Infosys cobalt

WHITE PAPER

SCALING CLOUD FOR FINANCIAL SERVICES

Migrating Mainframe Banking Applications to AWS Cloud with Infosys Modernization Framework

aws PARTNER Financial Services Competency

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Contents

Introduction

Within banking mainframes host critical applications that support key functional capabilities: core banking, lending, payments, and trade finance.

These applications contain millions of lines of code, supporting millions of online transactions and thousands of batch processes. Developed over decades in different programming languages including COBOL, PL/I and Assembler.

Outdated and difficult to maintain, these applications represent an un-sustainable cost of ownership with significant limitations on their ability to transform to sustainable digital technologies and meet new regulatory requirements.

Mainframe Cloud Transformation

The Infosys transformation framework has delivered successful on-time on-budget business outcomes and provides much needed governance during each critical phase.

Figure 1 | Infosys portfolio assessment

Mission critical applications require an iterative approach to manage transformational risk, involving assessments of banking domains and porting related applications, parts of an application or user cohorts. Domain driven design techniques identify bounded functions which can be more easily decoupled and migrated with minimal impact.

Step one requires business alignment with the business owners.

Step two decomposes those banking domains into functional and technical subsystems, channels of interactions and foundational data capabilities.

Common banking domains

Front-End for Bank Users
Multi-channel UI for bank users providing Core Banking, Treasury, CRM, and Loan Origination functionality

Front-End for Consumer and Corporate Banking Users
Multi-channel UI for Retail and Corporate users providing consumer and business banking functionality

CASA and Deposits Management
Checking, Savings, and Deposit account management functionalities

Loan Origination
Loan origination functionality including capturing loan details, loan appraisal, loan disbursal and repayment of loans

Consumer and Corporate Loans
Consumer and corporate loan functionality including revolving loans, overdrafts, cash-term loans, and multi-currency disbursements

Trade Finance
Letters of Credit, bill processing, and Bank guarantees related functionality to support managing letters of credits, processing bills of exchange for collection

Customer Management
Manage customer data about deposit accounts, credit relationships, trust accounts, and joint ownerships

Payments and Funds Transfer
Facility to make payments across channels like Mobile, Web, SMS, internal and external transfer of funds

Reporting Front-End
Reporting Facility that displays data for different types of functional, analytical and regulatory capabilities

Business Support services
Support for foundational business capabilities listed above including Billing, Collections, Fraud detection

Common Technical Support services
Capturing images, delivering alerts through channels, managing business rules, managing batch jobs, and workflow capabilities

Application Portfolio Assessments

Portfolio assessments map mainframe applications to subsystem capabilities when complete they are analyzed across following major dimensions:

BUSINESS VALUE

Criticality for running the business. Financial impact of failure. Number of users supported. Transaction volumes processed. Regulatory & compliance requirements

TECHNICAL VALUE

Overall fit for the architecture and technology stack, team skills, and technical capabilities

OPERATIONAL HEALTH

Performance and stability. Ability to meet SLAs for batch & online. Previous failures, incidents, trouble tickets by severity, and number of releases and enhancements

SUPPORT LEVEL & DATA VOLUMES

Number of programs, Lines of Code, number of batch jobs. Average data processed in a day. Performance SLAs for Availability, Response times, throughput.

STRATEGIC ALIGNMENT

Alignment to business value and cloud IT strategy

COMPLEXITY

Maintenance based on skills availability, business rules, documentation, and standards

COST/SPEND

Cost to run/operate actual vs planned spend, Total Cost of Ownership (TCO), Maintenance Cost, Hardware/Software/ Licenses/Infrastructure costs

RISKS

Operational risks that can lead to negative business outcomes such as financial impacts, security risks, and vendor / supplier risks

Migration Approach Strategies

The key strategies described below, provide patterns for mainframe migration to AWS cloud.

R-treatments and Dispositions

Although lift-and-shift may get you into the cloud faster. Faster it not necessarily better. A manual lift-and-shift approach is only marginally faster when compared using the Infosys Mainframe Modernization framework and tools with the AWS Blu Age product.Eventually the costs of licensing and cloud consumption will require you to convert your shift-and-shift workloads to cloud native services.

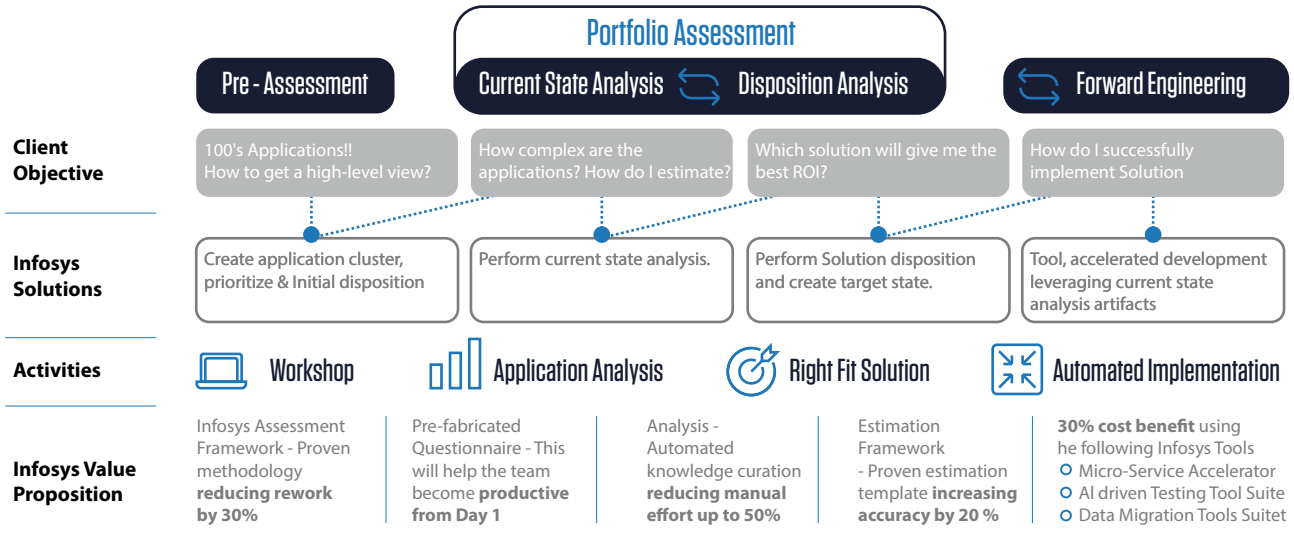


Figure 2 | Infosys mainframe transitioning

1 Refactoring or Rearchitecting

Refactoring changes the structure of application components and optimizes the existing code using an automated method without changing the external behavior. This removes technical debt and improves nonfunctional capabilities. Rearchitecting modernizes applications without impacting business functionality by leveraging AWS cloud services.The focus is on code transformation, evolving the underlying hardware with key AWS, and database services.

AWS Blu Age is a key to automating the refactoring process of mainframe source code to an open language that can run on native AWS cloud services. Blu Age automation substantially reduces modernization costs and shortens project timelines whilst mitigating risk. AWS Cloud based deployments increase application agility, engaging DevOps best practices, CI/CD pipelines, modern data stores, and service-enablement.

Partnering with AWS, Infosys has undertaken large-scale transformations whilst successfully addressing key considerations of risk associated with upgrading the underlying technologies by automating established migration patterns.

Bounded or self-contained mainframe components can be containerized to handle online transactions, and batch jobs. Mainframe applications using DB2 tables and VSAM files can be refactored and migrated to individual Amazon Aurora relational databases. Other services include AWS App Mesh for internal application-level communication, Amazon API Gateway and Amazon MQ for external integrations.

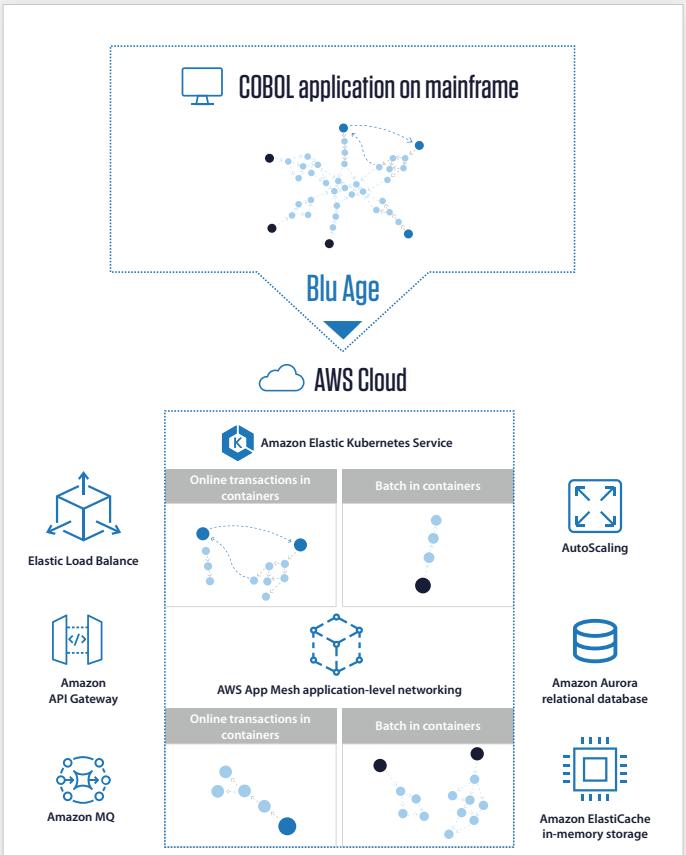


Figure 3 | Refactoring or Rearchitecting

2 Re-platforming or Re-hosting

Re-platforming enables infrastructure modernization whilst retaining the applications' integrity. Reinstallation occurs on a target architecture with updated OS's databases and runtimes incurring only minor code changes.

Rehosting migrates applications/services without any architectural, technology or business changes. This also applies to workloads migrated by means of a hardware emulator that "Encapsulate" the mainframes OS, with the application. Re-platforming and Re-hosting can be enabled by using the AWS M2 (Re-platforming) pattern that hosts COBOL/ PL1 based applications on to AWS Cloud. This pattern preserves the application language, code, and artifacts to minimize migration impact, enabling customers maintain their application knowledge and skills. While the application changes are limited, this pattern also facilitates modernization of the infrastructure and processes. The infrastructure is changed to a modern cloud-based managed service while the processes are changed to follow best practices for application development and IT operations.

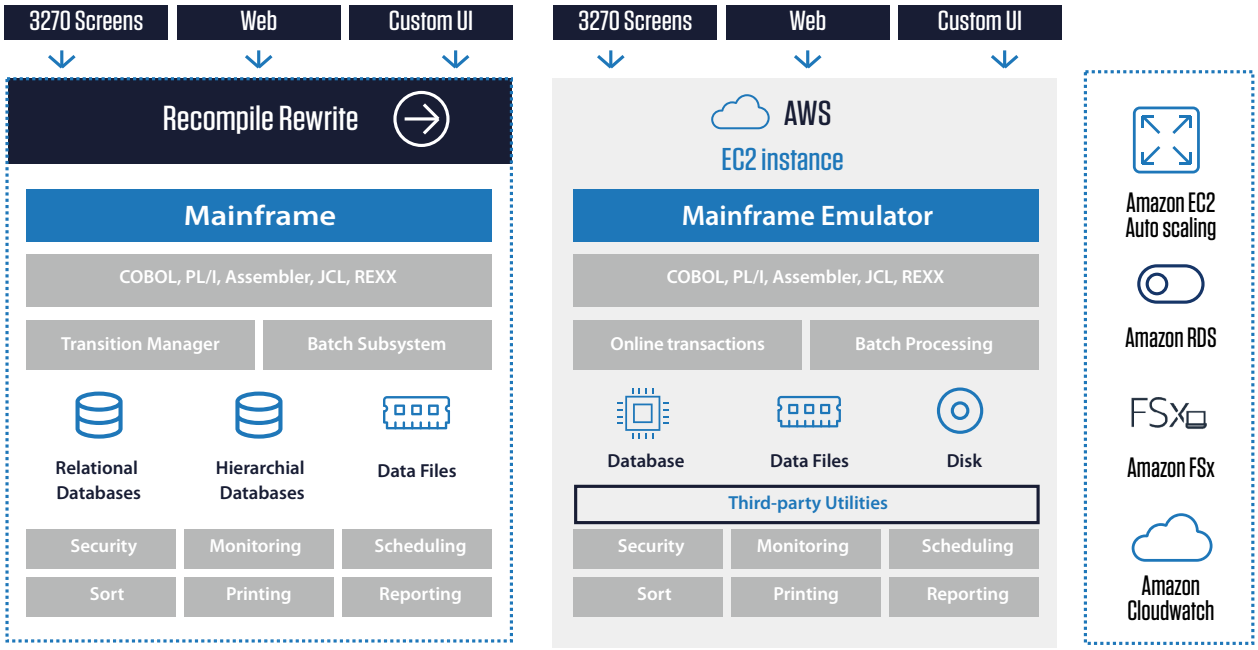


Figure 4 | Re-platforming or Re-hosting

3 Re-engineering

This Identifies applications and services that support key business capabilities that would most benefit from cloud-native features, improving agility to bring new products and features to market faster. The most effective use of AWS cloud is through re-engineering the application and business services, but this process also demands the most time, effort, and customer involvement.

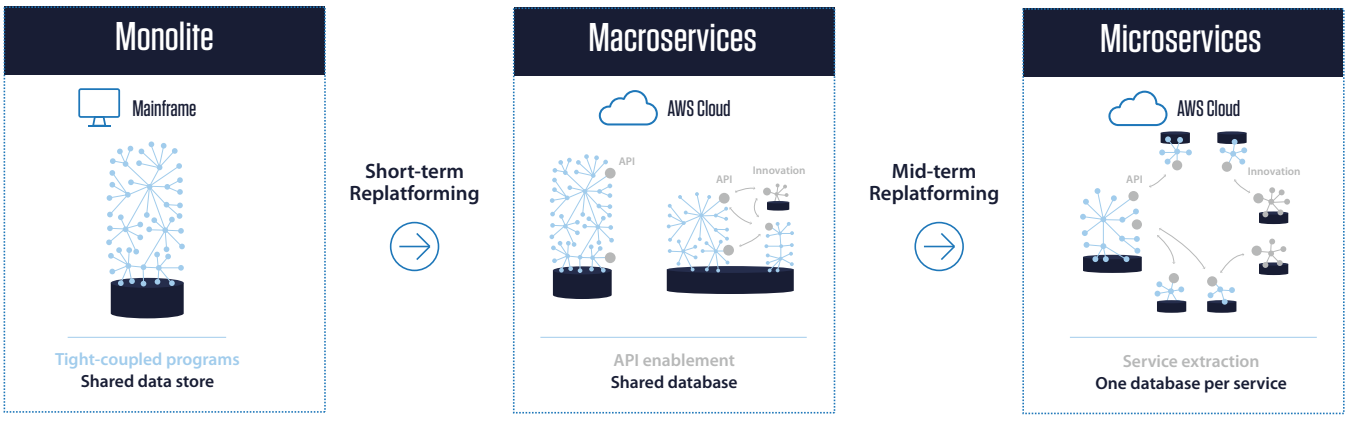


Figure 5 | Re-engineering

Defining the Roadmap

The roadmap for application migration workload would be based on the following criteria:

Improving customer experience

Reducing Risks

Supporting agility and innovation

By overlaying the above criteria with the outputs of functional decomposition and portfolio assessments, we can establish the following workload migration roadmap:

Move the Front-End components to a modern UI based architecture accessible through digital channels, and integrates with an AWS cloud deployed API layer

Create Read Replicas on the Cloud for specific types of financial data including Checking / Savings / Customer information accessed directly from digital apps and APIs deployed on AWS cloud

Phase application migrations depending on number of upstream and downstream dependencies, with ones that have smaller number being moved first, followed by ones with higher number (of dependencies)

Data aggregation, warehousing, analytics, and reporting capabilities moved to AWS cloud to leverage the innovative capabilities AWS cloud offers

Migrate more complex data systems of record later in the roadmap, once we have established enough critical mass of applications and data in the AWS cloud

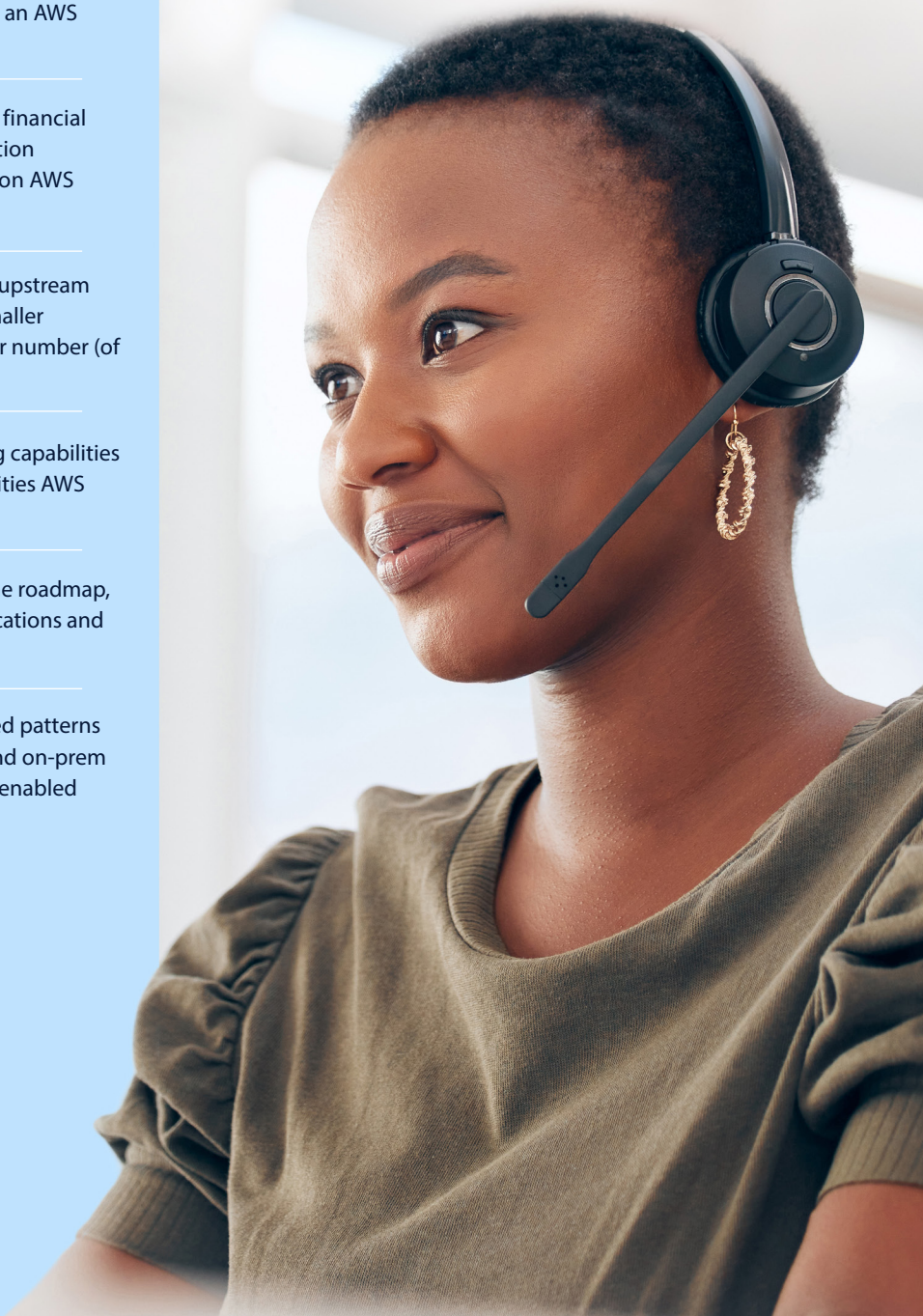
Plan for a hybrid architecture and ensure that established patterns for data replication, connectivity between AWS cloud and on-prem facilities for data security, operations, and resiliency are enabled

Support and Hypercare

One key component of success is the seamless interchange from mainframe to cloud with minimum or zero disruption and down-time.

Dual existence is the period when the old system incrementally transitions into the new system while both systems operate simultaneously, essential for business critical, and complex applications which require re-architecture and refactoring.

Hypercare is critical support given, immediately after implementation starts while users and applications are still being migrated and dual running. Hypercare can vary in terms of length of time and level of support and typically includes onsite SME, development/configuration, and communications support.



Benefit from Infosys Zero Cost Mainframe Transformations

There is a high up-front cost for all large cloud transformations. Firms often face short term liquidity issues due to economic volatility, budget freezes or simply cannot clearly define the Return on Investment (ROI).

Infosys can use economic engineering with AWS migration funding to provide a 'Zero-Cost-Transformations'. We absorb the up-front costs and spread that cost over the lifetime of the service, which is substantially lower than the existing run-rate. At the end of the duration, we can either hand-back the operations or negotiate a new service contract.

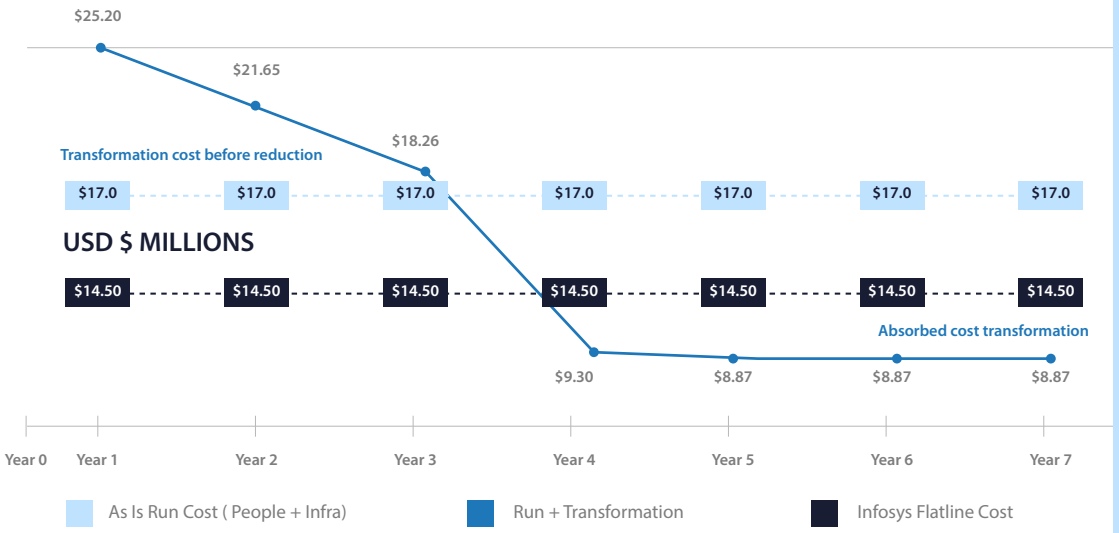


Figure 6 | Infosys ZERO COST proposition for TOTAL COST @$14.5M (including RUN and Transformation), providing annual spend rection of ~48%

Infosys Zero Cost Transformations

Addresses short term liquidity shortfall for client

Fully absorbs cost of the transformation within the fixed payment structure

Typical durations 5, 7 and 10 years

Delivers transformation with managed services

Conclusion

Mainframe off-loads or mainframe retirement is tricky, it is a difficult trifecta of application complexity, business criticality and precise planning. Automation and trusted partners are key to success. Automation both at application, data and user level, de-risks the project, releases migration value early, gives transparency on progress and confidence to the business.

Having partners that have a track record in mainframe delivery to cloud is also vital, close co-operation is required between all three parties.

About the Authors

Infosys Author

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