



Cloud Based Core Banking: Is it Possible?

Cloud computing has long passed the threshold from bleeding edge to mainstream. The next question is how fast businesses should adopt and transform to use the cloud. In the Financial Services Industry (FSI), 74% of companies¹ have already adopted some extent of hybrid / public cloud architecture.

Those numbers are predicted to grow as enterprises look to expand possibilities of innovation, scale efficiencies and grow revenue. Financial institutions have typically taken a risk-based approach to adopting the cloud, beginning with proofs of concepts (PoCs), Software as a Service (SaaS) solutions like CRM, new native cloud application development, and front-office functions but not necessarily core functionality. As cloud becomes more mature, is it time to move core processing to the cloud?

A select number of global financial institutions have made the move and are now running select core banking services on the cloud. As an example, a Dutch bank² has moved its entire retail banking platform to cloud, and an Australian bank² has moved partial transaction services to cloud. Within the US, cloud adoption is growing with some financial institutions focusing on moving self-contained applications that have limited upstream or downstream dependencies to the Cloud. Others are looking to be entirely cloud-enabled.

¹Forbes, 2017 State Of Cloud Adoption And Security, Figure 7. (Apr 23, 2017)

²Forbes, Some Banks Are Heading To The Cloud -- More Are Planning To (Jun 26, 2014)



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Why Cloud?

To really make a strong case for moving core banking to the Cloud, it is important to highlight the immediate and long-term benefits financial institutions can realize by migrating their core banking infrastructure.

Infrastructure savings

Cloud computing cuts out the high cost of infrastructure as institutions do not have to maintain their own data centers. With a public cloud pay-as-you-go model, customers enjoy a subscription-based approach, offloading all infrastructure support and maintenance responsibilities to the cloud provider. Such support helps Institutions to free up resources that would have otherwise been dedicated to running their data centers.

On-demand scaling and agility

Capacity is often calculated based on coverage for peak periods; therefore, institutions are usually paying extra for off-peak timeframes throughout the year just to ensure uptime during high-demand situations (such as holiday seasons). In the case of core banking historically, such

capacity is calculated on mainframes based on million instructions per second (MIPS) and institutions are charged based on MIPS as well. Cloud-based services, on the other hand, are agile and easy to scale up (or down) on demand, adhering to organizational computing needs. This level of agility can give businesses a real cost advantage over competitors that operate and maintain their own data centers.

Security & availability

The public cloud excels in two critical security areas: information resiliency and privacy. Resiliency is the idea of not losing data or letting it be susceptible to corruption. Most of the public cloud environments (Amazon's Simple Storage Service, for example) are designed for 99.99999999 percent durability and up to 99.99 percent availability of objects over a given year. That is difficult to mimic in an on-premise environment. From a security perspective, Identity and Access management provided by cloud vendors allow organizations to impose fine-grained controls on what can be done to the data in a cloud environment. These security and audit controls, integrated

with organizational Active directory or other authentication platforms, provide the ability to audit and reduce the surface area of penetration attacks, which are otherwise require large investments to implement in an on-premise environment.

Future workforce ready

Most mainframe applications are coded in COBOL or other similar languages. Over the past two decades, they have slowly been phased out of computer science curriculums in colleges and universities across the nation and internationally. As such, mainframe technologies are viewed as a dying platform, well past its expiration date. Recent graduates have a better understanding of more modern languages and architecture principles, both of which form the bedrock of cloud computing. Combined with significant investments from cloud providers in proliferating knowledge and understanding of systems (such as AWS certifications), migrating technical assets to the cloud becomes an obvious choice when thinking about future workforce.

Risks / Challenges with cloud migration

While the benefits highlighted are quite compelling, modernizing core banking infrastructure to a cloud platform doesn't come without certain risks that need to be addressed.



Limited understanding of mainframe applications

In the case of financial institutions, legacy platforms have been around for decades, often with limited supporting documentation and few key resources who have a comprehensive understanding of the platform and applications. Cloud migration of such technical assets – especially when considering the criticality of core banking applications – can pose a risk if due diligence is not performed to ensure that all necessary dependencies are preserved and functionality tested. Further, a comprehensive governance structure around the migration is also required to ensure timely resolution of issues.



Preserving upstream/downstream dependencies

Frequently, core banking applications send / receive data to / from each other or other applications within the institution's ecosystem. Depending on where a particular application falls within the data chain, such upstream or downstream data dependencies must be accounted for when migrating said application to the cloud. Accounting for such dependencies is even more critical when adopting a phased approach (the recommended approach) for migrating core banking functionality to the cloud, as not all assets will migrate at the same time. In such scenarios, it is recommended that institutions analyze data publishing and consumption patterns for core banking applications as part of migration planning.









Untangling data transformations from third-party sources

Core banking applications can rely on data from 3rd party systems (such as TSYS, First Data, Equifax, etc.). When transmitted into the enterprise, such data often goes through various layers of transformation to ensure consumption by a target application. With years of iterations on such transformations, tracing the actual 3rd party data elements required by a particular core banking application can be challenging. However a detailed analysis of the data transformation back to the source (third party) can be performed to obtain the source data format. This may require some time and resources to complete, but is essential to accurately understand the nature of 3rd party data dependencies.

Dispositions

Ultimately, mainframe based applications that support core banking will need a target disposition assigned to them. These dispositions lay out the migration approach for core banking applications:

Disposition	Description	LOE	Rational for Disposition
Re-host	<ul style="list-style-type: none"> Application migration to target Cloud, but run on a simulator (such as Micro-Focus) Minimal changes to the application Cloud-ready storage required 		<ul style="list-style-type: none"> Low cost method to convert application to Cloud Ideal for applications that provide a functionality but no value in rebuilding from scratch
Re-platform	<ul style="list-style-type: none"> Application reinstalled on target cloud, but current state is already non-mainframe; therefore, not relevant for this discussion 		<ul style="list-style-type: none"> N/A
Re-factor	<ul style="list-style-type: none"> Automated porting of application to Cloud through code conversion tools (such as InnoWake) Cloud-ready storage is required 		<ul style="list-style-type: none"> Ideal for applications that need to be rebuilt on the Cloud, but also need to be moved off existing mainframe technologies in the short-run
Re-architect / Replace	<ul style="list-style-type: none"> Requires rebuilding of application on a Cloud platform with a microservices based architecture Application may have the same or additional features / functionality Target application leverages benefits of Cloud infrastructure (security, CI/CD, enhanced data analytics, increased uptime, etc.) 		<ul style="list-style-type: none"> Recommended course of action when desired state requires potential use of modern technology (ML / AI), shorter release cycles, etc. Ideal for applications that need serious upgrades or have outlived their functionality and are getting expensive to maintain on mainframe technologies
Retire	<ul style="list-style-type: none"> Application decommissioned; no migration needed 		<ul style="list-style-type: none"> Ideal for applications that are no longer needed, potentially because of existing functionality native to Cloud
Revisit	<ul style="list-style-type: none"> Application left as-is for the time being 		<ul style="list-style-type: none"> N/A

If your organization is ready to move core banking to the cloud, how should it start? Initially we recommend that institutions should evaluate their core technical landscape against three major factors (application / data dependencies, architectural alignment, and competitive advantages) to understand how cloud ready your environment is.

The first step is to take a closer look at various components that fall under the core banking services umbrella and associated critical applications / functionalities. Examples include customer records, payments / transactions and authorization. This analysis includes logically grouping services provided by applications and then evaluating against the pillars mentioned earlier to build out a well-defined roadmap to cloud:

- **Application/data dependencies:**

These can include upstream and downstream dependencies on other internal applications within the enterprise or dependencies on data being provided by / to external / 3rd party applications

- **Architecture alignment:** This pillar considers the actual architecture and functionality of the application to gauge cloud suitability, as well as an understanding of the bank's 3rd party mainframe footprint and whether it makes sense to bring some of this in-house

- **Competitive advantages:** This pillar assesses the viability of moving an application to the cloud by examining the economic impact of a chosen disposition, available cloud based solutions, speed to market, opportunities for innovation and / or operational efficiencies

Banks can shape this roadmap into a three-phased approach that enables your organization's cloud capabilities to and IT resources to mature naturally within the cloud:

Phase 1: Quick wins

Leading candidates for migration - You can start these now, with relatively little risk. This also enables you to shift your IT towards being more cloud-savvy (DevOps, Security, etc.). The candidates exhibit the below factors:

- **Independent applications:** Fewer or 'known' dependencies on other applications or data coming in to / from 3rd party applications
- **Architectural alignment:** High cloud-suitability based on their functionality
- **Competitive advantages:** Less expensive cloud based solutions, faster speed to market

These typically include Deposits, Construction lending, Cash Management and Customer Information Filing. Potential disposition strategies can be re-hosting, re-purchasing or a minimal amount of re-platforming.

Phase 2: Relatively more challenging

As the organization's cloud capabilities (people, infrastructure, etc.) mature, consider moving on to the second phase. Candidates in this set contain:

- **Dependent applications:** Dependencies on other applications (inter / intra-dependent) and/or data provided to/by 3rd party applications
- **Platform alignment:** Applications requiring some re-platforming to move to Cloud

- **Competitive advantages:** Cloud based solutions require some customization from available solutions to meet business capabilities

Often, these applications can include Lending (Auto & Personal, Commercial, Small Business, et al), Merchant Services and Payments & Transfers. Potential disposition strategies can be re-platforming, re-architecting to some extent or re-purchasing as a solution comes available.

Phase 3: Complex Assets

As more applications are migrated to the cloud, several dependencies will have resolved themselves. At the same time, increasing knowledge, governance, etc. around data security, cloud app management, etc. allows other core applications to move to the cloud. Candidates that pose a more challenging journey to cloud display:

- **Dependent applications:** Heavy dependencies on other applications, across platforms, and/or data transformation and transfer exists across applications including 3rd party applications.
- **Architectural alignment:** Requirements for a good amount of re-architecting/ re-designing
- **Competitive advantages:** Custom built solutions are key to satisfy business capabilities

These typically include International Services, Government Services and Specialty Core banking. Potential disposition strategies include re-platforming and re-architecting.



With the above approach, companies can reap early benefits of cloud by migrating Phase 1 candidates and gain a strong foothold into cloud as they begin migrating the more challenging core functionalities. While the concerns around 3rd parties, governance and security still stand - cloud enables failing fast due to optimized speeds and increased agility through operational efficiencies.

So, is it time to move core processing to the cloud? Yes, it absolutely is, and it should be on the minds of all banking

executives. Keeping core banking on legacy platforms will not only deprive institutions of the benefits highlighted here, but also make it more challenging to maintain operations as the workforce familiar with the underlying technology ages. In this environment of tech talent constraints and increased competition from other banks as they adopt a cloud-based approach, inaction to overhaul a legacy core banking platform will only increase the cost of simply maintaining existing functionality. The approach detailed in this paper lays out an achievable, calculated approach to

moving core banking to the cloud while mitigating risk throughout the move. Cloud has the scale, security, availability and meets the regulatory needs to have critical core banking workload migrated. Banks can realize quick wins while simultaneously learning – as a cohesive organization – on how they need to adapt to a post-mainframe world.

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