloud and other third party IT services). United States has issued its regulatory directives in 2012, through Federal Financial Institutions Examination Council to regulate the industry.

The Central Bank of Sri Lanka's (CBSL) 2014 amendment to the Direction for the risk management framework for the licensed banks directs the banks to implement base line information security standards for information security. The directive which reflects alignment with ISO 270001:05 discussed about access security and internet and e mail (Under number 9 and 10 of 14 item security domains). Future advancement of Cloud banking in Sri Lanka will be affected to a great extent by this directive.

6.0 Conclusion

Cloud banking is an attractive architecture based on IT infrastructure which incorporates vast benefits as well as inherent risks. Banks should follow the new trend armed with a viable and comprehensive policy framework which acts as a road map. The selection of cloud business model should be based on a proper evaluation of the risk appetite of the bank, nature of data and information to be shifted to the cloud and their sensitivity. An all in approach targeting a fully fledged cloud banking solution should include three major steps , first step being the shifting of non sensitive/Critical data, developing infrastructure investments and performance capitalizing on cloud techniques and thirdly shifting of production environment to the cloud. The success of a adoption of cloud solution will depend on the bank's true assessment of risk return trade off considering all inclusive inherent and other risk factors, compliance and regulatory burden as against the value addition through process efficiencies and impact on cost and Return on Investment (ROI).