ISG Provider Lens™

Mainframe Services & Solutions

Mainframe Modernization Software

U.S. 2021

Quadrant Report

A research report comparing provider strengths, challenges and competitive differentiators

Customized report courtesy of:

TmaxSoft

April 2021

About this Report

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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 February 2021, 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 lead author for this report is Pedro L. Bicudo Maschio. The editors Ipshita Sengupta and Grant Gross. The research analyst is Srinivasan PN and the data analyst is Anirban Choudhury. The quality and consistency advisors are John Schick, Tony Mataya, and Shriram Natarajan.

ISG Provider Lens™

ISG Provider Lens™

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EXECUTIVE SUMMARY

This is the first time ISG Provider Lens™ studies have included mainframe modernization. It is a response to buyers' requests for advice on what to do with their mainframes. This research qualified 47 vendors and service providers in five quadrants. According to these companies, the mainframe modernization market has been accelerating in the last two years, driven by the need to increase business agility.

In the preparation phase for this study, we found a lot of articles speculating about what a CIO should do with the mainframes. Common questions include: How should they include the mainframe in their cloud strategies? As COBOL programmers are getting close to retirement, what are the risks of facing a skill shortage?

In this report, clients will find five alternatives represented in each quadrant. Mainframe modernization considers the choice of introducing agility into legacy mainframe applications. Mainframe transformation deals with options to move all applications off the mainframe. Mainframe-as-a-Service (MFaaS) supplements the modernization path, providing a pay-as-you-go (PAYG) business model. Those that do not plan to modernize consider outsourcing mainframe operations. These four quadrants help clients find the right service provider that can deliver to their needs. The fifth quadrant provides clients with modernization tool options for those that prefer to run modernization projects themselves.

A CIO should reflect on the real issue before figuring out if there is a need to modernize or change the mainframe. Setting a short timeframe (12 to 18 months) is imperative to guide reasoning in this case. More than 24 months would lead to a bias in favor of long application modernizations, which are not recommended. Decision-makers will find more details about the key topics that follow.

Mainframe legacy applications are dead: IBM Z platform has a future running z/OS, Linux, and other operating systems. However, for enterprise clients, the future of the hardware is irrelevant. Business applications are what is important. COBOL, Assembler, PL1, Natural, and other legacy programming languages are procedural and outdated. Modern applications are built on object-oriented programming languages such as Java, .NET, and C#. Investing in modernizing the toolset for agility will bring more significant benefits in the long run.

The top 100 have mainframes: According to IBM, "92 of the world's top 100 banks, 23 of the 25 top U.S. retailers, and nine out of 10 of the world's largest insurance companies run System z mainframe. Nine out of the top 10 global life and health insurance providers use a System z mainframe. And 71 percent of global Fortune 500 companies are System z clients." These facts do not suggest that enterprises should be writing new COBOL applications.

Optimizing the mainframe: Clients have several tools to optimize their mainframes. Providers of MFaaS and mainframe modernization can bring 10 to 25 percent cost savings while transitioning services. They check configurations, software licenses, and dead code that may waste mainframe resources. Also, competitive bidding processes have historically helped reduce cost.

Modernizing the mainframe: The most frequently used method is encapsulating batch and business functions into microservices that can run directly in the cloud. Application programming interfaces (APIs) that expose business function or mainframe data to other applications are always cited as part of the modernization. When the intention is to decommission the mainframe, modernization results in moving all applications to the cloud (or replatforming). Two methods that are prevalent include emulators, which enable COBOL to run in the cloud, and COBOL code compiled to Java or .NET to run in the cloud.

Re-engineering applications off the mainframe: A method that is gaining momentum is automated application re-engineering. Tools are fast, reliable, and produce quality code. Recent advances in methods and technology include artificial intelligence (AI), programming frameworks, code quality inspection, and automated testing. In the past, these tools required expensive on-premises processing power; however, at present, these tools run in the cloud with an increased processing capacity at much lower costs as well as much lower risks. Re-engineering of applications is viable and cost-effective.

Re-engineering: Most case studies cover less than 5 million lines of code converted to Java. Other languages include .NET and C#. Re-engineering is completed in a few months. The largest case study was 20 million lines of code converted in 20 months. Automated re-engineering can convert 2 million lines of code in one hour. Most of the project duration is spent on testing and quality assurance.

Converting COBOL to Java: Direct conversion does not include re-engineering. Data and logic stay the same, and the new code behaves the same as the old code. These conversion tools handle COBOL and many legacy languages and write modern code where Java is the most popular language. Converting code is much faster than re-engineering but also involves many testing cycles. These automation tools can convert 28 million lines of code in one hour.

Emulators: Replatforming and moving applications to x86 servers from mainframes have long been a possibility. The recent development observed is cloud virtual machines have increased the capacity of each x86 server, and the virtual servers can scale horizontally (many server images install within minutes). Cloud capacity and improved emulation technologies enable workloads of more than 100,000 MIPS to run in the cloud.

The database and storage myth: Mainframes hold vast amounts of data, which suggests that mainframe databases cannot go into the cloud. However, none of the participants in this survey mention issues associated with database size or storage complexity. Cloud data lakes are popular alternatives for storage, flat files, and virtual tape backup. Service providers are unanimous in converting legacy databases to any relational database with automated tools. The most popular choice to replace IBM DB2 is the open-source PostgreSQL.

The performance myth: Mainframes scale vertically, by adding more disk, CPU, and memory. The cloud scales horizontally, adding more servers of the same capacity. Any of the methods for replatforming mainframes to the cloud offer the same performance, or better, because of horizontal scaling.

The skill shortage myth: Service providers have demonstrated they can attract and train young talents to work on mainframes. The assessed providers employ more than 170,000 mainframe programming experts, including 60,000 COBOL programmers. In operations, more than 53,000 experts keep mainframes running. They have five years of experience on average. Only 6 percent of the mainframe operators have more than 14 years of experience. However, these numbers need to be put in perspective. COBOL skills are just as rare as SAP. A LinkedIn search returns more than 350,000 people with COBOL skills, 288,000 experts in ABAP (SAP programing language), 3 million C# programmers, and an astonishing 10 million people with Java skills.

Offshoring is a solution for skills shortage: All participating service providers have global operations and COBOL delivery capacity in India. The assumption that a COBOL career is not interesting to youth generations is valid in the U.S.; however, global companies have found ways to attract and retain talents to work on mainframes and COBOL.

Knowledge versus innovation dilemma: Knowledge retention can be a challenge for clients that migrate from COBOL to Java because newly hired programmers do not understand the business and the company may not have a career path to offer to experienced COBOL programmers. A few solutions that compile COBOL to Java enable the co-existence of both programmers for a smooth transition, enabling for knowledge transfer.

Java is by far the preferred destination language when moving off the mainframe. Other languages include .NET, C#, Python, and Powershell (the last two for scripting batch jobs.). Code re-engineering and code conversion tools provide automation to replace COBOL with Java. It performs well on any cloud and any relational database. Application development tools can handle both languages, providing a smooth transition for application development shops.

Estimating project cost: Vendor and providers usually mention lines of code (LOC) as the base for cost estimation (76 percent of the respondents). However, complexity, tools, and size have an additional impact on pricing. Some statistics include:

- Modernization and code refactoring cost: US$0.25 to US$2.30 per LOC; project duration: 2 to 36 months; and project cost: US$100,000 to US$25 million.
- Transformation and code conversion cost: US$0.50 to US$8.00 per LOC; project duration: 6 to 60 months; and project cost: US$100,000 to US$50 million.

Estimating project viability: Mainframe MIPS measures hardware capacity; it is not used for project estimations. However, it provides the first cost estimate for the cloud. A rough estimation is one x86 core in the cloud can replace 50 to 100 MIPS mainframe.

- Top 100 mainframe clients manage more than 50,000 MIPS, with few of them operating more than 200,000 MIPS.
- Very large MIPS client manages 10,000 to 50,000 MIPS.
- Large clients manage 5,000 to 10,000 MIPS.
- Mid-sized clients manage 2,000 to 5,000 MIPS.

- Small clients manage less than 2,000 MIPS.
- Top mainframe outsourcing providers manage more than 300,000 MIPS each, up to millions of MIPS.
- The average outsourced mainframe has 4500 MIPS per client.
- The U.S. concentrates 60 percent of global mainframe MIPS.

Clients running less than 5,000 MIPS should consider migrating their mainframes to the cloud. Any of the migration options are viable and cost-effective, providing short-term ROI. Clients hosting 10,000 MIPS and more can consider MFaaS as the first move for cost saving while assessing the modernization and transformation options. Top 100 mainframe clients run mainframe farms, not single monoliths. Outsourcing is a good option to reduce cost, while offshoring eliminates the skill shortage risk. Simultaneously, top mainframe clients can consider clustering their mainframe systems around similar business functions to study each cluster separately.

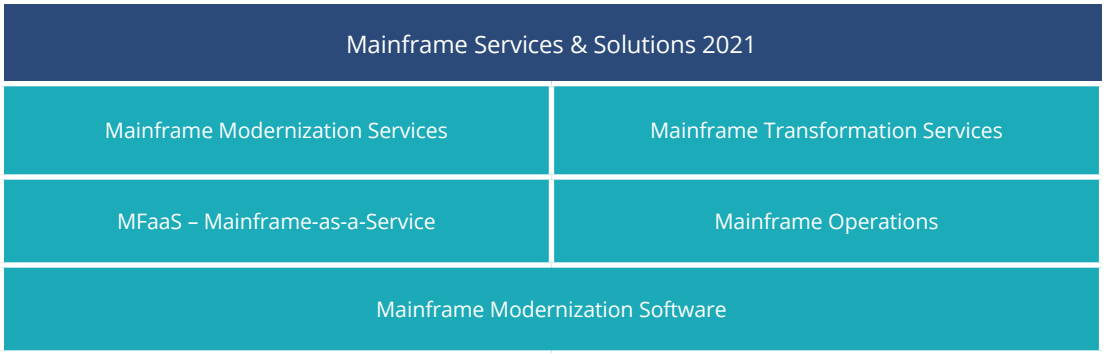
Financing mainframe modernization is a challenge: Many companies consider mainframe modernization a low return investment. A CIO of a large bank with more than 100,000 MIPS responded to our questions saying, "My mainframe is running the bank's support functions, it is certainly not a problem, and I am not going to invest in it, not even to turn it off." Vendors of modernization tools responded that, in most cases, the CIO sees the value but considers that the risk is an impediment. Vendors and service providers are working on making the projects faster, secure, and cost-effective to enable mainframe modernizations.

Consider self-financing the modernization: Some providers of application management and support services (AMS) propose deals that include mainframe modernization in the AMS goals. As a result, clients take the maintenance budget they already have and use it to move applications to low-cost platforms and code that is easier to maintain. Their three-year deal becomes a transformation program.

ISG Provider Lens™

Introduction

Simplified Illustration



Source: ISG 2021

Definition

Mainframes have evolved and scaled to handle high transaction per second (TPS) requirements. These machines consolidate many high-performing CPUs (cores) into a single hardware platform. Their architecture distributes tasks to cores that run in parallel, sharing the internal bus, memory and I/O, thereby providing superior performance. Because of its more than 40 years history, many mainframes today host legacy programming language applications written with COBOL, RPG, Fortran, PL/1, Natural and others.

To comply with digital transformation business requirements, clients can modernize their mainframe applications and introduce agile methods as well as automate continuous integration tools. Two alternatives exist in the market, which include modernization and transformation. Modernization updates legacy code without changing the programming language and introduces automation,

Definition (cont.)

DevOps and modern Agile practices. Mainframe transformation converts legacy code into modern languages to run on modern platforms, including private and public clouds.

To align with PAYG approaches, service providers have been offering MFaaS, which includes all hardware, software licensing and operations under a pay-per-MIPS arrangement. MFaaS is provided in a shared environment. Clients that need PAYG but prefer not to share resources may opt for managed mainframe operations, which enable custom combinations of hardware and licensing ownership.

This study focuses on understanding client objectives and assessing provider capabilities to deliver mainframe services, including modernization, transformation and supporting toolset.

The ISG Provider Lens™ study offers IT decision-makers the following:

- Transparency on providers' relevant strengths and weaknesses
- A differentiated positioning of providers by segments
- A perspective on different markets

This study focuses on the U.S. mainframe market.

ISG studies serve as an important decision-making basis for positioning, key relationships and go-to-market considerations. ISG advisors and enterprise clients use information from these reports to evaluate their current vendor relationships and potential new engagements.

Definition (cont.)

Scope of the Report

This study considers four mainframe markets: modernization, transformation, as-a-service and operations. To enable clients to select the tools available for modernization and transformation, this study includes a mainframe modernization software quadrant. This ISG Provider Lens™ quadrant study introduces five quadrants on mainframe services and solutions.

Mainframe Modernization Services: This quadrant focuses on service providers that offer legacy application modernization, introducing code repositories such as GitHub or similar options, DevOps integration and testing automation over original programming languages, such as COBOL, adding optimization to enable agility. After the modernization is complete, clients can embrace agile methodologies in the development and maintenance of applications running on mainframe systems.

Mainframe Transformation Services: This quadrant assesses application development and maintenance service providers that have evolved their application modernization methodologies to refactor, replatform or rewrite legacy programming language applications written with COBOL, RPG, Fortran, PL/1, Natural and others, enabling the same logic and business rules to run on any platform, including the public cloud.

MFaaS – Mainframe-as-a-Service: This quadrant assesses infrastructure service providers that offer shared IBM Z mainframes under a pay-per-use contract model. Services include facilities, hardware, connectivity, mainframe network management, licensing, operating system and subsystems, tools, and other services.

Mainframe Operations: This quadrant assesses traditional outsourcing providers that have long been offering mainframe services. Typical participants employ experienced practitioners to cover legacy mainframe technologies as well as the most recent mainframe releases. Services can be delivered on any hosting facility (client- or provider-owned).

Provider Classifications

The provider position reflects the suitability of IT providers 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:

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

Provider Classifications

The ISG Provider Lens™ quadrants are created using an evaluation matrix containing four segments (Leader, Product & Market Challenger and Contender), and the providers are positioned accordingly.

Leader

The Leaders among the vendors/providers have a highly attractive product and service offering and a very strong market and competitive position; they fulfill all requirements for successful market cultivation. They can be regarded as opinion leaders, providing strategic impulses to the market. They also ensure innovative strength and stability.

Product Challenger

The Product Challengers offer a product and service portfolio that provides an above-average coverage of corporate requirements, but are not able to provide the same resources and strengths as the Leaders regarding the individual market cultivation categories. Often, this is due to the respective vendor's size or weak footprint within the respective target segment.

Market Challenger

Market Challengers are also very competitive, but there is still significant portfolio potential and they clearly fall behind the Leaders. Often, the Market Challengers are established vendors that are somewhat slow to address new trends due to their size and company structure, and therefore have some potential to optimize their portfolio and increase their attractiveness.

Contender

Contenders still lack mature products and services or sufficient depth and breadth in their offering, but also show some strengths and improvement potential in their market cultivation efforts. These vendors are often generalists or niche players.

Provider Classifications (cont.)

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).

Rising Star

Companies that receive the Rising Star award have a promising portfolio 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. This award is only given to vendors or service providers that have made significant progress toward their goals in the last 12 months and are expected to reach the Leader quadrant within the next 12 to 24 months due to their above-average impact and strength for innovation.

Not In

The service provider or vendor was not included in this quadrant. There might be one or several reasons why this designation is applied: 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 qualify due to market share, revenue, delivery capacity, number of customers or other metrics of scale to be directly compared with other providers in the quadrant. Omission from the quadrant does not imply that the service provider or vendor does not offer this service or solution, or confer any other meaning.

Mainframe Services & Solutions - Quadrant Provider Listing 1 of 4

	Mainframe Modernization Services	Mainframe Transformation Services	MFaaS – Mainframe-as-a-Service	Mainframe Operations	Mainframe Modernization Software
Accenture	Not in	Leader	Not in	Not in	Not in
Advanced	Not in	Product Challenger	Not in	Not in	Leader
Astadia	Not in	Product Challenger	Not in	Not in	Not in
Asysco	Not in	Product Challenger	Not in	Not in	Product Challenger
Atos	Leader	Leader	Leader	Leader	Not in
Blu Age	Not in	Product Challenger	Not in	Not in	Leader
BMC	Contender	Not in	Not in	Not in	Not in
Capgemini	Leader	Leader	Not in	Leader	Not in
Cognizant	Contender	Product Challenger	Leader	Product Challenger	Not in
CPT Global	Contender	Not in	Not in	Not in	Not in
Deloitte	Not in	Product Challenger	Not in	Not in	Not in
DXC	Leader	Product Challenger	Product Challenger	Product Challenger	Not in

Mainframe Services & Solutions - Quadrant Provider Listing 2 of 4

	Mainframe Modernization Services	Mainframe Transformation Services	MFaaS – Mainframe-as-a-Service	Mainframe Operations	Mainframe Modernization Software
Ensono	Leader	Contender	Leader	Leader	Not in
Fujitsu	Not in	Leader	Not in	Not in	Not in
GFT	Not in	Product Challenger	Not in	Not in	Not in
GigaSpaces	Contender	Not in	Not in	Not in	Not in
Google	Not in	Not in	Not in	Not in	Leader
GT Software	Not in	Not in	Not in	Not in	Contender
HCL	Product Challenger	Leader	Rising Star	Leader	Not in
Heirloom	Not in	Not in	Not in	Not in	Rising Star
HostBridge	Not in	Not in	Not in	Not in	Contender
IBM	Leader	Market Challenger	Leader	Leader	Market Challenger
Infosys	Leader	Leader	Not in	Leader	Not in
INNOVA	Not in	Contender	Not in	Not in	Not in

Mainframe Services & Solutions - Quadrant Provider Listing 3 of 4

	Mainframe Modernization Services	Mainframe Transformation Services	MFaaS – Mainframe-as-a-Service	Mainframe Operations	Mainframe Modernization Software
Keyhole	Not in	Contender	Not in	Not in	Not in
LzLabs	Not in	Not in	Not in	Not in	Product Challenger
Maintec	Not in	Not in	Not in	Contender	Not in
Micro Focus	Not in	Not in	Not in	Not in	Market Challenger
Mindtree	Product Challenger	Leader	Not in	Product Challenger	Not in
MOST	Not in	Contender	Not in	Not in	Not in
Mphasis	Product Challenger	Leader	Not in	Contender	Not in
NTT (UniKix)	Not in	Not in	Not in	Not in	Contender
NTT DATA	Not in	Contender	Not in	Not in	Not in
PSR	Not in	Not in	Contender	Contender	Not in
Raincode	Not in	Not in	Not in	Not in	Contender
Software AG	Contender	Not in	Not in	Not in	Not in

Mainframe Services & Solutions - Quadrant Provider Listing 4 of 4

	Mainframe Modernization Services	Mainframe Transformation Services	MFaaS – Mainframe-as-a-Service	Mainframe Operations	Mainframe Modernization Software
SysperTec (Virtel)	Not in	Not in	Not in	Not in	Market Challenger
TCS	Not in	Leader	Not in	Leader	Not in
Tech Mahindra	Contender	Leader	Not in	Not in	Not in
TmaxSoft	Not in	Not in	Not in	Not in	Leader
TSRI	Not in	Not in	Not in	Not in	Leader
T-Systems	Product Challenger	Product Challenger	Contender	Contender	Not in
Unisys	Product Challenger	Not in	Not in	Rising Star	Not in
UST	Leader	Rising Star	Not in	Not in	Not in
Vion	Not in	Not in	Contender	Not in	Not in
Wipro	Not in	Market Challenger	Not in	Contender	Not in

Mainframe Services & Solutions Quadrants

ENTERPRISE CONTEXT

Mainframe Modernization Software

This report is relevant to enterprises in the U.S., evaluating vendors of modernization software within the mainframe ecosystem.

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

Even during the current times of business and economic uncertainties, ISG sees a growing need for modernization software that enable code assessments and code conversion of legacy applications. Typically, it encompasses reverse engineering, business logic mapping, business rules extraction, code review and inspection, documentation, emulators, frameworks and application development tools that can accelerate code and application modernization. The range of competencies among vendors makes it more challenging to identify and engage with the most suitable partners.

Who should read the report:

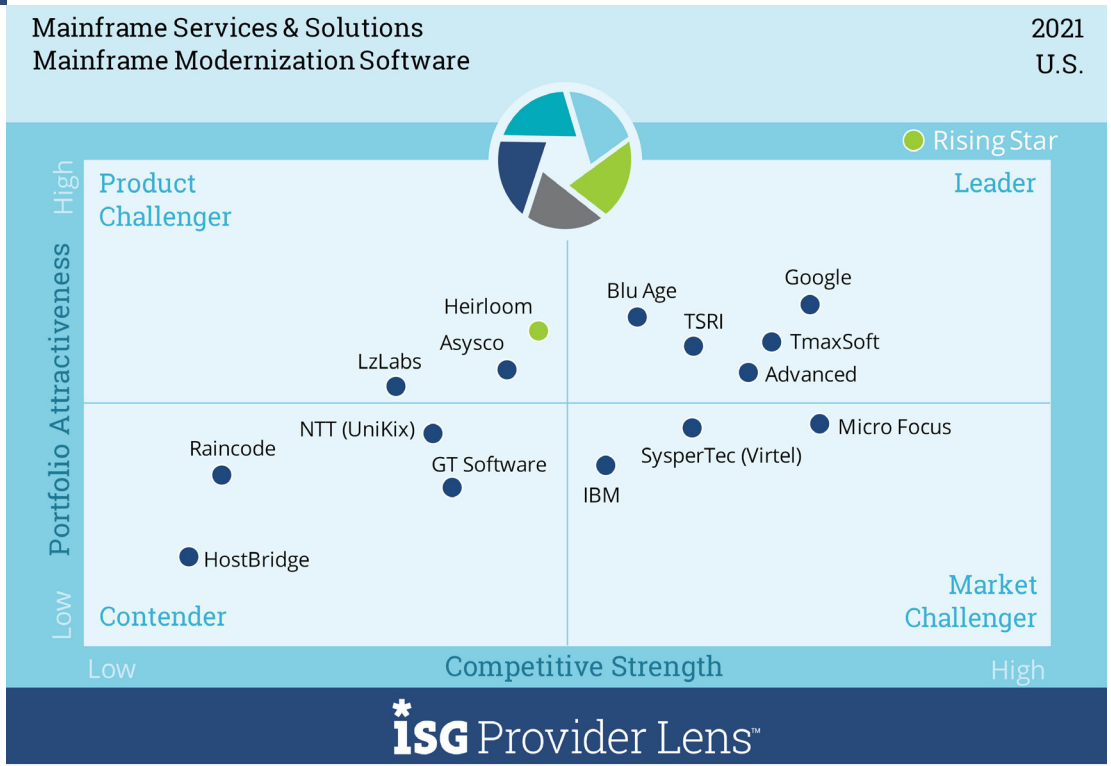
- **Marketing and sales leaders** should read this report to understand how mainframe modernization vendors can help them develop and improve business planning, go-to-market strategy and related activities.
- **IT and technology leaders** should read this report to understand the strengths and weakness of vendors offering modernization solutions, including their offerings, capabilities, architecture, and the way they employ latest technologies to deliver reliable offerings that suit enterprise needs and expectations.

MAINFRAME MODERNIZATION SOFTWARE

Definition

This quadrant ranks the software and toolsets that enable legacy application code assessments and code conversion. Mainframe modernization software includes reverse engineering, business logic mapping, business rules extraction, code review and inspection, documentation, emulators, frameworks, and application development tools that can accelerate code modernization and application modernization.

Enterprises and service providers require tools to perform their mainframe modernization and transformation. This quadrant includes vendors that supply the modernization toolset and eventually partner with global system integrators (GSI) that deliver modernization services. Mainframe modernization software outcomes can include logic flows, data architectures, automated code conversion, serverless functions, APIs and microservices that accelerate the mainframe modernization program.



Source: ISG Research 2021

MAINFRAME MODERNIZATION SOFTWARE

Eligibility Criteria

- Vendor should provide case studies that illustrate its software capabilities.
- The software should be licensed or delivered as a service, enabling client autonomy.
- The vendor must have mainframe specialization and offer mainframe-specific tools.
- Generic code conversion tools or wide-scope server/cloud optimization tools are not included.
- The product must be available and in use by clients for more than one year.
- The solution must have a robust service support organization or service partner ecosystem in the U.S. to ensure enterprise support.

Observations

The mainframe modernization software market is expanding, with some vendors reporting more than 20 percent growth. The increased interest in modernizing mainframes is driven by the desire to migrate applications to the cloud and shut down data centers. The COVID-19 pandemic accelerated cloud adoption in 2020 because many enterprises discovered they should have better business continuity solutions, and the cloud showed reliability, availability and scale during such difficult times.

Modernization software in this report includes application re-engineering tools, code compilers, emulators, database conversion tools and many other tools used for assessing, replatforming, refactoring and rewriting mainframe applications. Only four of the 16 companies evaluated are very large vendors (IBM, Google, Micro Focus and NTT DATA). Of those four, two acquired niche vendors to leverage their tools (Google and NTT DATA). The market is dominated by mid-sized companies, which have deep technology expertise, and a small number of practitioners.

Most efficient tools enable clients to continue changing their legacy code until transformation occurs. Some tools are differentiated by their capacity to synchronize legacy code and new code. Despite the method, it is important to reduce the need for code change freeze windows. Some tools persist in the client environment after the modernization project. It is often the case for emulators, application development tools, operation tools, monitoring platforms and code compilers. Clients need to understand the solution beforehand.

MAINFRAME MODERNIZATION SOFTWARE

Observations (cont.)

There are no best or worst methods, each has its pros and cons. Clients need to understand the modernization method and the implications of their choice. From a high-level perspective, emulators enable faster migrations to the cloud, but they impose residual costs. Code compilers eliminate emulators but introduce other residual costs. Re-engineering eliminates residual costs, but the project is more expensive. There is always a trade-off; this report highlights the most evident points, but clients need to study the consequences further.

No tool has all features to cater to the needs of the clients. In many cases, clients need to combine two or more tools from different vendors to cover all programming languages and methods required in their particular environment. In most cases, if not all, clients do not have the skills or training required to use the modernization tools themselves. It is recommended to hire professional services from the vendor organization or their certified partners.

For this report, ISG has considered the seven most common legacy languages for comparison purposes (COBOL, Natural, PL/1, Assembler, JCL, REXX and Easytrieve). Some vendors support more languages that were not been considered for their portfolio attractiveness.

We have qualified 16 vendors in this quadrant and identified five Leaders and one Rising Star. They are as follows:

- **Advanced** is a software vendor and IT service provider headquartered in the U.K. with more than 2,500 employees, generating US$330 million in revenue. The company focuses on application modernization and cloud migration services. In 2019, it acquired Modern Systems and later created its Modernization Platform-as-a-Service (ModPaaS) available on AWS, Microsoft Azure, Google Cloud Platform and Oracle Cloud, which gives it excellent visibility in the market. The company's differential is the automatic generation of object-oriented applications in Java or C#.
- **Blu Age** is a software vendor and service provider headquartered in France. It is a privately held organization with 130 legacy modernization experts. The company has been providing code transformations for 15 years. Its patented technology is available on AWS, Microsoft Azure and Oracle Cloud. The toolset generates cloud-native Java Spring with a modern Angular/HTML/Bootstrap UI. The toolset re-engineers applications, considering business rules, application behavior and dependencies to automatically design object-oriented programs.

MAINFRAME MODERNIZATION SOFTWARE

Observations (cont.)

- **Google** is part of a US$161 billion revenue company, headquartered in California. In 2020, Google Cloud acquired Cornerstone Technology and its product G4. Google has been investing to power G4 technology with AI. Clients can access G4 through some certified partners or Google's professional service organization. Once set, the automated platform extracts business rules and converts both programs and databases to run on Google Cloud Platform. Final applications can run in any cloud. Typical projects take a few months to complete and deliver consistent results with nearly 100 percent automation.
- **TmaxSoft** is a software vendor headquartered in Illinois with more than 1,700 employees in 20 countries. TmaxSoft OpenFrame is a platform on Linux, Unix or in the cloud, to run legacy applications without code changes. It provides batch and other tools, code compilers and database conversion tools. It offers a scalable replatforming solution to rapidly reduce costs, while providing modernization and improved integration. TmaxSoft partner program enables several system integrators in the U.S. to provide support to mainframe modernization.
- **The Software Revolution, Inc., (TSRI)** is a software vendor headquartered in Washington. It offers JANUS Studio®, a framework for automated software assessment and documentation, transformation, and refactoring. The company has completed more than 130 mainframe modernization projects. The company's size and geographic presence limit its portfolio attractiveness. The tool offers the most comprehensive functionality for application re-engineering, and the company's professional organization has seasoned professionals and good case studies.
- **Heirloom Computing** (Rising Star) is a software vendor headquartered in California, founded in 2010. Heirloom refactors mainframe applications to cloud-native Java programs that can scale horizontally on AWS and other clouds. The company offers a modern refactoring toolset that attracts system integrators and cloud providers' attention because of its code refactoring speed and scalability.

TMAXSOFT

Overview

TmaxSoft has more than 1,700 employees in 20 countries. TmaxSoft OpenFrame is a platform to run legacy applications without code changes. It supports COBOL, Natural, PL/1, Assembler, JCL, REXX, Easytrieve and other technologies such as BMS maps, CICS, IMS DB/DC, IDMS DB/DC, Adabas, IDEAL, Datacom, RPG, CSP, EXEC, CMS and more. Modernization comprises replatforming/rehosting (lift and shift) to public or private cloud using TmaxSoft code compilers and distributed RDBMS with incremental conversion of legacy assets to Java microservices architecture.

Strengths

Low-risk approach to modernization: TmaxSoft assesses the environment to collect details, dependencies and programing syntax peculiarities to set up compilers and configurations. Its proven success in 20 years of delivering mainframe replatforming eliminates the risk of complex application re-engineering. It enables fast lift and shift by using tools for automated migration, supporting interoperability with mainframes for partial replatforming of applications. Clients can move programs successively to manage change and risk. The solution scales up to more than 100,000 MIPS.

Retaining of seasoned COBOL programmers: TmaxSoft provides compilers and support to Eclipse tooling. Clients can modernize their application development workbench and retain the programmers that understand the application logic and business rules. Clients concerned with their programmers leaving or retiring can offshore COBOL support to one of many TmaxSoft partners.

Performance gains: OpenFrame is built upon a powerful middleware used in numerous critical systems in the banking and finance industry, which enables the flow management of large memory and efficient IO. TmaxSoft enables horizontal scaling applications in the cloud to equal or excel mainframe systems. OpenFrame is the only solution that can support recompiling of Assembler and Easytrieve. Legacy databases are migrated to any relational database, including TmaxSoft's Tibero. In most cases, clients experience an improvement in performance because of scaling.

Caution

TmaxSoft OpenFrame charges maintenance fees. It reduces mainframe licensing costs but does not eliminate maintenance fees.

Clients should note that they would retain COBOL programmers to maintain legacy code. Clients concerned with legacy technologies skills' shortage should plan for outsourcing or the replacement of programmers. After re-platforming clients can eliminate the legacy code with the OpenFrame tool, converting all COBOL to Java microservices.

2021 ISG Provider Lens™ Leader

TmaxSoft OpenFrame offers a safe path to significant cost reduction after a short duration of the modernization project, delivering optimum ROI.

Methodology

METHODOLOGY

The research study "ISG Provider Lens™ 2021 – Mainframe Services & Solutions" analyzes the relevant software vendors/service providers in the U.S. market, based on a multi-phased research and analysis process. It positions these providers based on the ISG Research methodology.

The study was divided into the following steps:

1. Definition of Mainframe Services & 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. Detailed analysis & evaluation of services & service documentation based on the facts & figures received from providers & other sources.
6. Use of the following key evaluation criteria;
   - Strategy & vision;
   - Innovation;
   - Brand awareness and presence in the market;
   - Sales and partner landscape;
   - Breadth and depth of portfolio of services offered;
   - Technology advancements.

Authors and Editors

Pedro Luís Bicudo Maschio, Author

Partner Author

Distinguished analyst and author, Pedro brings extensive experience in research of the Americas and SEMEA (Southern Europe Middle East and Africa) 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 Asia Pacific. 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.

Srinivasan PN, Enterprise Context and Global Summary Analyst

Research Analyst

Srinivasan is a senior analyst at ISG and is responsible for supporting and co-authoring Provider Lens™ studies on AWS Ecosystem and Insurance BPO Industry. His area of expertise lies in the space of engineering services and digital transformation. Srinivasan has over 6 years of experience in the technology research industry and in his prior role, he carried out research delivery for both primary and secondary research capabilities. Srinivasan is responsible for developing content from an enterprise perspective and author the global summary report. Along with this, he supports the lead analysts in the research process and writes articles about recent market trends in the industry.

Authors and Editors

Jan Erik Aase, Editor

Partner, Principal Analyst and Global Head – ISG Provider Lens/ISG Research

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™ | Report: Mainframe Services & Solutions
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