



eBook

Accelerated mainframe modernization on AWS with TCS

Increase agility and innovation by moving mainframe workloads to the cloud

Table of contents

Introduction	3
The value of modernizing mainframe applications on the AWS Cloud	4
Accelerated mainframe modernization with TCS	5
Migrate confidently with TCS Assessment and Migration Factory.....	6
Steps to migration success.....	7
TCS supports each step with best-in-class tools.....	8
Transforming Avis' Rate Shop using AWS cloud.....	9
Take the first step in your modernization journey	11

Introduction

Ever-changing enterprise needs call for a new plan to modernize technology and propel purpose-driven, future-ready organizations. While many enterprises want to digitalize, legacy applications limit them from exploring new business opportunities. Legacy systems impede the introduction of new features and offerings, and constrain enterprises from responding nimbly to changing trends.

As companies progress in their digital transformation efforts, many struggle with something of a legacy albatross: mainframe applications. Among the perceived risks they face in migrating these applications and systems to modern, cloud-based platforms are security, scarcity of mainframe expertise, fear of disruption, cost overruns, and lengthy migration timeframes. Yet the benefits are undeniable: achieving faster innovation and increasing reliability, availability, and security—all at a lower cost.

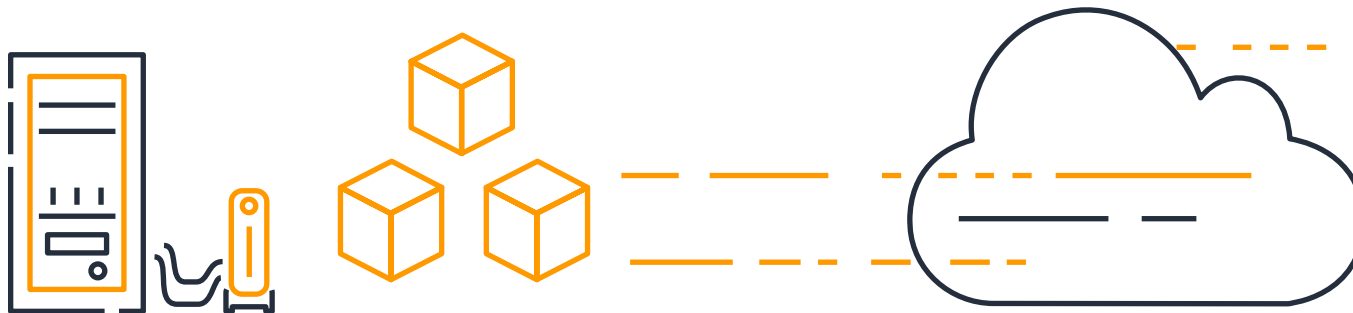
Moving mainframe workloads to AWS can also be the foundation for transformation. AWS cloud provides new operational models and tools that yield greater business agility. Organizations can free up teams from undifferentiated tasks and refocus them to better serve customer needs. Additionally, moving away from legacy proprietary mainframes allows access to a large pool of talented architects and specialists for design and operation. This resolves the mainframe retirement skill gap and attracts new talent to modernize core business workloads.

Moving mainframe workloads to AWS offers many benefits and opportunities. But successful migrations take planning and expertise, as well as an understanding of the challenges you're likely to face as part of the process. With an experienced AWS Mainframe Migration Competency Partner like TCS by your side, you can navigate those challenges, accelerate your cloud journey, and achieve cloud benefits faster.

Customers reduce costs by
60-90%
after migrating mainframes
to AWS.

The value of modernizing mainframe applications on the AWS Cloud

Moving mainframe workloads to the AWS cloud helps customers reduce costs, increase agility, retire technical debt, and accelerate innovation. Modernizing mainframe environments allows organizations to retire costly on-premise systems by eliminating capital expenditure and MIPS, ISV license costs, and leveraging elastic pricing (pay-as-you-go) models. Once migrated to AWS, customers reduce costs by up to 60%-90%, allowing them to gain flexibility to experimentation and innovation. Customers can break data silos, make mainframe data available to a wider range of stakeholders, and gain access to analytic tools to derive more value from this locked data.



Accelerated mainframe modernization with TCS

TCS is an AWS Premier Tier Services Partner and Mainframe Migration Consulting Competency Partner with extensive experience helping clients to transform their legacy systems to modern systems that meet customer demands. TCS is also launch partner for AWS Mainframe Modernization launched at AWS re:Invent 2021. TCS' deep domain knowledge of customer applications, extensive expertise in legacy systems including IBM mainframe, AS400, Unisys, Tandem, Fujitsu systems, among others, positions TCS as a leader in cloud modernization. TCS's four decades of experience in legacy technology and TCS Mastercraft TM, TCS Business 4.0 framework, and the newly launched AWS Mainframe Modernization provides the right experience to enable organizations adapt their IT applications to meet changing business and IT needs, while adopting latest solutions.



Migrate confidently with TCS Assessment and Migration Factory

TCS Assessment and Migration Factory provides a structured, end-to-end solution leveraging automation and agile for accelerated value realization on the AWS Cloud. With its industry-leading set of accelerators and frameworks, the solution can quickly re-host or convert legacy code into cloud-ready Java code and reduce the cost of conversion.

By leveraging TCS' Assessment and Migration Factory solution, enterprises can achieve the following benefits:

- **Reduce cost** of conversion up to **50%**
- Enjoy **70% faster mainframe modernization**
- Achieve up to **60% faster conversion** of legacy code into cloud-ready Java code
- Identify the right migration strategies
- Deploy the right set of automation tools for various testing activities
- Automate refactoring of legacy applications and data to the target architecture

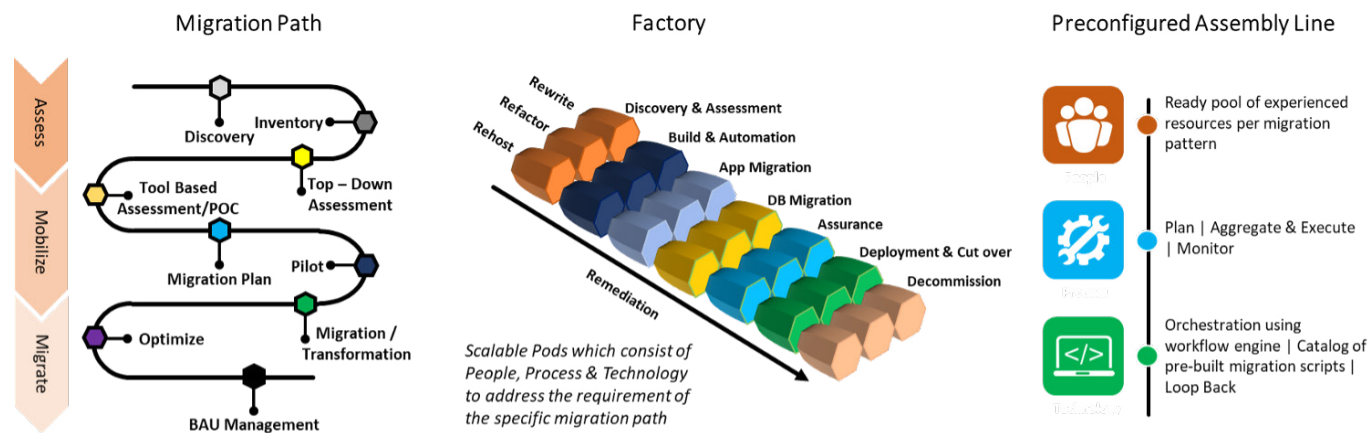
- Analyze legacy testing processes and build test cases for the target application
- Achieve significant **reduction in the mainframe CAPEX costs** through **innovative funding models**

TCS mainframe modernization approach

TCS Assessment and Migration Factory is an offering that delivers a proven, step-by-step process for mainframe workload migrations to AWS cloud through different units that includes the following:

- Discovery and assessment unit
- Build and automation unit
- Remediation unit
- Assurance unit
- Deployment and cutover unit
- Decommission unit

Figure 1: TCS Assessment and Migration Factory for AWS mainframe modernization



Powered by a set of TCS tools, accelerators, and services that enable customers to shift their mainframe workloads to the new AWS Mainframe Modernization (M2) platform.



Steps to migration success

Discovery and assessment unit

The discovery and assessment unit includes experts with vast knowledge and experience on mainframe modernization initiatives. They are equipped with various tools and accelerators to perform the discovery and assessment of multiple mainframe technology stacks and arrive at the right target disposition (Rehost/Refactor/Rewrite/Replace) for each of the mainframe applications. TCS tools like Cloud Counsel and Intelligent Cloud Migration Continuum (iCMC™), will be leveraged as part of the assessment phase. A detailed tool-based assessment and a PoC is performed to firm up the modernization roadmap and estimates

Build and automation unit

The build and automation unit creates the infrastructure on the target AWS environment and will also ensuring that the required tools for migration are included. The automated scripts required to perform certain tasks, like data migration, compilation of the code, creating test environment will be created by this unit. The team will also write the playbooks and cookbooks that will describe the step-by-step approach to perform certain tasks. TCS tools, like Cloud Mason and Zippedagile, will be leveraged as part of this foundation set up.

Remediation unit

The remediation unit includes pods for each of the mainframe modernization options: rehost, refactor, rewrite, and replace. This unit will take care of the application migration and data migration aligned to the selected modernization option.

Rehost pod

The rehost pod will focus on moving the mainframe applications to emulated environment on cloud with minimal changes, cost and risk. While various emulation products are available in the market, TCS will work with AWS and use the tools available in the AWS M2 platform for rehosting.

Refactor pod

This pod will use TCS Mastercraft TransformPlus™ application modernization edition, or an equivalent tool, to convert the legacy COBOL code to Java. Based on technology stack on the source side, different refactoring tools are available to convert the legacy code.

Rewrite pod

The team will perform tool-based reverse engineering to extract the business rules and a forward engineering team to rewrite the application in Java. TCS MasterCraft TransformPlus™ will be used for automated reverse engineering and forward engineering.



TCS supports each step with best-in-class tools

Assurance unit

The assurance unit will focus on preparing and executing a comprehensive test strategy that aligns to the modernization strategy and cloud service model. The team will address vulnerable areas (across integration, data, infrastructure, security, and performance) leveraging TCS in-house platforms (CX Panel and BITS) for automated data validation and productivity improvements

Deployment and cutover unit

The deployment and cutover unit will execute dress rehearsals to ensure that business continuity requirements are met. The cloud integrations and code deployment of the modernized application is done while disabling the required functionality on the mainframe.

Decommission unit

The decommissioning unit will turn off the existing applications and other resources on the mainframe after managing the functionality migration and data archival requirements. The complete benefit of a modernization program cannot be achieved unless the cost incurred on the mainframe is completely taken out of the financial books.

TCS tools and accelerators

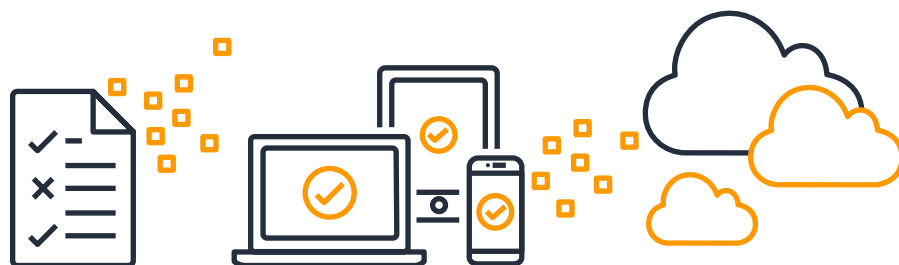
Complementing the native toolsets of AWS M2 are TCS' proprietary services and tools, including:

TCS Cloud Counsel: A discovery, cloud assessment and recommendation offering to help customers select the right cloud model and determine the migration roadmap

Cloud Mason: Helps define, design, and deploy an enterprise-scale cloud foundation for deploying modern digital applications using IaaS, containers, PaaS and serverless architecture on a public cloud, which can be integrated with a private cloud or on-premises data centers

TCS MasterCraft™ TransformPlus: An intelligent automation product that automates business logic extraction and significantly accelerates end-to-end application modernization and supports a wide range of legacy and modern programming languages

Cloud Exponence: A comprehensive platform that applies a Machine First™ approach, optimizing machine-human collaboration to deliver smart managed services in hybrid cloud environments





Transforming Avis' Rate Shop using AWS cloud

Challenge

With end-to-end legacy modernization, Avis Budget Group aims to accelerate growth.

Avis Budget Group is one of the world's largest car rental companies operating in 180 countries from over 11,500 locations. Avis is focusing on reinventing the car rental experience through data-driven intelligence, and enabling connectivity, convenience, and choice through digitalization.

To keep pace with the changing industry dynamics, Avis needed to transform its legacy mainframe platform. Rate Shop, the company's primary revenue-generating product, needed to be re-architected to be cloud-ready and provide the flexibility to adjust pricing in real-time to drive optimal demand and meet customer expectations. Rate Shop accounts for 70% of the transaction volume on Avis' IT systems, growing on an average of 25% annually. Re-architecting to a cloud-based environment was a necessity to meet such demand. Along with the immediate goal of reducing operational and licensing costs of legacy applications, Avis also required a seamless cloud migration journey to scale customer engagement and overcome technical debt.

Solution

TCS helped transform Avis' Rate Shop through mainframe modernization using AWS Cloud.

TCS partnered with Avis to transform Rate Shop from a legacy assembler-based, tightly coupled application, running on the mainframe, to a modern C-based application running on AWS cloud. As part of this transformation, TCS migrated more than 250 legacy databases (DB2 and IMS) to high performance Couchbase database technology on Amazon Elastic Compute Cloud (Amazon EC2) cloud instances. IBM's data replication product, CDC (change data capture) in conjunction with Apache Kafka was leveraged to replicate very large data volumes from the mainframe to cloud in real time.

TCS worked with Avis to design a highly resilient, highly available solution that enabled a low-risk iterative rollout by channel and segment. Using its agile methodology, TCS architected Rate Shop to the AWS cloud to kick start Avis' digitalization journey. This approach enabled TCS to successfully execute the Rate Shop cloud migration program in just eight months. TCS implemented real-time analytics of Rate Shop operations that resulted in a seamless end user experience on AWS. This fueled the on-demand pricing decisions and timely vehicle availability to match customer needs. To meet the sub-second Rate Shop response time needs, Amazon Elastic Container Service (Amazon ECS), AWS Auto Scaling, Elastic Load Balancing, Amazon ElastiCache and Amazon CloudWatch services were used.

The team established a comprehensive DevOps foundation to automate key tasks related to application integration, cloud provisioning, application configuration, and test case execution. With this implementation, Avis' ongoing integration and deployment needs were automated and scripted by leveraging native AWS CodeCommit in combination with Jenkins. This also provided greater security controls of the code migration process.



Benefits

TCS helps Avis achieve faster time-to-market with zero system downtime.

TCS was involved from the ideation stage to incubation and initiation for the mainframe modernization at Avis. Post incubation, TCS successfully helped Avis re-engineer an improved customer experience model for its ongoing digital transformation across the enterprise fostering purpose-led growth.

The modernization of the Avis Rate Shop application to AWS has resulted in:

- 50% reduced application cost for Rate Shop
- 20% faster time-to-market
- 400 partners on-boarded live on cloud
- 99.99% system availability

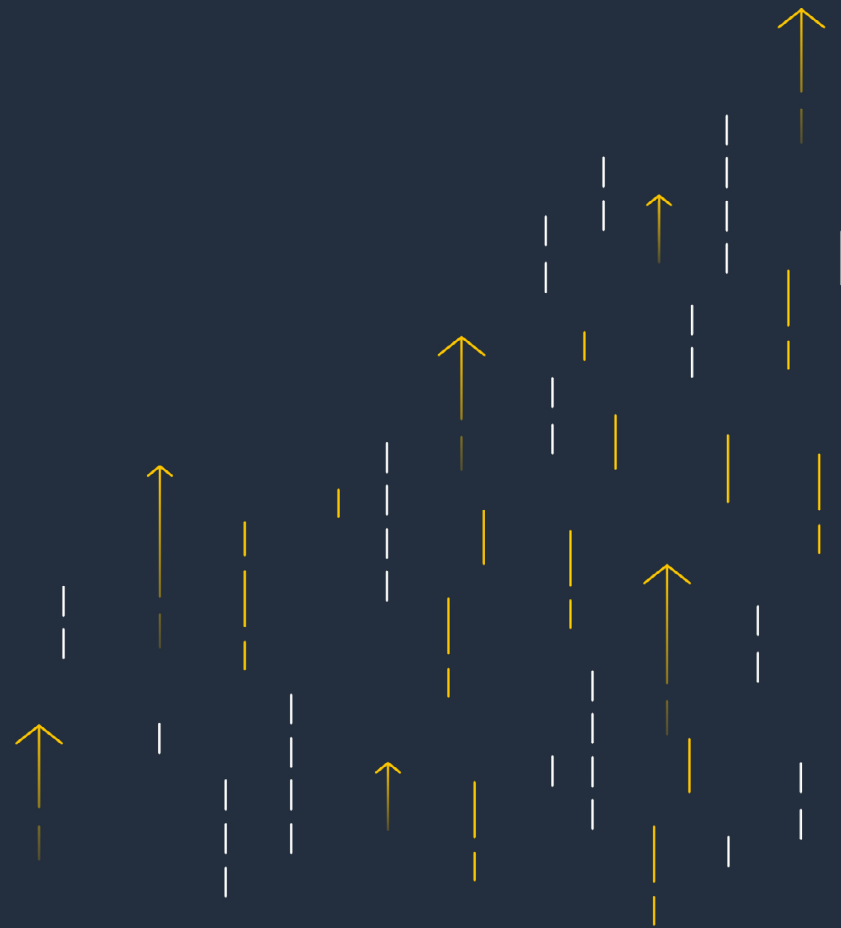
[Access the full case study >](#)



Take the first step in your modernization journey

For over 15 years, AWS has been the world's most comprehensive and broadly adopted cloud platform. As a validated AWS Mainframe Migration Consulting Competency Partner, TCS helps you navigate every step of your AWS migration – from consulting, through transformation, to management and operations – all to accelerate business innovation. TCS has carried out more than **390+ mainframe modernization engagements** and have about **49,000+ mainframe-skilled associates**. TCS is a Leader in **Application Transformation** in the Everest PEAK Matrix in 2017,19, 20 and 2021 and Forrester wave. TCS has also been rated as a leader in Mainframe Transformation by ISG.

Get started today with an assessment from TCS ›



The AWS logo consists of the lowercase letters 'aws' in a white, sans-serif font. Below the letters is a curved orange arrow pointing from left to right, which is the Amazon logo's signature element.

aws migrations