



MAINFRAME MIGRATION TO AZURE – DATA REPLICATION AND TOOLS

Abstract

As the backbone of most of the processes in an organization, data needs to be handled in a highly sensitive manner. This white paper highlights the patterns in which data can be moved from mainframe to Azure along with various tools and accelerators that can help get the job done with minimal human or process errors.





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1. Introduction

Data replication is critical for any application migration as there are multiple considerations. For an online application, data is updated every second and moving this dynamic data to the target poses enormous challenges. Data format is another key constraint in data replication. This white paper focuses on mainframe

data tier migration and replication, different data migration use cases, and Infosys proprietary and third-party tools and accelerators to expedite the migration and adoption of Azure/SQL data platform.

Mainframe data workload migration has the following use cases for file and database systems:

- One-time data migration for rehosting, re-engineering and re-platforming scenarios
- Data replication/sync for co-existence during migration phase and ease of DevOps
- Change data capture for co-existence and hybrid scenarios

2. One-time data migration

This use case is for migrating data, schemas and programmable objects from mainframe database to the Azure data platform in a single and seamless manner. This migration approach includes three steps:

- **Pre-migration** – The goal of pre-migration is to discover the existing data sources and assess details about the features that are being used. This will help gain a better understanding and plan for the migration. Once the databases are assessed and the

discrepancies addressed, the next step is to execute the migration process.

- **Migration** – This step focuses on schema and data migration. It involves two steps:
 - o Convert and publish the schema and programmable objects
 - o Migrate data from the source to the target environments

Once the migration has been successfully completed, there is a series of post-migration tasks to be executed to ensure

that everything functions smoothly and efficiently.

- **Post-migration** – In this step, various post migration tasks should be run. These include:
 - o Application remediation
 - o Data validation
 - o Functional testing
 - o Performance testing
 - o Optimization

3. Data replication and sync

All the steps outlined above in the one-time data migration approach are applicable here. However, this use case scenario is best suited for situations where

the customer wants both environments to co-exist for some time. In such scenarios, apart from one-time data migration, Infosys also sets up data replication/sync

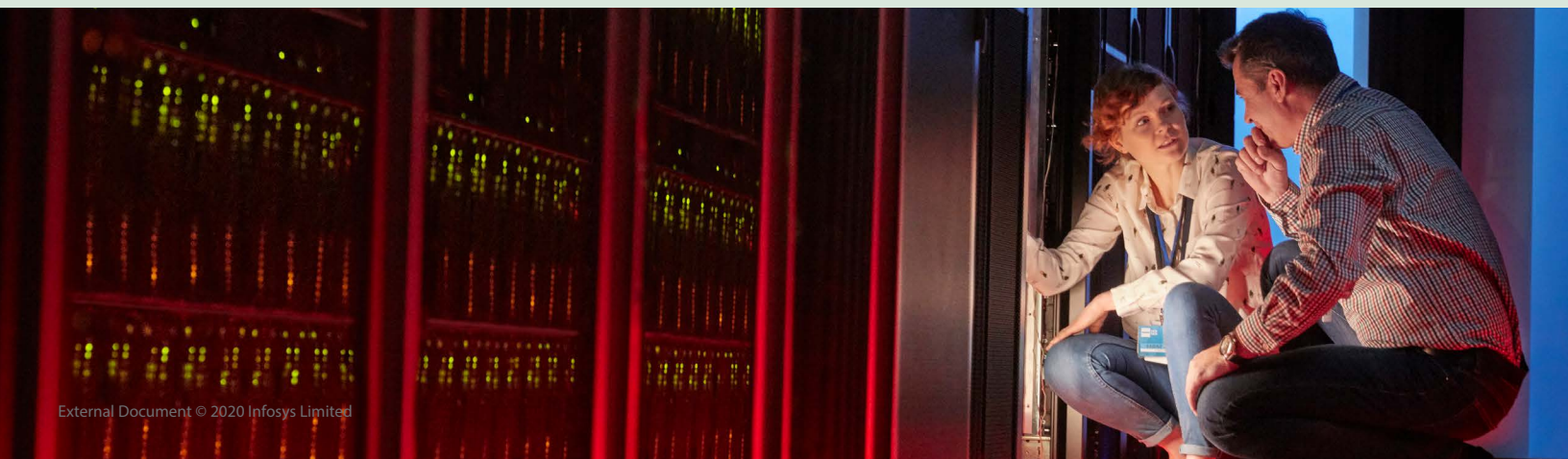
that synchronizes data between both environments in near real-time.

4. Change data capture

All the steps outlined in one-time data migration are applicable here. However, this use case is leveraged when the customer wants to maintain two copies

of records in real time. In such scenarios, apart from one-time data migration, we also set up change data capture (CDC) processes that synchronize data between

both the environments instantly. There are two types of CDC – unidirectional and bi-directional.



5. Products

Various products can be used to streamline data migration depending on the use

case scenario. The following table outlines Microsoft first-party, Infosys proprietary

and third-party products that help accelerate data migration use cases.

a. Products for database migration

Product name	Description
Microsoft SQL Server Migration Assistant (SSMA)	SSMA for DB2 is a tool to automate the migration from IBM DB2 database(s) to SQL Server, Azure SQL Database and Azure SQL Database Managed Instance. This product includes a client-based graphical user interface (GUI) application to manage the migration process.
Azure Data Factory (ADF)	ADF is a cloud data integration service that composes data storage, movement and processing services into automated data pipelines.
SQL Server Integration Services (SSIS)	SSIS is flexible tool for extraction transformation loading (ETL). Integration with other Microsoft Azure service is easy and can be leveraged for data migration.
Infosys Data Services Suite (iDSS)	iDSS is an Infosys data movement platform that helps migrate data from mainframe to Azure platforms.
Attunity (ISV)	Attunity (a division of Qlik) is high performing data replication tool which does one time historical and incremental loads and connects across multiple source/target platforms.
Ispirer (ISV)	Ispirer MnMTK and Ispirer Services ensure easy, successful and automated database migration. It supports the conversion of most source and target technologies.

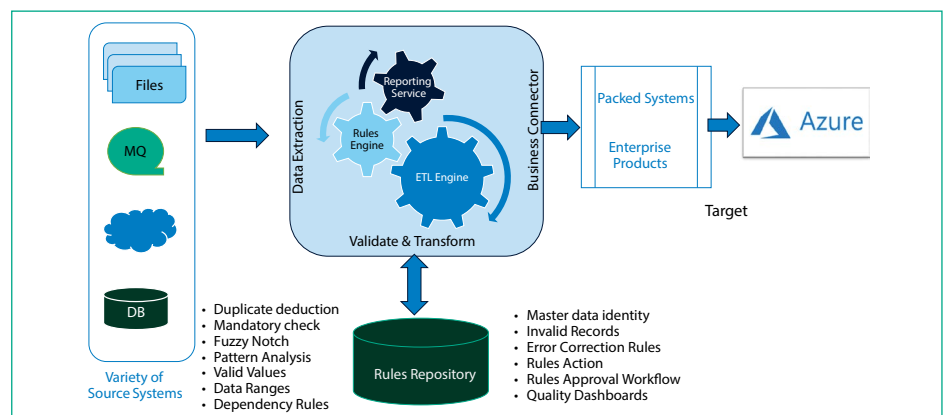
b. Infosys Data Services Suite (iDSS)

iDSS addresses the need for data quality assessment, data quality enrichment, data extraction, business transformation, and data loading in a cost-effective and efficient manner. It supports various file formats and relational databases either as source or target systems for all data management requirements.

Key features of Infosys Data Services Suite (iDSS)

- Simplifies client/project-specific on-demand tool customizations, enhancements and new feature development
- Cuts TCO significantly with managed services and low development/ infrastructure costs
- Enables reuse of expert knowledge bases, thereby enhancing accuracy and reducing overall effort

- Delivers a simple and enriched user experience that empowers non-technical and functional users to adopt solutions with minimum training
- Leverages open source lightweight repositories/databases
- Is equipped with a rich set of domain specific accelerators and utilities
- Addresses end-to-end data lifecycle requirements during enterprise transformation
- Leverages specially designed algorithms/procedures that reduce data processing/job execution time



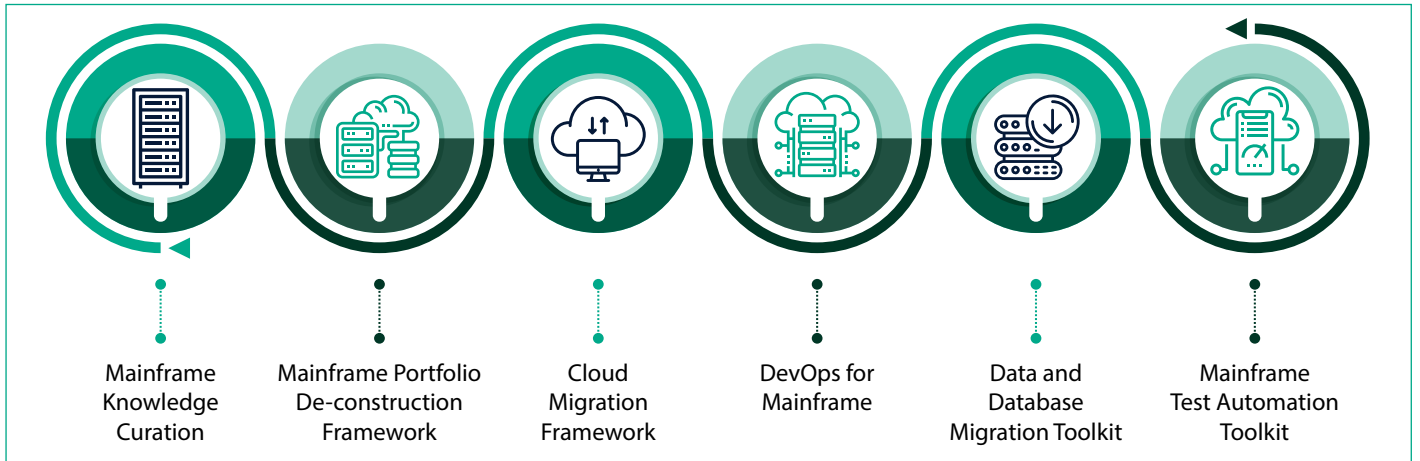
c. Infosys migration tools

Infosys File Migrator helps easily migrate mainframe files into Azure. It can achieve up to 90% automation of the movement of files from mainframe to Azure. This tool helps clients:

- Get all the files present for a high-level qualifier
- Get catalog information of the files
- Create Catalog JCL for the rehosted environment
- Create FTP jobs to get the data out
- Handle different kinds of files such as physical sequential files (PS), VSAM files and GDG files

6. Infosys accelerators

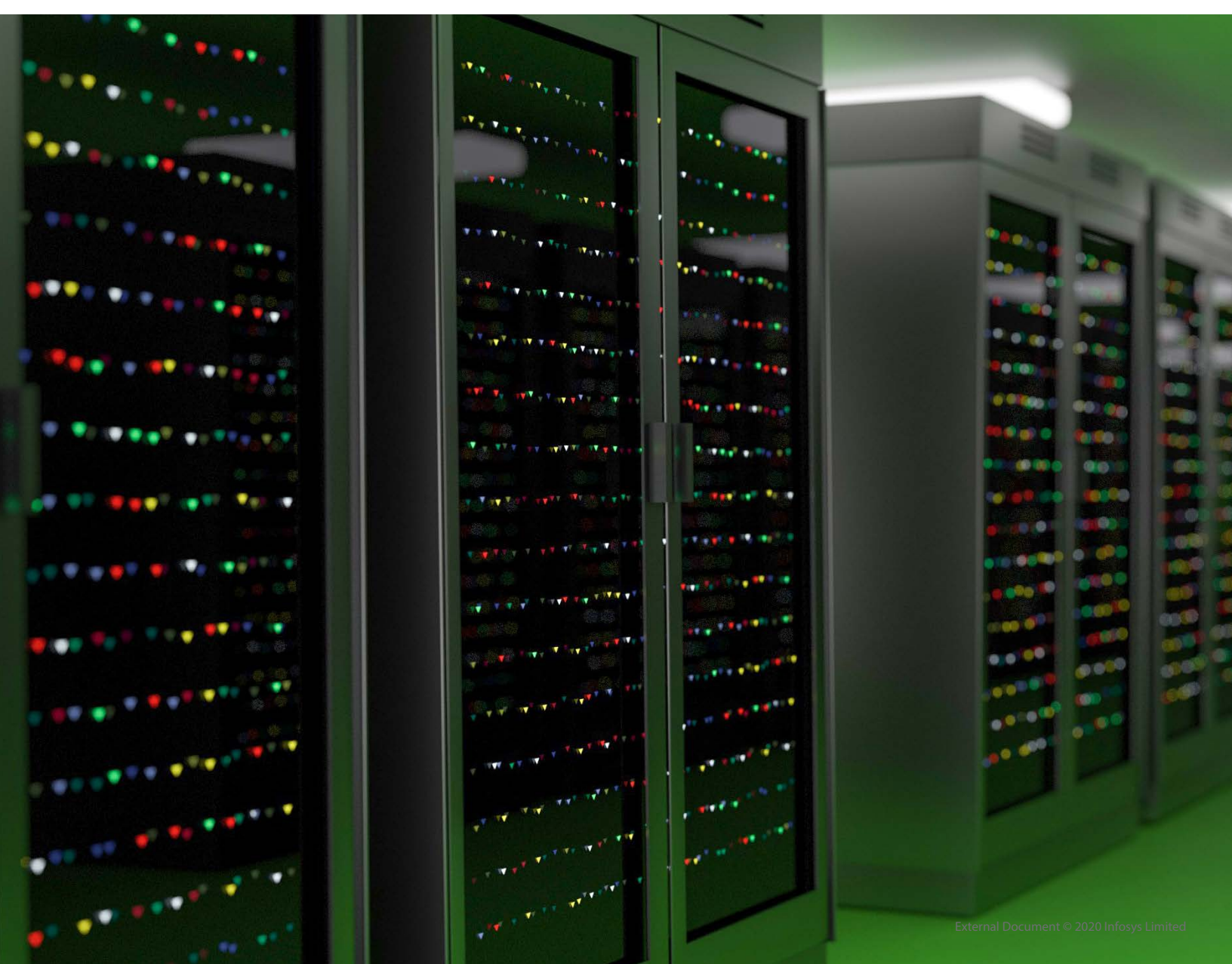
Infosys has invested in several tools and accelerators that streamline mainframe migration so clients can realize value faster with minimal effort.

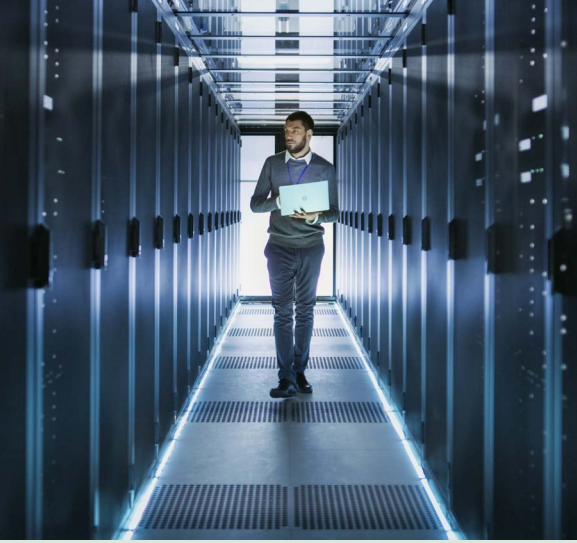


7. Why choose Infosys?

Infosys possess several differentiators that make us the partner of choice for migrating from mainframe to Azure. Some of these include:

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	<ul style="list-style-type: none">• 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.





8. Conclusion

As the data residing in an organization can vary vastly depending on how the application evolved over the years, the right choice of tools is critical for successful data migration. The data migration itself has to be split into multiple stages based on the magnitude of data that the organization has. Some of the major steps for data movement include one-time data migration, data replication/sync and change data capture. Infosys has enabled several customers to smoothly migrate their database and file systems from mainframe to Azure across a wide range of application and data considerations. With our considerable experience across multiple migrations, Infosys can help your organization make the right decisions during data migration.

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