



Analyzing the Adoption of Cloud Computing For Banking & Finance

WHITEPAPER

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Abbreviations

FSP	- Financial Service Provider
On-prem	- On-premises
IT	- Information Technology
SaaS	- Software as a Service
PaaS	- Platform as a Service
IaaS	- Infrastructure as a Service
API	- Application Programming Interface
BNPL	- Buy Now Pay Later
DDoS	- Distributed Denial of Service



Abstract

The banking & finance industry is famously reluctant to adopt innovative technology. Many financial institutions still use decades-old legacy systems. However, the FSPs that started migration towards the cloud banking model have made instant gains through efficiency. These efficiencies can only be realized through 'Cloud-native Core Banking' software. The purpose of this whitepaper is to investigate the issues & limitations with on-prem deployment, the benefits of cloud technology, and the implementation of cloud banking solutions.



I don't need a hard disk in my computer if I can get to the server faster... carrying around these non-connected computers is byzantine by comparison.



- Steve Jobs, Co-founder,
CEO & Chairman, Apple Inc.

1.0 Drawbacks of On-prem Systems

1.1 Cost and Infrastructure Issues of the On-prem Approach

Storing data and running applications on an in-house server is still a widely accepted approach in banking and many other industries. The capital cost is exceptionally high when implementing an on-prem server solution, including licensing fees, hardware, and infrastructure costs. The infrastructure cost includes a disaster-proof room, servers, air-conditioning, various other electronics, and not to mention the high-power consumption due to excessive heat. In addition, a 24/7 dedicated internal IT team is required to maintain an on-prem system. Further, maintaining a fully functional 'disaster recovery site' external to the operation is mandatory in most instances.



1.2 Security Risks Associated with On-prem Systems

On-prem systems often fall victim to cyber-attacks and internal breaches that are commonly associated with malice, incompetence, and negligence by the employees or contractors.

External Security Threats

Many attacks targeting financial institutions originate from external sources. Malware, DDoS and social engineering are the most imminent external cyber threats FSPs are facing.

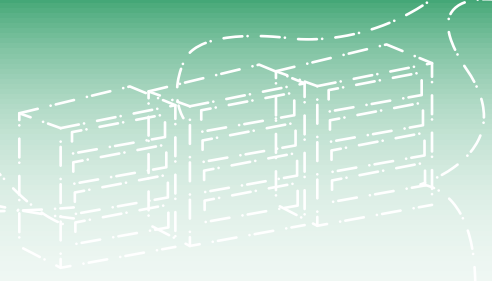
Malware: Malware (or malicious software) such as viruses, trojans, spyware, and ransomware are intrusive programs that infect computer systems. Ransomware could even target the personal devices of bank employees by demanding access to sensitive information. Other types of malware directly steal information from a system.

DDoS (Distributed Denial of Service) Attacks: A DDoS attack disrupts the usual traffic flow of a server system by flooding it with artificial web traffic, overwhelming its infrastructure in the process. A DDoS program infects thousands of devices and then launches a simultaneous attack on the targeted server by utilizing the compromised devices. DDoS attacks cause system failures and disruption of services. The attackers may even steal privileged information.

Social Engineering Attacks: Social engineering attacks use psychological manipulation to make the victim willingly disclose privileged information or grant access to attackers. For instance, phishing and spear-phishing attacks often take the form of emails that mislead the recipient. According to Cisco Systems, Inc., phishing attacks are accountable for most breaches and are commonplace in financial institutions.

Internal Security Threats

In-house systems offer poor protection against internal data breaches, theft, sabotage, and espionage in the absence of advanced security measures. A spiteful employee could misuse their privileges & access to share company data with external parties. Employees could cause considerable damage by altering or deleting information completely, making the recoverability process a tedious undertaking.



1.3 Limitations of On-prem Data Centres

Before the advent of cloud technology, data storage relied on the in-house IT infrastructure. In the on-prem approach, the FSP would bear full responsibility and greater control of running the systems but restrict its operations due to infrastructure and capital deficiencies.

Mentioned below in detail are a few obstacles of running an in-house data centre.

Data Recoverability: FSP has the sole responsibility for managing customer data on internal servers. In the event of a data loss, the possibility of recoverability falls plainly on the storage and technical capabilities of the on-prem systems. Data losses might occur due to system failures, software bugs, cyber-attacks, human errors, malice associated with operators, and natural disasters. On most occasions, the rate of recoverability is next to zero.

Scalability: The scalability of a standalone internal IT server is extremely limited or could be expensive due to layers of redundancy. Enhancing the capacity is a challenging task. Either new infrastructure has to be purchased, or costly upgrades are required to facilitate operations as the organization grows.

Flexibility: During the global pandemic and lockdowns, remote workability has become critical for business continuity. FSPs are no exception. Most FSP staff are working away from their offices. Many on-prem systems have constraints in accommodating the new norm of a hybrid or work from home environment. Moreover, many traditional on-prem solutions have little or no flexibility and do not work well with 3rd party applications.

Scope of Internal IT Staff: The FSP must at least have a dedicated internal IT team for the sole purpose of administrating and maintaining on-prem servers. There are many technological & regulatory changes taking place in the financial domain today, and FSPs need to respond rapidly & precisely. It all depends on the technical prowess of the organization's IT staff.

The higher costs, vulnerability to security threats, and technological barriers make the on-prem server systems unnecessarily overpriced, risky, time-consuming, and outdated. The cloud computing model was introduced to resolve all of the above issues.



...instead of just having a device to program, we now have the entire Cloud out there, where a single program can go and travel to many different sources of information and create a sort of a virtual service.



- Andy Hertzfeld, an Early Apple Employee
(Wired Magazine, April 1994)

2.0 The Cloud Computing Model

2.1 Cloud Technology

Cloud computing in a nutshell...

Cloud computing is essentially sharing computing resources remotely regarding storage, networking, software applications, processing power, real-time updates, and advanced analytics. The diagram below provides an accurate depiction of the cloud computing model.

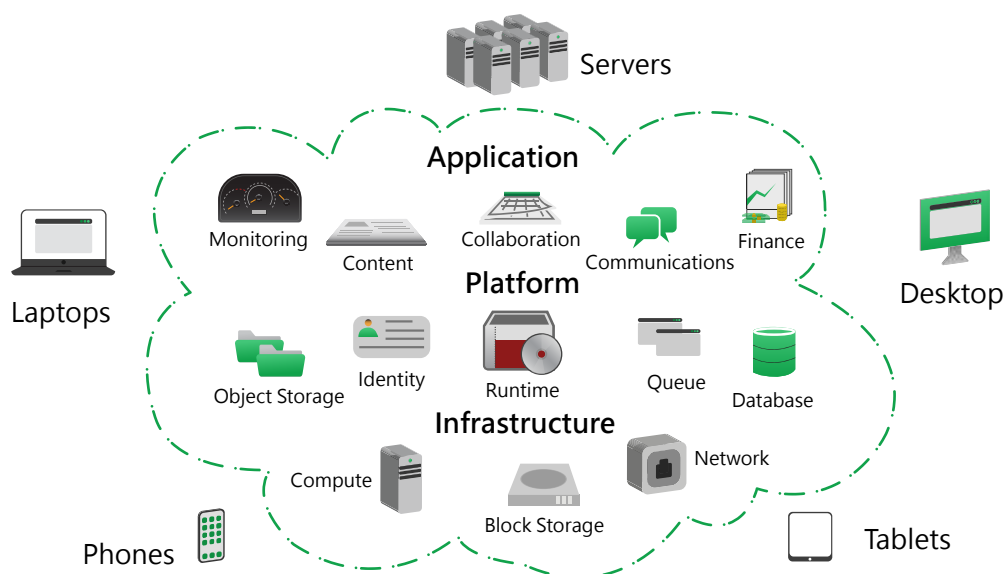


Figure 01 - The cloud computing model



2.2 Misconceptions of Cloud Technology

An industry made murkier by myths & fallacies...

Misconception 01 - Cloud computing is riskier and increases data breaches

'Having data stored externally with a cloud service provider is more dangerous than storing data within company premises. Cloud platforms are more vulnerable to malware and breaches. Therefore, banks cannot afford to keep data externally in the cloud regardless of other benefits.'

Misconception 02 - Cloud computing is costly

'Cloud computing is exorbitant and not suitable for small and medium operations. Implementation and subscription incur heavy capital and operational expenditure. Maintaining and operating all storage and software on-prem is more cost-effective for FSPs.'

Misconception 03 - Cloud computing is just a fad

'Cloud computing is just a trend, and participating by the FSPs is not warranted. The cloud rush will eventually die out, and many firms will return to the traditional on-prem layout. Therefore, cloud migration will be a waste of time and money.'

Misconception 04 - Cloud computing is still new and underdeveloped

'The cloud computing model is still in its infancy and needs improvement. Cloud-based applications are slow and primitive in operability, unlike non-cloud-based software. Cloud applications have much more downtime and lags which could jeopardize entire operations.'



2.3 Regulatory Issues

Regulatory bodies around the globe are concerned with guiding and regulating cloud technology. The Federal Financial Institutions Examination Council (FFIEC) of the United States issued a regulatory directive back in 2012 concerning outsourced cloud computing activities.

European Union issued legislation on cyber security in August 2016 known as the Directive on the security of Network and Information Systems (NIS Directive), focusing on cyber security and risk management. Likewise, many regulatory authorities have defined guidelines and regulations for cloud service providers to follow.

Regulatory curbs are a major reason for the laggard cloud adoption rate in the banking industry. However, they are disappearing rapidly due to wide acceptance, normalization, and the abundance of benefits from cloud usage. Amid the regulatory backlash, it is clear that some authorities and central banks are beginning to consider the necessity of cloud computing for the modern banking institution.

2.4 Benefits of Cloud Computing

Cost Savings

Although cloud computing isn't free, it is cheaper than running in-house data servers. The cloud approach incurs some capital costs during the implementation phase. However, building and maintaining IT infrastructure is much more complex and costly. On the other hand, the cloud computing model allows the user to have the opportunity to use the infrastructure that already exists and is managed by the service providers. They offer subscription payment plans that may vary according to the consumption of cloud resources favouring large and small enterprises.

Data Security

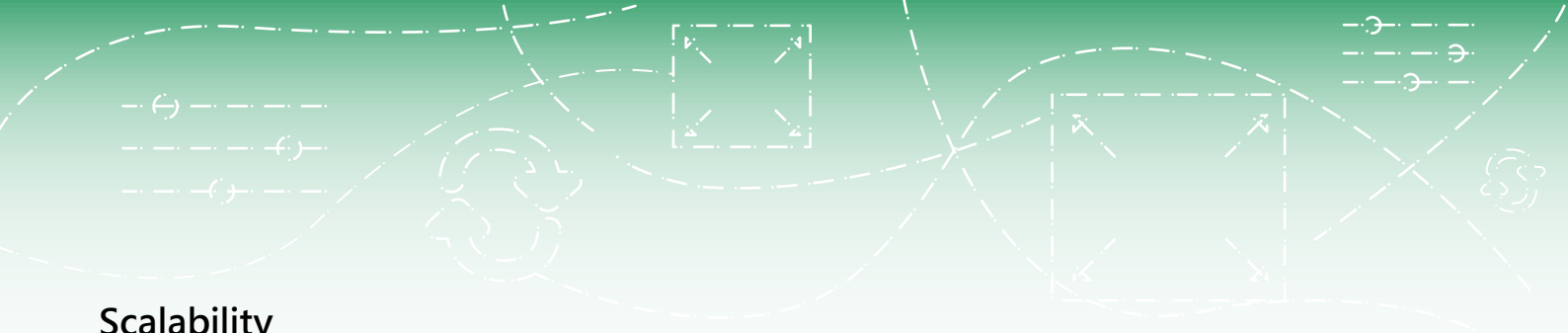
State of the art cloud platforms such as Microsoft Azure, AWS (Amazon Web Services), and GCP (Google Cloud Platform) use complex algorithms to encrypt and protect data. While no system can guarantee 100% security, reliable cloud platform vendors offer the most acceptable security per today's industry standards (i.e. Identity & Access Management [IAM], Governance [policies on threat prevention, detection, and mitigation], Data Retention [DR] and Business Continuity [BC] planning, and legal compliance). Cloud systems can also safeguard against data losses due to hardware issues and power failures.

Swift Deployment

Cloud adoption offers rapid deployment of software as it does not require building on-site data centres. Most of the infrastructure & software have been pre-loaded onto the cloud, and the solution will be ready to go in seconds. The only prerequisite is a mere internet connection.

Seamless Integration

Cloud computing connects many applications, systems, and devices with real-time data interchanging, creating a unified IT ecosystem. A non-cloud approach could never match the level of integration the cloud has to offer. The cloud transforms the IT infrastructure into a digital nervous system where information can flow seamlessly regardless of geographical and technological boundaries.



Scalability

Banks have moved away from paperwork to keeping records electronically. The data storage requirement of a bank increases every year. In-house data centres are not scalable without incurring some capital expenditure. Therefore, building and maintaining on-prem data centres is impractical, while the cloud model offers on-demand scalability.

Parameterization

The delays in managing and controlling internal IT infrastructure could be reduced with a cloud-based approach enabling the company to respond to demand changes and customer preferences quickly. Product customization offers the client a tailor-made product with only the desired functionality, giving a competitive advantage. On-prem solutions are often slow, costing the business many opportunities that arise with the changes in the market.

Mobility

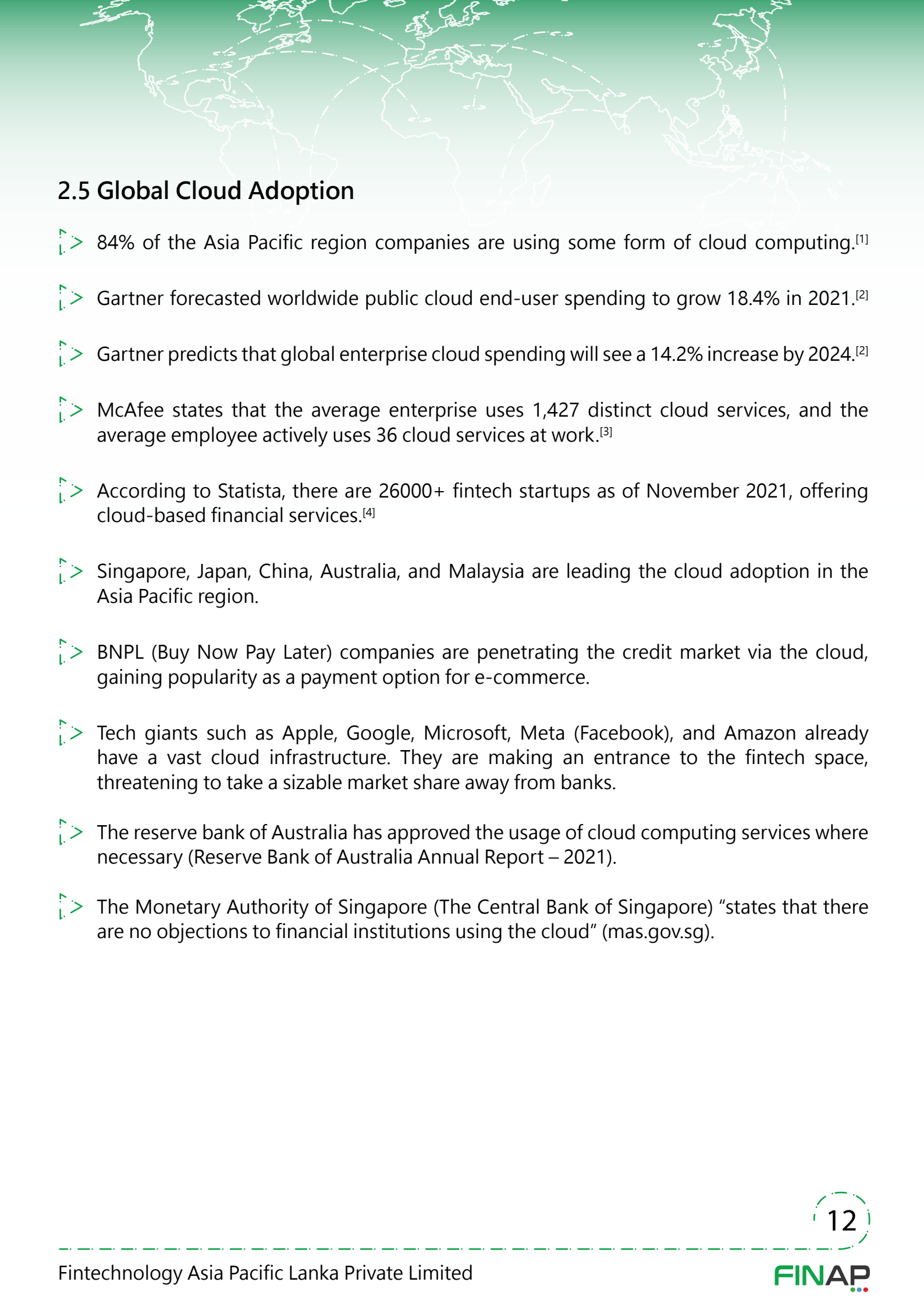
Cloud services offer great agility & mobility across various platforms compared to non-cloud systems. Remote working amid the Covid-19 pandemic would never be possible without cloud technology. The cloud enhances inter-branch communications and enables staff to log in from personal devices with proper security measures. Field agents and other officers away from their workstations can carry out tasks remotely, eliminating physically visiting a branch.

High Availability

The timeliness & the reliability to access and use data on cloud platforms have improved significantly over the years. The industry standard of cloud platform annual availability rate is 99.999%, which brings the expected annual downtime to 5 mins & 16 secs (totaluptime.com).

Recoverability

Cloud solutions have greater recoverability even during disasters and significant service outages. This is possible due to the multiregional deployment of the cloud. A multiregional deployment enables an organization to deal with technical failures and allows faster access with relatively low latency, even in large organizations.



2.5 Global Cloud Adoption

- 84% of the Asia Pacific region companies are using some form of cloud computing.^[1]
- Gartner forecasted worldwide public cloud end-user spending to grow 18.4% in 2021.^[2]
- Gartner predicts that global enterprise cloud spending will see a 14.2% increase by 2024.^[2]
- McAfee states that the average enterprise uses 1,427 distinct cloud services, and the average employee actively uses 36 cloud services at work.^[3]
- According to Statista, there are 26000+ fintech startups as of November 2021, offering cloud-based financial services.^[4]
- Singapore, Japan, China, Australia, and Malaysia are leading the cloud adoption in the Asia Pacific region.
- BNPL (Buy Now Pay Later) companies are penetrating the credit market via the cloud, gaining popularity as a payment option for e-commerce.
- Tech giants such as Apple, Google, Microsoft, Meta (Facebook), and Amazon already have a vast cloud infrastructure. They are making an entrance to the fintech space, threatening to take a sizable market share away from banks.
- The reserve bank of Australia has approved the usage of cloud computing services where necessary (Reserve Bank of Australia Annual Report – 2021).
- The Monetary Authority of Singapore (The Central Bank of Singapore) “states that there are no objections to financial institutions using the cloud” (mas.gov.sg).



Ignoring technological change in a financial system based upon technology is like a mouse starving to death because someone moved their cheese.

- Chris Skinner,
Fintech Expert & Writer

3.0 Cloud Banking as a Solution

3.1 What is a Cloud-native Core Banking System

A core banking system provides a software solution for the day-to-day operations of a financial institution.

A cloud-native core banking system fully utilizes the power of cloud technology for banking and financial institutions. Cloud-native core banking software is explicitly written to operate in a cloud ecosystem, unlike their older legacy counterparts, written well before cloud technology became widespread. Legacy software could be upgraded to incorporate some cloud-enabled characteristics. By building over legacy on-prem systems, an organization cannot take full advantage of the cloud because the underlying technology has not changed in reality, hence unable to share or pool resources seamlessly as cloud applications do. Cloud-native systems have an open-ended ecosystem, unlike on-prem systems that are close-ended.

3.2 Things to Consider Before Cloud Adoption

Cloud technology can be utilized on three different levels;

- **IaaS (Infrastructure as a Service)** – Availability of basic hardware such as servers, storage, firewalls, and network access via the internet.
- **PaaS (Platform as a Service)** – Availability of development and deployment environments via the internet.
- **SaaS (Software as a Service)** – Availability of 3rd party software applications & functions via the internet.

The diagrams below show a comparison of the cloud computing and on-prem approaches.

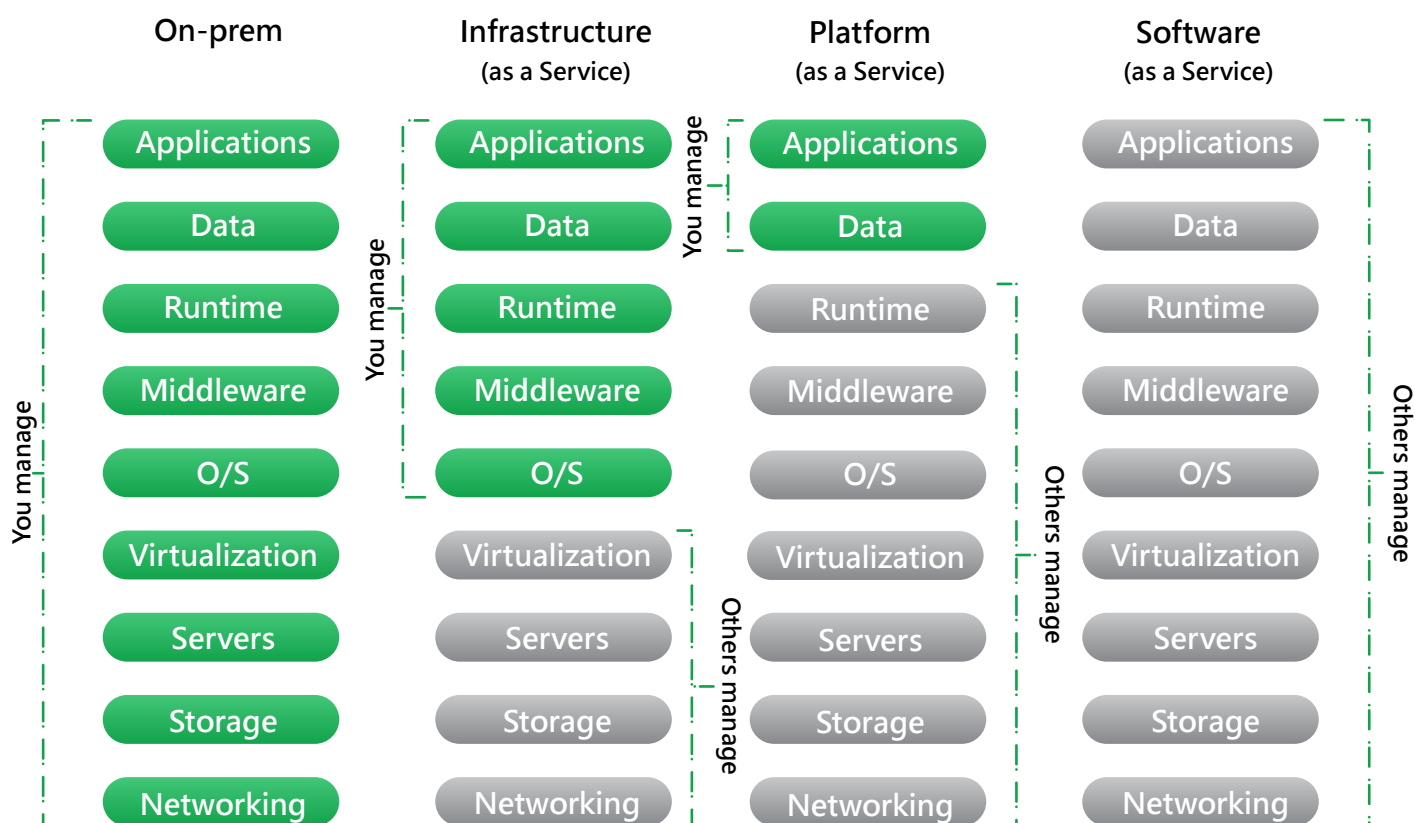
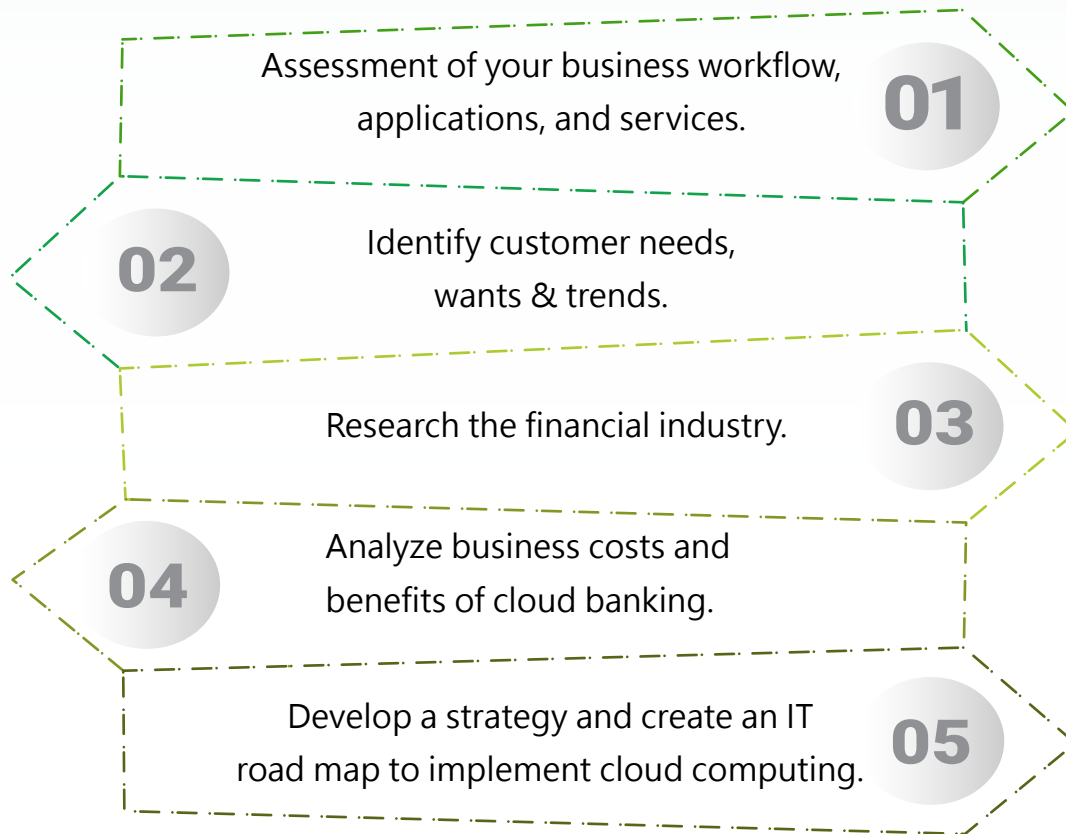


Figure 02 - Comparison of On-prem, IaaS, PaaS, and SaaS

A Guide for Successful Implementation of Cloud Banking



Here are some top cloud service providers in the world. ^[6]

1. Amazon Web Services (AWS)
2. Microsoft Azure
3. Google Cloud Platform (GCP)
4. Alibaba Cloud
5. IBM Cloud
6. Oracle
7. Salesforce
8. SAP
9. Rackspace Cloud
10. VMWare

AWS, Azure & Google are considered the big three and are prime players in the cloud arena.

3.3 Why the Time is Right for a Cloud-based Banking Ecosystem

Cloud technology has been instrumental in maintaining business continuity during the global pandemic. Cloud banking extends remote access to the bank's core functions for employees working from home with the highest security enablement. With the cloud's agility & mobility, banks can expand their operations without building high-cost infrastructures.

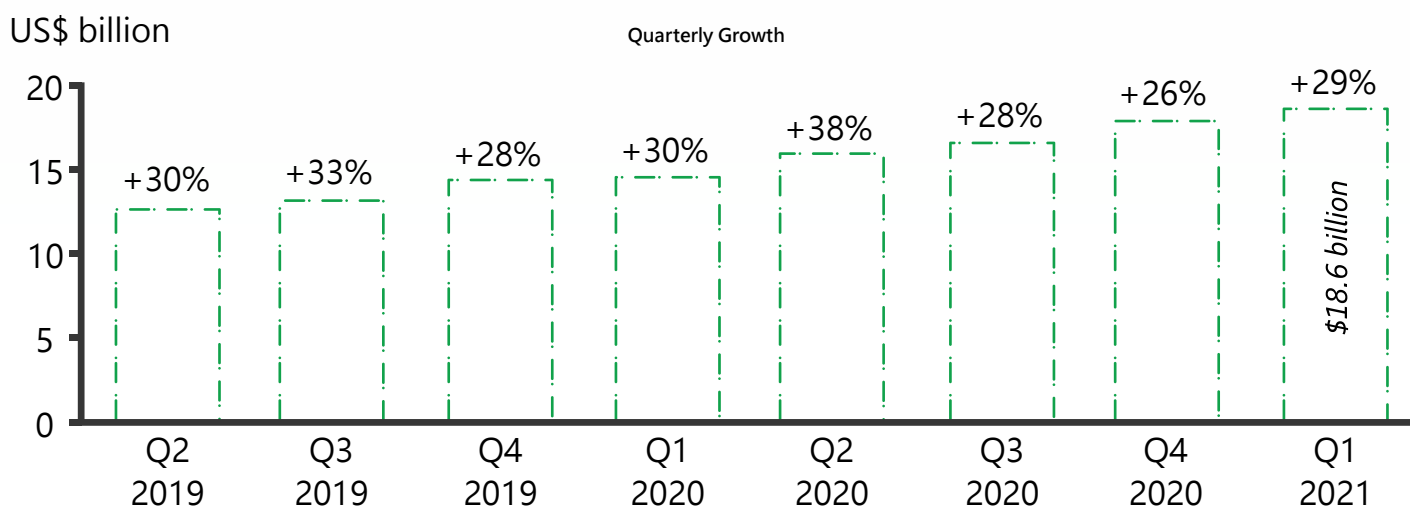


Figure 03 – United States cloud infrastructure services spend (Canalys estimates, May 2021)

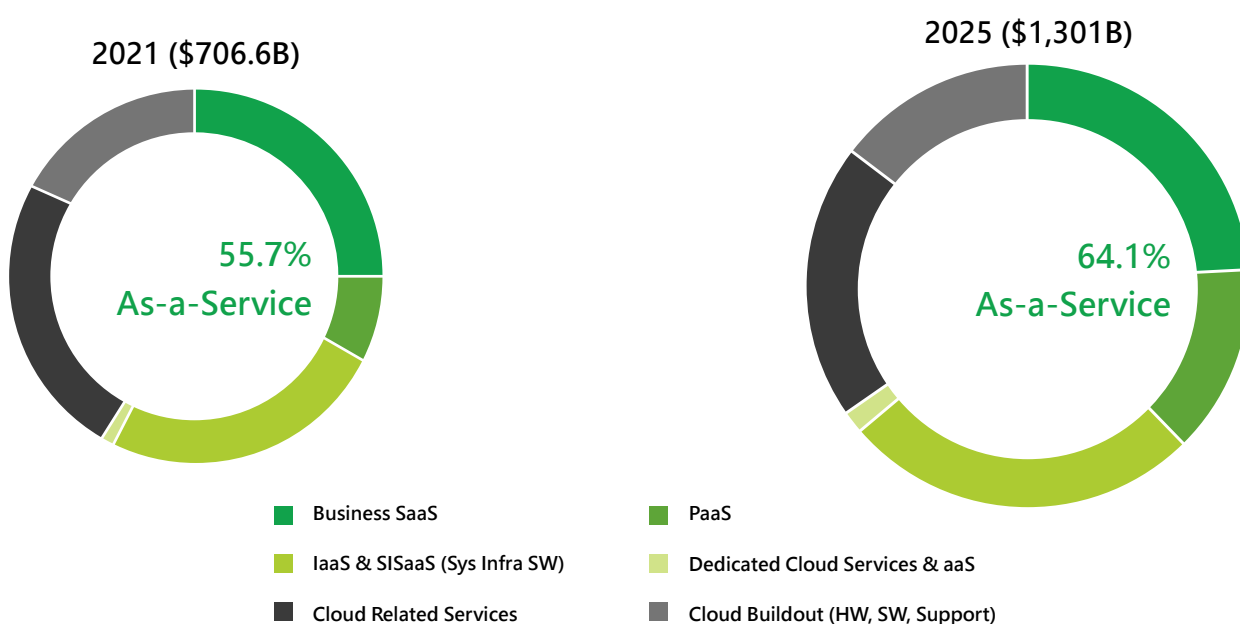


Figure 04 - Worldwide whole cloud outlook forecast (IDC, 2021)

Many banking institutions choose a partial cloud adoption strategy, where smaller processes are taken to the cloud while the core operations remain in a bank-controlled data server. Some FSPs have their entire disaster recovery site on a cloud platform and use another 'Cloud-native Core Banking' solution as a 'fail safe' mechanism.

Non-banking firms have used open APIs and embedded finance technologies to provide financial services through digital channels. These banking alternatives are gaining popularity due to their simplified customer-centric approach and are beginning to threaten the once monopolized banking & finance domain.

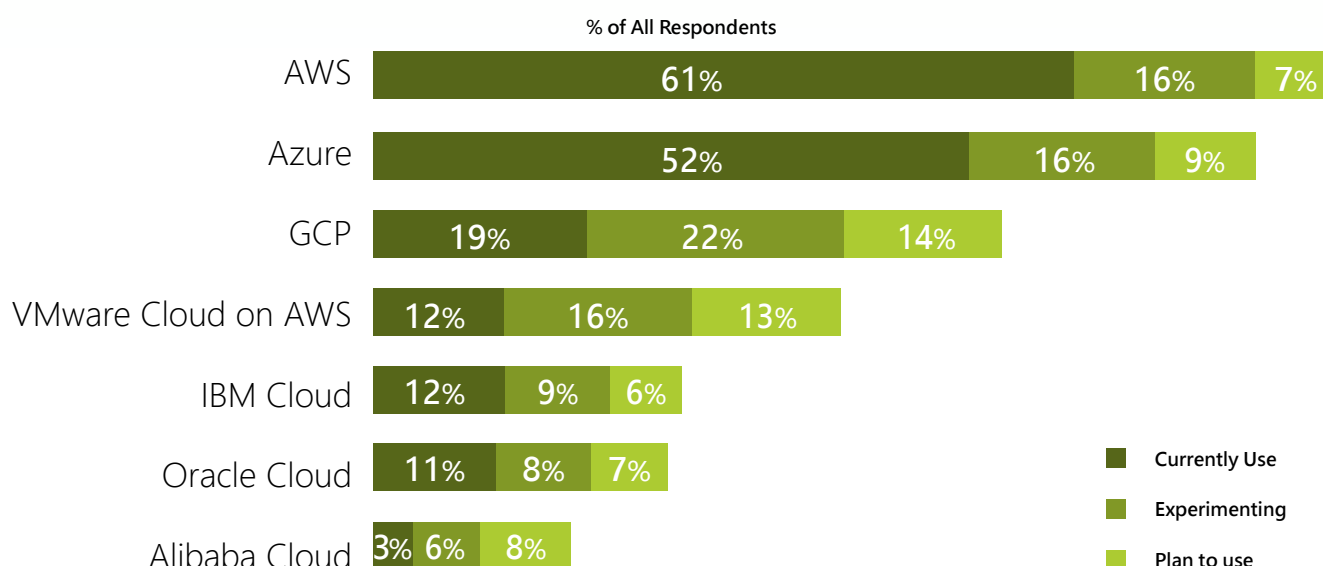


Figure 05 - Public Cloud Adoption (RightScale 2019 State of Cloud Report from Flexera)

A cloud banking ecosystem is a complex system of interdependent components that all work together. Modern financial institutions need to keep pace with the latest trends in technology and customer expectations. Moreover, financial institutions can use a cloud ecosystem to build new business models/strategies to keep up with fintech startups and big tech companies.

Applications of Omnichannel Banking



Modern banking services such as omnichannel banking would never be possible without cloud technology. Omnichannel banking provides the same financial products & services, which are available in a bank branch for customers across multiple channels, both online & offline, regardless of geographical location or time of day. Unlike the traditional banking approach, omnichannel banking offers excellent flexibility for the end consumer.



Technological innovations will be the heart and blood of the banking industry for many years to come and if big banks do not make the most of it, the new players from Fin-Tech and large technology companies surely will.



**- David M. Brear,
Founder & CEO at 11:FS**

4.0 Endnote

Cloud computing offers a wealth of benefits to any organization. In particular, FSPs can leverage enormous benefits through participation in the retail ECO system, retail funds mobilization, capturing the entire payment system, and guarding against moves by pure digital base operators engorging into the market space.

The cloud computing approach is the clear winner in cost, security, ease of deployment, operability, agility & scalability. The on-prem deployment is an inefficient, risky, and outdated approach that makes it hard for FSPs to stay in contention with big tech giants and various fintech alternatives such as BNPLs, neo banks, blockchains, and other disruptive technologies.

It no longer matters how long they have been in business for banks. The industry has transformed. Technology has evolved, and with it, customer expectations have changed. The traditional in-house core banking solutions cannot facilitate the modern API-driven omnichannel banking infrastructure required to stay competitive in the fintech arena.

The banking industry has long ignored the consumer and has been too focused on products & services. Cloud banking is making amends to resolve this dilemma. Cloud adoption is pivotal for FSPs to revitalize the customer-centric approach and pave the way for an unparalleled consumer banking experience.



When did the banking industry decide that a consumers' emotional experience is secondary to the devices it supports, the channels they promote and the payments they process? Would we go back to it once all channels were digitized enough?



- Duena Blomstrom,
Founder & CEO of PeopleNotTech

About Us

● Stability

● Security

● Quality

FINAP is a renowned IT solutions provider incorporated in Sri Lanka. Our vision is "To be the most accepted solutions provider through simplicity." We employ the best minds in the banking & finance domain to envisage our fintech concepts.

Every FINAP application is built upon four fundamental principles:

- !> User Experience
- !> Open API Platforms
- !> Parameterization
- !> Scalability

Our processes are ISO 9001:2015 certified, where every line of code goes through rigorous testing, quality assurance, and constant re-engineering, ensuring the best user experience.

Although FINAP's origins were as a fintech company, we have branched out to provide innovative business solutions for e-commerce & retail enterprises, workflow automation, fleet management, project management, and tech resource augmentation.

Ecoru - Banking & Finance Solution

Ecoru is our flagship fintech solution. Ecoru provides an all-inclusive, modern yet simple cloud-native Core Banking System (CBS) to empower small to more complex financial institutions and banks. Designed by industry specialists according to international standards, Ecoru offers Financial Service Providers the opportunity to create new distribution channels, competitive products, cost-effective service delivery, and provide a better customer experience. Most importantly, Ecoru allows existing and new FSPs to rapidly scale, be competitive and go beyond the traditional boundaries set by on-prem & legacy software.

Serviceable Financial Service Providers



Commercial Banks &
Savings Banks

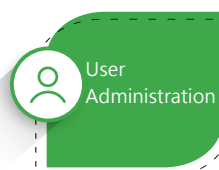
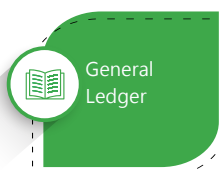
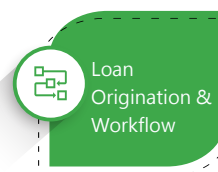


Development Banks &
Finance Companies



Micro-financiers &
Credit Unions

Modules



References

1. www.businesswire.com. (2021). Asia Pacific Sourcing Market Driven by Cloud Services in Q3. [online] Available at: <https://www.businesswire.com/news/home/20211110006478/en/Asia-Pacific-Sourcing-Market-Driven-by-Cloud-Services-in-Q3>.
2. Gartner, Inc. (2021). Gartner Forecasts Worldwide Public Cloud End-User Spending to Grow 18% in 2021. [online] Available at: <https://www.gartner.com/en/newsroom/press-releases/2020-11-17-gartner-forecasts-worldwide-public-cloud-end-user-spending-to-grow-18-percent-in-2021>.
3. McAfee Blogs. (2017). 12 Must-Know Statistics on Cloud Usage in the Enterprise. [online] Available at: <https://www.mcafee.com/blogs/enterprise/cloud-security/12-must-know-statistics-on-cloud-usage-in-the-enterprise>.
4. Statista (2019). Number of Fintech startups globally by region 2019 | Statista. [online] Available at: <https://www.statista.com/statistics/893954/number-fintech-startups-by-region>.
5. Chand, M. (2021). Top 10 Cloud Service Providers In 2020. [online] Available at: <https://www.c-sharpcorner.com/article/top-10-cloud-service-providers>.
6. Holori - Outstanding cloud market size growth: AWS vs Azure vs GCP market share. (2021). [online] Available at: <https://holori.com/2021-cloud-market-size-and-aws-azure-gcp-market-share>.
7. International Data Corporation (IDC): The premier global market intelligence company. (2021). IDC Forecasts Worldwide. [online] Available at: <https://www.idc.com/getdoc.jsp?containerId=prUS48208321>.
8. Flexera™ (2019). RightScale 2019 State of the Cloud Report from Flexera. [online] pp.32. Available at: <https://resources.flexera.com/web/media/documents/rightscale-2019-state-of-the-cloud-report-from-flexera.pdf>.



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