MAINFRAME MIGRATION TO AZURE – ONLINE APPLICATION RE-ENGINEERING

Abstract

Mainframe applications rely heavily on online processing. Percentage of online processing in an application can vary between 60 to 100 percent. Such workloads are usually mission critical for business. This white paper outlines Infosys' strategy to move online workloads from mainframe to Azure with minimum or no disruption for business. It also highlights some of the tools and accelerators that Infosys uses to streamline the migration.

Microsoft

Infosys®
Navigate your next

Table of Contents

1. Introduction

Online applications are business critical since they need to propagate required data changes to the backend database in quick time. Mainframes have long been known for their good online throughput coupled with enterprise grade security. However, with enterprises moving to newer technology stack that are different from the traditional ones on the mainframe, it is becoming increasingly difficult to manage both mainframe as well as the new

distributed online programing stacks. This is a key driver for organizations to move some of their online applications from mainframe to the cloud.

Microsoft Azure has proved itself in terms of scalability, elasticity and security to run mainframe online workloads with the same ease as they ran on mainframes. By moving to Azure, enterprises are reaping benefits in terms of cost, time to market and

flexibility with infrastructure. This white paper discusses how a mainframe online workload can be moved to Azure with zero or minimal downtime for the application.

Infosys has executed multiple projects successfully with Microsoft Azure and has gained significant experience and expertise in multiple online patterns of mainframe migration.

2. Online applications

One of the main types of applications seen on mainframes are online applications. These are fundamental business transactions (like creating orders) that

require higher processing speed.

This white paper examines how legacy online applications can be re-engineered to the Azure platform. To gain a deep

understanding of the current applications and their dependencies, Infosys suggests beginning the modernization journey using Infosys Ki tool.

2.1 Infosys Ki – The Knowledge Curation Platform

Infosys uses its knowledge curation tool Ki to understand legacy applications and derive insights from the current landscape. The tool provides the following views:

- **Portfolio view** – This displays a summary of key details about all

applications including the number of applications, total programs, total lines of code, unused/un-referred programs, existing tables, etc.

- **Applications/sub-applications view** – This provides details about visualization,

maintainability analysis, dependency charts, SQL queries, program/data flow, and system insights

Click here to know more about Infosys Ki

2.2 Architecture on mainframe – Online with CICS/IMS

A typical online workflow in mainframes involves components such as:

- **Transaction manager** – A customer information control system (CICS) or information management system (IMS) may act as the transaction manager

- **Transaction** – The logical application that has the embedded application logic

- **Data layers** – Generally, database or VSAM files act as backend data layers

- **Interface** – Screens that users can access for business functionalities

- **Integrations** – This includes:

  o MQ or payloads that come into mainframe and trigger a transaction

  o Email as a communication channel
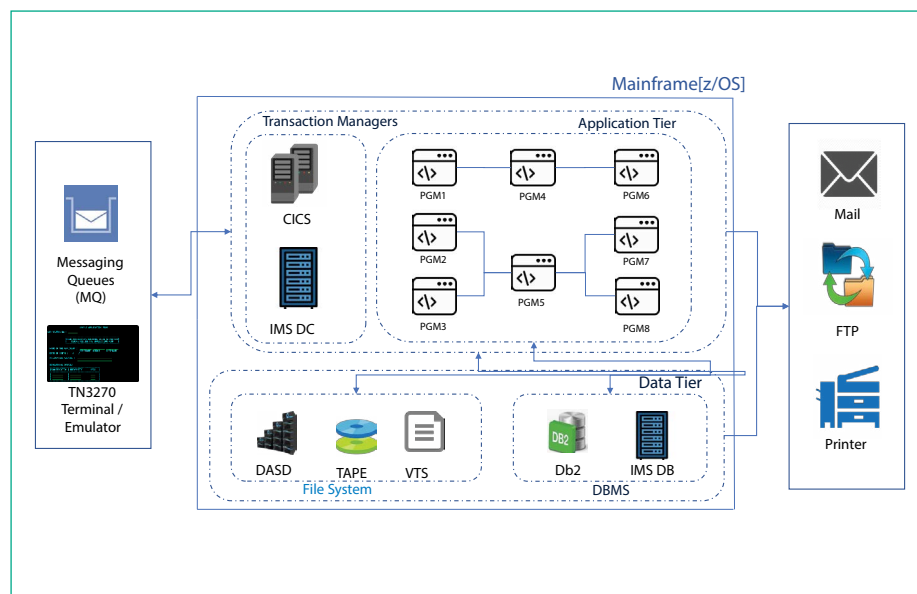
  o Printer as a physical print medium

Fig 1: *Mainframe online architecture*

2.3 Azure architecture online – Rehost and re-compile

Mainframe applications can be rehosted without major structural changes using lift and shift process. There are some third-party ISVs that can re-host platforms without modifying the existing source code.

Mainframe applications can also be recompiled as-is to cloud using cloud-native compilers or to cloud-native languages such as Java or .NET using a translator. There are some third-party ISVs that recompile mainframe applications to the cloud. This helps modernize mainframe applications to new technologies in a scalable manner based on the requirements.

Rehosting and recompiling of mainframes is beyond the scope of this white paper. The following section examines how to re-engineer mainframe application onto the Azure platform using Azure virtual machine (VM) and Azure Kubernetes Service (AKS).

2.4 Azure architecture online – Re-engineering on virtual machine (VM)

Mainframe applications can be re-engineered using Azure VM whereby each server can be scaled up or down depending on the request. Applications are re-engineered such that online, batch, application, middleware, and database servers reside in different VMs that can access the Azure services within VNET. The primary and secondary networks are connected through a VPN gateway that aides in disaster recovery.

The reference architecture on Azure VM has the following components/services:

- An **application gateway** that manages traffic for the applications and routes traffic to the right destination server

- An **online/transaction** server that acts as the front-end to receive input transactions like the web server

- A **middleware server** that handles the message queues and routing mechanisms for the applications

- An **application server** that contains the business logic and processes data

- A **batch server** that contains the scheduler to process the jobs

- An **SQL DB server** that provides the database services and stores data

- A highly available **SQL server** that leverages synchronous commits for automatic failover

- A **gateway subnet** that connects the two regions through VPN
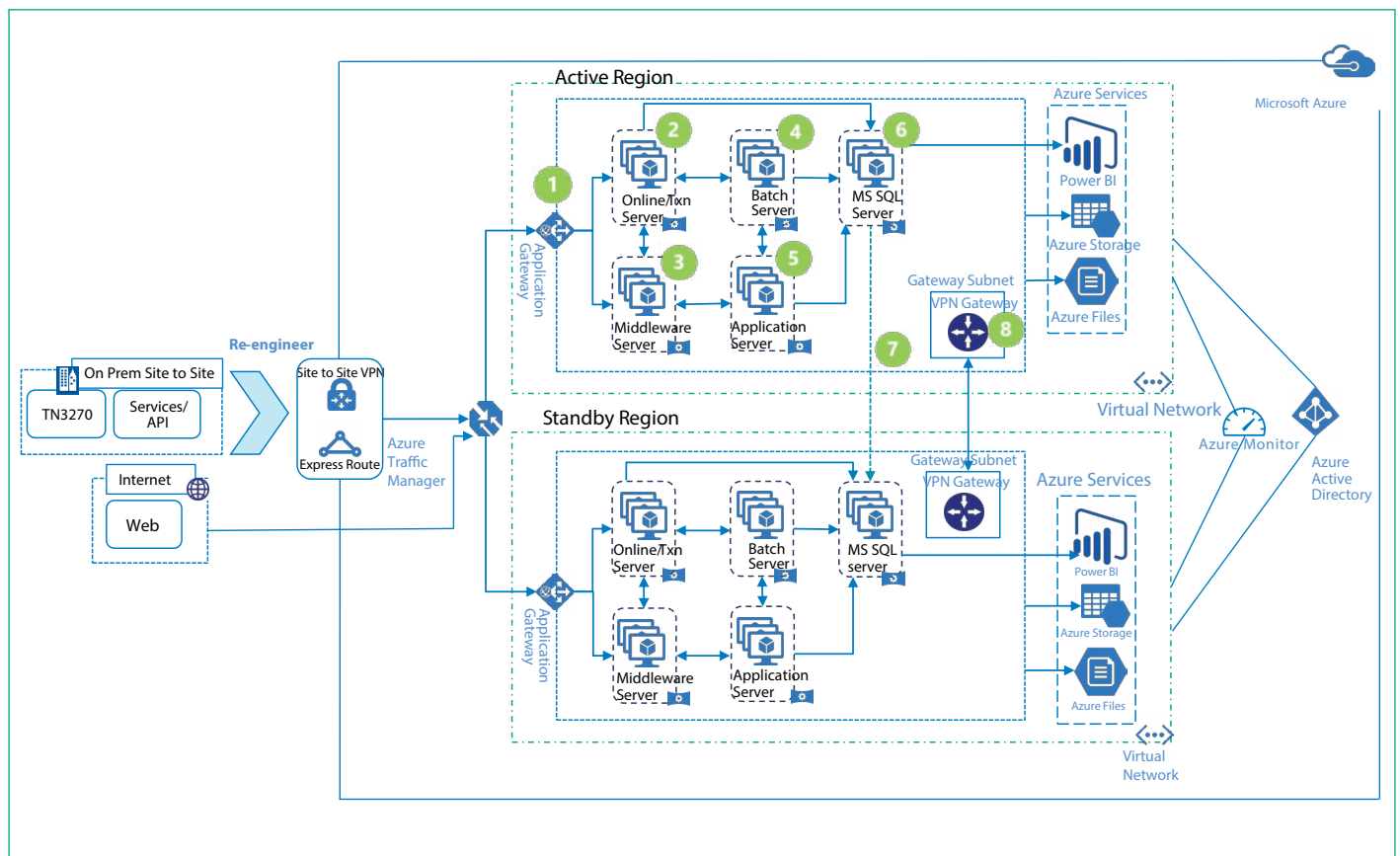
2.5 Azure architecture online – Re-engineering on AKS

Mainframe applications can be re-compiled/translated to cloud-native languages and containerized using Azure Kubernetes Service (AKS). These containerized applications reduce the infrastructure cost and are scalable based on traffic. AKS can be used to connect to different database nodes and operating platforms.
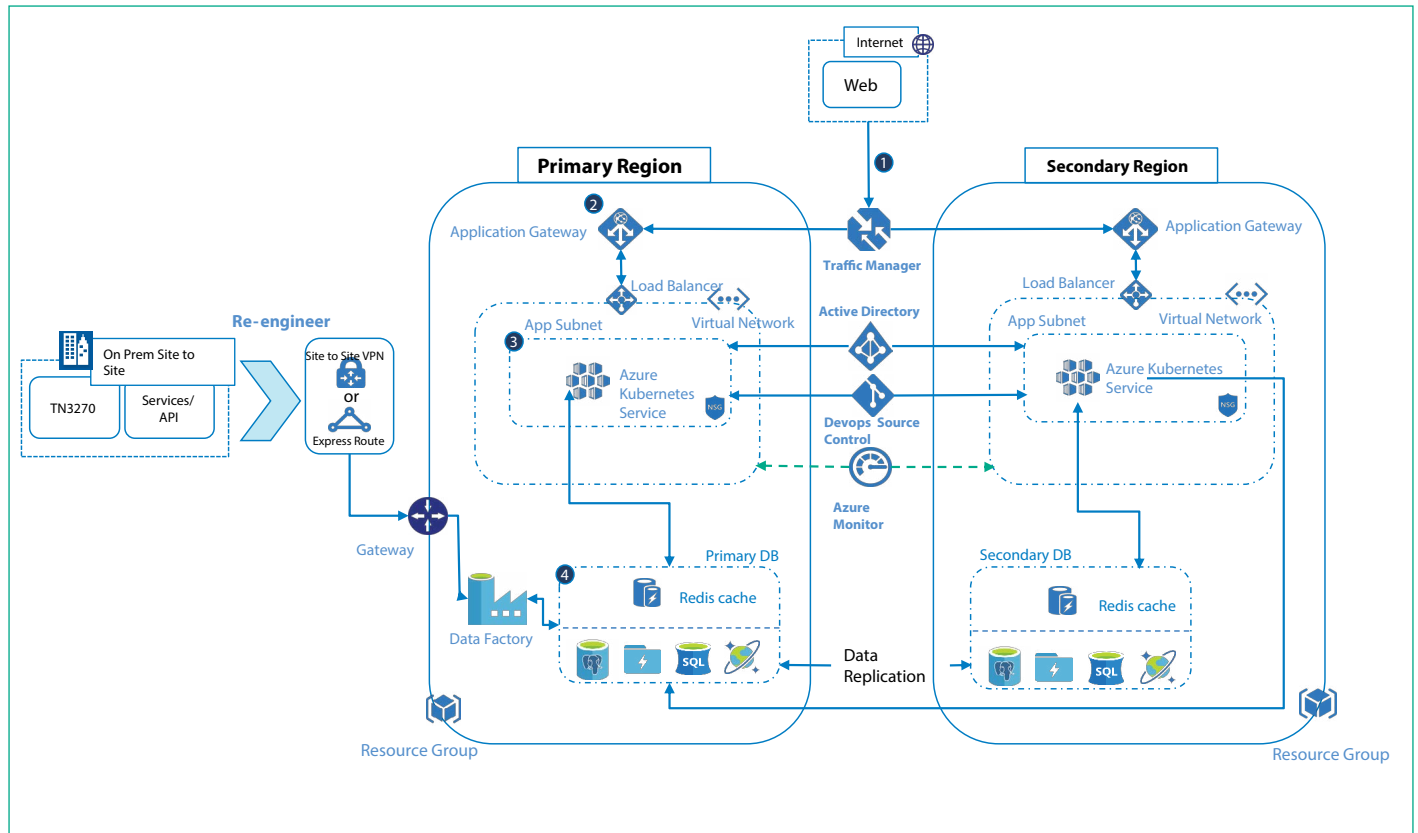

The reference architecture on AKS has the following components:

- A **traffic manager** that directs the requests/traffic to specific endpoints, thereby balancing load optimally

- An **application gateway** that manages traffic for the applications and routes these to the destination server

- An **application subnet** that handles requests from the application gateway and interacts with databases. The AKS consists of applications and online/batch processes
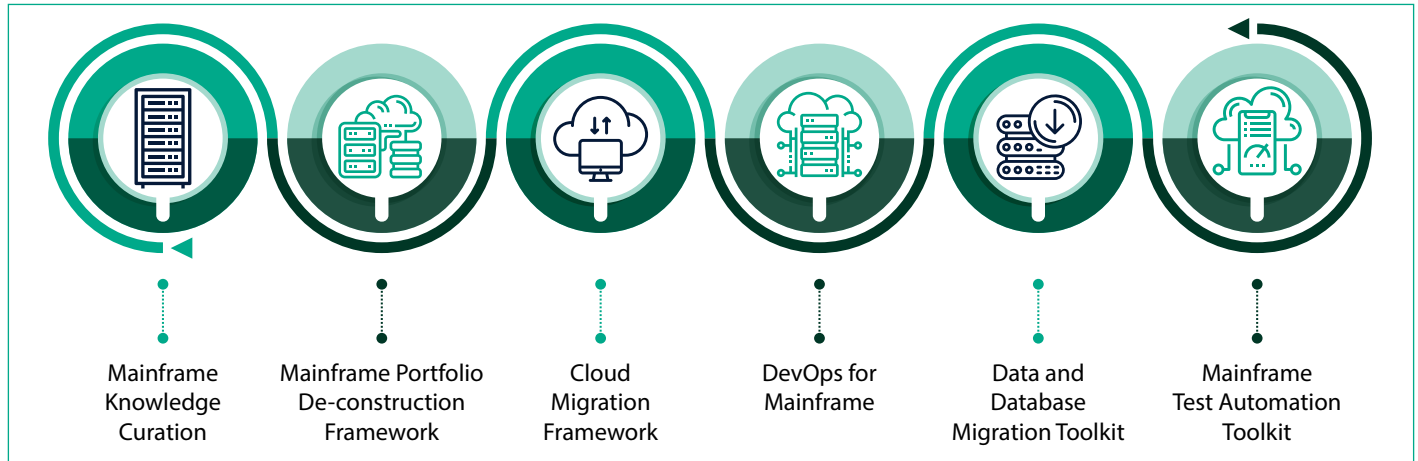
- A **primary database** that has a Redis cache for caching database requests and supports primary databases in Azure

- **Azure Data Factory** is used to orchestrate the services and build data pipelines

- **Azure Kubernetes Service (AKS)** manages the hosted Kubernetes environment, making it quick and easy to deploy and manage containerized applications without container orchestration expertise. The fully managed AKS offers serverless Kubernetes, an integrated CI/CD experience and enterprise-grade security and governance
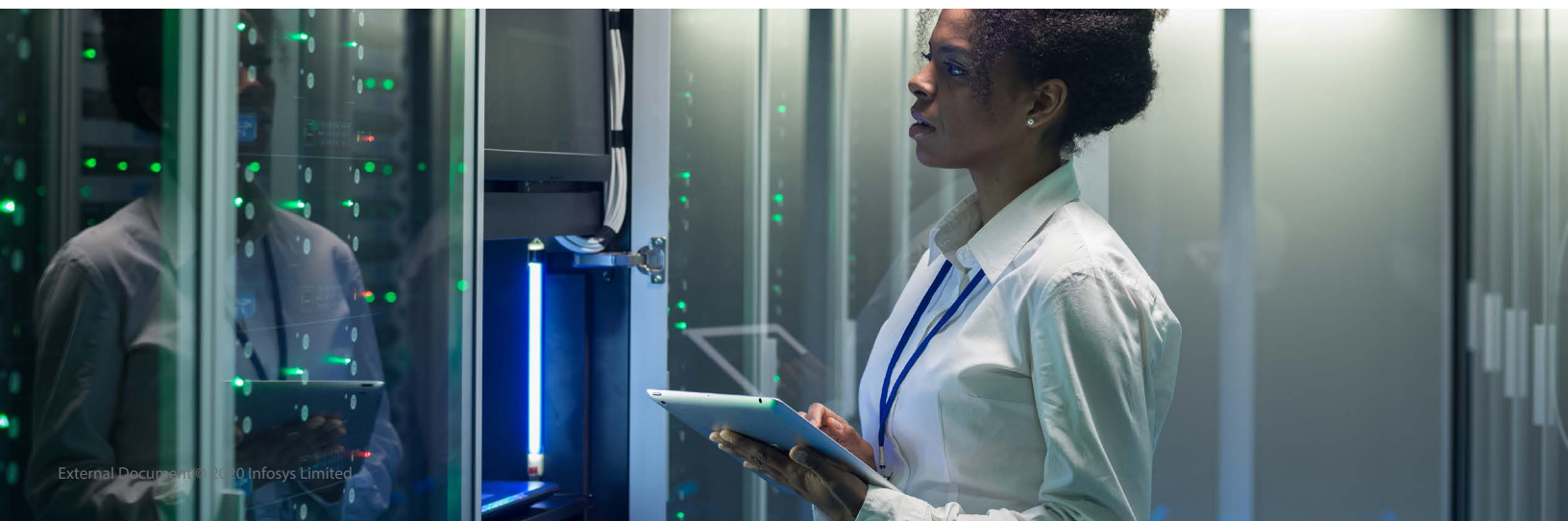
3. Infosys accelerators

Infosys has invested in several tools and accelerators that streamline mainframe migration so clients can realize value faster with minimal effort.

| Mainframe Knowledge Curation | Mainframe Portfolio De-construction Framework | Cloud Migration Framework | DevOps for Mainframe | Data and Database Migration Toolkit | Mainframe Test Automation Toolkit |

4. Why choose Infosys?

Infosys possesses several differentiators that make us the partner of choice for migrating from mainframe to Azure. Some of our differentiators are:

Reference architecture	Infosys has identified 10 mainframe patterns. Combined with Azure expertise, we have created proven architecture for all these patterns.
Identification of modernization candidates	Infosys Ki tool and our cloud questionnaire help identify the mainframe patterns for modernization during the assessment phase.
Benefit realization framework	Azure TCO Calculator has been incorporated with pattern sizing (small, medium and large) to provide the cost-benefit analysis for mainframe migration.
Accelerated execution	Cloud templates have been created for all patterns to accelerate migration to Azure.
ISV partnerships	We have identified best-fit conversion tools from our partners that reduce migration effort when adopting cloud.
Awards and recognitions	• Infosys recognized as winner for 2019 Microsoft Global Alliance SI Partner of the Year. • Infosys recognized as finalist for the Application Innovation category at Microsoft 2019 Partner of the Year Awards.

5. Conclusion

Migrating online applications can be very difficult at times. To make the right decisions, Infosys accelerators and differentiators can help tackle issues at an early stage so that critical workloads are not affected. When migrating to cloud, it is important to understand how online applications in mainframes map to their equivalent architecture on Azure. Re-engineering through Azure Virtual Machine and Azure Kubernetes Services helps clients reduce infrastructure cost and improve disaster recovery and scalability. Infosys' proven implementation expertise helps streamline migration journeys.

To understand the data replication and tools pattern, check out our white paper on Mainframe Migration to Azure – Data Replication and Tools.

To know more about how to streamline your migration from mainframe to the cloud, reach us at Legacy.Mod@infosys.com.

6. About the authors

Infosys contributors:

Ajay Jeswani: Principal Consultant, Legacy Modernization Practice, Infosys

Rajesh Kumar Vinukonda: Technology Architect, Legacy Modernization Practice, Infosys

Microsoft contributors:

Ashish Khandelwal: Senior Engineering Architect, Mainframe Modernization, Microsoft

Mukesh Kumar: Engineering Lead for Mainframe and Legacy Modernization, Microsoft

Pramod Vasanth: Principal Cloud Solutions Architect, Microsoft

7. References

https://www.infosys.com/modernization/

https://datamigration.microsoft.com/

https://www.infosys.com/services/cloud/offerings/Pages/microsoft-azure.aspx

https://azure.microsoft.com/en-in/services/

https://docs.microsoft.com/en-in/azure/mysql/partners-migration-mysql

Infosys®
Navigate your next

For more information, contact askus@infosys.com

Infosys.com | NYSE: INFY

Stay Connected   SlideShare