Unlocking Hybrid Cloud

An opportunity for banks to maximize cloud success with a hybrid approach

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Preface

In the thrilling race of Cloud Adoption Grand Prix, banks are revving up to hit the next gear, but their starting lines vary. Some have shot off the grid with a head start, benefitting from varied levels of cloud and overall IT maturity. Others are still in the pit lane, strategizing their optimal route.

As banks move ahead, the intricacies of managing different workloads across different cloud environments unravel. The concerns around risks, regulations, governance, latency and security present newer twists, posing the challenge of striking the right balance between on-premise, private and public cloud options.

This is where a hybrid cloud strategy, seamlessly blending the power of private and public cloud infrastructures, emerges as a viable approach for modern banks seeking to balance the imperative of security with the agility required for growth.

In this paper, we'll delve into the advantages of hybrid cloud, examining the benefits it accrues from both individual and combined use of public and private cloud environments. Subsequently, we'll assess the current state of hybrid cloud adoption in banking, concluding with essential considerations for banks to maximize the impact of hybrid cloud.

The Preamble

Defining Hybrid Cloud

Hybrid cloud is defined as a computing environment that combines one or many instances of public cloud, private cloud (on-premise/third-party hosted) infrastructures, with a seamless connection (integration tools, protocols, APIs) between the many environments, enabling data movements and application portability between them as needed.

It’s a strategic approach that seeks to leverage the benefits of both deployment models while addressing their respective limitations. In a hybrid cloud setup, organizations have the flexibility to choose where to run different workloads based on factors such as performance requirements, data sensitivity, regulatory compliance, and cost considerations.

A hybrid cloud combines the strengths of public and private clouds, allowing organizations to optimize their IT resources, maintain data control, and respond to changing business needs in a flexible and efficient manner.

In banking, cloud journeys are intricate, challenging and multi-faceted

As banks push forward with their digital transformation agenda, cloud serves as a pivotal enabler. Today, most banks recognize the importance of adopting cloud, and several of them are moving ahead with a sense of urgency. However, the cloud journey is not without its complexities, and demands a nuanced adoption strategy.

Each bank, at varying stages of adoption, crafts its unique path, dictated by context, regulations, and risk appetite. Initially favoring private cloud for heightened control, many institutions are now increasingly treading into public cloud territory for certain applications, even moving critical functions. Amidst stringent data security, compliance demands and intricacies of mission-critical systems, relying on a single provider often proves insufficient, paving the way for multi-cloud setups.

Public cloud, celebrated for agility and scale, faces limitations in terms of latency, governance, and compliance concerns, directing attention to the reliability of private cloud for specific workloads. Private cloud's greater control and security makes it a preferred option for sensitive banking applications. Regulatory requirements for data localization further complicate public cloud dynamics. This complex environment leads to a heterogeneous hybrid cloud estate, defying a one-size-fits-all approach. A hybrid model, embracing diversity, allows strategic workload placements – public for scalable customer-facing applications and private for secure financial data.

The hybrid approach harmonizes the reliability and control of private cloud with the agility and scale of public cloud. Whether enhancing operational resilience or driving innovation, banks can savor the benefits of both worlds, positioning them at the forefront of digital evolution.

A hybrid cloud approach can simplify cloud journeys and accelerate success

The benefits are multi-fold

Strengthened Resilience

Hybrid cloud strengthens banks' resilience by offering redundancy through diversified cloud environments, ensuring business continuity during outages, and minimizing disruptions with enhanced data recovery capabilities via geographically dispersed backups

Enhanced cost optimization

As banks advance in their cloud adoption journey and migrate numerous workloads to public cloud environments, the hybrid cloud strategy emerges as a key driver for optimizing costs within the banking sector.

The hybrid cloud promise

Enhanced Data Security and Compliance

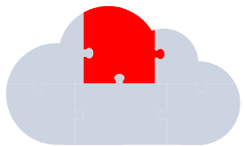
Banks can store sensitive customer data on-premises or on private cloud to maintain security and compliance. They can also leverage public cloud's advanced security features and third-party tools, enhancing overall security posture.

Modernization flexibility

Hybrid cloud creates a bridge between existing on-premises legacy infrastructure and modern cloud-based solutions. This allows them to progressively migrate and update critical applications and services without disrupting core operations

Faster Speed to market

With rapid resource allocation, portability of workflows and services, automated deployment pipelines and build-once development approach, hybrid cloud helps banks accelerate product innovation and delivery.



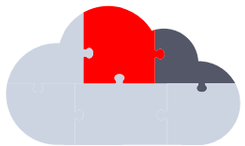
The Hybrid Cloud promise

Strengthened banking resilience

Hybrid cloud can play a pivotal role in bolstering the resilience of banks in today's dynamic financial landscape. With a hybrid approach, banks can diversify their infrastructure, spreading their resources across both public and private clouds. In the event of a localized outage or a disaster, having data and applications replicated or backed up in a different cloud environment ensures business continuity. This redundancy reduces the risk of downtime and ensures that essential services remain accessible to customers even during unforeseen disruptions.

Hybrid cloud architecture also enhances the scalability and flexibility of banks' IT infrastructure. Banks can dynamically allocate resources between public and private clouds based on demand. During peak usage, they can seamlessly tap into the elastic scalability of public clouds to accommodate increased workloads. Conversely, during periods of lower demand or for sensitive workloads, they can rely on their private cloud or on-premises data centers. This flexibility not only optimizes resource utilization but also ensures that the bank can respond quickly to fluctuations in customer demand, further enhancing resilience.

With hybrid cloud, banks can vastly improve their data recovery capabilities by leveraging public cloud resources for robust and geographically dispersed data backups. In the event of data loss or corruption, this redundancy ensures that critical data can be rapidly restored, minimizing disruption and financial losses. The combination of private and public clouds in a hybrid setup provides a robust safety net for safeguarding sensitive financial data and maintaining operational resilience.



The Hybrid Cloud promise

Enhanced data security and compliance

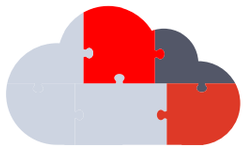
Data security and regulatory compliance have been two of the leading areas of concern banks have had with respect to cloud. By utilizing a combination of on-premises and cloud-based infrastructure, banks can strategically allocate data and workloads. Sensitive customer information, as well as other data that are regulatory mandated to adhere to strict data residency requirements can be kept on-premises. In this way banks can ensure the maximum security, control and compliance while still leveraging the scalability and efficiency of the cloud for less sensitive operations.

Hybrid cloud platforms often come with advanced embedded as well as third-party security features and tools with advanced threat management capabilities, which can be integrated seamlessly into a bank's existing security infrastructure. This enables banks to bolster their overall cybersecurity posture, with the added ability to monitor and protect data across both on-premises and cloud environments. Banks can implement encryption, identity and access management, threat detection, and data loss prevention measures consistently throughout their hybrid infrastructure, ensuring data remains safeguarded against evolving security threats.

Lastly, hybrid cloud facilitates improved data governance and compliance reporting. Banks can establish centralized policies and procedures that govern data access, sharing, and retention across the hybrid environment. Automated compliance monitoring tools can track adherence to regulatory requirements and generate audit-ready reports. This level of transparency and control not only simplifies compliance efforts but also ensures that banks are well-prepared to meet the stringent data security and privacy standards expected in the financial industry.

Banco Sabadell*, the first 100% mobile bank in Mexico, leveraged a hybrid cloud approach to manage the regulatory norms and run its Banking as a service business model on a security rich, IT infrastructure build for high availability.

Source: *IBM case study on Banco Sabadell



The Hybrid Cloud Impact

Flexibility in legacy modernization

Moving away from the maze of legacy systems has been the numero uno priority for banks for a while now. However, the speed, scale and style of modernization differs from bank to bank, depending upon their IT maturity, business and regulatory context.

With hybrid cloud, banks can seamlessly integrate their existing on-premises legacy systems with modern cloud-based infrastructure. Rather than undertaking an extensive, costly “rip-and-replace” strategy, banks can gradually transition critical applications and workloads to the cloud. While the big bang approach has its own benefits and challenges, a phased, flexible modernization approach minimizes disruption to daily operations, reduces migration risks, and provides time for staff to adapt to the new environment, preserving the continuity of critical financial services.

By carefully placing each workload onto the cloud/on-prem model perfectly suitable for its context, banks can drive modernization at their own pace, while maximizing effectiveness and efficiency.

Furthermore, hybrid cloud offers banks the opportunity to modernize legacy applications through a cloud-native, containerized architecture. Banks can leverage microservices to break down monolithic legacy applications into smaller, independently scalable components. They can then migrate and optimize these components in the cloud, exposing them via APIs, and eventually aggregating them to create bespoke product. This composable approach enhances scalability, boosts agility, and drives customer-centric innovation, aligning the legacy modernization process with the bank’s evolving business and technology landscape.

The Hybrid Cloud Impact

Faster Speed to Market

Banks today compete with the likes of Amazon, Netflix, Uber in terms of customer experience. The velocity of new product innovations and updates these players bring can not be matched with a traditional infrastructure.

Hybrid cloud provides the essential tools and practices for banks to streamline development and operations, accelerating their speed to market for new banking products and services. It empowers banks with a dynamic and scalable infrastructure that aligns perfectly with the principles of DevOps. By combining the scalability of public cloud with the security of private cloud, banks can provision resources dynamically while adhering to regulatory requirements. This flexibility enhances DevOps practices, allowing development teams to quickly build, test, and deploy applications in an integrated environment, thereby fostering a culture of rapid iteration and continuous delivery of fast and frequent releases.

Additionally, hybrid cloud supports the automation of key DevOps processes. Banks can implement infrastructure as code (IAC) principles, defining their infrastructure using code and automating the provisioning of resources. This automation extends to deployment, configuration management, and scaling.

With hybrid cloud, banks can standardize these processes across the entire cloud estate, ensuring consistency and repeatability. This not only accelerates the development cycle but also enhances the reliability of deployments, reducing the risk of errors and downtime associated with manual processes.

M&T Bank, a large US financial institution, leveraged hybrid cloud to modernize its core banking applications, achieving a **40%*** reduction in development time for data-driven hybrid cloud applications and enabling self-service for faster issue resolution.

Source: *IBV Report on Foundations on Banking Excellence, 2022.

The Hybrid Cloud Impact

Reduced cost of operations

Hybrid cloud places cost reduction at the forefront of its many benefits. Firstly, it enables banks to optimize their resource usage by judiciously allocating workloads to the most cost-efficient cloud environment. Non-sensitive tasks and workloads can be routed to the scalable and cost-effective public cloud, eliminating the need for excessive on-premises infrastructure, reducing both capital and operational expenditures. The on-prem infrastructure and private cloud can be kept for critical workloads to maximize security, control and compliance.

Secondly, the pay-as-you-go pricing model of public clouds is instrumental in cost reduction. Banks can precisely match their resource consumption to their needs, eliminating over-provisioning and unnecessary spending. This flexibility allows for dynamic scaling, ensuring that expenses align closely with actual demand, contributing significantly to cost savings.

Lastly, hybrid cloud providers can leverage economies of scale to negotiate favorable terms for hardware and software, further reducing infrastructure costs. Additionally, public cloud providers continuously invest in optimizing their data centers for energy efficiency, reducing power consumption and the associated costs. Overall, hybrid cloud not only streamlines operational costs but also enables banks to achieve substantial cost reductions while maintaining the agility and control needed for their financial operations.

Westpac partnered with IBM to create a hybrid-platform-as-a-service, which helped it achieve **40%** saving in set-up costs from start to deployment of an application*

Source: * Computerworld.com article, 2018

The current state

Slowly and steadily, the hybrid approach is gaining prominence

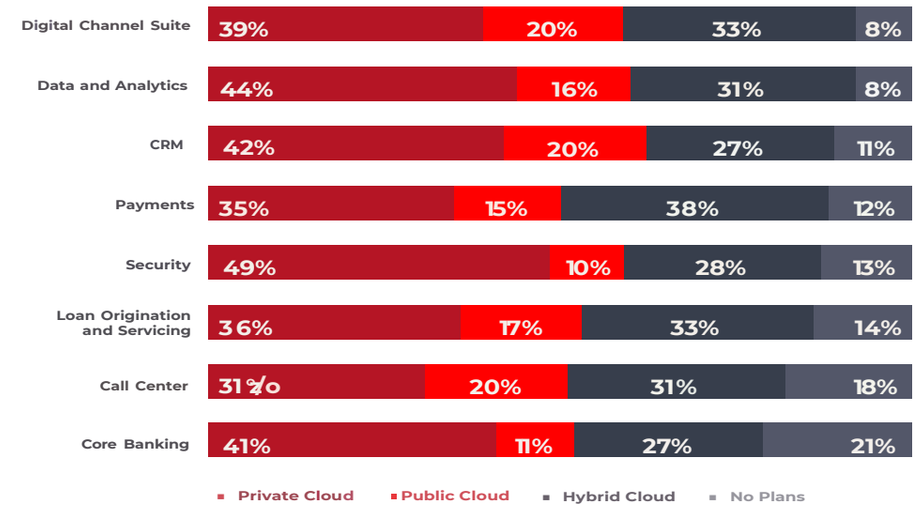
As banks move along the cloud migration path, the adoption of hybrid cloud continues to grow. As per a recent survey1 by IBM Institute of Business Value, the mean percentage of banking workloads on hybrid cloud are expected to increase by 18% in the period 2022-2025.

Since most banks are in the early phases of the journey, their lack of confidence on public cloud over security and compliance concerns make private cloud as the most preferred cloud model. However, hybrid cloud is gaining momentum among preferences. In the 2023 banking innovation survey[2] by Infosys Finacle and Qorus, Hybrid cloud maintains its position as the second most favored model across all major banking applications.

The hybrid cloud platform market is also witnessing a rapid growth. Statista research reports that the hybrid cloud market size, spanning multiple industries, is projected to reach $262 billion, marking a growth of over threefold compared to its $85 billion size in 2021. These statistics underscore the increasing significance of hybrid cloud in the cloud and IT strategies of banks worldwide.

Type of Cloud Model Anticipated in 2025 by Application

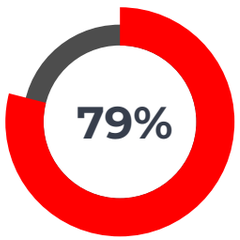
What is your organization's preferred cloud model by 2025 across various applications used by your bank?



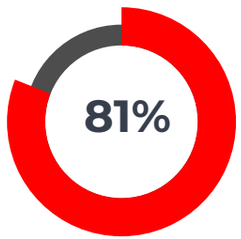
Source: Innovotion in Retail Banking Report' © March 2023 Qorus & Infosys finacle

Source: (1) Foundation of Banking Excellence, report by IBV, 2022 (2) Innovation in Retail Banking Report, Infosys Finacle and Qorus, 2023 (3) Statista research, 2023

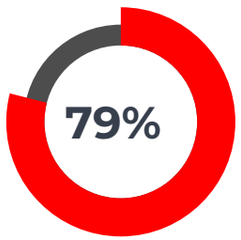
However, most banks are far from harnessing the true value of hybrid cloud



of banks are still in the foundational stages of their hybrid cloud journey



of executives face difficulty in developing business cases for their hybrid cloud investments



of executives struggle to manage and optimize cloud spending

A carefully curated, architecturally robust hybrid cloud strategy is critical for banks to scale adoption and unlock success.

Source: IBM Consulting report on “Mastering Hybrid Cloud”

The path ahead

Five key considerations for banks to maximize hybrid cloud impact

Five Key considerations for banks to unlock hybrid cloud impact

#1 Build a robust workload allocation and governance framework

A comprehensive business-driven decisioning framework to identify right cloud setup for each workload must be put in place. This, along with a data and application governance framework is key to drive hybrid cloud success.

#2 Take a coherent, strategic approach to hybrid cloud security

Banks must look at hybrid cloud investments as catalyst to drive enhanced enterprise security. An integrated approach to harmonize security posture across the cloud estate, along with building a single pane of glass is of paramount importance.

#3 Maximize hybrid cloud ROI with FinOps and AIOps

There is an opportunity for banks to leverage advanced software capabilities and processes, baked in the hybrid cloud architecture, to track and optimize cloud spending across the entire estate.

#4 Adopt multi-pronged transformation approaches for application migration

A host of transformation approaches are available, such as rehosting, refactoring, re-platforming, and more. A bank must choose an approach based on factors such as application size, customization needs and the level of transformation skills.

#5 Unify the diverse cloud estate with an integrated hybrid cloud platform

A hybrid cloud infrastructure, without well-defined architectural guardrails in place, can be counterproductive. Banks must ensure due integrations to drive cohesive data flow between applications across the entire hybrid cloud estate.

1

Key considerations to maximize hybrid cloud impact

Build a robust workload allocation and governance framework

The impact of hybrid cloud in bringing the best of both worlds and driving agility and control in tandem, is undoubted. However, the best impact can be derived when the banks crack the right configuration and strike the right balance of workloads between on-premise, private and public cloud setups.

To solve this, banks must thoroughly analyze their workloads, and augment their integrated hybrid cloud application architecture with a business-driven decisioning framework to identify which applications are suited for which cloud model, based on the application size, level of customization and digital transformation maturity of the bank.

Moreover, banks need to setup management and governance practices around data transfer between applications and environments, to maintain their integrity, consistency and security.

*Source: IBM Consulting report on “Mastering Hybrid Cloud”

Composable banking is another major cog in the wheel of a successful hybrid cloud strategy. A cloud-native architecture provides banks with the power of microservices and domain-driven design principles. Using this, banks can look at redesigning certain applications by carving them out in form of reusable components. These components can be exposed using APIs and aggregated to compose new bespoke applications. With hybrid cloud’s portability of workflows and services, a reusable component can be deployed anywhere across on-prem, private or public cloud environments, as per business needs.

One of the biggest value propositions of a successful hybrid cloud strategy is – “Build applications once, deploy them anywhere”*.

2

Key considerations to maximize hybrid cloud impact

Take a coherent, shift-left approach to hybrid cloud security

Back when banks operated solely with on-premises systems, cloud held a realm of untapped possibilities. However, the life was simpler for the security organization within bank. Their concerns, although substantial, were confined to applications, data center, and the network. Since the introduction of public cloud, and multi-cloud setups, the complexity has soared, stemming from shared security responsibility models with cloud providers, multiple application environments, disparate security tools, policies, and protocols.

The attack surface has also significantly expanded traversing many networks, applications, integration points, databases and deployment environments, and the risk gets compounded for banks who lack architectural guard rails in their cloud estate. However, at the same time, the hybrid approach allows banks to hedge their security risks. In fact, as per an IBM research estimates, a hybrid cloud approach experienced lower average costs of data breaches, at USD 3.80 million[1], compared to USD 4.24 million for private cloud breaches and USD 5.02 million for breaches in public clouds.

Source: (1) Cost of a Data Breach Report 2022

To enhance security, banks must align enterprise security strategy with the hybrid cloud strategy. It is crucial to have security enablers such as strong IAM practices, zero-trust models, and encryption capabilities weaved into the core design of hybrid cloud architecture, ensuring their seamless operation across diverse environments. This will enable banks harmonize and standardize the security posture across the entire estate including cloud platform, production environments, network, data, containers, landing zones and more, building a fabric of protection around the weakest link.

Then, banks must build a single pane of glass by investing in state-of-the-art security dashboards which aggregate security anomalies across the diverse cloud estate. This will empower security operators to quickly determine the “what, where, when, and who” of the incident and launch swift mitigation actions. Finally, there is an opportunity for banks to harness the power of the fast-evolving AI landscape and predictive modelling techniques for real-time threat detection and risk mitigation, greatly enhancing their security effectiveness.

3

Key considerations to maximize hybrid cloud impact

Maximize hybrid cloud ROI with FinOps and AIOps

Managing and optimizing cloud costs is one of the biggest challenge most banks realize as they progress along the journey. With hybrid, the complexity gets compounded with varied cloud environments supported by different cloud providers. As a result, the ROI conversation becomes difficult in the initial phases. In a recent IBM survey, 79%[1] of IT executives acknowledged difficulty developing business cases for their hybrid cloud initiatives. Imbibing advanced capabilities and processes around FinOps (Financial Operations) and AIOps (Artificial Intelligence for IT Operations) as part of the hybrid cloud operating model can help banks maximize their returns from hybrid cloud investments.

FinOps aids banks by meticulously monitoring and managing cloud expenditures, enabling them to see how and where cloud services are being consumed across the entire cloud estate. It facilitates cost allocation and allows for setting and tracking spending limits for different cloud projects and teams. With this, banks can better forecast demand for cloud services, take data-driven decisions to optimize cloud spending and right size resources in line with business priorities. FinOps simplifies cloud billing and cost reporting across all the external cloud service providers, tightening the grip on unaccounted, variable and hidden costs.

AIOps strengthens the impact of FinOps by leveraging the cognitive power of AI and ML models to accurately predict the optimum level of resource allocation, where the program does just enough implementation to support desired business benefits. With such practices and enablers baked into the hybrid cloud operating model, banks stand to save over 20%[1] of cost on their cloud operations.

Source: (1) IBM Consulting report – Mastering Hybrid Cloud, Mar 2022 (2) Wall street journal article, Feb 2023

KeyBank[(2)], a historic US bank with a 200-year legacy, embarked on its multi-cloud journey back in 2017.. By implementing cloud FinOps solutions for cost management, the bank was able to benefit from actionable insights to achieve transparency on cloud spending, These insights empowered KeyBank to identify and leverage cost-saving opportunities effectively, precisely when needed. Real-time monitoring of cloud costs also acted as a safeguard, preventing unexpected consumption expenses and driving an improved return on investment (ROI).

4

Key considerations to maximize hybrid cloud impact

Adopt multi-pronged transformation approaches for application migration

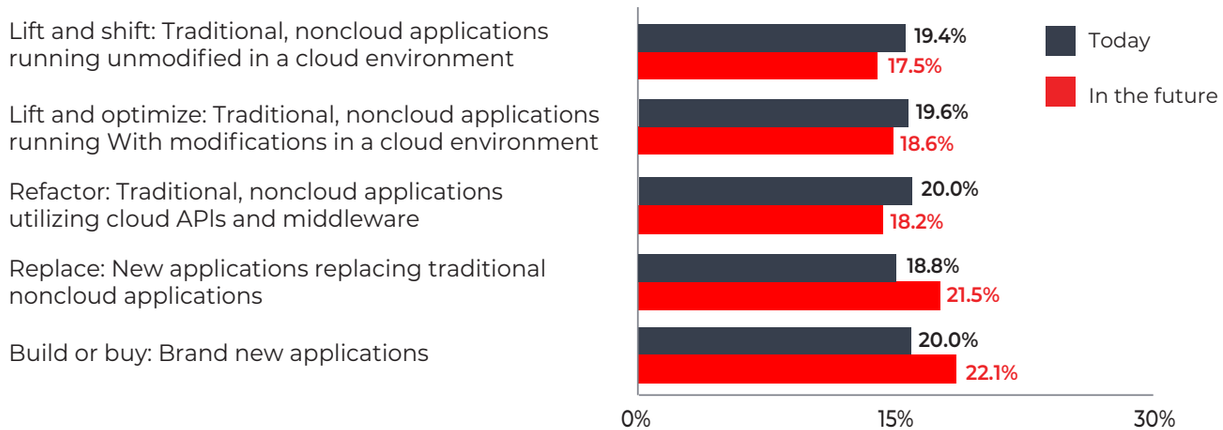
Gartner estimates that 85%[1] of the existing enterprises' core IT applications – such as legacy mainframe, midrange, ERP, UNIX-based applications – are not built for cloud. The story is no different in the banking industry.

A successful hybrid cloud transformation requires banks to modernize their application landscape for a variety of cloud and on-prem setups. For this, bank scan leverage a number of well-understood transformation approaches – Rehosting, Refactoring, Re-platforming, Replacing, Recomposing, and Rebuilding – each with their own strengths and limitations. The goal should be to pick out the most suitable one among these and apply it across workloads in a particular cloud mode. Depending on the size and customization of their applications, and the level of transformation skills (internal as well as partners) banks should draw up an appropriate roadmap, whose priorities are based on business value, criticality and risk of application transformation.

One of the popular strategies includes implementing the strangler pattern to phase out existing legacy applications with services from cloud native applications. These services can co-exist on cloud while legacy applications run on premise. Gradual proliferation of cloud native services will replace existing legacy application services with minimal disruption to banks.

Direction of applications in the cloud[2]

Mean Calculation



n = 366 use public cloud infrastructure; excluding don't know/not sure

D2. What is your orgnization's plan for public coud application today/in the next two years?

Source: (1) Gartner report 'Break Down 3 Barriers to Cloud Migration', 2021 (2) 2020 Gartner Cloud End-User Buying Behavior Survey

5

Key considerations to maximize hybrid cloud impact

Unify the diverse cloud estate with an integrated hybrid cloud platform

During the pandemic, the unprecedented business situation demanded banks to move many applications to cloud to ensure business continuity. Such migration done in haste, without a well-curated strategy in place, proves counterproductive in the long run and further complicates the already crowded cloud estate, resulting in half-baked applications scattered across public cloud, private cloud and on-prem setups, not interacting seamlessly among each other. In fact, 71%[1] of IT executives across industries see data integration across various cloud environments as a major problem.

To drive cohesive cloud operations, its important for banks to establish proper architectural guard rails for orchestrating interactions between applications placed across multiple cloud environments. An integrated hybrid cloud platform does just that. It enables a seamless connection between the many cloud environments, allowing banks to manage and move applications effectively across on-prem, public and private cloud, creating a unified, interconnected infrastructure.

With a hybrid cloud integration platform, banks can unlock data from legacy system and boost information velocity. They can manage runtimes across a hybrid IT environment from a single management view, thus driving operational efficiency gains and enhancing decision making. They can also easily move applications across cloud and on-prem environments without rewriting code, thus increasing transformation agility and flexibility.

Average number of cloud environments in a bank[2]

Source: (1) IBM Consulting report on “Mastering Hybrid Cloud”, (2) IBM report on “A Hybrid cloud platform advantage”

Unlock true hybrid cloud potential with Finacle

Embrace the hybrid cloud advantage with Finacle

Finacle brings a revolutionary paradigm to banking technology with a single, versatile codebase. Designed for both on-premise and seamless extension to public cloud, this unified approach ensures consistency across deployment environments. The platform's containerized deployments, managed by Kubernetes, enable unparalleled agility and scalability.

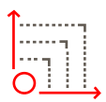
The integrated architecture facilitates deployment on either public or private domains, catering to diverse data residency requirements across geographies. The strategic flexibility allows banks to allocate heavy workloads on-premises, ensuring robustness, while lighter applications, such as channels, can effortlessly transition to the public cloud for enhanced accessibility.

Embracing a cloud-neutral stance, Finacle grants the liberty to deploy specific components on either public or on-premises infrastructure. This flexibility becomes particularly valuable in handling fluctuating workloads, empowering banks with on-demand scaling for compute resources. The composability feature further distinguishes Finacle by offering the optimal combination of different components. Leveraging widely adopted standards like Docker and Kubernetes, Finacle allows building once and deploying anywhere, providing unmatched versatility in the dynamic landscape of banking technology.

Finacle – A truly cloud native platform

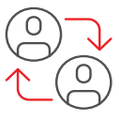
Finacle suite of digital banking solutions is a strong cloud-native architectural philosophy, rooted in CNCF principles and 12 factor app methodology. Finacle applications run in a containerized environment orchestrated by Kubernetes, which is supported in all cloud environments and lends a cloud-neutral deployment approach to enable functional and horizontal scalability without vendor lock-in. This approach ensures delivery and support across managed cloud services, for private, public and hybrid cloud, and seamless porting of Finacle applications to any cloud.

Microservices architecture



Stateless processes

Containerization



Orchestration

Declarative APIs and RESTful APIs

CI/CD

Service mesh

Observability and analysis

Container registry and run times

Streaming and messaging

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