

# Mainframes – Services and Solutions

A research report comparing providers and software vendors strengths, challenges and competitive differentiators

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**Compliance, agility and cost are driving the market**

The mainframe market findings for 2023 are in line with client priorities identified in 2022 when ISG interviewed a group of ISG client executives in the U.S. to understand how the macroeconomic climate impacts their spending plans on technology services. The clients represented multiple industries, including insurance, retail, manufacturing and energy. Most clients are reprioritizing their technology budgets to focus on investments that produce results in the short term. At the same time, almost all organizations recognize the importance of technology modernization.

Trends in mainframe modernization are similar across all countries in the Americas because IBM and Unisys, the major suppliers of mainframe technology, support clients seamlessly across the region. In 2022, mainframe clients increased outsourcing and

accelerated their mainframe modernization plans. Outsourcing enables clients to assess their spending and find opportunities to optimize operations, replace middleware tools and add automation. When opting for a mainframe-as-a-service (MFaaS) deal, additional savings are from opting for a shared environment and gains of scale that reduce licensing costs.

Modernization can provide additional benefits, and either starts with outsourcing or is set into motion after that. Modernizing applications running on mainframes improves application performance and reduces MIPS requirements, further reducing costs. New data solutions, such as the ones provided by Model9 and Precisely, can facilitate mainframe data access, enabling clients to move data from expensive mainframe storage to low-cost cloud storage, but without the need to replace or modify mainframe applications.

A few enterprises modernize COBOL to insert APIs and DevOps, with percentage utilization under 15 percent – the same trend observed in previous years. The new trend in mainframe

ESG is impacting  
**mainframe**  
modernization  
demand.



modernization is data integration, with bi-directional integration or ETL to use analytics in the cloud. Data analytics continue to drive demand for mainframe modernizations.

Data analytics continue to drive demand for mainframe modernization. Mainframe migrations to the cloud have accelerated. Hyperscalers continue to invest in marketing and in developing partners' capabilities. AWS and Google are more active in promoting partner capabilities and in incentivizing clients to take modernization initiatives, in comparison with Azure that is not as intense in marketing, but equally relevant as a cloud destination.

Besides data access and cost savings, migrations to the cloud enable enterprises to standardize their application portfolio development workbench. Converted applications use the same DevOps and continuous integration tools, improving the agility and quality of the applications.

ESG is impacting mainframe modernization demand. Mainframe hardware can be energy efficient, but its surrounding technology is not. Also, updating client-owned data centers to

comply with changing regulations can have cost implications. By migrating applications to the cloud, enterprises benefit from locations that use clean energy and are certified carbon neutral. Most cloud data centers do not meet this requirement, but all hyperscalers have committed to meeting their ESG targets before 2030. Concerns and regulations around environmental control vary by country; it is more important in the U.S., with a minor impact in Brazil.

The governance aspect of ESG is also pushing modernization. To comply with regulations around data availability, location and sovereignty, auditors may have doubts about the ability of legacy applications to meet privacy, data loss prevention, location and access control requirements. The old answer that mainframes are secure is not adequate for certification; the doubt surrounds the application. Most enterprises do not have the documentation or test cases to prove compliance. In some particular cases, data originating in one country should not be accessed, stored or processed in another. Replicating the mainframe in many locations

to comply with regulations would be extremely expensive, but refactoring the applications to run in the cloud can be fast and involve low risk, besides producing the documentation and tests to prove compliance.

The cloud has proven to provide better scalability and performance than mainframes, with the additional benefit that it enables easy replication in different cloud regions, thus ensuring higher availability and business resilience.

Mainframe migration to the cloud involves cost reductions, technology modernization, controlled data access and compliance with increasing ESG regulations. Service providers have accumulated many success cases to predict the time required for modernization, ensure transparency on cost and risk factors, and have the required controls for incremental modernizations.

The providers of mainframe migrations to cloud are experiencing growth beyond their expectations. Any obstacles in expansion arise from the need for training and educating more practitioners to operate the application

refactoring tools. Tools are innovative and use high-end technology and sophisticated software engineering methodologies.

The market is characterized by three modernization strategies:

- **Replatforming** adjusts an application code to run on emulators in the cloud or uses compilers to build executable code that runs natively on cloud virtual machines. This approach simplifies the process and can be scaled fast. However, legacy application source codes remain untouched and are not modernized.
- **Rewriting** uses compilers and translators to convert legacy languages to new ones, usually Java, C# or .Net. This approach retains application logic and behavior. Most tools generate readable and maintainable code, allowing clients to maintain applications in the new language. A few solutions do not generate a readable code and all subsequent changes are made in the legacy source code. Rewriting is popular among vendors.



- **Reengineering** uses automated assessment tools that extract business rules and design the application flow, which is useful for documentation. It creates code requirements that AI-assisted tools interpret to write a new code. The full process is automated but manual intervention is needed to correct the interpretations used to write the new code.

All methods require data extraction from the mainframe databases and for files to be loaded into new databases and cloud storage. Testing automation is fundamental for success and risk control. Vendors run tests multiple times to achieve success. Tests need to include application, performance and database conversion.

Many vendors and service providers compare the cost of mainframe infrastructure with cloud infrastructure. It is noted that mainframe system, database and storage licensing comprise most of the savings from any modernization initiative.

These factors, among other drivers, impact the modernization software market.

Vendors are passionate about their solutions and often tend to overlook their limitations. Clients should always prioritize consulting, project management and risk management to bring projects that do not deliver the desired outcomes to a stop. No single tool can address all legacy languages and modernization options, requiring clients to select a toolset that involves several vendors.

A cloud infrastructure offers high performance and scale to run sophisticated modernization tools, where vendors use cloud capacity to further improve their tools. A major innovation this year is Google Dual Run, a solution developed in partnership with Micro Focus that enables clients to compare a mainframe application in production with the same application running on Google Cloud. It is not a simple setup, but has proven to be valuable to highlight application performance, integration and accuracy before removing the application from the mainframe.

AWS announced its mainframe migration service in 2022. It aims to leverage the AWS Marketplace to deliver Everything as a Service,

including modernization tools and consulting services. The company is assessing and certifying partners to ensure usability, capacity and the quality of outcomes and service levels.

The focused activities of the hyperscalers in the mainframe modernization market portends that it will continue to accelerate, with mainframes gradually moving to the cloud. It is too early to say that all mainframes will migrate. At the current pace of migration it would take years, perhaps more than a decade, to migrate all mainframes. However, small modifications in IBM licensing terms and hardware prices could change the game entirely.

**Data analytics continue to drive demand for mainframe modernization.**



## Provider Positioning

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	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
Accenture	Not In	Leader	Leader	Not In	Not In	Not In
Adaptigent	Not In	Not In	Not In	Not In	Not In	Contender
Advanced	Not In	Product Challenger	Not In	Not In	Not In	Leader
Astadia	Not In	Not In	Not In	Not In	Not In	Leader
Avanade (Asysco)	Not In	Product Challenger	Not In	Not In	Not In	Leader
Atos	Product Challenger	Leader	Contender	Product Challenger	Product Challenger	Not In
AveriSource	Not In	Not In	Not In	Not In	Not In	Product Challenger
AWS	Not In	Not In	Not In	Not In	Not In	Leader
BMC	Contender	Not In	Not In	Not In	Not In	Not In
BRQ	Not In	Not In	Contender	Not In	Not In	Not In




## Provider Positioning

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	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
Capgemini	Leader	Leader	Product Challenger	Product Challenger	Leader	Not In
CloudFrame	Not In	Not In	Not In	Not In	Not In	Contender
Cognizant	Market Challenger	Product Challenger	Not In	Leader	Product Challenger	Not In
Compass	Not In	Not In	Contender	Not In	Not In	Not In
CPT Global	Product Challenger	Product Challenger	Not In	Not In	Not In	Not In
Deloitte	Not In	Product Challenger	Contender	Not In	Not In	Not In
DXC Technology	Rising Star ★	Leader	Product Challenger	Leader	Leader	Not In
Ensono	Leader	Product Challenger	Not In	Leader	Leader	Not In
FNTS	Not In	Not In	Not In	Rising Star ★	Contender	Not In
FreeSoft	Not In	Not In	Not In	Not In	Not In	Product Challenger




 Provider Positioning

	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
Fujitsu	Not In	Product Challenger	Not In	Not In	Not In	Not In
GFT	Contender	Product Challenger	Leader	Not In	Not In	Not In
Google	Not In	Not In	Not In	Not In	Not In	Leader
HCLTech	Leader	Leader	Not In	Product Challenger	Product Challenger	Contender
Heirloom	Not In	Not In	Not In	Not In	Not In	Leader
Hexaware	Not In	Rising Star ★	Not In	Not In	Not In	Not In
HPE	Not In	Product Challenger	Product Challenger	Not In	Not In	Contender
IBM	Not In	Not In	Not In	Not In	Not In	Contender
IKAN	Not In	Not In	Not In	Not In	Not In	Contender
Infosys	Leader	Leader	Product Challenger	Product Challenger	Leader	Not In






 Provider Positioning


	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
INNOVA	Not In	Contender	Not In	Not In	Not In	Not In
Kyndryl	Leader	Contender	Product Challenger	Leader	Leader	Not In
LRS	Not In	Not In	Not In	Not In	Not In	Contender
LTIMindtree	Product Challenger	Leader	Not In	Product Challenger	Product Challenger	Not In
LzLabs	Not In	Not In	Not In	Not In	Not In	Product Challenger
Maintec	Not In	Not In	Not In	Contender	Contender	Not In
Micro Focus	Not In	Not In	Not In	Not In	Not In	Leader
mLogica	Not In	Not In	Not In	Not In	Not In	Rising Star ★
Model9	Not In	Not In	Not In	Not In	Not In	Contender
MOST	Not In	Contender	Not In	Not In	Not In	Contender



 Provider Positioning

	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
Mphasis	Product Challenger	Leader	Not In	Not In	Contender	Not In
Natsoft	Not In	Not In	Not In	Not In	Not In	Product Challenger
NTT DATA	Not In	Contender	Contender	Not In	Not In	Contender
PSR	Not In	Not In	Not In	Contender	Contender	Not In
Raincode	Not In	Not In	Not In	Not In	Not In	Contender
Sonda	Not In	Not In	Contender	Not In	Not In	Not In
TCS	Leader	Leader	Product Challenger	Not In	Leader	Product Challenger
Tech Mahindra	Product Challenger	Product Challenger	Product Challenger	Not In	Not In	Not In
TmaxSoft	Not In	Not In	Not In	Not In	Not In	Leader
TSRI	Not In	Not In	Not In	Not In	Not In	Leader



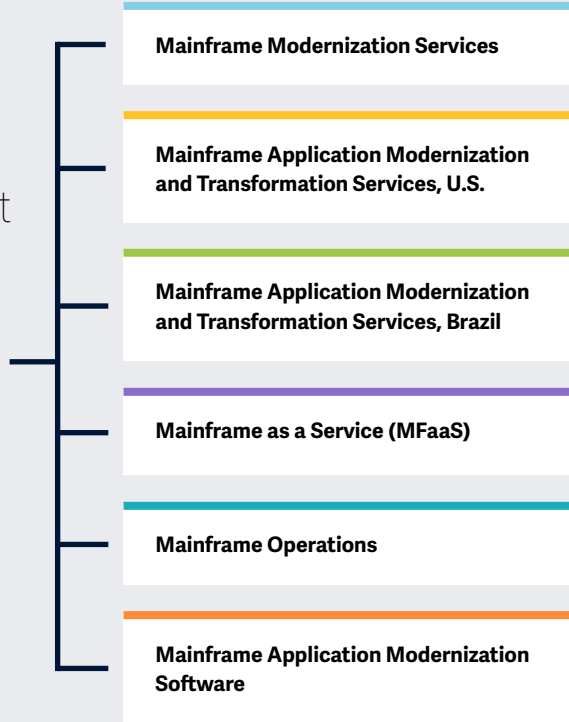
 Provider Positioning

	Mainframe Modernization Services	Mainframe Application Modernization and Transformation Services, U.S.	Mainframe Application Modernization and Transformation Services, Brazil	Mainframe as a Service (MFaaS)	Mainframe Operations	Mainframe Application Modernization Software
TIVIT	Not In	Not In	Contender	Not In	Not In	Not In
T-Systems	Not In	Not In	Contender	Not In	Not In	Not In
Unisys	Product Challenger	Not In	Not In	Not In	Product Challenger	Not In
UST	Contender	Product Challenger	Not In	Not In	Contender	Not In
Verang	Not In	Contender	Not In	Not In	Not In	Contender
Wipro	Leader	Leader	Product Challenger	Product Challenger	Leader	Not In



This study focuses on what ISG perceives as most critical in 2023 for **Mainframes Services and Solutions.**

Simplified Illustration Source: ISG 2023



**Definition**

Digital business transformation has been pushing companies to become more agile in adapting to market changes. The cloud provides the core agility elements, including cloud-native AI, machine learning, serverless computing, database as a service, data services, full automation and many SaaS options to improve business performance.

The more advanced enterprises are prioritizing mainframe modernization. Mainframe systems are complex and slow to change, thus pushing back against agility. These enterprises have two options. They can migrate their legacy applications to the cloud or adapt the old applications with APIs, microservices and DevOps.

Mainframe systems combine high-performance hardware, software tools, and large, individually programmed applications that are complex to replace. Thus, modernization is not a trivial task.

The market offers automation tools to transform legacy applications, without loss in functionality, into new ones in the cloud.

Such solutions enable the standardization of application languages and databases, including open-source tools.

However, many enterprises are not ready for a full exit from mainframes. They may prefer outsourcing or pay-as-you-go (PAYG) models to enable mainframe-as-a-service – thus running their legacy applications on cloud-like mainframe data centers.

This study assesses service providers that modernize mainframe applications or convert applications to run in the cloud, and those that offer mainframe outsourcing and MFaaS. Software vendors of automation tools for refactoring, rehosting, replatforming, rewriting and reengineering applications are also evaluated.



### Scope of the Report

In this ISG Provider Lens™ quadrant study, ISG includes the following five quadrants: Mainframe Modernization Services; Mainframe Application Modernization and Transformation Services; Mainframe as a Service (MFaaS); Mainframe Operations; and Mainframe Application Modernization Software.

The trends identified and other findings largely apply across the region. However, ISG did add a national quadrant analysis on Mainframe Application Modernization and Transformation Services for Brazil because of specific market conditions there.

This ISG Provider Lens™ study offers IT-decision makers:

- Transparency on the strengths and weaknesses of relevant providers and software vendors
- A differentiated positioning of providers by segments
- Focus on regional markets

ISG studies serve as the basis for important decision-making in terms of positioning, key relationships and go-to-market considerations. ISG advisors and enterprise clients also use information from these reports to evaluate their existing vendor relationships and potential engagements.

### Provider Classifications

The provider position reflects the suitability of IT providers and software vendors for a defined market segment (quadrant). Without further additions, the position always applies to all company sizes classes and industries. In case the IT service requirements from enterprise customers differ and the spectrum of IT providers operating in the local market is sufficiently wide, a further differentiation of the IT providers by performance is made according to the target group for products and services. In doing so, ISG either considers the industry requirements or the number of employees, as well as the corporate structures of customers and positions IT providers according to their focus area. As a result, ISG differentiates them, if necessary, into two client target groups that are defined as follows:

- **Midmarket:** Companies with 100 to 4,999 employees or revenues between \$20 million and \$999 million with central headquarters in the respective country, usually privately owned.
- **Large Accounts:** Multinational companies with 5,000 or more employees or revenue above US\$1 billion, with activities worldwide and globally distributed decision-making structures.

The ISG Provider Lens™ quadrants are created using an evaluation matrix containing four segments (Leader, Product Challenger, Market Challenger and Contender), and the providers are positioned accordingly. Each ISG Provider Lens quadrant may include a service provider(s) which ISG believes has strong potential to move into the Leader quadrant. This type of provider can be classified as a Rising Star.

**Number of providers in each quadrant:** ISG rates and positions the most relevant providers according to the scope of the report for each quadrant and limits the maximum of providers per quadrant to 25 (exceptions are possible).





**Provider Classifications: Quadrant Key**

**Product Challengers** offer a product and service portfolio that reflect excellent service and technology stacks. These providers and vendors deliver an unmatched broad and deep range of capabilities. They show evidence of investing to enhance their market presence and competitive strengths.

**Leaders** have a comprehensive product and service offering, a strong market presence and established competitive position. The product portfolios and competitive strategies of Leaders are strongly positioned to win business in the markets covered by the study. The Leaders also represent innovative strength and competitive stability.

**Contenders** offer services and products meeting the evaluation criteria that qualifies them to be included in the IPL quadrant. These promising service providers or vendors show evidence of rapidly investing in products/ services and a follow sensible market approach with a goal of becoming a Product or Market Challenger within 12 to 18 months.

**Market Challengers** have a strong presence in the market and offer a significant edge over other vendors and providers based on competitive strength. Often, Market Challengers are the established and well-known vendors in the regions or vertical markets covered in the study.

★ **Rising Stars** have promising portfolios or the market experience to become a Leader, including the required roadmap and adequate focus on key market trends and customer requirements. Rising Stars also have excellent management and understanding of the local market in the studied region. These vendors and service providers give evidence of significant progress toward their goals in the last 12 months. ISG expects Rising Stars to reach the Leader quadrant within the next 12 to 24 months if they continue their delivery of above-average market impact and strength of innovation.

**Not in** means the service provider or vendor was not included in this quadrant. Among the possible reasons for this designation: ISG could not obtain enough information to position the company; the company does not provide the relevant service or solution as defined for each quadrant of a study; or the company did not meet the eligibility criteria for the study quadrant. Omission from the quadrant does not imply that the service provider or vendor does not offer or plan to offer this service or solution.





# Mainframe Modernization Services

### Who Should Read This Section

This report is relevant to enterprises in the U.S. for evaluating providers of mainframe modernization services.

In this quadrant, ISG assesses providers of legacy mainframe modernization. It also evaluates providers that offer code repositories such as GitHub or equivalents, DevOps integration and testing automation and security testing.

Enterprises are focusing on modernizing their core mainframes and other existing systems for competitive differentiation, which is leading to an increased emphasis on digital transformation. Most enterprises are also facing the challenge of having consistent access to the right IT talent in house to manage their legacy systems. Service providers can modernize the mainframes of clients with various tool vendors and can deliver consulting, planning and management expertise to ensure project success.

In recent times, mainframe service providers have focused on offering a full-fledged modernization strategy to best suit a business, including offering consultation on the resources to be terminated and the applications to be kept in the mainframe. Enterprises investing in mainframe modernization look for providers that have a thorough understanding of their exact business requirements and can determine the stage of modernization they are in with respect to core processes.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.



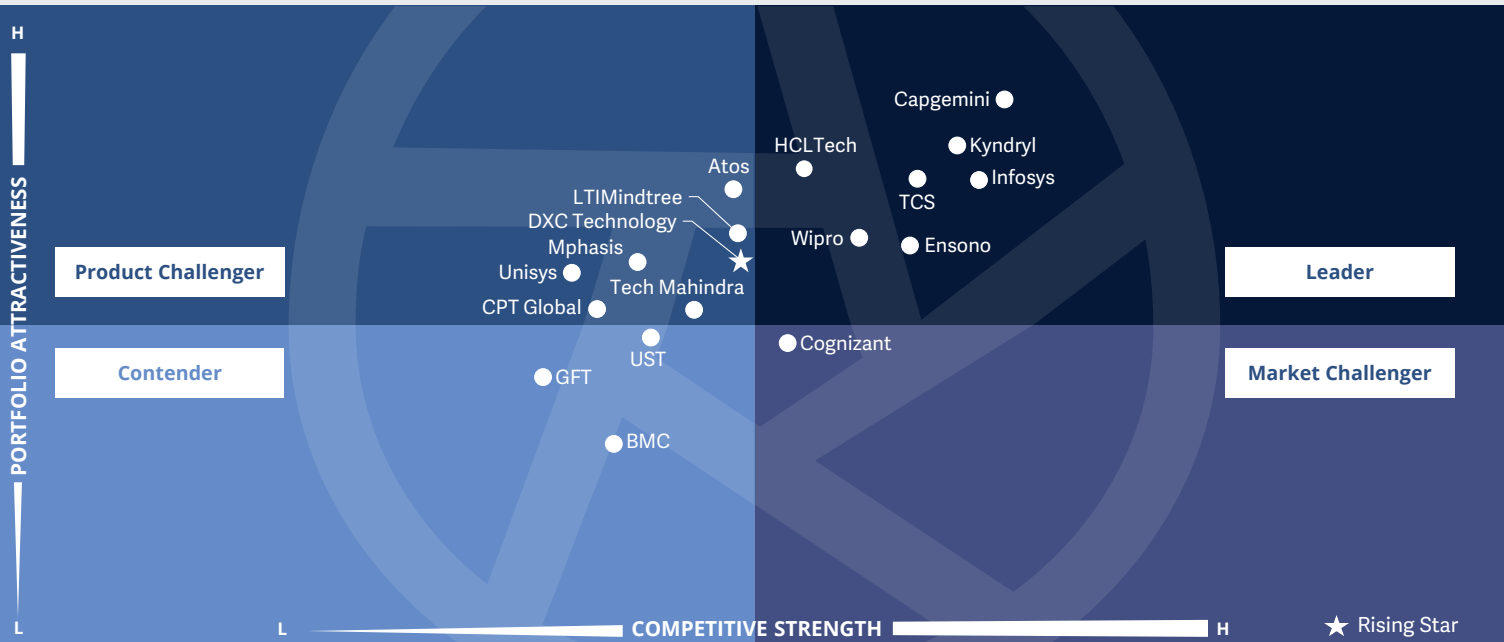
**Tech leaders** should read this report to understand the competing providers in the mainframe market, in terms of their offerings, innovations and talent.





**Mainframes – Services and Solutions**  
**Mainframe Modernization Services**

U.S. 2023



This quadrant assesses providers of mainframe **modernization services** to clients that continue to run their **applications on mainframes**.

*Pedro L Bicudo Maschio*



## Mainframe Modernization Services

### Definition

Service providers in this quadrant offer mainframe application modernization and can introduce code repositories such as GitHub or equivalents, DevOps integration and testing automation, and security testing. Modernization retains the original programming language, such as COBOL, adding architecture optimization and documentation to enable agility. After the modernization is complete, clients can embrace agile methodologies to develop and maintain applications running on mainframe systems, including code repositories, quality assurance and DevOps.

These providers can assess a client's application portfolio to deliver a modernization plan with guidance on what applications should be retained on the mainframe platform. They also help enterprises decide on the type of applications that can be transformed and migrated to other platforms, thus enabling cost and performance optimization.

### Eligibility Criteria

1. The participant should provide **case studies** around mainframe modernization of either IBM Z, IBM AS/400, IBM iSeries, HP, Cray, Fujitsu or Unisys mainframe applications.
2. Case studies must include **DevOps tools integration**, including code repository.
3. Modernization must enable legacy programming languages to build and deploy in line with modern **continuous integration** and deployment best practices (for example, implementation of COBOL CI/CD pipelines).
4. Services must include **portfolio and application assessments**.
5. Ideally, the provider can plan for phased modernization with robust testing and quality assurance.
6. The provider **can decouple applications**, develop APIs and integrate with applications outside the mainframe environment.
7. The provider offers guidance for future-state application **governance**.
8. The provider delivers services with its own employees, with adequate **expertise in COBOL** and other mainframe programming languages. It does not subcontract this core competency.



## Mainframe Modernization Services

### Observations

As in 2022, AI and machine learning capabilities continue to push the demand for data services. However, in many cases, data is locked in mainframes. Application modernization includes data access through APIs and more agile development practices to enable IT to respond quickly to business demands.

ISG observes a reduction in references to Zowe™, the integrated and extensible open-source framework promoted by IBM. Instead, ISG notes the emergence of integration platforms such as Kyndryl's data pipes in partnership with Microsoft Azure and vendors such as model9, mLogica, Micro Focus and TmaxSoft that offer tools to synchronize mainframe and cloud data. Most service providers in this quadrant offer solutions for data integration using proprietary and commercial solutions and a few still support Zowe™.

Data from providers that responded to this year's survey show that the percentage of mainframe clients that have modernized their

applications is still low, with 10 percent using DevOps, 12 percent having APIs and 8 percent using Java on z/OS.

From the 56 companies assessed for this study, 18 have qualified for this quadrant with seven being Leaders and one a Rising Star.



**Capgemini** has long been operating in the U.S. and offering mainframe services. It has accumulated experience, and can claim a strong partnership with IBM and a robust offshoring capacity to serve large accounts and support them to optimize and modernize their mainframes.

### Ensono

**Ensono** has a strong focus on attracting new clients and has a solid track record of winning deals. It focuses on modernizations to reduce MIPS utilization and costs for clients migrating to Ensono's data centers. It is agile and responsive in addressing service issues, and has a major presence in the midmarket.

### HCLTech

**HCLTech** invests in R&D to offer advanced tools. It works closely with IBM in enabling mainframe modernization. It focuses on automation and uses advanced tools to assess clients' portfolios and enable optimization and technical debt reduction. Its fabric approach is best suited for large application portfolios that can benefit from automation.



**Infosys** offers a complete modernization portfolio, delivered by a robust team of experts. It has more than 26,000 mainframe experts in the U.S. and India to support large modernizations. Its optimization approach includes middleware replacement, license optimization and COBOL upgrades, besides DevOps and application modernization.

### kyndryl

**Kyndryl** has the largest mainframe installed base, providing it with exposure to diversity and innovations. It supports both midmarket and large accounts. It can introduce agile practices and tools into clients' mainframe development workbenches, with differentiated capacity in automation and cloud integration, enabling high-performance hybrid environments.



**TCS** hosts a mainframe lab for clients' experimentation and focuses on large accounts. It nurtures innovation in collaboration with clients, IBM and other vendors. Application modernization includes DevOps and automation of development and production environments. It helps clients explore the many possibilities of modernization, including cloud service integrations.



## Mainframe Modernization Services



**Wipro** leverages the ModerniZ framework to help clients identify the best modernization path in alignment with business goals. It engages in long-term commitments, enabling continuous quality improvements, including code quality, DevOps, automation and cloud integrations. Wipro has a large footprint in the U.S., with a major focus on large accounts.

### DXC Technology

**DXC Technology** is a Rising Star for its revitalized go-to-market strategies that enable it to experiment with new growth opportunities in the mainframe modernization space. It offers deep expertise in IBM technologies to help clients upgrade legacy languages, fine-tune operations, improve automation and use DevOps, APIs and data services.



# Kyndryl



“Kyndryl’s seasoned professionals help clients improve the value of their investments in mainframes.”

*Pedro L Bicudo Maschio*

## Overview

Kyndryl is headquartered in New York, U.S. and operates in 60 countries. It has more than 90,000 employees across 79 global offices. In FY21, the company generated \$18.7 billion in revenue. In 2021, it acquired Oy Samlink to expand its capabilities in consulting and modernization and in the financial services industry. Kyndryl’s consulting portfolio includes advisory and implementation services, and cloud integration.

## Strengths

### **A balanced approach to modernization:**

Kyndryl focuses on client needs to recommend the right workload for the right platform. It proposes a modernization strategy that takes a neutral approach to options such as retaining the mainframe, moving off the mainframe and integrating the cloud and the mainframe.

**Agile practices on all fronts:** Kyndryl co-executes mainframe modernization with clients through joint development squads and introduces new tools, skills and ways of working to undergo transformation with modern, agile delivery practices. It deploys new development tools and introduces DevOps, automation and infrastructure integration.

## **Forward-thinking:** Kyndryl has been using

open source solutions such as Zowe and graphical user interface (GUI)-based tools to enhance user productivity and reduce the need for clients to have knowledge specific to IBM Z. In partnership with Microsoft, it launched a Mainframe Data Democratization offering, which provides advanced connectivity between mainframes and Microsoft Azure, enabling cloud, machine learning, AI, analytics and low-code/no-code applications with Microsoft Power Platform.

## **Caution**

Kyndryl can provide on-premises services. However, its portfolio is more attractive for clients exploring automation and connectivity for their mainframes running in Kyndryl’s facilities in a dedicated model or using its consumption-based MFaaS zCloud.





Mainframe Application Modernization  
and Transformation Services, U.S.

## Mainframe Application Modernization and Transformation Services, U.S.

### Who Should Read This Section

This report is relevant to enterprises in the U.S. for evaluating providers that offer services for transforming and modernizing mainframe applications to a contemporary environment.

In this quadrant report, ISG assesses the current market positioning of providers of mainframe application modernization and transformation services.

Enterprises in the U.S. typically are looking for mainframe modernization that can deliver cost savings with flexibility and can adapt to dynamic demands such as capacity change and MIPS consumption. Most enterprises are facing the challenge of deciding on a modernization strategy that is suitable for their business needs. Mainframe modernization projects in the U.S. are faced with the challenge of hiring the right professionals along with the required infrastructure.

Enterprises are on the lookout for providers with proprietary integrated toolsets for supporting the transformation of core applications and to integrate automation capabilities through the use of analytics and machine learning for testing. Providers in this space have the ability to rewrite legacy programming language applications written in languages such as COBOL, RPG and Fortran that typically run on mainframes. Enterprises wish to hasten the process of transforming and modernizing current technologies, processes and infrastructure, and expect providers to accelerate delivery for core business systems.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.

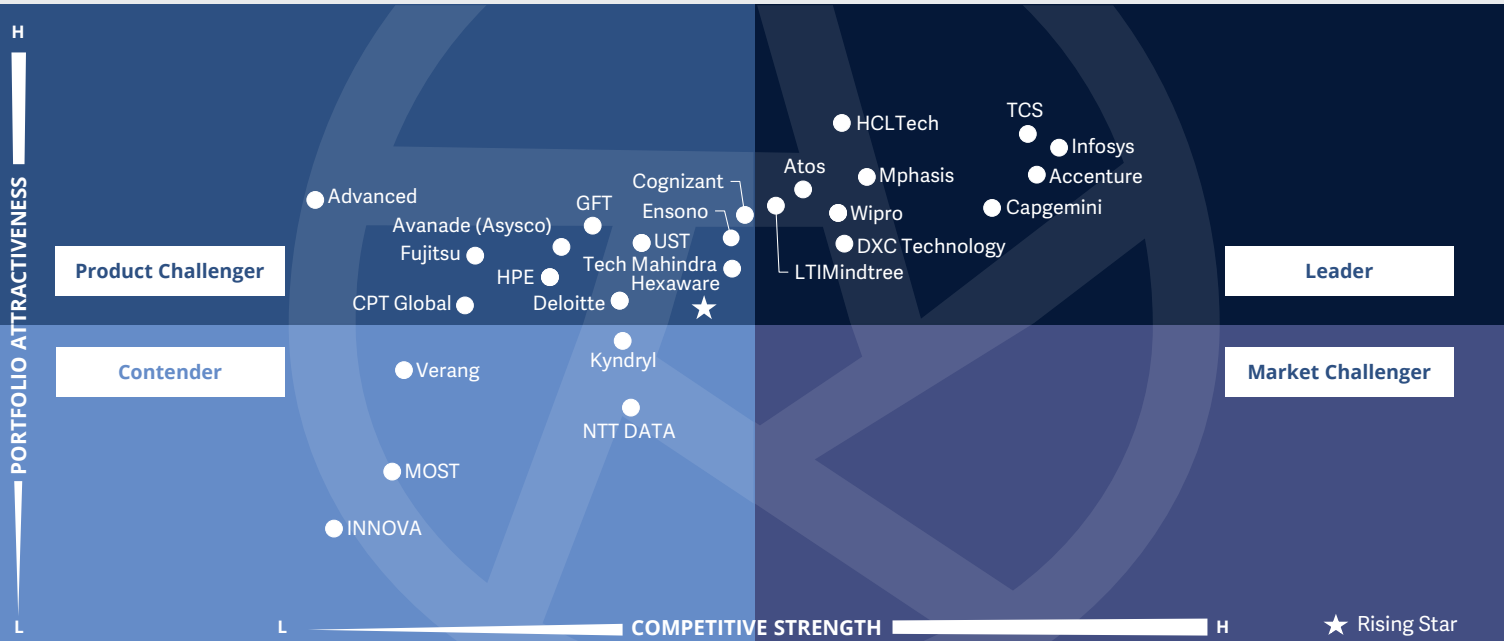


**Tech leaders** should read this report to understand the competing providers in the mainframe market, in terms of their offerings, innovations and talent.



**Mainframes – Services and Solutions**  
**Mainframe Application Modernization and Transformation Services**

U.S. 2023



This quadrant assesses the providers of **application modernization services** that transform applications and databases to **migrate mainframes to the cloud** in the U.S.

*Pedro L Bicudo Maschio*





## Mainframe Application Modernization and Transformation Services, U.S.

### Definition

This quadrant evaluates providers of application services that use advanced application modernization methodologies to assess and rewrite legacy programming language applications. These providers partner with tool vendors to automate code writing, data conversion, database migration and cloud migration.

Typical legacy applications use COBOL, RPG, Fortran, PL/1, Natural and other languages that typically run on mainframes. The capacity of covering a large number of legacy languages contributes to the service provider rating. Thus, providers that use more vendor tools may have better appraisals.

The main target programming languages may include Java, .Net, C# and Python, among others. The number of destination languages does not impact a provider's rating because past studies show a prevalence of Java and .Net, which most providers can address. Providers may also use emulators and compilers to replatform rather than rewrite (not converting the source code), and this does not impact their rating.

The service provider can offer refactor, rehost, encapsulate, replatform, rewrite or reengineer strategies. More options provide a better rating. A complete transformation should include user interface (UI) translation services that can eliminate green screens while introducing a modern graphic UI for a better user experience (UX).

### Eligibility Criteria

1. The service provider should be able to reverse engineer legacy applications to provide application logic **documentation**.
2. It must be able to **automate code conversion** with tools to reduce the time required to transform the applications.
3. Optionally, it may offer emulation systems to run legacy applications on other platforms without refactoring code. However, the provider should offer convincing case studies that **demonstrate the viability** of the emulation to be considered.
4. Services must include application **assessment**, application **decoupling**, system **architecture**, **API development** and future-state application governance.
5. The provider should offer phased transformation with **robust project management, testing** and quality assurance.
6. The transformation should enable the enterprise client to operate **agile development and maintenance** with CI/CD automation.
7. Legacy platforms can include IBM Z, AS/400, HP, Cray, Fujitsu and Unisys mainframes.



## Mainframe Application Modernization and Transformation Services, U.S.

### Observations

The mainframe application modernization market accelerated in 2022 with an increasing number of service providers competing in the space. AWS and Google are pushing more partners to participate in their mainframe migration programs, with Azure less focused on establishing new partnerships. However, most mainframe migrations target AWS and Azure.

More companies now wish to adhere to ESG principles, requiring them to reduce their IT carbon footprint. Some are, therefore, opting to migrate their mainframes from on-premises data centers to colocation facilities that offer clean energy or have carbon neutrality programs, while others are choosing to migrate their applications to the cloud and decommissioning their mainframes.

Privacy and data location regulations are also impacting mainframes that centralize data from many countries. To decentralize operations, companies would need to replicate their mainframes, which would be counterproductive. Companies can replatform to the cloud to decentralize and meet new

compliance requirements. For instance, Google Dual Run, launched in 2022, enables concurrent operations on the mainframe and in the cloud, enabling auditing companies to attest security and compliance.

Large service providers are responding rapidly to market demand. In 2022, Kyndryl announced a new partnership with Google and developed data pipes with Microsoft, enabling mainframe data to be accessed from those clouds.

Also in 2022, Avanade acquired mainframe modernization tools vendor Asysco, and AWS completed the acquisition of Blue Age, a reengineering toolset. Asysco was a service provider in this quadrant last year. For this reason, for the first time, we have Accenture and Avanade positioned on the same quadrant.

From the 56 companies assessed for this study, 27 have qualified for this quadrant with 10 being Leaders and one a Rising Star.

### accenture

**Accenture** has improved its position with strong partnerships with hyperscalers and tool modernization vendors. Its mainframe migration go-to-market policies are a part of its cloud-first strategy. Its large scale of operations and strong presence among large accounts in the U.S. places it at the forefront of the largest and most demanding modernization opportunities in the market.

### Atos

**Atos** has a robust toolset, including proprietary and commercial tools to migrate mainframes to the cloud. It works with all hyperscalers but has stronger cases with AWS in the U.S. Its services do not cease when application conversions are completed. The company commits to project outcomes in three-year transformation deals that deliver stable operations in the cloud.

### Capgemini

**Capgemini** leverages a vast partner ecosystem to accelerate mainframe migrations. With more than 100 completed mainframe decommissioning projects, it demonstrates both experience and capacity, which attracts hyperscalers' interest in sharing client references. It also has strong partnerships with IBM and Micro Focus.

### DXC Technology

**DXC Technology** has entered the Leaders' quadrant because of its strong partnership with hyperscalers, which, in turn, is driving new leads. It has long been delivering mainframe modernization services to midrange platforms and has increased the number of cases in the cloud. It has a proprietary toolset to automate transformations and can integrate vendor tools when necessary.



## Mainframe Application Modernization and Transformation Services, U.S.

### HCLTech

**HCLTech** offers comprehensive transformations with its FENIX 2.0 frameworks and Advantage Modernize. Its heavy use of automation ensures consistent delivery of quality outcomes. Its toolset integrates with leading modernization tools to cover all legacy languages and complex transformations. The company runs detailed assessments to align modernization and business priorities.

### Infosys

**Infosys'** legacy application modernization services are a part of a broader portfolio of application services. It generates a complete overview of an application portfolio to prioritize a modernization program. Advanced project and risk management tools ensure zero-disruption modernizations, using the best-fit solution of rehosting, refactoring or reengineering.



**LTIMindtree** uses more than 30 accelerators and vendor tools to provide options and cover all legacy clients' requirements. It has many success cases and showcases experience in migrating mainframes to the cloud. It is an agile organization and can support large accounts, but has more cases in the midmarket.

### Mphasis

**Mphasis** offers three-year application portfolio modernization engagements and commits to quality improvements and cost reductions. It plans several project releases that enable its self-funding modernization approach. Mphasis uses proven modernization tools and has an experienced delivery team to ensure client satisfaction.



**TCS** leverages MasterCraft for automating a modernization program. It also uses many partner tools, enabling a best-fit approach to each application. TCS is a certified mainframe migration partner of AWS, Azure and Google, providing it priority access to innovation and best practices. The company focuses on large accounts.



**Wipro** uses the proprietary tools, ModerniZ, devNXT and AssureNXT, to automate its migration program. It has partnerships with leading tool vendors to provide clients with many modernization options. After the acquisition of Capco, in 2021, Wipro has elevated its business consulting capabilities and offers modernizations with a focus on business outcomes.



**Hexaware** is a Rising Star. It has refurbished its application services portfolio to create a dedicated organization for mainframe modernizations. It is focused and nimble and offers a pragmatic approach with its Amaze for Legacy automation toolset. Hexaware differentiates itself in this space by creating a data catalog before deciding on modernization priorities.





# Mainframe Application Modernization and Transformation Services, Brazil

## Mainframe Application Modernization and Transformation Services, Brazil

### Who Should Read This Section

This report is relevant to enterprises in Brazil for evaluating providers that offer services for transforming and modernizing mainframe applications to a contemporary environment.

In this quadrant report, ISG assesses the current market positioning of providers of mainframe application modernization and transformation services.

Enterprises in Brazil are facing the challenge of prioritizing application modernization and determining the destination for modern applications. Clients are accelerating their plans for modernizing their legacy infrastructure, technologies and processes and are subsequently partnering with service providers to transform their core business systems. However, the transformation wave in Brazil is still in the nascent stage, with few local providers.

Organizations are expecting service providers to have a portfolio that can deal with mainframe CI/CD, rehosting mainframe to the cloud (7R strategy) and secure host access. Enterprises in Brazil typically look for modernization that can help with cost savings, allow greater flexibility and is adaptable to dynamic demands of application transformation. They are on the lookout for providers that have proprietary integrated toolsets to support transformation of core applications and integrate automation capabilities through the use of analytics and machine learning in testing.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.

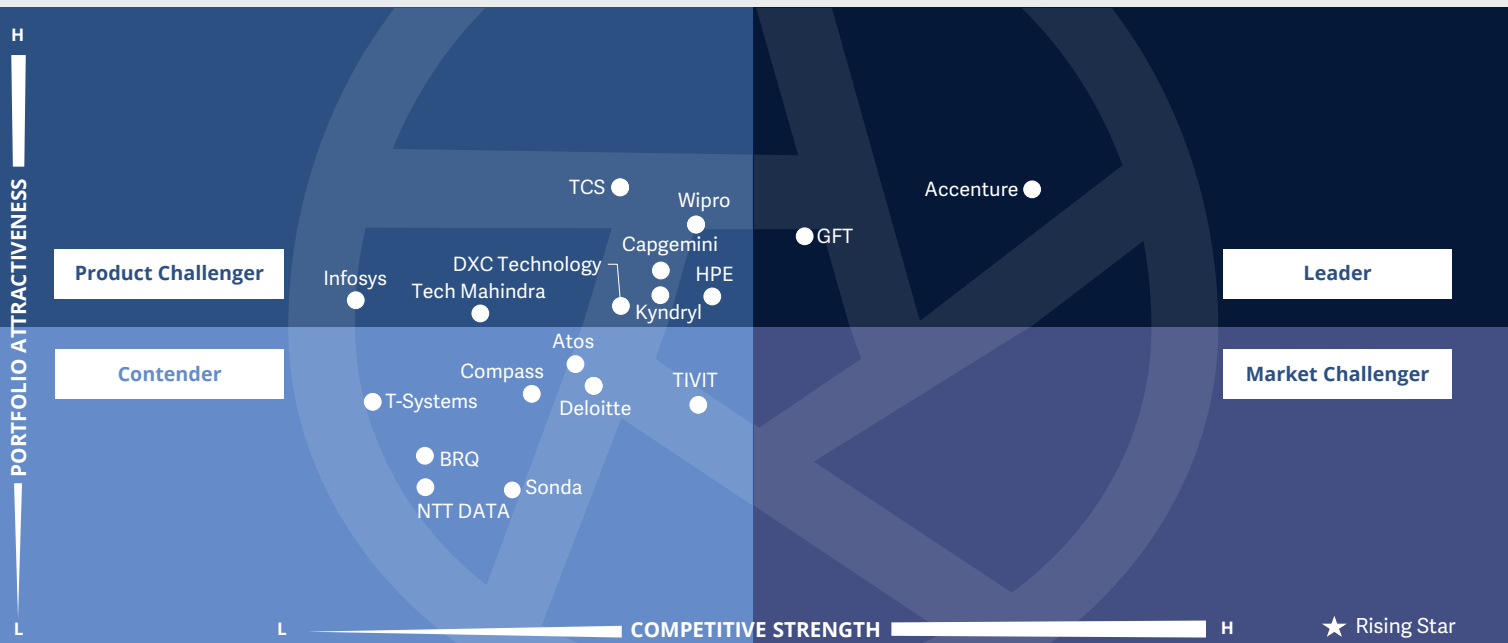


**Tech Leaders** should read this report to understand the competing providers in the mainframe market, in terms of their offerings, innovations and talent.



**Mainframes – Services and Solutions**  
**Mainframe Application Modernization and Transformation Services**

Brazil 2023



This quadrant assesses providers and cloud partners in Brazil that offer **application modernization** services to migrate **mainframes to the cloud**.

*Pedro L Bicudo Maschio*



## Mainframe Application Modernization and Transformation Services, Brazil

### Definition

This quadrant evaluates providers of application services that use advanced application modernization methodologies to assess and rewrite legacy programming language applications. These providers partner with tool vendors to automate code writing, data conversion, database migration and cloud migration.

Typical legacy applications use COBOL, RPG, Fortran, PL/1, Natural and other languages that typically run-on mainframes. The capacity of covering a large number of legacy languages contributes to the service provider rating. Thus, providers that use more vendor tools may have better appraisals.

The main target programming languages may include Java, .Net, C# and Python, among others. The number of destination languages does not impact a provider's rating because past studies show a prevalence of Java and .Net, which most providers can address. Providers may also use emulators and compilers to replatform rather than rewrite (not converting the source code), and this does not impact their rating.

The service provider can offer refactor, rehost, encapsulate, replatform, rewrite, or reengineer strategies. More options provide a better rating. A complete transformation should include user interface (UI) translation services that can eliminate green screens while introducing a modern graphic UI for a better user experience (UX).

### Eligibility Criteria

1. The service provider should be able to reverse engineer legacy applications to provide application logic **documentation**.
2. It must be able to **automate code conversion** with tools to reduce the time required to transform the applications.
3. Optionally, it may offer emulation systems to run legacy applications on other platforms without refactoring code. However, the provider should offer convincing case studies that **demonstrate the viability** of the emulation to be considered.
4. Services must include application **assessment**, application decoupling, system **architecture**, **API development** and future-state application governance.
5. The provider should offer phased transformation with **robust project management, testing** and quality assurance.
6. The transformation should enable the enterprise client to operate **agile development and maintenance** with CI/CD automation.
7. Legacy platforms can include IBM Z, AS/400, HP, Cray, Fujitsu and Unisys mainframes.



## Mainframe Application Modernization and Transformation Services, Brazil

### Observations

Brazil is the second-largest market for installed MIPS in the world. Historical reasons made IBM the primary provider of mainframe technology by the time the financial sector expanded and consolidated in the 80s and 90s. The largest banks run their core banking systems on IBM Z, supporting millions of clients. Examples of large retail banks are Caixa Economica Federal with 148 million clients, Banco Bradesco with 102 million, Itaú Unibanco with 95 million and Banco do Brasil with 73 million. These banks have mainframes of more than 300,000 MIPS each.

However, traditional banks are facing fierce competition from digital banks, which can achieve equal transaction performance without mainframes. For example, Nubank has 64 million clients, Banco Original has 42 million, Mercado Pago has 39 million, PagBank has 25 million and C6 Bank has 21.3 million clients.

In Brazil, many technology vendors are on the lookout for system integrator partners to bring mainframe modernization to the large banks. AWS, Google and Microsoft are also

in conversation with banks to migrate their workloads to the cloud. A few small banks have completely moved to the cloud. However, banks and other mainframe clients in financial services, insurance, retail and the government sectors are in a “watch and see” position, expecting to base their decision-making on true cases.

There are many challenges to overcome. First is the language barrier; the winners in this market must have local experts speaking Portuguese. At the same time, they must understand local regulations, legacy languages and mainframe architecture, which is not simple. Also, the mainframe applications in Brazil follow a different pattern for CICS, batch, scheduling and middleware systems. When experts from other countries share their experiences and describe past projects, local clients cannot identify with the context.

ISG believes that the mainframe modernization and migration market in Brazil will overcome the challenges and accelerate during 2023-2024.

From the 56 companies assessed for this study, 18 have qualified for this quadrant with two being Leaders.

### accenture

**Accenture** has a strong market position with both AWS and Microsoft. The company has a major stake in Avanade, which acquired Asysco in 2022, and launched a mainframe modernization center of excellence in partnership with Microsoft in Brazil. Accenture has a strong presence in the financial sector and the consulting capability to manage large and complex transformations.

### GFT

**GFT** has large delivery capabilities, and works with clients in the financial services, banking and insurance sector in Brazil. It has experts in legacy languages, banking, regulations, testing and mainframe migrations, positioning it at the top of client options for mainframe modernization and migrations. It has experience in Europe and in the U.S., and partners with AWS, Google and Microsoft.







# Mainframe as a Service (MFaaS)

## Mainframe as a Service (MFaaS)

### Who Should Read This Section

This report is relevant to enterprises in the U.S. for evaluating providers offering MFaaS.

In this quadrant report, ISG assesses the current market positioning of providers of MFaaS in the U.S., based on the depth of the service offering and market presence.

Enterprises in the U.S. are increasingly focused on reducing their budget for maintaining aging mainframe infrastructure for running business applications, and are increasingly opting for the MFaaS model for core business processes. The key benefit of utilizing MFaaS is that the provider takes complete responsibility for maintaining and upgrading to an advanced IT infrastructure, which, in turn, delivers cost benefits and risk avoidance for a CIO.

Mainframe service providers considered here deliver the necessary IT infrastructure and support services. The clients only pay for the consumption of the services along with any of their own requirements related to coding (such as Java or COBOL) to run their batch processes.

Enterprises that use MFaaS offerings are focused on reducing operational costs, achieving a quick turnaround and improving customer satisfaction.

Service providers are expected to offer the maintenance services required to keep workloads running and are expected to meet performance metrics across the modernization journey.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.



**Procurement and Sourcing Specialists** should read this report to understand their outsourcing deals and develop a better understanding of the consulting and transformation landscape for mainframes.



**Mainframes – Services and Solutions**  
**Mainframe as a Service (MFaaS)**

U.S. 2023



This quadrant assesses the **providers** of infrastructure, facilities, hardware, software and managed services related to mainframe, in the pay-per-use, **mainframe-as-a-service** model.

*Pedro L Bicudo Maschio*



## Mainframe as a Service (MFaaS)

### Definition

This quadrant assesses infrastructure service providers that offer shared IBM mainframes under a pay-per-use contract model.

The MFaaS services scope must include facilities, hardware, connectivity, mainframe network management, operating system and subsystems, licensing and tools. It must also offer all maintenance services that are required to keep workloads running to meet the expected performance metrics established upfront.

Typically, MFaaS is offered on the provider's data centers, but colocation partners are also considered as long as the MFaaS offers cloud-like experience; clients should not have to check and audit the underneath infrastructure. Thus, high availability and disaster recovery are included in the default scope.

For a cloud-like experience, the service provider offers clients a self-service portal with rich service catalogs covering approval workflows, security, compliance and automated service provisioning, enabling them to increase and decrease utilization.

Service providers typically offer application migration services to onboard clients. The migration can include application modernization and operating system upgrades to run clients' workloads on a shared mainframe environment.

### Eligibility Criteria

1. The service provider should offer **robust and secure data centers** that can deliver high performance and availability as expected from mainframes.
2. Services include job scheduling automation, performance optimization, CICS, batch, backup, restore, system upgrades, security patches and other **typical mainframe operations**.
3. Provider must demonstrate proven **disaster recovery** effectiveness for its MFaaS infrastructure.
4. Hosting facilities offer **low-latency connections** to clients' locations and the public cloud such as AWS Direct Connect, Azure Route, and GCP Direct Connect. Carrier-neutral data centers are preferred.
5. The provider must demonstrate the **financial capacity** to invest in and grow its mainframe operations.
6. It should have a **hiring and training program** to ensure skills availability in the future.
7. It must ensure high performance and security as per **service-level agreements** and corresponding contractual penalties.
8. Platforms can include IBM Z an IBM Power Systems (AS/400 and iSeries).



## Mainframe as a Service (MFaaS)

### Observations

The mainframe-as-a-service market has experienced surprising growth in the past year. Service providers have reported two-digit growth. The market has also seen an increase in companies offering MFaaS. All providers report that they are receiving more requests for information (RFIs) and requests for proposals (RFPs), projecting more growth for 2023.

Most deals involve mainframe clients that need to decommission their facilities to accelerate toward their ESG targets, including reducing their carbon footprint. MFaaS is a part of clients' cloud strategies, enabling them to reduce IT investments and to pay per use of mainframe capacity.

The providers in this quadrant offer MFaaS in their data centers or in colocation facilities (partners). For the incumbents of mainframe services, offering MFaaS on top of partners' facilities has become essential to retaining mainframe services clients.

From the 56 companies assessed for this study, 13 have qualified for this quadrant with four being Leaders and one a Rising Star.



**Cognizant** has longstanding experience and a large footprint in the mainframe services space. It supports large accounts in the banking, financial services and insurance (BFSI) sector by managing their core systems. Cognizant helps clients optimize their operations with improvements in performance and application management.

### DXC Technology

**DXC Technology** was a pioneer in mainframe outsourcing. It operates from remote centers spread over the globe that provide 24/7 service and support. By managing 23 data centers in the U.S., it offers clients the most options for mainframe location and connectivity.

### Ensono

**Ensono** is well recognized for its services in this market and was one of the first companies to offer MFaaS. It modernizes clients' technologies prior to migrating them into the MFaaS model, enabling MIPS reduction from the outset. It has high client retention and a strong partnership with IBM.

### kyndryl

**Kyndryl** has the largest MIPS footprint, which gives it superior scale of operations and capacity to handle any client need. Its MFaaS offering includes IBM Z and IBM i platforms and can handle varying client demands for computing. It runs large data centers and provides support with experts.

### FNTS

**FNTS** is a Rising Star for its capacity to accommodate new clients with strict security and compliance needs. It does not have the same scale of operations as the Leaders, but it compensates with deep knowledge, agility and customer support abilities, which enables it to grow faster than its competitors.





“Kyndryl offers a flexible, secure and highly scalable multi-tenant mainframe platform.”

*Pedro L Bicudo Maschio*

# Kyndryl

## Overview

Kyndryl is headquartered in New York, U.S., and operates in 60 countries. It has more than 90,000 employees across 79 global offices. In FY21, the company generated \$18.7 billion in revenue, of which 27 percent was contributed by the U.S., where it has five data centers. Kyndryl’s Core Enterprise and zCloud Services include its Managed Extended Cloud Infrastructure as a Service for IBM Z (MFaaS). The company has the largest installed base of IBM Z mainframe MIPS.

## Strengths

**Cloud integration:** Kyndryl’s data centers have high-capacity connectivity to public cloud providers. In partnership with Microsoft, it has launched Mainframe Data Democratization offering, providing advanced connectivity with Azure to use cloud machine learning, AI, analytics and low-code/no-code applications with the Microsoft Power Platform.

**Advanced infrastructure services:** Kyndryl offers support for Red Hat OpenShift Container Platform (OCP) for application development, and z/OS Connect to expose traditional mainframe middleware and data through APIs. Clients can co-host these solutions on the same mainframe hardware for near-zero latency between applications before they connect to the cloud.

**Creators of the MFaaS model:** Kyndryl is a pioneer in pay-per-use mainframes, offering a shared platform under a cloud operating model. Its zCloud includes a multi-tenant infrastructure that is designed for flexibility and adaptability. Kyndryl supports IBM z/OS, z/VM and Linux. Clients can access a service catalog, enabling self-service and automated provisioning.

## Caution

Kyndryl zCloud offers standardized operating systems and software from independent software vendors (ISVs) to enable a shared environment and comprehensive automation. Clients requiring custom solutions may want to explore dedicated mainframe operation services.





# Mainframe Operations

## Mainframe Operations

### Who Should Read This Section

This report is relevant for enterprises in the U.S. for evaluating providers of mainframe operations related to mainframe applications.

In this quadrant report, ISG assesses traditional outsourcing providers with extensive experience in offering mainframe services.

U.S.-based enterprises are increasingly focusing on mainframe operations for core business processes and are simultaneously facing the cost pressure of modernizing mainframes.

These enterprises are relying on mainframe operations management solutions that will help to integrate a mainframe into an organization's overall service management strategy, thus aligning business priorities across IT infrastructures for increased efficiencies.

In recent times, mainframe operation services can result in reduced operating costs and decreased risk of downtime for core business applications.

Enterprises wish to engage with a service provider that offers operations services that can lead to incremental modernization of business applications in the current IT infrastructure. Providers need to offer enterprises with the flexibility to modernize the applications in their business processes and provide the required technical staff to support the transformation journey.

Service providers in this space are focused on engaging in all types of mainframes deals – from initial legacy system augmentation to full outsourcing and modernization.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.



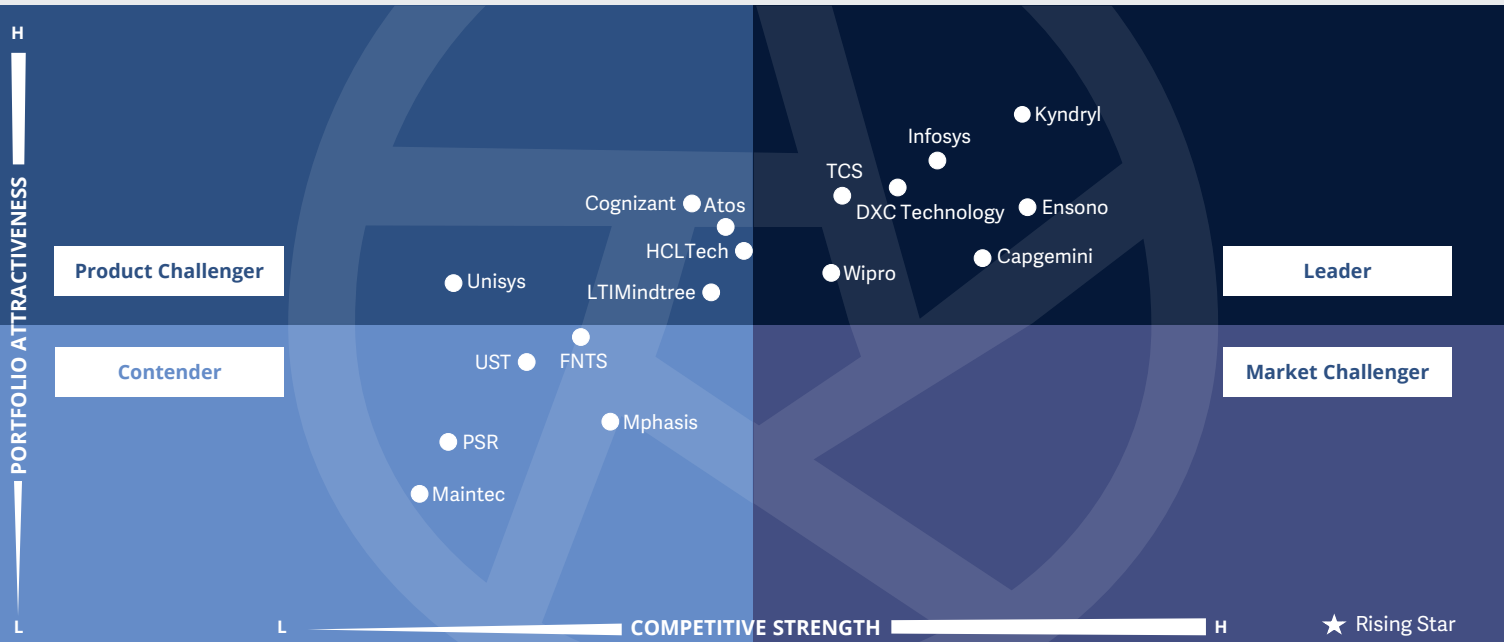
**Procurement and sourcing specialists** should read this report to understand their outsourcing deals and develop a better understanding of the consulting and transformation landscape for mainframes.





**Mainframes – Services and Solutions**  
Mainframe Operations

U.S. 2023



This quadrant assesses the **service providers** and outsourcers that **operate clients' mainframes** on-premises, in colocations or at the providers' facilities.

*Pedro L Bicudo Maschio*



## Mainframe Operations

### Definition

This quadrant assesses traditional outsourcing providers with extensive experience in mainframe services. Typical participants employ experienced practitioners to cover legacy mainframe technologies and the most recent mainframe releases. They typically have skilled teams to keep clients' mainframes running.

Services can be delivered on any hosting facility (clients' data centers, provider-owned and colocation facilities). These services, which have long been in existence, include job scheduling, performance optimization, CICS, batch, backup, restore, system upgrades, security patches and other typical mainframe operations.

Multiple options exist for hardware and software ownership, upgrades and modernization responsibilities. A typical deal structure includes clear service levels and a responsibility matrix that can be simplified as follows:

- The client owns data center, hardware and software. The provider delivers services on site.

- The client owns data center, hardware and software. The provider delivers services remotely, nearshore or offshore.
- The client owns the software. The provider owns data center and hardware.
- The client owns the data center. The provider owns hardware and software.
- Full outsourcing: The provider owns data center, hardware and software.

The owned data center can be in colocation facilities. Services delivered on-site typically include staff augmentation. All the above service scope models are considered in this quadrant.

### Eligibility Criteria

1. The provider should demonstrate a strong mainframe **operation capacity** through case studies.
2. The provider should have a **hiring and training program** to ensure skills availability in the future.
3. The provider offers **management and monitoring** of CPUs, memory, databases, operating systems and tools.
4. It offers **professional services** to install and replace hardware, software and tools.
5. Professional services must include patching services for operating systems, middleware and applications, system upgrades, data center security, network configuration and system integration.
6. The provider enables clients' access to **management dashboards**, including utilization reports, performance indicators, chargeback and other **reporting functionality**.
7. Services must comply with IT service management (**ITSM**) best practices and include incident management, problem management and release management.
8. Outsourced platforms can include IBM Z, AS/400 and iSeries, HP, Cray, Fujitsu and Unisys mainframes.



## Mainframe Operations

### Observations

The Mainframe Operations quadrant includes traditional mainframe outsourcing. Most of the providers in this quadrant have longstanding outsourcing clients of more than 20 years.

The market continues to grow, albeit the growth is single digit, and all providers experience high client retention.

Most of these clients are going through mainframe modernization and workload migrations to the cloud. However, some large mainframe shops continue to add more MIPS to their current installations, offsetting the MIPS reductions due to migration to the cloud. This allows providers of mainframe operations to achieve stability or growth in their installed base.

The market imposes new demands on clients running mainframes on-premises. Skill shortages, licensing costs, upgrade costs, compliance and carbon reduction goals push enterprises to close their data centers and outsource their mainframe operations.

From the 56 companies assessed for this study, 16 have qualified for this quadrant with seven being Leaders.



**Capgemini** offers full-service scope, including application services and mainframe operations. It integrates services in a feature-rich ITSM platform to provide end-to-end client support. The company focuses on large deals that comprise managed services delivered on-site or remotely from large delivery centers in India.

### DXC Technology

**DXC Technology** operates 16 data centers in the U.S., providing clients with an array of choices in location and connectivity. It uses a global service platform that enables remote access to mainframes and 24/7 support. The company has rich experience in outsourcing and mainframe technologies.

### Ensono

**Ensono** operates 10 data centers in the U.S. and has robust capacity of more than 750,000 MIPS. It partners with IBM to provide clients with leading technology innovation. The company has been growing steadily, attracting clients from on-premises and the competition. It can support large accounts, but most of its clientele is in the midmarket.



**Infosys** manages five data centers in the U.S, with significant activity in large accounts in the financial services market. It has one of the largest mainframe resource pools globally, enabling highly efficient offshore operations and 24/7 support.

### Kyndryl

**Kyndryl** excels in installed capacity and operates many data centers globally, including five in the U.S. Its global presence enables it to provide unhindered services to large multinational enterprises. The company covers many industry verticals and supports large accounts and the midmarket.



**TCS** offers a comprehensive mainframe portfolio, ranging from operations to application modernization. It uses automation and offshoring to deliver efficient operations. The company does not promote operations in its data centers; instead it engages in outsourcing deals on-premises or through colocation partners.



**Wipro** operates clients' data centers, using its robust automation platform. It provides on-site, onshore, nearshore and offshore services for 24/7 support. It does not have data centers in the U.S. but can help clients collocate their mainframes in partner facilities.



# Kyndryl



“Kyndryl offers secure and trusted services for mainframe operations in accordance with any client’s needs.”

*Pedro L. Bicudo Maschio*

## Overview

Kyndryl is headquartered in New York, U.S., and operates in 60 countries. It has more than 90,000 employees across 79 global offices, with five data centers in the U.S. In FY21, the company generated \$18.7 billion in revenue, 27 percent of which was from the U.S. Kyndryl’s Core Enterprise and zCloud Services utilize its experience in managed services for IBM Z and IBM i workloads. Kyndryl offers on-premises mainframe support or full outsourcing.

## Strengths

**Comprehensive service portfolio:** Kyndryl offers global best practices around security, resiliency, application, data, AI, network, edge and cloud, providing clients with complete solutions. The company employs seasoned experts in managing clients’ operations, ensuring high availability and quick response to incidents.

**Outstanding scale of operations:** Kyndryl has the most significant MIPS footprint to accommodate any client’s mainframe, ensuring support for growth and economies of scale at competitive prices. Its market relevance facilitates its access to vendor support and IBM innovation.

**Advanced automation:** Kyndryl has accumulated years of experience in automation with AI and virtual assistants. In 2022, the company introduced Kyndryl Bridge, a multi-cloud platform that integrates third-party tools to orchestrate AIOps and FinOps. It integrates modern tools such as ServiceNow, VMware and clients’ preferred tools. It also offers a library of automation bots, best practices and integrations, including Zowe, z/OSMF Workflows and restAPIs.

## Caution

Kyndryl supports many clients through five data centers in the U.S. (and has more centers in other parts of the world). Clients should assess if data center location, distance and network latency match their disaster recovery requirements.





# Mainframe Application Modernization Software

## Mainframe Application Modernization Software

### Who Should Read This Section

This report is relevant to enterprises in the U.S. for evaluating vendors of mainframe application modernization software.

In this quadrant report, ISG assesses the current market positioning of vendors offering mainframe application modernization software to enterprises in the U.S., based on the depth of their service offerings and market presence.

ISG sees a growing need for modernization software that enables code assessments and automated code conversion of legacy applications. Enterprises are facing challenges in modernizing their applications because they lack modernization vendor partners, the limited availability of modernization tools and platforms, and a short supply of legacy and next-gen technical skills.

Enterprises in the U.S. are enhancing their modernization capabilities, and their needs are changing along with the IT infrastructure and current business processes. The major intention of modernizing legacy systems is based on the current scaling of business applications; applications must be kept

updated to address modern business demands. Application modernization software adoption continues to rise among enterprises that are modernizing and transforming their applications in this business environment.

Enterprises are on the lookout for service providers that can fully automate application coding, testing and database migration, and with a unique migration approach for every business process.



**CIOs** should read this report to understand the strengths and weaknesses of providers, including the way they employ the latest technologies to deliver reliable offerings.



**CTOs** should read this report to understand the mainframe modernization capabilities of providers to ensure suitable technology integration into products, services and business administration.

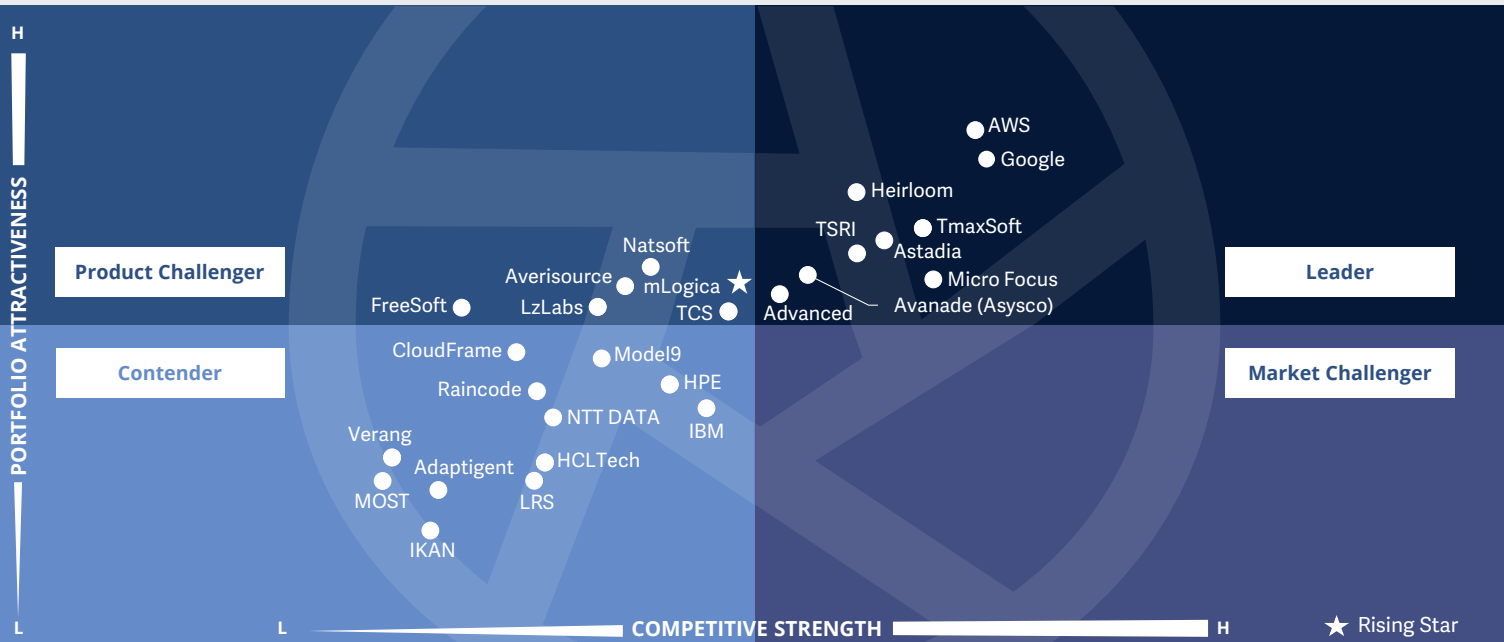


**Application services and portfolio managers** should read this report to understand their competitors in the application services market, in terms of their different offerings and innovations.



**Mainframes – Services and Solutions**  
**Mainframe Application Modernization Software**

U.S. 2023



This quadrant assesses the **vendors of application modernization software** that supports clients with professional services to transform and **migrate mainframe applications to the cloud.**

*Pedro L Bicudo Maschio*



## Mainframe Application Modernization Software

### Definition

This quadrant ranks vendors of software and toolsets that enable legacy application assessments and application conversion (replatform, rehost, refactor, rewrite or reengineer).

Typical clients are enterprises and service providers that need automation tools to perform mainframe modernization and transformation. The modernization software can include reverse engineering, business logic mapping, business rules extraction, code review and inspection, documentation, emulators, compilers, frameworks and application development tools to accelerate code modernization and application modernization.

This quadrant covers vendors that supply the modernization toolset and can partner with global system integrators (GSIs) that deliver modernization services.

Mainframe modernization software outcomes include compiled code to run in the cloud, refactored code to run on emulators in the cloud, or new source code from reengineering. The intermediary products include documentation, logic flows, data architectures, automation tools, test artifacts, testing tools, serverless functions, APIs and microservices that can accelerate the mainframe modernization program.

Professional services and consulting expertise can improve the vendor rating but are not a requisite if these are offered through certified partners.

### Eligibility Criteria

1. The software should be licensed or delivered as a service to enable **client autonomy**. The global system integrator's proprietary tools are not included, except if clients can acquire the tool without the GSI's services.
2. The vendor must have mainframe specialization and offer **mainframe-specific tools**.
3. The product must be **available and in use** by clients for longer than one year. Startup and lab tools are not included.
4. The solution must have a robust **support organization** or service partner ecosystem to ensure enterprise-grade support.
5. Assessment tools and **compilers are included**. Generic code conversion tools or wide-scope server/cloud optimization tools are not covered.





## Mainframe Application Modernization Software

### Observations

Most of the vendors in this quadrant can modernize applications to run on any x86 platform. However, the major trend in this market is the migration of legacy mainframe applications to the public cloud.

The advanced mainframe migration programs promoted by AWS, Google and Microsoft are driving market growth and maturity. The certification programs help vendors enhance their sales and delivery processes. The hyperscalers test and curate partner solutions to ensure clients are not disappointed by partners.

The market is expanding rapidly. The hyperscalers' push on partners and the clear client demand have enabled ISG to qualify more vendors, from 17 last year to 27 now, with all reporting significant market growth.

Like many other IT segments, having consistent access to skilled experts is difficult. Some vendors and their partners are investing in training and education to support skill growth.

From the 56 companies assessed for this study, 27 have qualified for this quadrant with nine being Leaders and one a Rising Star.

### Advanced

**Advanced** offers consulting, services and automated code rewriting with the technology it acquired from Modern Systems, a solution that has long been in the market and is used by many partners. The company has many clients, but in the U.S., it operates primarily through partners.

### Astadia

**Astadia** improved its FastTrack Factory in 2022. It aims to provide clients with full automation on a self-service platform. Astadia is expanding rapidly through partners. It enables clients to work with COBOL and compile to Java until they choose to start maintaining only Java.

### Avanade

**Avanade** acquired Asysco in 2022. Its AMT toolset translates legacy languages to Java or .Net, allowing clients to compare new and legacy source codes. Asysco was assessed in previous years and has gained the scale required to grow globally.

### AWS

**AWS** acquired Blue Age in 2022. The company partners with Micro Focus, Precisely Connect and Model9 to offer mainframe migration as a service. AWS Blu Age had a Leader position in 2021 and 2022. AWS Marketplace offers additional AWS-curated tools.

### Google

**Google** has retained its Leader position with added tools and functionality. Most service providers interviewed this year cited Google Dual Run as a worthwhile innovation. In partnership with Micro Focus, Dual Run enables clients to compare the same production application running on their mainframe and on Google Cloud.

### Heirloom

**Heirloom** is highly focused on performance, using compiling technology that converts legacy applications to Java. The company's partnerships with hyperscalers and system integrators have enabled it to achieve better brand recognition and increased sales. It can handle large-scale applications.

### Micro Focus

**Micro Focus** has enhanced its market coverage and participation in partnerships, including with hyperscalers, which makes it a frontrunner in replatforming. Its market reach and broad support organization enable it to respond to market demand. The solution the company offers converts legacy languages to Micro Focus COBOL.



## Mainframe Application Modernization Software

### TmaxSoft

**TmaxSoft** offers a unique solution for rehosting, including a proprietary database. Its toolset enables application rewriting to run in the cloud. It covers most languages and mainframe datasets, with a differentiation of seamless support for Fujitsu and Hitachi mainframes. TmaxSoft offers superior performance and can handle large MIPS shops.

### TSRI

**TSRI** is an agile expert that can resolve complex transformations. It has extensive coverage of legacy languages and many years of experience in mainframe modernizations. It operates in the U.S. with significant activity in the public sector.

### mLogica

**mLogica** is a Rising Star because of its advances in partnerships, reference cases and product features. The vendor can handle large-scale databases and analytic systems to move big data from mainframes to the cloud. It uses compiler and translator technologies to modernize applications to run on any cloud.





# Appendix

The ISG Provider Lens™ 2023 Mainframes – Services and Solutions analyzes the relevant software vendors/service providers in the Americas, based on a multi-phased research and analysis process, and positions these providers based on the ISG Research methodology.

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The research and analysis presented in this report includes research from the ISG Provider Lens program, ongoing ISG Research programs, interviews with ISG advisors, briefings with services providers and analysis of publicly available market information from multiple sources. The data collected for this report represents information that ISG believes to be current as of December 2022, for providers who actively participated as well as for providers who did not. ISG recognizes that many mergers and acquisitions have taken place since that time, but those changes are not reflected in this report.

All revenue references are in U.S. dollars (\$US) unless noted.

The study was divided into the following steps:

1. Definition of Mainframes – Services and Solutions market
2. Use of questionnaire-based surveys of service providers/ vendor across all trend topics
3. Interactive discussions with service providers/vendors on capabilities & use cases
4. Leverage ISG's internal databases & advisor knowledge & experience (wherever applicable)
5. Use of Star of Excellence CX-Data
6. Detailed analysis & evaluation of services & service documentation based on the facts & figures received from providers & other sources.
7. Use of the following key evaluation criteria:
  - \* Strategy & vision
  - \* Tech Innovation
  - \* Brand awareness and presence in the market
  - \* Sales and partner landscape
  - \* Breadth and depth of portfolio of services offered
  - \* CX and Recommendation



*Lead Author*



**Pedro L. Bicudo Maschio**  
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Distinguished analyst and author, Pedro Maschio brings extensive experience in the research of the SEMEA (Southern Europe Middle East and Africa) and Latin America service markets. With more than 30 years of experience in sourcing, he has developed vendor assessments plus contract restructuring, services scope and IT benchmarking programs for diverse vertical markets in the Americas and APAC.

Before joining ISG, Pedro was a partner of TGT Consult and managing vice president at Gartner Inc., responsible for the consulting business in APAC and Latin America.

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Manoj is a research analyst at ISG and supports ISG Provider Lens™ studies on Mainframes Services & Solutions, Cloud Native Services & Solutions and Public Cloud Data Center Solution and Services. He also supports the lead analysts of multiple regions in the research process. Prior to this role, he supported the ROI process in the sales intelligence platform and was an individual contributor in

handling research requirements for advanced technologies in different sectors. He has considerable expertise in predicting the automation impact by considering certain parameters such as productivity, efficiency and time reduction. During his tenure, he has supported research authors and authored Enterprise Context and Global Summary reports with market trends and insights.





*IPL Product Owner*

**Jan Erik Aase**  
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Mr. Aase brings extensive experience in the implementation and research of service integration and management of both IT and business processes. With over 35 years of experience, he is highly skilled at analyzing vendor governance trends and methodologies, identifying inefficiencies in current processes, and advising the industry. Jan Erik has experience on all four sides of the sourcing and vendor governance lifecycle - as a client, an industry analyst, a service provider and an advisor.

Now as a research director, principal analyst and global head of ISG Provider Lens™, he is very well positioned to assess and report on the state of the industry and make recommendations for both enterprises and service provider clients.



### iSG Provider Lens™

The ISG Provider Lens™ Quadrant research series is the only service provider evaluation of its kind to combine empirical, data-driven research and market analysis with the real-world experience and observations of ISG's global advisory team. Enterprises will find a wealth of detailed data and market analysis to help guide their selection of appropriate sourcing partners, while ISG advisors use the reports to validate their own market knowledge and make recommendations to ISG's enterprise clients. The research currently covers providers offering their services across multiple geographies globally.

For more information about ISG Provider Lens research, please visit this [webpage](#).

### iSG Research™

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**REPORT: MAINFRAMES – SERVICES AND SOLUTIONS**