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Cloud Powered Business Reinvention

February 2022

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Foreword

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Context

Cloud is core to success

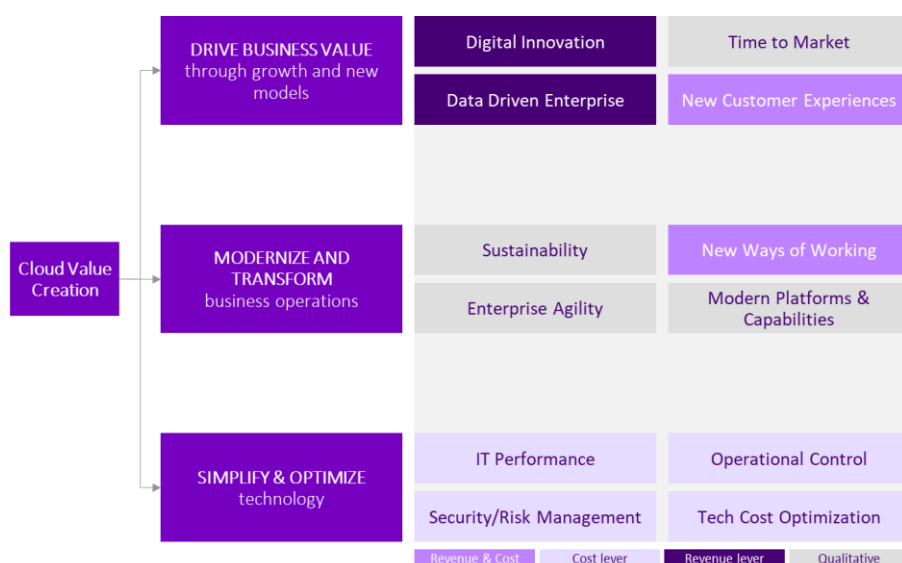
The post-pandemic world has witnessed accelerated demand for digital-native and 'Do-It-Yourself' banking experiences as customer expectations are set by GAFAA enabled liquid experiences. Emerging as a leader in this scenario requires significant differentiation and scalability.

The legacy on-prem infrastructures of Indian banks have led to frequent service outages¹ as they struggle to meet the demand surge for digital native experiences. The trend is expected to continue as digital payment volumes rise and open banking is increasingly adopted, heightening key risk concerns around data security, fraud, and compliance.² Critically, such outages have led to poor stakeholder experiences and resulted in lost revenue opportunities, even as banks incur significant costs towards the maintenance of such architecture.

50% Weekly digital interaction with banks in FY20 (compared to 32% in FY17-18)

44% Digital Sales in Q32020 for BofA (compared to 29% in FY17-18)

Accenture – [“Making digital banking more human”](#)

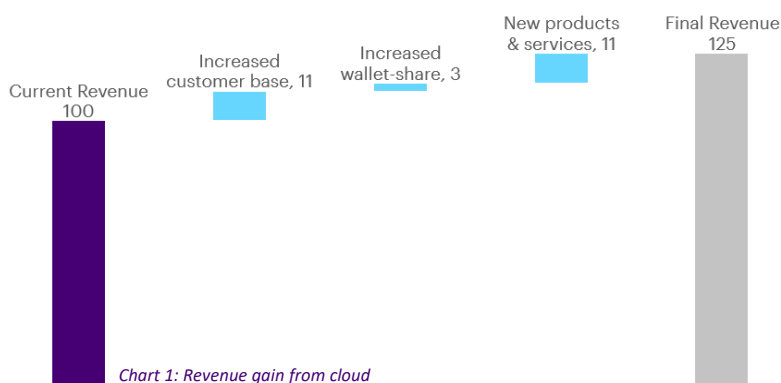


Cloud technology and services are well equipped to enable banks power through transformation that solves for the above-mentioned challenges. The impact of such transformation can enable significant IT infrastructure cost savings at the bare minimum. More importantly, cloud adoption can drive substantial business value by lowering time to market for new products and services, providing better omni-channel experiences and enabling digital innovation that drives new revenue streams and improved cross-sell rates. Finally,

cloud adoption can result in massive reductions in carbon footprint and energy emissions, helping organizations in their effort to meet their sustainability goals seamlessly.

There is significant value at stake

Switching to cloud can drive revenue by 25%



Revenue Growth

Cloud adoption allows banks to be agile and flexible and enables digital innovation leading to superior customer experience. Accenture's research suggests cloud adoption can drive up to 25% increase in revenue for banks from an increased customer base, greater share of wallet and new product and service offerings.

30% REVENUE UPLIFT EXPERIENCED BY A GLOBAL INSURER DRIVEN BY FASTER SPEED TO MARKET AND IMPROVED CUSTOMER RETENTION FROM AN IT EXPERIENCE TRANSFORMATION TO CLOUD.

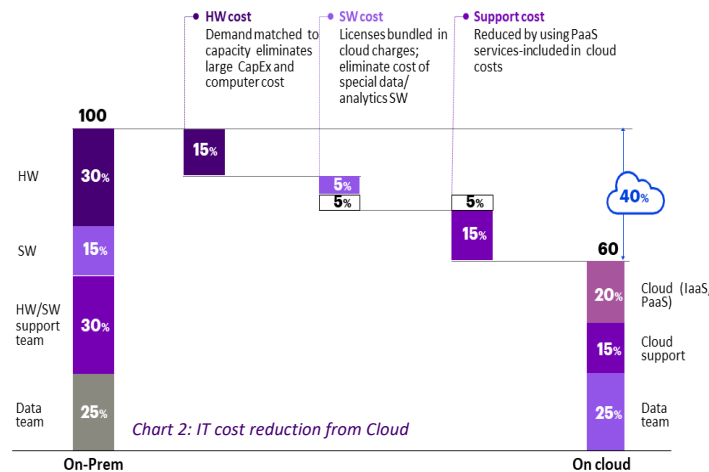
¹ Tinesh Bhasin, [“Digital banking too big strides but outages pose a challenge”](#) – Mint, 29th Dec 2020

² The number of banking fraud cases has increased by 28% in 2019-20.

Cost Optimization

Technology simplification and optimization can drive significant savings across the IT budget while ensuring better risk management, stronger security, and operational control. Resilient infrastructure combined with flexible capacity management can maintain high service levels and availability, while building dexterity in regulatory compliance and reporting. Finally, cloud adoption eliminates capex cost accrued for purchases and maintenance of peak on prem infrastructure. Only OPEX is incurred matched to demand for services. These

A LEADING AUSTRALIAN MULTI-NATIONAL BANK REDUCED ITS TECHNOLOGY INFRASTRUCTURE CAPITAL EXPENDITURE FROM 50% TO 26% THROUGH A FRONT-TO-BACK DIGITAL TRANSFORMATION AND TECHNOLOGY MODERNIZATION ON CLOUD.



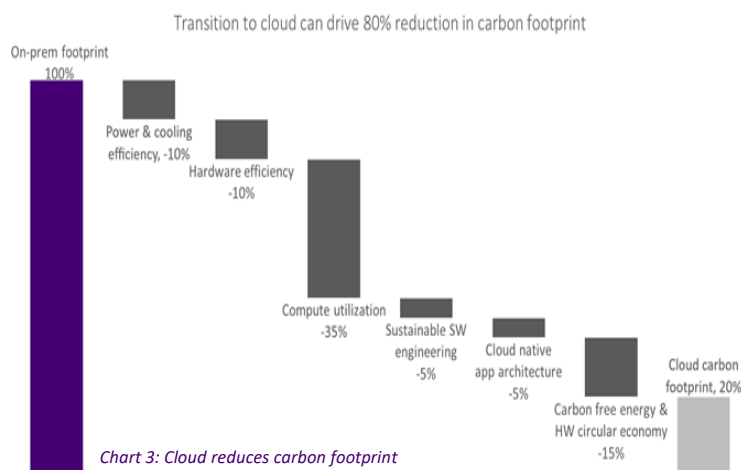
factors result in overall expected cost of IT ownership to be significantly lowered – by up to 40% – upon proper execution.³

Sustainability

Cloud computing generates smaller carbon footprint compared to on-prem because of improved infrastructure efficiency and reduced need for IT infrastructure to support a given user base. Accenture research indicates over 80% reduction in CO2 emissions for an IaaS migration which can be pushed further to 98% by optimizing apps for the cloud.⁴ A WSP report found the Microsoft Azure platform can be 93% more energy efficient than on-prem solutions.⁵

50-80% LOWER EMISSIONS FOR HSBC FROM USING THE CLOUD TO STORE APP DATA, HELPING THE BANK ACHIEVE ITS AMBITION OF NET-ZERO BY 2030

@HSBC on [Twitter](#), 11 Nov 2021



Yet, banks have been slow in leveraging cloud

Adoption of cloud remains elusive despite banks' enhanced focus on technology. Accenture's study of 100 global banks⁶ shows that just 8% of overall workloads (7% in growth markets⁷) have been migrated to cloud, despite near-universal adoption. Enterprise applications⁸ lead in migration to cloud, whereas core banking systems lag the most out of the four functional areas, which include Data & Analytics and Surrounds.

³ Accenture – “[Cloud imperative for banking – Growth Markets](#)”, 5th Feb 2021

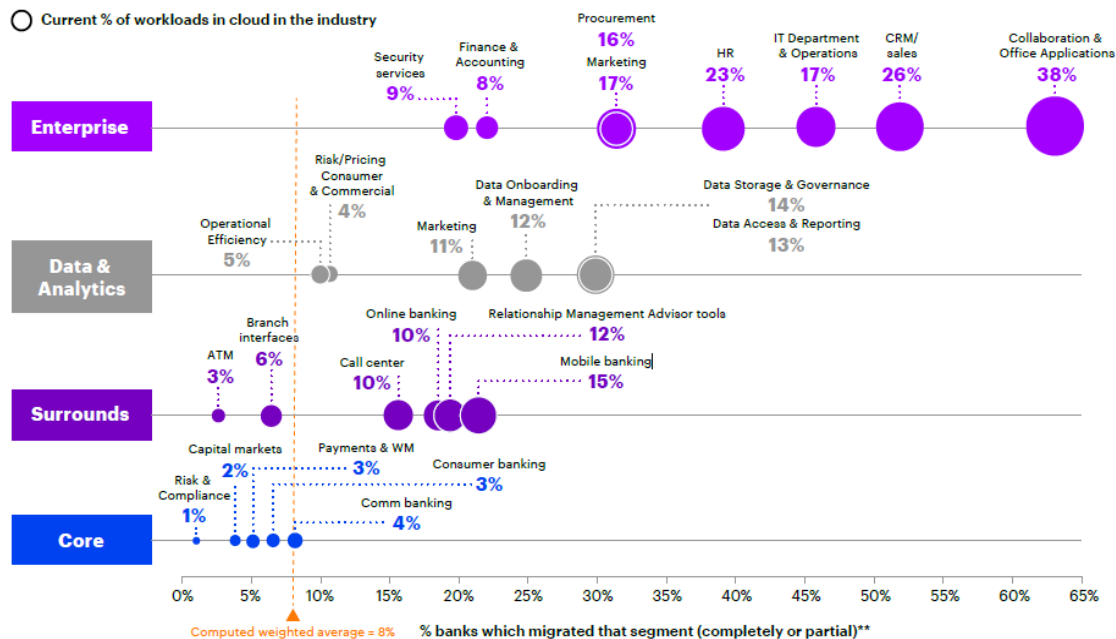
⁴ Accenture – “[The green behind the cloud](#)”, 22nd Sep 2020

⁵ Microsoft – “[The carbon benefits of cloud computing](#)”, 2020

⁶ Accenture Banking Cloud Altimeter – “[What does it mean to be a bank in the cloud?](#)”, 2021

⁷ Growth markets refer to emerging, developing markets outside of NA, Europe, and Japan.

⁸ Off the shelf software for running basic operations and improving productivity and efficiency across the enterprise.



Deciding on the cloud strategy (single or multi, public or hybrid) and roadmap (which applications to migrate first) itself becomes a stumbling block for many organizations due to lack of cloud skills, lack of thorough understanding of legacy architecture & applications, less clarity on costs and fear of loss of control and ownership.

Our research and interactions with leaders in the Indian banking industry highlight a few key concerns that lead to low adoption of cloud in the financial services space –

“Can I ensure safety of our data & applications?” – Security concerns

Banks are responsible for securing the environment they create on the cloud, even more so in a multi-cloud environment. A lack of understanding and skills creates severe apprehensions within the bank.

‘It’s outside my physical control. What if there is an outage?’ – Fear of loss of control and ownership

A common fear executives harbour on cloud migration is the loss of control and ownership. Service providers taking over part of policy and infrastructure responsibilities reduces visibility for the organization.

“What will my job be if we move to the cloud?” – Implications to IT Operations

Cloud adoption can make the traditional IT operations roles of managing on-prem infrastructure obsolete. Upskilling and reskilling the workforce is key to counter redundancies that may arise.

‘I don’t know how’ – Bridging the skill gap

54%+ CEOs identify lack of cloud skills as their leading barrier to cloud transformation⁹. Hiring comes with challenges of talent scarcity¹⁰ and eight-month lag on average¹¹ for priority resources.

‘Our architecture is too complex’ – Migrating a heterogeneous application landscape (C)

Architectural complexity that accompanies legacy infrastructure poses multiple challenges to cloud migration at scale. Several systems were not designed to handle current-day traffic. The new interdependence requirement among systems creates complex technology issues.

‘How much does it cost – how much should it?’ – Principles of purchase and cost of ownership

The shift from an on-prem model which incurs capital expenses to the cloud which incurs operating expenses, while beneficial, can give rise to some unexpected consequences on the cost front. Lack of

⁹ Accenture – [“Modern cloud champions”](#), 13th Aug 2021

¹⁰ Bhargu Haritas, [“Lack of talent is threatening cloud”](#) – Economic Times, 9th Feb 2022

¹¹ Accenture – [“Solving the skill gap in banking’s cloud journey”](#), 25th Oct 2021

understanding of total costs associated with migration and maintenance is a key stumbling block to devising a realistic business case with bottom-line targets that justifies migration to cloud.

“We are not sure if moving to multi cloud is the right path” - Challenges with multi-cloud

Multi cloud model brings certain challenges such as interoperability, data portability, orchestration, and governance among others that banks find tough to navigate.

Common cloud pathways

Despite concerns and lower rates of deployment, cloud is too critical, and banks have adopted one of the five following pathways to leverage cloud. We will talk about these pathways in increasing order of complexity and benefits –

Lift and Shift:

What does this entail – Movement of existing applications and associated data from on-premises environment to cloud with minimal changes.

What are the benefits – Simply rehosting applications in the cloud can lead to quick wins such as movement of costs from CAPEX to OPEX, cost optimization due to efficient asset utilization and solving of few technical debt issues. However, migration to cloud via this pathway leads to applications having same functionality, same development cycles, and same levels of flexibility as they had before the shift to cloud.

THE CORDANT GROUP, A LEADING UK BASED SECURITY BUSINESS, SAVED OVER 40% IN COSTS, BY USING THE LIFT-AND-SHIFT METHODOLOGY TO MOVE THEIR INFRASTRUCTURE TO PUBLIC CLOUD, THEREBY TURNING THEIR ON-PREM CAPEX TO CLOUD BASED OPEX.

[Lift and Shift cloud migration, NetApp](#)

Technology Modernization

ACCENTURE HELPED NATIONAL BANK OF CANADA, A LEADING CANADIAN FINANCIAL GROUP, LEVERAGE CLOUD TO MODERNIZE THEIR COMMERCIAL BANKING SYSTEMS, LEADING TO SIMPLIFICATION AND AUTOMATION OF THE BUSINESS LENDING PROCESS. THE TRANSFORMATION ALLOWED SMALL BUSINESSES TO OBTAIN SANCTION DECISIONS WITHIN MINUTES AND DISBURSEMENTS IN UNDER 24 HOURS.

What does this entail – Modernization of legacy technology and skills, along the pillars of application, infrastructure, and data architecture, to capitalize on the huge efficiency and innovation potential that cloud offers. Accenture’s “7Rs” framework breaks this spectrum down into a clearly defined set of migration options. As firms go across the scale, the degree of modernization and complexity increase from zero (rehosting, replacing) to comprehensive (refactoring, reimagining).

What are the benefits – Modernization is the key to reducing technical debt and can help banks achieve greater agility, higher

resiliency, lower latency, and faster time to market. There is a wide spectrum of application modernization approaches to choose from, with widely differing levels of cost, complexity, and ultimate value to the business.

Business led Transformation:

What does this entail – Business led transformation helps banks adopt emerging trends and deliver on their business aspirations, by building cloud-native capabilities that reduce time to market for new products and services.

What are the benefits – The biggest business impact derives from the ability to move an idea into production quickly and efficiently. Companies can innovate rapidly and react to marketplace events with greater agility; they can deliver new customer experiences and value propositions enabled by data insights and intelligent operations, leading to significant revenue and market success.

‘HOME DEPOT’ LEVERAGED CLOUD NATIVE ARCHITECTURES AND CONTINUOUS DELIVERY PRACTICES TO RESPOND TO THE THREAT FROM E-COMMERCE COMPETITORS. THEY WENT FROM SPENDING SIX WEEKS, TO DEVELOP ONE APPLICATION AND GETTING IT INTO PRODUCTION, TO DEPLOYING NEW CODE EVERY 15 MINUTES.

Two-speed Transformation:

ACCENTURE HELPED A LEADING INDIAN PRIVATE SECTOR BANK KEEP UP WITH THE DEMAND FOR DIGITAL-FIRST EXPERIENCES THROUGH A TWO-SPEED TRANSFORMATION THAT ORGANIZED THE BANK BY PLATFORMS FOR SCALE, AGILITY, AND EFFICIENCY. THE BANK IS IN THE PROCESS OF IMPLEMENTING THE 'BANK OF PLATFORMS' SOLUTION

What does this entail – Driving business value through creation of new customer experiences, delivering business capabilities at high speed and leveraging the opportunity to modernise enterprise technology. It requires alignment of business and IT strategies to support target experiences.

What are the benefits – Key benefits include improved customer experience, higher operational efficiency, higher cross-sell / upsell, faster time to market and scalability across any product or market.

Launch Digital Challengers:

What does this entail – Launching new digital business models and / or new experiences that drive next generation of growth, powered by superior customer experience, nimble and dynamic services, and tailored solutions leveraging cloud-based strategies.

What are the benefits – In launching digital challenger banks that cater to business banking for SMEs, in a highly regulated environment, both Australia based Judo Bank and UK based Redwood Bank saw significant benefits in adopting a 100% 'Cloud based' strategy and leveraged SaaS platforms hosted on Microsoft Azure. This allowed both banks to establish cloud based, API centric, technology ecosystem connections to their core banking solutions, hosted on SaaS platforms, enabling them to connect with third parties as they grow, and "own" the full CX (customer experience), without compromising on security or integrity.

Recently, Judo Bank has raised \$400 million in the biggest ever single funding round in Australian history and has a lending pipeline of about \$1 billion and has taken \$1.5 million in deposits.

Redwood bank, launched in 2017, has recently become profitable, attributing the success to low CAPEX investments due to its 100% 'Cloud based' strategy. The bank has lent over £400Mn. to its roughly 5000 strong SME customer base, while attracting over £400Mn. in deposits.

Business led transformation pathway

There are several opportunities for banks which necessitate business led transformation, such as –

- *Payments* to support processing across channels at scale while adhering to modern security and regulatory standards,
- *Open Banking* to provide new-age financial services across bank-owned and partner channels,
- *Super App* that delivers a seamless and engaging front-end experience for users,
- *Data Led Transformation* that involves taking data lake to cloud & enabling analytics to drive value,
- *Sales Transformation* involving ability to provide relevant products at optimum price to the right customer, through their channel of choice, and,
- *Service Transformation* involving ability to service customers - whenever, wherever with omnichannel capabilities

In this POV, we will further deep dive into business reinvention of payments and open banking areas, which have a combined potential of over \$700Bn^{12,13} in overall incremental revenue for banks worldwide. Cloud based solutions such as a modern and lightweight payments services hub, and an API management and development platform for Open Banking are imperative for banks to capture a larger share of the opportunity at hand and respond with greater agility to market needs.

¹² '...a \$300Bn. opportunity for payments providers', Accenture – "[Long game in payments modernization](#)"

¹³ '...as much as \$416Bn. in global banking revenue at stake', Accenture – "[Catching the Open Banking wave](#)"

In both the areas, we will look at the key business and technical trends, typical challenges / strategic plays and use cases, need for modernization, how cloud forms an integral part of the solution, our recommendation with the north star solution architecture, and roadmap for deployment.

Cloud for payments transformation

Changes in payments landscape

Over the current decade, a total of 2.7 trillion transactions worth US\$48 trillion¹⁴, are expected to shift from cash to cards, interbank payments, and alternative payments instruments, presenting a US\$300 billion opportunity for payments providers. While this will result in incremental changes in already mature e-payments markets, we should see a radical shift away from cash in Indian, South Asian, and Latin American economies as they increasingly adopt e-payments. COVID-19 has further strengthened the case for new alternative payments systems.

In an Accenture survey¹⁵ of 120 payments executives across twenty countries across the globe, 75% respondents in Asia Pacific, Brazil & UAE agreed that transforming payments business is a critical aspect of digital transformation and most of them had “Payments Modernization” on their agenda. However, the survey also indicated that, while revenue growth was the main desired outcome for the payments modernization programs, these investments were often driven less by customer needs than by changes in regulation and national payments infrastructure mandates.

This indicates that unlike the more successful payments focused FinTechs, banks are generally reacting to changes rather than driving disruption, resulting in implementation of point solutions, despite the attractive size of the prize.

Key Business & Technical trends in Indian Payments’ space

Payments industry, globally and in India, is in the midst of a digital revolution, driven primarily by the rapid growth of digital commerce, which in turn is being fuelled by increasing smartphone penetration and access to reliable and cheap internet. This has led to the emergence of alternate payments mechanism and development of next generation payments infrastructure and messaging standards –

✓ **Exponential rise in Digital payments** – Covid 19 has accelerated already percolating trends toward contactless, online, and instant payments. As per Indian government data, digital transactions grew close to 90% in the three years from FY19 to FY21. It is clear Indians are rapidly adopting digital payments primarily led by the United Payments Interface (UPI) with transactions worth Rs. 73 trillion in CY ‘21 alone. Further, 66.6 billion transactions worth USD 270.7 billion are expected to shift from cash to cards and other digital payments in India by 2023 - and increase to USD 856.6 billion by 2030 as per Accenture report.¹⁶

✓ **Exploration of Alternate payments mechanisms and platforms**

- Central Bank Digital Currency – India is a late starter to this, with RBI announcing its intent to conduct its first proof of concept only by the end of 2021. CBDC in India, has the potential to emerge as the Digital Rupee for the entire Indian economy in addition to being a low-cost, scalable, and very robust payments infrastructure in the short term.
- Offline Payments¹⁷ – While India has witnessed a boom in sales of cheap smartphones and even cheaper data connection¹⁸, only 41% of its population has access to an internet connection. To

¹⁴ Calculations based on global data

¹⁵ Accenture – [“Playing the long game in payments modernization”](#)

¹⁶ Accenture – [“Playing the long game in payments modernization”](#)

¹⁷ RBI – [“Offline Digital Payments”](#)

¹⁸ [World Bank Data](#), 2019

promote further inclusivity, RBI has allowed offline mode of payments using any channel or instrument like cards, wallets, or mobile devices applicable from 2022. Such payments can be carried out face-to-face (proximity mode) with an upper limit capped at ₹200 and an overall limit of ₹2000 for all transactions.

- New Umbrella Entity (NUE)¹⁹ - Exponential rise in digital payments in India, primarily driven by UPI, has led to rising incidences of internet fraud, cyber-crimes and transactions that got reversed or declined due to technical issues. To address the “risk concentration” of only one platform and offer consumers more options, RBI, in 2020, invited private companies to bid for a license to set up a new platform and many have shown interest.
- Payments Data Monetization – Payments business has generally been a loss leader for banks, except cross border transactions, with some even outsourcing to third party FIs that have scale. However, criticality of payments in the lives of their customers and the need to provide superior experience on a daily usage high-touch product, has ensured banks continue to invest in this area. The business case, though, has worsened, in the recent past, as government has mandated Zero MDR charges on UPI and RuPay debit cards transactions. This has led to banks increasingly mining payments data, for monetization purposes such as cross sell, up sell etc. for ETB customers, and leveraging such data to attract NTB customers with personalized offers among others.

✓ Development of Next Generation Infrastructure –

- Banks owned cloud-based payment gateways – Increased usage and deeper penetration of digital payments across urban and rural India has led to significant growth in transaction volumes. This has led to higher overall OPEX pay-outs to payment gateway service providers. Considering the future of payments, banks are awakening to the possibility of building their own cloud-based payment gateways thereby saving costs on infrastructure and services. This has the potential to garner revenue by white labelling such gateways and licensing the same to other banks.
- Adoption of microservices based architecture for high velocity payment services – This kind of architecture is being explored by few Indian banks to solve for scalability and resilience challenges they currently face.

Challenges in payments segment faced by Indian banks

Increased demand for digital native and ‘Do-It-Yourself’ experiences in the post pandemic world has resulted in unprecedented growth in online transactions. However, the payments applications still lag, leading to transaction failures and poor customer experiences, hampering growth in payments domain, and triggering audits and reviews by the central bank. Below mentioned are root causes, primarily found in legacy technology and applications of Indian public and private sector banks that has led to the above experiences –

- **Lack of scalability** – Legacy infrastructure of banks hosted in on-premises data centres are costly to upgrade and ill equipped to handle sudden spikes in volumes leading to transaction failures.²⁰
- **Inextensible architecture** – Core Banking Systems (CBS) while being robust in functionality, have become monolithic due to multiple applications being connected. Additionally, complexity has increased, with banks entering the retail, SME & corporate value chains as well as catering to third party partners such as bureaus, compliance etc. Unlike SaaS applications—built using microservices and hosted on cloud—scaling up part of the CBS results in slowing of overall core.
- **Lack of reusability of rules and orchestration services** – The present scenario involves instances of multiple payments systems being deployed, having overlapping business functions and rules that are duplicated across channels & systems, thereby inhibiting reusability. Additionally, such

¹⁹ RBI – “[Umbrella Entity for Retail Payments](#)”

²⁰ Pratik Bhakta, “[As UPI grows leaps and bound](#)” – Moneycontrol, 29th Oct 2020

applications are deployed in silos, across environments, with tightly coupled business logic, resulting in absence of orchestration capabilities.

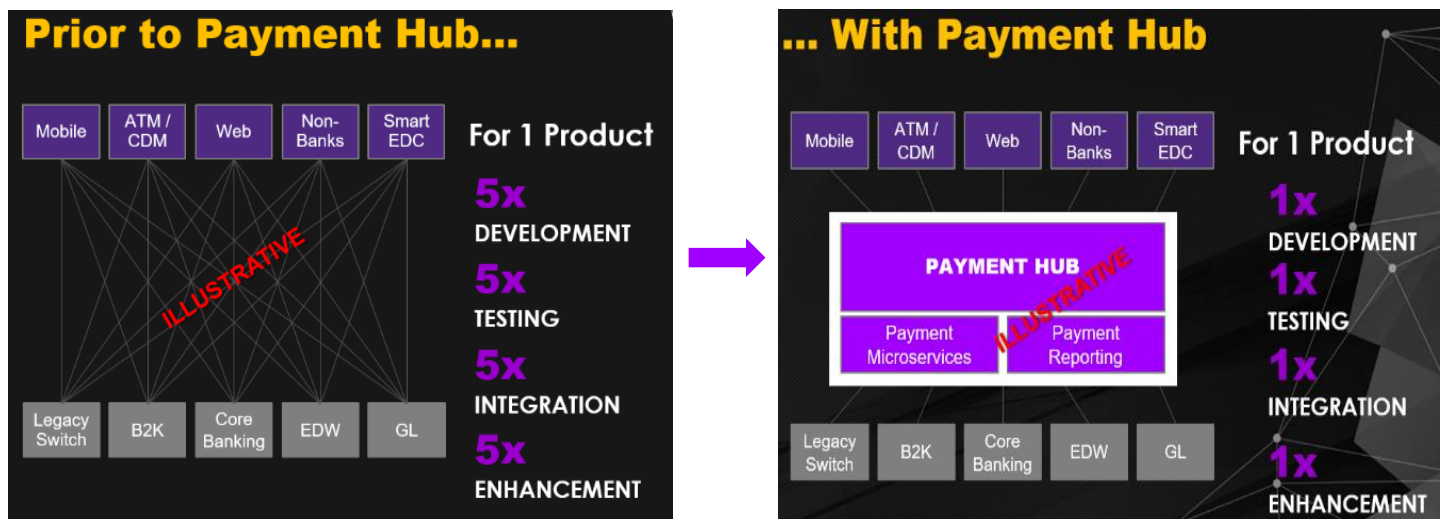
- **Lack of modern security models** –Modern security protocols such as checksum, AES encryption, PKI, Token etc. require flexible architecture due to business and/or regulatory requirements which are difficult to configure within legacy architecture. Another major issue with AES is that, as a symmetric algorithm, it requires both encryption and decryption using the same key. This gives rise to a crucial key management issue that various banks are facing currently. Additionally, banks also face issues when integrating with SAAS / Managed services players who expect latest security standards (asymmetric encryption etc.). However, inflexibility of legacy architecture at banks to incorporate such requests within limited timeframe has led to lost opportunities for banks.

Payments Modernization – Payments Services Hub

Our point of view on payments modernization is to fundamentally rethink the payments architecture and build a centralized Payments Services Hub (PSH) offering capabilities that support payment processing across channels at scale and adhering to modern security and regulatory standards. PSH would provide modularity, scalability, resiliency, and transparency (observability) through modern cloud-based architectures and solve for the challenges mentioned in the previous section.

Implemented correctly, PSH on cloud should be positioned to help banks undertake business-led payments transformation that creates value by –

- Capturing significant payments market share via best-in-class customer experience and state-of-the-art platform experience for partners,
- Driving payments revenue through ‘Industry first’ product & services launches, enabled by a modular architecture that allows for business services to be built with lower turnaround time, thereby providing banks with first-mover advantage for partner acquisition, and,
- Accumulating significant cost savings through reusable payment services leading to elimination of duplication across channels and legacy systems, reduced integration complexity and operational risk, and replacement of ageing legacy systems.



Types of Payments Service Hub

There are four types of PSH for banks to consider for their target payment modernization architecture-

Traditional Monolithic PSH

What does this entail – Traditional Monolithic PSH is typically implemented as part of a larger transformation program. It is focused on centralizing payments orchestration for enterprise or specific lines of business or specific use cases (e.g., high value, low value, international / SWIFT) across the bank with a strong integration layer. Monolithic PSH build requires tie-up with solutions

providers / OEMS (ACI, FIS, Finastra etc.) and implementation of packaged solution with standard design principles including orchestration, integration services and workflow.

Benefits	Drawbacks
<ul style="list-style-type: none"> ▪ Availability of standard out-of-the-box (OOTB) functionality to support multiple payment types and schemes ▪ Industry package functionality that can be customized as per Bank's specific requirements ▪ Products' functional certification and performance benchmark data is available pre deployment ▪ Faster time to market, especially in case of low customizations, and, ▪ Moderate runtime cost 	<ul style="list-style-type: none"> ▪ Large transformation program requiring significant investment (time, manpower etc.) ▪ High upfront costs (licensing, Third party procurement, customization etc.) ▪ High cost of decommissioning and transition cost in the future ▪ Heavy dependency on OEM's product roadmap for changes / updates especially from regulatory & business perspective and vendor lock in challenges ▪ Integration testing is complex with every release requiring exhaustive testing ▪ Customization on OOTB functionalities could be complex, costly (time & money) and OEM dependent during subsequent releases

Everything-as-a-Service

What does this entail – Everything-as-a-service (EaaS) involves building payments processor as discrete services that can be leveraged as building blocks for future services. Typically customized based on framework of SaaS solutions provider or built in-house by bank's own IT department.

Benefits	Drawbacks
<ul style="list-style-type: none"> ▪ Banks able to decide architecture principles for each microservice ▪ Incrementally built as and when new microservice is required ▪ Allows granular level of testing leveraging bank's own automation framework ▪ Allows co-existence of multiple service version/s across products and geography ▪ Banks retain full control on customization ▪ Cost spread across the development phases ▪ Potentially reusable services resulting in faster time to market ▪ OOTB functionalities if services provided by SAAS solutions provider 	<ul style="list-style-type: none"> ▪ Large transformation program requiring significant investment in resources (Time, Manpower...) ▪ Complex development across all components for any new service (orchestration, security, logging, workflow etc.) ▪ Overall higher costs as compared to industry package because all functionality is built in-house ▪ Heavy dependency on SAAS providers product roadmap for changes / updates especially from regulatory (RBI, NPCI, Payments industry) & business perspective and vendor lock in challenges

Integration / Orchestration Layer

What does this entail – Decoupling of integration / orchestration and focused on addressing the messaging and orchestration challenges across the payment landscape. Allows banks to meet new messaging & regulatory standard (ISO20022) without significant overhaul of legacy systems.

Benefits	Drawbacks
<ul style="list-style-type: none"> ▪ Easy to design integration layer, taking responsibility of message standardization and transformation ▪ Easy to develop integration services ▪ Ease of testing for only new services ▪ Highly customizable and less complex implementation ▪ Lesser cost of development as per new service 	<ul style="list-style-type: none"> ▪ Involves limited transformation of integration / orchestration logic only ▪ Legacy applications continue to be in existence with inherent constraints and limitations, impacting time-to-market capabilities ▪ Higher cost of maintenance if deployed in distributed environment

Microservices based Modern and Lightweight Engine

What does this entail – Microservices based modern and lightweight engine complements existing payment infrastructure and allows progressive migration of new or existing payment rails to cloud depending on strategic, business, regulatory priorities of bank

Benefits	Drawbacks
<ul style="list-style-type: none"> ▪ Banks able to decide architecture principles for each microservice ▪ Incremental build lets banks modernize at own pace ▪ Coexist with the existing payments systems allowing banks time to phase out legacy over a period ▪ Easy to develop integration services and ease of testing for only new services ▪ Highly customizable and less complex implementation ▪ Lower total cost of ownership (TCO) spread across development cycle 	<ul style="list-style-type: none"> ▪ Higher cost of maintenance if deployed in distributed environment

Advantages of Microservices based ‘Modern and Lightweight Engine’

Banks may choose to undertake payments modernization leveraging any of the four major types of PSH (refer to ‘Types of Payments Services Hub’ section), based on their present investments, future vision, and criticality of current challenges. However, adopting the cloud ready and microservices based ‘Modern & Lightweight’ PSH, for payments modernization, solves for existing challenges, has potential to drive significant revenue gains and incur lowest total cost of ownership, from long term perspective, if implemented correctly –

- ‘Modern & Lightweight’ PSH architecture protects existing investments made into payments ecosystem e.g., Payments switches, gateways, authorizations, etc. Such a PSH deployed on cloud leveraging the Pub Sub model, allows flexibility to develop a decoupled payments solutions (decoupling of non-financial data into microservices) that enables ease of adoption without significant infrastructure investments, simplifies technical complexities while ensuring high availability on demand.
- PSH architecture allows for faster deployment of industry initiatives using microservices, facilitates integrations with ease using open banking principles and allows flexibility to deploy services in hybrid or public cloud environment along with option of multi cloud portability.
- By its design, PSH architecture enables scalability with faster throughput, as container-based applications deployed can spawn on demand. Moreover, PSH on cloud ensures on tap availability of infrastructure capacity to match sudden spikes in demand without having to budget for peak infrastructure on premises. Payments security in PSH is embedded during development using CI/CD

pipelines of enterprise DevSecOps thereby requiring little to no rework. The multitude of DevSecOps managed services readily available on cloud can be leveraged to allow integration with bank specific tools, e.g., container scan services, open-source software (OSS) scans, thereby helping deploy solutions using shift left strategy.

- PSH deployed on cloud enables deployment of applications and its services across multiple availability zones, spread across various regions (Multi AZ patterns) thereby making the solution tolerant to local failures and providing efficient disaster recovery and management.
- Complexities and management of container services and infrastructure in PSH, is now taken care by leveraging managed container orchestration services based on Kubernetes for building scalable and resilient applications. Deployed on cloud, such managed services can be leveraged further to ease management and intercommunication between various microservices.

TOP FIVE MYTHS IN MIGRATION OF PAYMENTS TO CLOUD

• **Security** – Security is often seen as the biggest inhibitor to a cloud-first journey—but, in reality, it can be its greatest accelerator. Banks are concerned regarding compliance around PII / SPDI / PCI-DSS, data residency and hybrid security encryption support in cloud. However, modern CSPs offer secured managed services and cloud based HSM that take care of key management using bank owned key for encryption of both data-at-rest and data-in-transit.

• **Latency** – Debunking this myth requires understanding instances of all infrastructure hosted on cloud and, the hybrid model of core banking applications (CBA) being ‘On Prem’ while ecosystem and orchestration infrastructure is on cloud. In the former case, banks have solved for latency by providing content at speed optimized basis location, content request, and server availability. In the latter case, banks have looked at caching customer data on cloud to solve identified latencies. This involves partitioning of CBS for select use cases responsible for latency, using microservices as an orchestration layer to throttle traffic, and digital decoupling to ensure high throughput and low latency.

• **Dependency on core transformation** – Applications have evolved over time at large banks, making them monoliths in nature, and banks are sceptical to undertake transformation for such applications due to absence of documentation, traceability of decision-making logic and obsolete technology versions. Combined with the myth of having to undergo large scale transformation of their core banking and other systems to realise intended benefits from payments modernisation, increases banks’ apprehension on undertaking the journey. However, the truth remains that banks need to follow the modernization roadmap that starts with identification and containerization of select high impact applications only with the rest of the system remaining same. Typically, in a large bank, non-financial enquiries like viewing balances, statements, cheques status etc. constitute significant portion of hits on the core system resulting in failure of write requests leading to declined transactions. Decoupling of non-financial transactions into microservices can eliminate hits on core aiding higher transaction success ratios.

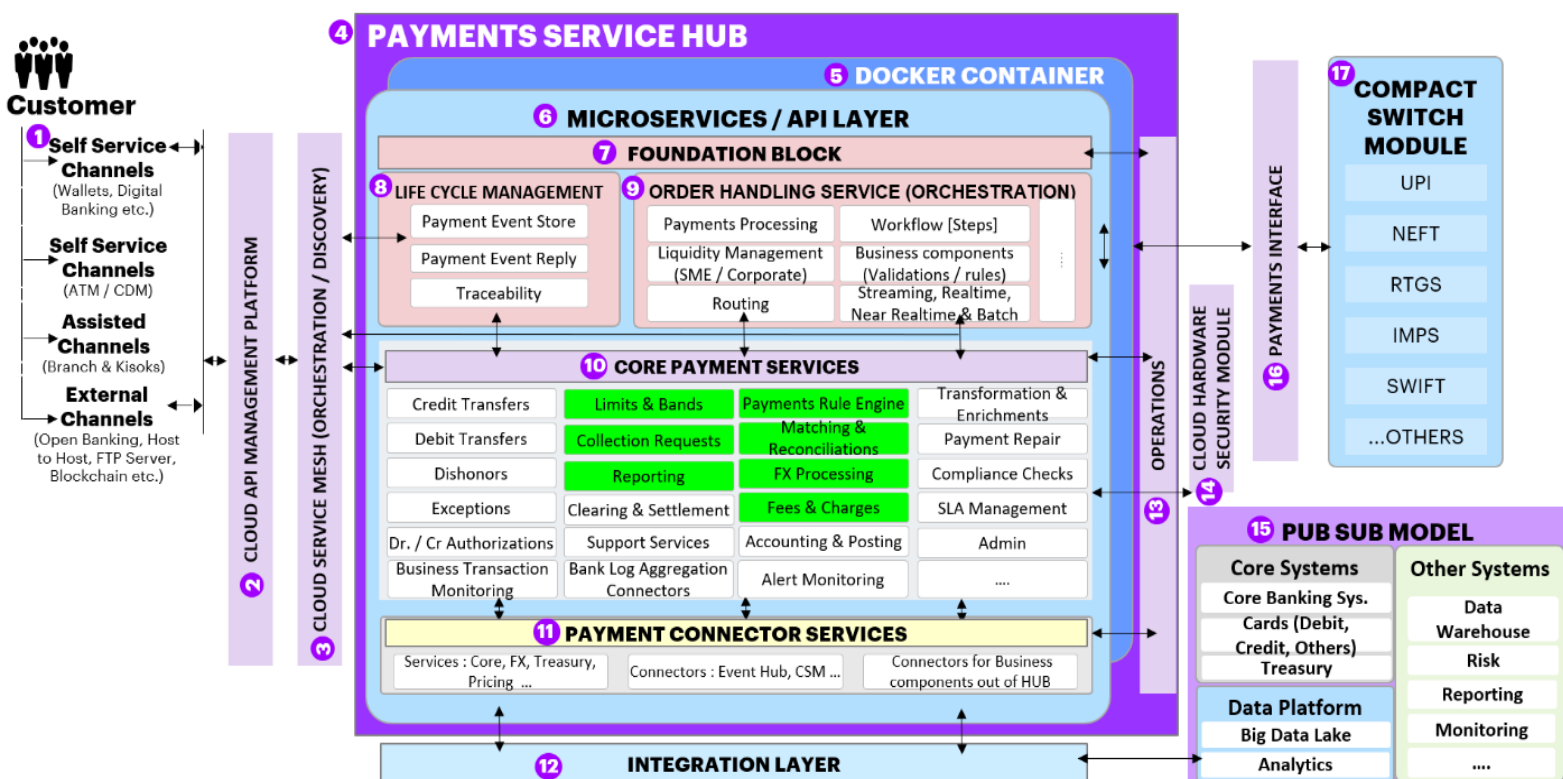
• **Decomposition of monolith** – Banks fear cloud migration would need decomposition of all modules within the monolith application for payments modernization, leading to challenges in management of such a complex migration. In reality, banks need to adopt a two-speed approach for decomposition. There are several modules e.g., admin etc. that would need to be only containerized on premises and need not be broken to microservices. Only core payments services capabilities need to be identified and decomposed as part of the rebuild. Typically, in a large bank, non-financial enquiries like viewing balances, statements, cheques status etc. constitute significant portion of hits on the core system resulting in failure of write requests ensuing declined transactions. Decoupling of non-financial transactions into microservices can eliminate hits on core aiding higher transaction success ratios.

Operational Resiliency & Observability – Another myth of cloud migration is the apprehension of recovery in case of system failure and limited ability of banks to monitor applications in cloud. Migrating to cloud ensures high availability of applications, enabled by underlying infrastructure availability guarantee by the cloud provider, and architecting, designing the application layer for resiliency by the cloud tenant. Additionally, monitoring applications in ‘On Prem’ data centres are outdated while it is a readymade service provided by public cloud providers across multiple parameters that can be easily leveraged to create state of the art business KPI monitoring.

North Star Reference Architecture – Microservices Enabled Payments Services Hub

Our north star reference architecture for payments ecosystem modernization proposes using the cloud ready and microservices based modern and lightweight PSH leveraging Kubernetes, that allows decoupling of legacy systems into modern microservice based framework in phases.

NORTH STAR REFERENCE PAYMENTS ARCHITECTURE



In the proposed architecture, API Management Platform plays a pivotal role along with service mesh in laying the foundation of PSH and all channels (except ATM/CDM and branches) communicate to PSH via API management platform. Payments requests initiated via ATM/CDM or branch channels use bank's TCP / IP network to reach PSH for processing and fulfilment. All the payments microservices are developed using system APIs published via the bank's integration layer. Existing bank's payments interface or third-party payment gateway can be integrated using API management platform for core payments services. Data decoupling is achieved using cloud-based pub sub model that can be updated on real time basis or based on event triggers. Transaction security is achieved by leveraging CSP's secured environment that takes care of data residency, hybrid security and encryption for both data-at-rest and data-in-transit making the solution secure by design.

In order to be ready to modernize payments through PSH, a critical prerequisite is to build the foundation technology block comprising of the following,

- 2 Cloud API Management Platform provides secure environment for end points to be published and / or consumed by external parties. Integrated developer portal, part of the platform, facilitates development by end users / third parties through published libraries
- 3 Cloud Service mesh keeps track of distributed collection of microservices hosted within the docker container of PSH (discoverability) and enables fail over to available and alive containers
- 8 Life Cycle Management helps in enabling traceability for end-to-end journey through logging of events. It also identifies, tracks broken journeys, and enables debugging through active dashboards that help build service resiliency.
- 9 Order handling service helps with orchestration of events through parallel payments processing, routing to relevant microservices and payments switch, management of rules and workflows, fulfilling validations (dormancy, authorization etc.), liquidity management (for SMEs and corporate only) and maintaining frequency of order fulfilment (streaming, real-time, near real-time or batch).

Having built the foundation zone, banks need to build remaining PSH components such as core payments layer comprising of microservices, payments connector services and operations layer that are hosted within docker container -

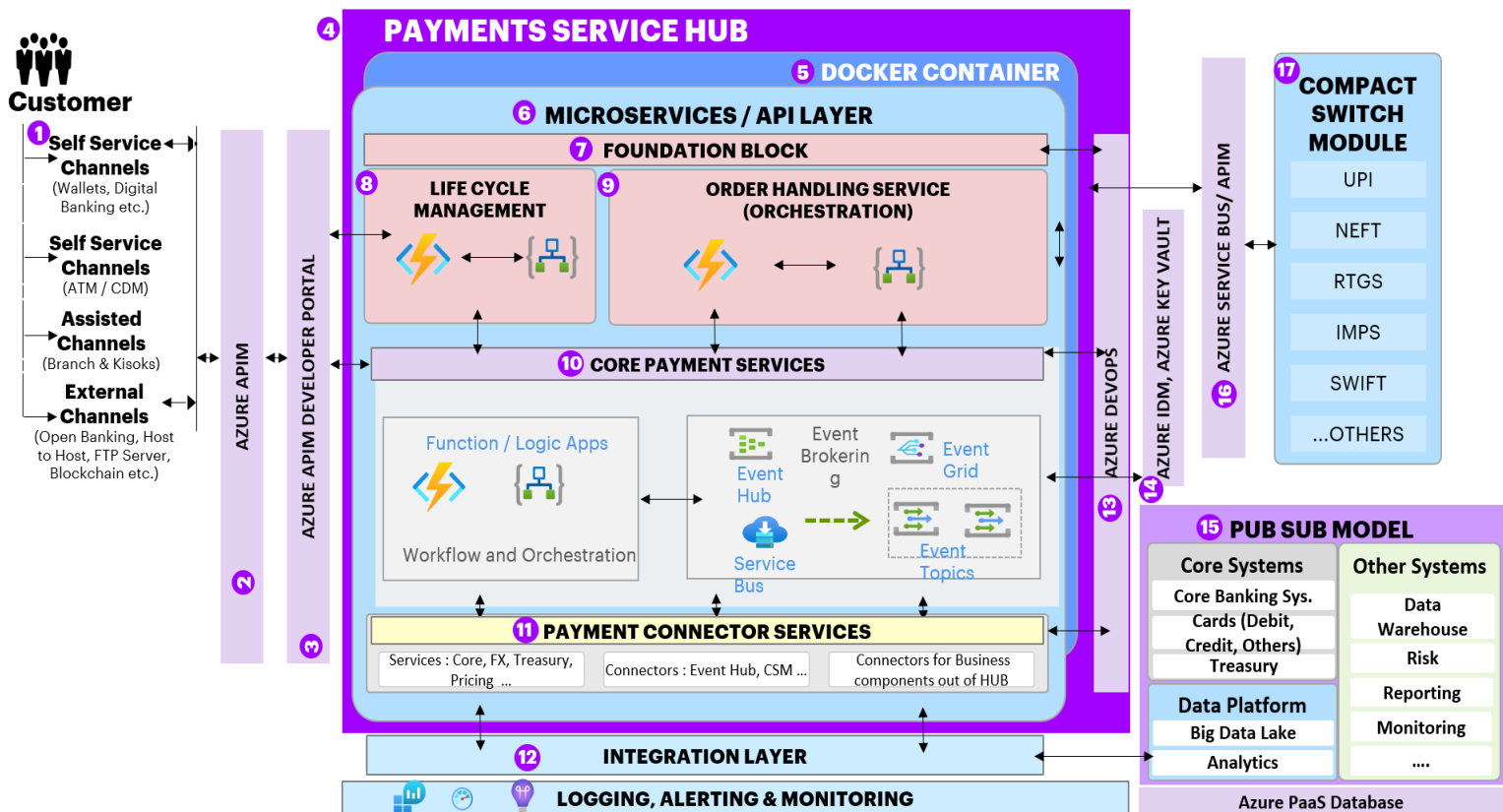
- 10 Core payments services layer hosts rationalised and distributed payment business services across functions required for payments processing. These services are consolidated into a collection of reusable microservices having business configurable system functions/parameters that are invoked by the foundation block. Microservices marked in green are easiest to migrate to cloud.
- 11 Payments connector services include business rules, workflows that are required for back-end validations and payments processing. This layer will further have standardized message protocols that can act as connectors for various hosts.
- 13 Operations layer involves manual and / or system interventions for various activities required either for configuration or authorization of processing services based on type of payments.

Incremental or transaction update data needs to be fulfilled either on a request or response basis for real time / near real time / streaming / batch requirements using event driven pub sub model -

- 12 To connect the back-end host and update various statuses and / or transactions, integration layer will facilitate provisioning of system APIs that will act as a bridge between core systems and Microservices layer.
- 15 Modern publisher – subscriber model enables changed data transmission based on certain events via integration layer
- 14 Cloud Hardware Security Module (HSM) can replace physical HSM hosted 'On Prem' with enhanced cloud enabled security controls enabling authorization and interfacing with various payment schemes
- 16 Payments interface (switch) in this layer aids transmission of transaction from / to various payment schemes under the compact switch module

This event driven architecture helps to decouple and decongest core with real time processing capabilities enabling availability of updated transactions for ecosystem around payments.

PAYMENTS – AZURE ARCHITECTURE



Note - Perimeter security is assumed to be taken care by the customer's Azure infrastructure topology and network design.

Illustrative Roadmap for Payments Modernization via Payments Service Hub

Typical myths such as complete decomposition of monolith and dependency on core transformation for realisation of intended benefits have held back payments modernization on cloud. The key to ensuring seamless transition lies in design and build of cloud ready, microservices based PSH and subsequent migration to cloud, in phases, without disrupting existing applications as listed below –

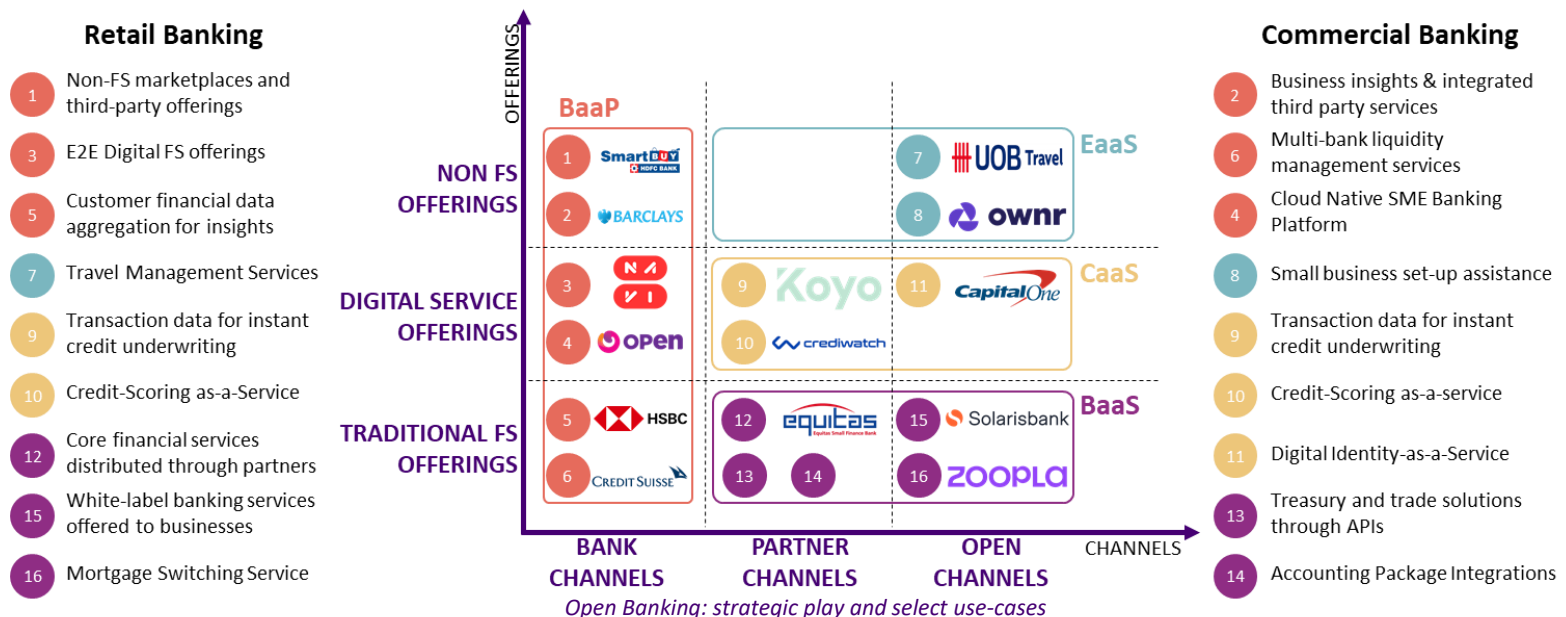
- Decompose legacy payment services into logical capabilities, then dissect the logical capabilities and identify reusable microservices.
- Design overall architecture framework for payment microservices, based on open banking principles and banks future vision, using 15 factor cloud native principles.
- Follow roadmap for adoption of cloud-based payment service hub –
 - Implement technology foundation blocks like API management platform, ingress load balancers, service mesh, event hub, life cycle management etc. which act as prerequisites for further PSH migration to cloud
 - Develop non-dependent core payments microservices which can be deployed even while the legacy payments system is processing parallelly.
 - In parallel, begin development of system APIs to be published through payments interface layer.
 - Drive OEMs towards digital decoupling and cloud readiness by carving out independently deployable core payments from legacy systems into new age, modern microservices architecture.
 - Design single node databases for non-finance related functions which can be refreshed on real-time / near real-time basis using event driven architecture.
- Data can be published from the core systems that can be subscribed by the microservices through event hub Deploy/migrate payment schemes (switch, HSM etc.) to cloud using open banking integration architecture

Cloud for open banking and ecosystem plays

Strategic plays and emerging trends in Open Banking

Open Banking is a new paradigm in financial services that improves data availability through APIs to enable the development of new products and their distribution through new channels, driving non-linear scale and reach for banks. Accenture's research indicates a potential 55% boost to overall banking revenues from the new opportunities created²¹.

The Open Banking model is characterized by four key strategic plays differentiated basis the channels of operations and scope of offerings.



Banking as a Platform (BaaP) aggregates and offers new digital and non-FS offerings through banking channels, enabling data-driven cross-sell and up-sell. Delivering integrated value propositions can increase customer acquisition and retention,²² thereby driving revenue for the bank. HDFC's Smartbuy, for example, aggregates third-party merchant and partner offers for the bank's customers, including a tie-up with Apollo Hospitals for free medicine deliveries and 24/7 tele-consultancies.

Banking as a Service (BaaS) enables the distribution of financial service products through non-bank channels, amplifying the reach of a bank without driving up accompanying marketing and operating costs. For example, Equitas SFB offers savings account facilities through Niyo, a Neobank player that bundles in other financial advice services. IDFC Bank leverages Udaan Capital's network to offer financing services to SMEs, with the latter serving as the originator and collector for the loans.²³

Capability as a Service (CaaS) involves banks extending the adjacency of their core products to third parties, creating new avenues for monetization. RBL Bank offers penny drop based account validation as-a-Service through an exposed API to third-parties which aim to ease their customer onboarding processes.²⁴ Crediwatch offers AI/ML driven risk analytics at underwriting and risk monitoring post-disbursal as-a-service to banking clients, enabling better evaluation of thin-file applications.²⁵

Everything as a Service (EaaS) involves banks offering new non-FS offerings through partners and third parties or as a new brand. Singapore based United Overseas Bank offers a travel management service

²¹ [Accenture Open Banking Insights](#)

²² '~50% consumers prefer integrated value propositions': Accenture – "[Catching the Open Banking wave](#)"

²³ Udaan Capital – [Lending Partners](#)

²⁴ RBL Bank – [Payee Name Validation API](#)

²⁵ Crediwatch – [Solutions for Financial Institutions](#)

to its retail and commercial clients through a wholly owned subsidiary separate from its regular banking channels.²⁶

Open Banking in India is at a nascent stage undergoing exponential growth, led by Neobanks and FinTechs driving adoption. As the Open Banking model evolves further, platform and ecosystem models are expected to drive digital banking and beyond banking services, with underserved business banking emerging as a key area of focus –

- Platform and ecosystem models will be a key focus area for organizations as a growing number of banks offer non-FS products on their platforms and vice-versa, made possible through APIs. The platform-plays help achieve scale and customer stickiness by providing new and integrated value offerings to customers. SBI YONO for example, has seen a phenomenal adoption of 5M+ downloads in just five months of its launch.²⁷ The revenues generated by these marketplaces and referrals will form a key part of non-banking income for banks.
- Neobanks and FinTech partnerships will increase with an aim to deliver easy-to-use, integrated value offerings to build a sticky customer base. An alliance between Monzo and TransferWise, for example, allows customers to seamlessly transfer money abroad with lower fees.
- Open Banking in the corporate and SME space is being led by FinTech's and Neobanks addressing specific areas of the value chain through specialized services. The new entrants aim to deliver financial services - embedded into the business workflows - whenever demanded. Over 47% of SMEs are willing to pay a premium over traditional banks for embedded finance.²⁸ The Indian MSME sector offers immense opportunity as formal sources cater to only 16% of the overall debt demand – leaving ₹58 Lakh Cr. to be financed by the informal sector.²⁹

API Banking in India is still in its nascent stages with significant room to grow. SBI YONO's GMV in H1FY22 is ₹526Cr.³⁰ in contrast to Flipkart's ₹150,000Cr. annualized GMV run rate for CY21³¹. While four of the top five³² private players have dedicated developer portals, none of the top ten public sector banks do. The APIs published by banks focus majorly on retail lending and trade services under BaaS, and penny drop account verification services under CaaS, presenting significant growth opportunities from adopting new use-cases. The NPCI aims to boost the adoption of Open API trends by launching Nfinite, which is a marketplace to aggregate the Banking and FinTech APIs.³³

API centric FinTechs that build and distribute APIs around banks' offerings such as payments, lending and deposits as-a-Service are seeing increased traction. These APIs are consumed either by other businesses or by the banks themselves to revamp their customer journeys, driving consumption through 'daily-use' applications such as WhatsApp and PhonePe. Equitas SFB, for example, relied on Setu to provide the underlying APIs to enable distribution of Term Deposits through Google Pay.³⁴

Open Banking Opportunity – in numbers

40% annual revenue growth of solarisBank, a pureplay BaaS enabling businesses to provide digital white label financial services to their customers.
TechCrunch – “Solaris raises \$224M”

\$92Bn. revenue potential for banks from SME embedded finance solutions like Stripe's lending APIs.
Accenture – “Embedded finance for SMEs”

5% increase in predictive power by leveraging customer transaction data
FICO – “Using alternate data”

55k+ entrepreneurs assisted by Ownr between 2017 & 2020.
RBS Annual Report FY20

²⁶ [UOB Travel](#)

²⁷ IBM – [“The rise of a financial tiger”](#)

²⁸ Accenture – [“Embedded finance for SMEs”](#), 15th Dec 2021

²⁹ IFC – [Financing India's MSMEs](#)

³⁰ SBI – [Q2FY22 Investor Presentation](#)

³¹ Digbijat Mishra, [“Flipkart in line for a 50% rise in annualized GMV”](#) – Economic Times, 13th Sep 2021

³² As ranked by total asset size

³³ Nfinite – [FAQs](#)

³⁴ CNBC TV18 – [“Equitas SFB's new scheme”](#), 27th Aug 2021

Driving Open Banking through API Standardization

Governing bodies of various components of India Stack are aiming to standardize relevant APIs to ensure smoother and secure functioning of the system while driving interoperability. Identification APIs such as eKYC and eSign are standardized by UIDAI and UPI, NEFT, etc. by NPCI.

Similarly, ReBIT has developed specifications governing account aggregation APIs to ease the transfer of financial information. The three categories of actors – The Account Aggregators, FIPs and FIUs must develop

- APIs that are asynchronous by design to provide a greater capacity to process requests by eliminating request queues,
- APIs that leverage detached JSON web signatures to prevent tampering while minimizing the signature token size.

The push towards standardization would ease the adoption of APIs and smoothen the data transfer processes, overall boosting the Open Banking ecosystem.

Banks cannot afford to let the Open Banking opportunity slip, given the enormous potential it presents, and allow FinTech – Neobank partnerships disintermediate them by owning the customer relationships. To effectively compete and maintain their share of the market, banks would need to adopt a robust, cloud-native Open Banking platform.

Why Open Banking platform – and why on Cloud?

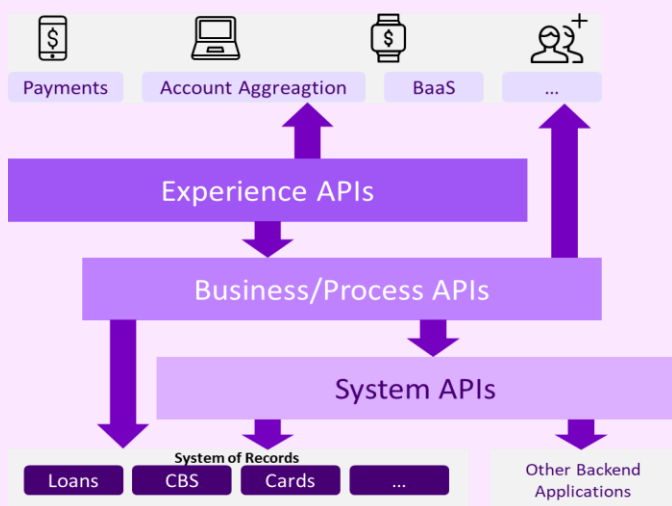
Building and adopting a distinct Open Banking platform, separate from the legacy architecture, is key to meet the liquid expectations and scalability requirements, as

- Banks need to leverage a dedicated API management platform to effectively distribute, manage and monitor the use of published APIs. Additionally, a cloud-based deployment enables faster onboarding of ecosystem partners at scale through managed services and controls on native API management platforms. These cloud functionalities ease traffic management and measurement of partnership KPIs such as revenue and customer engagements per partner.
- Banks need to adopt an architecture built around microservices deployed on containers to drive faster innovation and increased deployment velocity. Cloud based microservices architecture can ease scaling through the automated creation of new container instances as necessary, eliminating frequent infra upgrades and the need to maintain system capacity to handle peak volumes thereby reducing cost of ownership.
- Banks must consider a decoupled architecture to meet the Open Banking demand for real-time data access as legacy banking systems designed around batch processes would be incapable of the same. Cloud can also provide computing power necessary to deliver instant results to customers. For example, Singapore based ICS leverages public cloud to process hundreds of millions of records daily - scalable to billions - to provide instantaneous credit decisioning as-a-service to banks. Banks that don't have the infrastructure to lend at scale and speed can now do so through ICS.³⁵
- Banks would need to ensure API-platform-level security beyond regulatory compliance requirements – over 75% of credential abuse attacks targeted APIs.³⁶ Cloud provides security controls like WAF, managed DDoS protection and integrations with cloud HSM which can protect APIs and the PII/SPDI information exchanged as part of the APIs.

The preferred approach for building Open Banking APIs is to adopt a layered strategy to ensure ease of consumption and faster delivery for developers. In a layered architecture, APIs are categorized in various layers as System APIs, Business/Process APIs & Experience APIs.

³⁵ Google – [“Banking on data-driven credit decisions”](#)

³⁶ Akamai – [“Financial Services – Hostile Takeover Attempts”](#)



System APIs connect with core systems such as Core Banking, Credit Card system, AML, Payment and ID services that can only expose legacy SOAP APIs and convert them to modern, light-weight RESTful APIs for consumption by subsequent layers. These APIs insulate the caller from any changes to the underlying core systems to enable undisrupted and easier access to data.

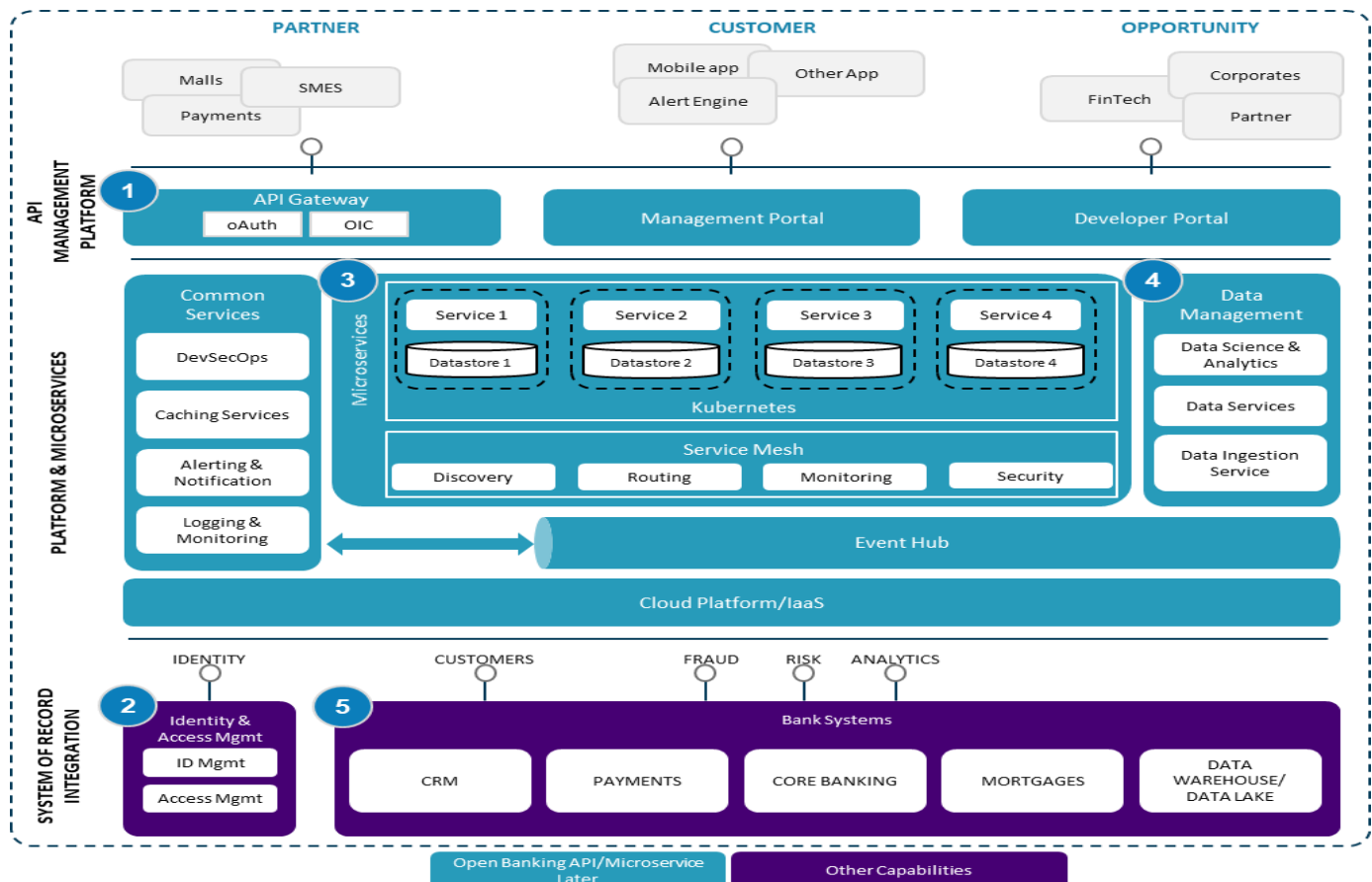
Business or Process APIs are used to create business value by working with single or multiple backend systems through System APIs such as name matching APIs, customer 360, account aggregation APIs etc. The Process APIs can orchestrate multiple services or refer multiple APIs sources of information and providing aggregated responses. Process APIs can connect directly

communicate with those core systems/backend applications which can expose RESTful APIs.

Experience APIs are tightly coupled to consuming applications or devices and are tailored to deliver data in the format as demanded by the target systems e.g., mobile banking app displaying account details, statement, balance enquiry etc. These APIs are publicly exposed for subscription through developer portals and are optimized for developer experience.

Modern Architecture for BAAS (CAAS & EAAS) Services

The proposed reference architecture allows banks to ease API management and distribution, drives scalability using containerized microservices and reduces the transaction load on core through a cloud-based data management layer. Additionally, a modern DevSecOps stack on the cloud brings agility and automation to the API and microservice development process.



Any incoming request to access banking services through API is authenticated and routed through the **1. API gateway**. The bank's OAuth functionalities supported by the **2. ID & access management** layer are leveraged to validate customers' consent as required.

A **3. service mesh** facilitates the routing of these requests and discovery of new container instances as necessary. The request is serviced by relevant **3. microservices** which execute underlying business logic. The required data is accessed by connecting either to a cloud-based **4. data management layer** for non-financial transaction requests or to **5. core systems** hosted on-prem via System APIs & ESB.

The reference architecture consists of several components deployed on the cloud –

API Management Platform consists of three key capabilities:

API Gateway which acts as an interface between the API consumers and the bank's back-end services; allowing banks to manage traffic, route requests and maintain security.

Analytics service which can be used to monitor API usage trends, developer engagement, API performance and generate any custom reports for the bank.

API Developer Portal which is primarily a mechanism to subscribe to bank-created APIs with added functionalities such as a sandbox for testing and community forums.

ID & Access Management Layer supports authentication & authorization required to service requests.

Microservices built around independent business capabilities such as credit cards, lending, payments etc. deployed to a containerized infrastructure. Banks must adopt the right microservice based architecture with modern design patterns like circuit breaker, fallback pattern & retry-replay frameworks using events/messaging platform for resilience & scalability.

Service Mesh complements the microservice layer to manage communications and facilitate request routing, made easier by its language agnostic nature. The mesh also assists in discovery of new container instances in addition to other features such as service observability, traceability, resiliency, and real-time traffic monitoring.

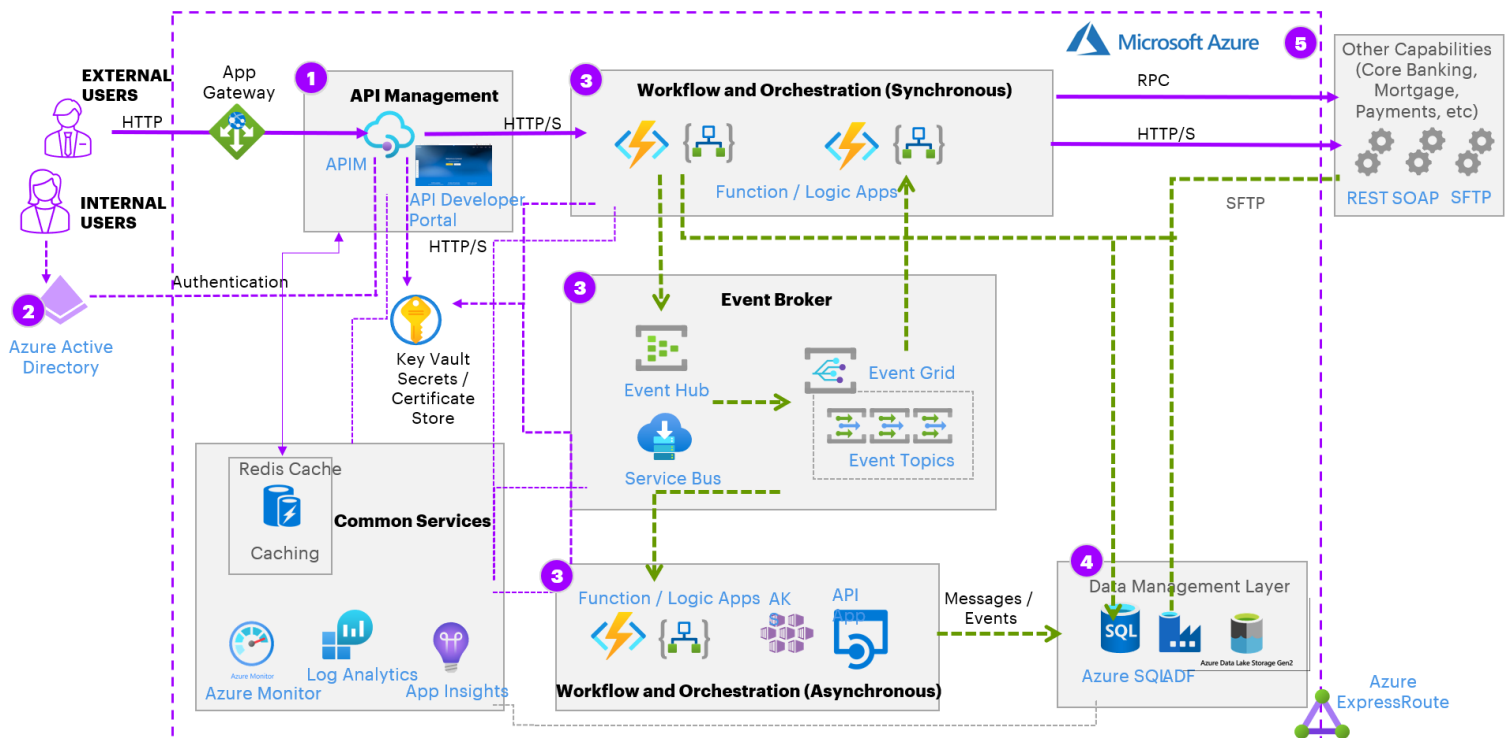
Data Management Layer assists in maintaining and managing banking data on cloud by leveraging categorization algorithms, ML capabilities and data audit mechanisms. Banks can adopt a digital decoupling strategy by processing non-financial transactions, which form over 60% of the transactions³⁷, on microservices built on the cloud data platform. The hollowed-out core banking systems experience a reduced load to process financial transactions effectively.

Event Hub can queue events generated by customer activities that demand simultaneous processing from several core services which subscribe to the event to provide real-time customer experiences. For instance, a POS financing could be orchestrated through an Event Hub as it requires parallel balance checks, eligibility validations and creation of a loan accounts in CBS. The hub can also be used to capture technical events such as failure, errors to be processed by respective systems asynchronously in the background.

Enterprise DevSecOps toolsets can be leveraged to drive agility and automation in the API and microservice development process. The pipelines need to be configured to automate build and packaging of API proxies, automate unit & integration testing, include API security checks like SAST & DAST, publish API details to developer portal and deploy the APIs to various environments.

³⁷ Basis Accenture's experience with leading Indian banks

OPEN BANKING – AZURE ARCHITECTURE



Note - Perimeter security is assumed to be taken care by the customer's Azure Infrastructure topology and network design.

Types of API Management Platform Deployment

There are three types of platform deployment for banks to consider for their target open banking architecture, with the right selection of the API Management platform deployment will depend on the organization's cloud strategy.

Cloud Native Deployment

What does this entail – This form of deployment is designed to route client requests to back-end microservices used to build cloud native applications by Banks.

Who is it for – This arrangement is ideal for enterprises which are already cloud native or have minimal physical infrastructure to hinder a migration to cloud, such as Neobanks and FinTechs. Additionally, incumbents that have used on-prem API management are looking to cloud for the benefits of scalability, throttling and monitoring as well as the integration with cloud provided Function-as-a-Service capabilities.

Multi-Cloud Deployment

What does this entail – These API platforms typically host the control plane on one cloud environment with the runtime planes hosted across the cloud environments where the bank is present.

Who is it for – This form of deployment is necessary for banks that leverage multi-cloud to reduce dependencies, costs or meet regulatory requirements.

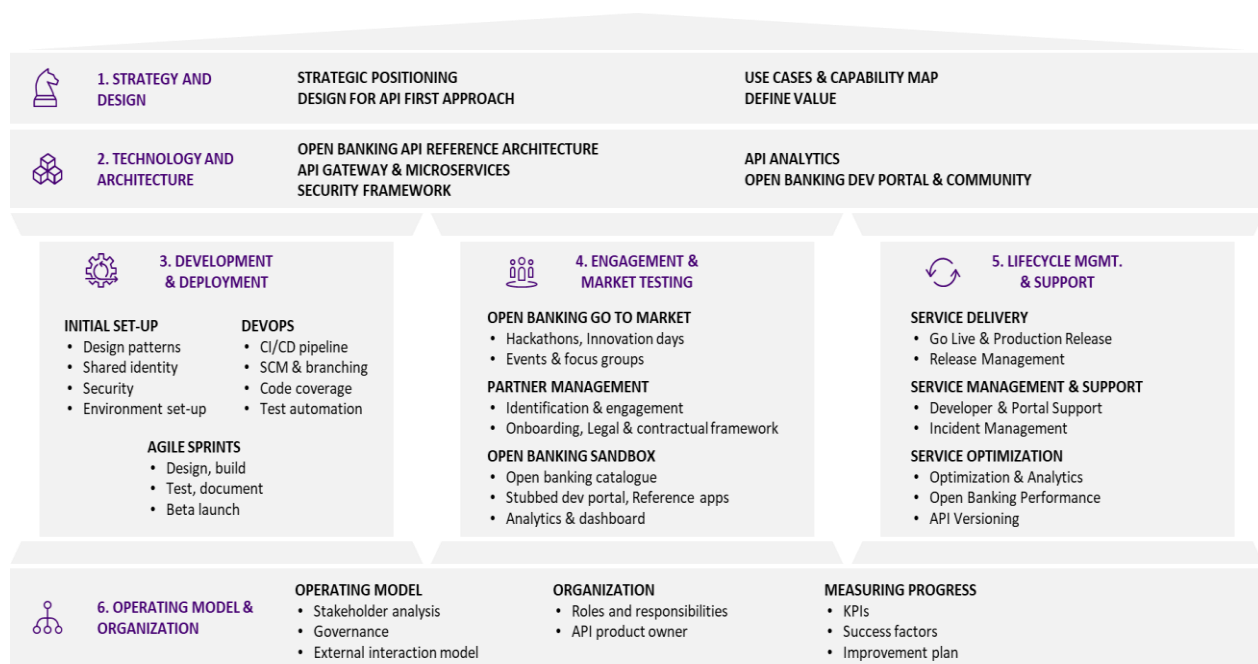
Hybrid Deployment

What does this entail – The control plane of a hybrid deployment would be hosted on public cloud whereas the runtime planes can be hosted across public cloud as well as private clouds.

Who is it for – API platform deployment can support APIs hosted across public and private clouds and are suited for banks that are transitioning cloud that have a share of applications hosted on premises yet to be migrated, with the rest on cloud. As the on-premises applications are migrated to the cloud, the associated APIs can be easily migrated from on-prem runtime plane to cloud runtime plane.

Banks must identify the API management model that suits their business needs and technology investment appetite the best and deploy accordingly. However, to achieve the desired benefits, banks must not view the development of the platform in isolation but align it with the business strategy and build an effective framework to facilitate continued API publishing, distribution, and support.

- **Strategy & Design** – Banks need to define a clear strategy for Open Banking adoption and align the future use-cases with the business vision. Instead of having an application centric mindset, Banks must take the API-as-a-Service approach.
- **Technology & Architecture** – Banks must adopt a state-of-the-art API management platform and a robust security framework to drive the proliferation of the published APIs. The microservice layer along with the service mesh and event hub must be configured on cloud.
- **Development & Deployment** – Banks must adopt a CoE or Factory approach to manage and streamline API development process by breaking down siloes to prevent duplication and improving development speed by implementing CI/CD pipelines.
- **Engagement & Market testing** – Banks must drive innovation and adoption of their APIs through developer community engagement and market testing. Banks can facilitate engagement through easy onboarding, clear documentation, and flexible pricing models.
- **Lifecycle Management & Support** – Banks must set up a service model enabling all stakeholders to engage and work with the CoE for service delivery, service support and service optimization.
- **Operating model and Organization** – Banks must create a framework covering governance, instituting new roles and so on to enable partners and developers to collaborate to reap the maximum benefits.



Regulatory environment

The Indian regulatory framework allows for the use of cloud by financial service providers, with over 80% of Indian corporate banks set to leverage cloud according to an IDC report.³⁸ While there are no blanket restrictions on the usage of clouds by financial institutions, RBI requires that outsourcing agreements beyond a certain scale be reported. If the transition to cloud involves cross-border data transfer, banks are required to

- Report to RBI where extensive data sharing is required,
- Perform enhanced due diligence and monitoring,
- Maintain original records within India, and
- Ensure data excludes jurisdiction of foreign courts

Public sector banks are required by Central Government legislation to seek and obtain permission before transferring public records outside of India. In the case of overseas processing of payment transactions, the *localization directive* stipulates in the deletion of data from systems abroad and movement back to India within 24 hours.³⁹

Banks can ensure compliance with the data residency requirements by processing and storing data on any of the several data centers located in the country. Microsoft Azure, for example, provides cloud services from three local datacenters in India at Pune, Chennai, and Mumbai.⁴⁰

Critical enablers

A successful cloud strategy would consider all the key enablers for the migration - security, risk management, operating model, governance, and workforce skill.

Security

99% cloud security failures
will be customers' fault through 2025
Gartner – "[Is the cloud secure?](#)", 10th Oct 2019

An extensive enterprise-level cloud security strategy is necessary to effectively secure data and applications. Organizations must ensure visibility of vulnerabilities and risks across estates, remediate the gaps, and constantly reimagine and modernize security technologies.

Governance and Operating Model

**~20% PRODUCTIVITY GAIN
REALIZED BY A LARGE NORTH
AMERICAN BANK POST-
DEPLOYMENT OF A CLOUD
CENTRIC OPERATING MODEL** The cloud operating model defines processes, tools, organization, & governance models required to deliver cloud strategy. A robust cloud governance model is necessary to manage costs, security & compliance, identity, and resource configuration across cloud platforms. Cloud governance should be highly automated, developed parallel to & interact with existing structures.

Risk Management

Banks need to develop exhaustive risk management frameworks prior to the cloud migration. The major areas of consideration include

- Business continuity on the cloud: Banks must ensure continuity provisions such as frequent back-ups and SLAs for support from the service provider are in place.
 - Mitigate vendor risk: Banks must prevent vendor concentration through a hybrid/multi cloud model and well-defined exit strategies.
 - Regulatory risk: Ensure compliance around data usage & retention policies for location of storage.
- In addition, a clear cloud strategy, effective migration and workforce skills are necessary to further mitigate the risk of not realizing desired value from cloud.

³⁸ "[80% Indian corporate banks to leverage cloud](#)" – Business Standard, 19th Feb 2021

³⁹ RBI, "[Storage of payment system data](#)"

⁴⁰ Microsoft – [Azure available in India regions](#)

Talent

Developing workforce cloud ability is key to successful transition and moves employees away from potential obsolescence. The skilling journey involves -

- Mapping the skills and competencies required by persona/role,
- Assessing the current workforce against cloud skills and competencies,
- Customizing learning paths, approach, and outcomes, and
- Accelerating skilling with certifications and necessary training

Conclusion

Cloud is one of the most powerful tools organizations have, to embrace exponential change in an era of compressed transformation, powered by cloud's elasticity and accelerated rate of business innovation. Banks need to let go of their fears, myths and concerns and drive adoption to cloud in order to leverage significant revenue, cost and sustainability benefits at stake. Basic 'lift and shift' migration or technology modernization can provide short to medium term cost and sustainability benefits. However, banks can drive significant value by leveraging cloud to adopt emerging trends, such as Payments, Open Banking, Super App and others, to deliver new customer experiences and value propositions that helps capture market share and drive significant revenue and profitability gains.

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Appendix

Accenture myNav®

Accenture myNav® is a full-spectrum proprietary tool that supports end-to-end cloud solutions at scale - helping banks navigate the complexities of choosing the appropriate cloud solution - private, hybrid or multi, understanding the economics and kickstarting the migration. myNav® supports transformation, from insights to action, by enabling banks to –

- Migrate by assessing existing infrastructure, building a robust business case for cloud, and planning the move to cloud with minimal business disruption.
- Accelerate by restructuring architecture, apps, and data for the cloud, evolving operating models and workforce.
- Grow and Innovate by using cloud to increase differentiation and competitiveness.

myNav® enables complete visibility across a multi-cloud deployment to monitor and enforce policies on cloud consumption, security & compliance, and operations.

Core Modernization

In addition to developing cloud native platforms to meet specialized business demands, banks must consider modernize and migrate their core systems to cloud. Such a transition would help banks compete in a rapidly evolving business environment in a cost-effective manner while mitigating IT risks. Banks can either expend significant tech resources to custom-develop the required functionalities or leverage market-packaged software to transform most of the core banking platform. Accenture can help banks achieve their digital transformation ambitions by migrating their core to Vault, which is a microservices-based, cloud-native core banking solution offered by Thought Machine.