Application Modernization with Google Cloud Platform

Legacy technology can hold your business back, slow down productivity, and increase your costs.

Modernization is necessary. As [Stefan van der Zijden, Research Director at Gartner](#) explains, "Application modernization is not one 'thing'. If you're faced with a legacy challenge, the best approach depends on the problem you're trying to solve. Replacement isn't the only option."

Client >
GE Capital

Sector >
Financial Services

"I thought I knew what my application did, but I was wrong. Advanced showed me how much more there was than I assumed...this assessment was one of the best things we did."

Mark Rubel > Director of Application Development > GE Capital

The broad scope of our Application Modernization practice means that it touches upon organizations resolving different kinds of issues across industries and around the world.

While technology continues to grow in prevalence across everything we do, organizations have two options. They can review their current estate and proactively look to move forward, or they can assume that relying on their current tech will suffice. Making this assumption is risky. In the digital age, it is becoming more necessary to align resources to the future.

Relying on your current IT often means agreeing to legacy technology as part of your future. In doing this, you are:

> Accepting a reduction in productivity

> Limiting your ability to adapt to, and deliver on, customers' expectations quickly

> Ignoring that your specialists are retiring and the new workforce cannot support your technology

> Increasing your costs

> Enabling susceptibility to security breaches and risk

As the difficulties around integrating legacy applications with modern technology show, trying to force old to mix with new is an arduous process. Though it may be necessary during your transition, it isn't a place you can stay in.

In our [2021 Mainframe Modernization Business Barometer Report,](#) more than 55 per cent say legacy modernization has helped the business accelerate their digital transformation efforts, while 54 per cent say it has allowed them to be more reactive to market changes. A large percentage of organizations saw the benefits of their mainframe modernization.

Our services

There are several different approaches (or disposition strategies) available when looking to modernize legacy assets. The selected approach (or combination of approaches) will depend on a number of factors such as broader project objectives, budget, timeframe, skillsets, and future corporate direction. The majority of application modernization specialty vendors focus on only a single modernization option.

On many occasions (especially with large complex legacy landscapes), the correct solution may require a combination of several approaches. Therefore, our experience and expertise in addressing the delivery requirements of different workloads is critical.

Advanced has proven expertise with different modernization approaches spanning nearly four decades – delivering projects on various legacy platforms, supporting many different legacy source code and data types, and assisting you in key areas such as testing, go-live planning and support, and the design, configuration, implementation, and management of the target operational and infrastructure environment. Our ability to address the "big picture" leveraging different modernization approaches means that we won't force an approach if it doesn't meet your needs.

Assessment

The foundation of all modernization projects and of comprehensive application understanding is an assessment. In the assessment process, you can discover artifacts you did not know you had, relationships you did not realize existed, and artifacts that are no longer in use. After the assessment is completed, you see an average code footprint reduction of 40-50%.

Assessment services consist of the collection of application code from a legacy system and utilization of Advanced' proprietary technology to map the legacy applications, gain insight into complexities, relationships, and business logic. Assessment services can be delivered purely as-a-service by Advanced or collaboratively using our cloud-based Modernization Platform-as-a-Service (ModPaaS). ModPaaS facilitates customer and/or partner participation during a legacy application modernization project by providing access to Advanced-developed solutions in a collaborative manner.

Rehost

Rehosting, sometimes referred to as replatforming, is ideal for organizations that want to retain their legacy application code as-is while moving away from expensive mainframe infrastructure.

In a rehosting project, the application code is shifted into an emulation environment (a proprietary piece of software) where it can run on modern, distributed infrastructure in private data centers or the Cloud without change.

Once rehosted, the application code interacts with the database through the emulation software.

Although this approach eliminates the mainframe, rehosting projects often take as long as alternative modernization initiatives such as refactoring, and after completion, the company remains constrained by their original legacy application code running in a vendor-specific emulation environment, which carries licensing costs that should be considered.

"We initially invested heavily in a user-friendly browser front end for our applications. Now the functional pieces of the application are aligned for a more direct data and integration model. COBOL maintenance resources are becoming increasingly hard to find, so application modernization puts us in a position to work with a global community of young talented developers."

Thanos Kaponeridis >
Aerosoft Systems

Our services

Refactor

Refactoring is centered around the use of automated tools to transform your legacy codebase to object-oriented Java or C#.

It also includes the automated transformation and migration of non-relational databases to relational models. The goal of refactoring is to achieve 100 per cent like-for-like functionality as compared to the legacy system.

The refactored applications and databases are deployed to Google Cloud or in open systems on premises, allowing you to retire the mainframe.

Not all refactored solutions are created equal. Breadth of service (turnkey solutions vs. do-it-yourself tooling) and refactored code quality are important considerations when looking at this disposition strategy. Advanced delivers turnkey refactoring solutions backed by unmatched expertise.

Rewrite

Rewriting (sometimes referred to as re-engineering) involves the manual reproduction of legacy systems' functionality using modern application development languages and practices.

Rewrites are the least automated, most expensive, and highest-risk disposition strategy. Significant time and effort are required to document and recreate the legacy estate's wealth of functionality with newly written application code, the scope and complexity of which is often vastly underestimated.

Rewrite projects can take years to complete, and by the time the new applications are ready to deploy, the systems they replace have changed so significantly, they are already obsolete before they hit production.

Even in optimal circumstances, rewrites require extensive code freezes, which for business-critical systems, is simply unattainable.

Replace

This approach focuses on replacing mainframe application functionality with packages and components available from third-party vendors. A positive of this strategy is a reduced amount of source code maintenance since most vendors shoulder responsibility for fixing production bugs and implementing new functional enhancements.

However, commercial off-the-shelf (COTS) packages offer standard domain business processes that often differ from the homegrown mainframe applications they are meant to replace.

Reuse of existing business logic is often not possible; therefore, some level of business process re-engineering or customization of the third-party solution will be required. Both processes can be time consuming and expensive.

In our experience, the older and more critical a legacy system is, the higher the likelihood of significant customization requirements.

Our services

Retain

Retaining the mainframe is the simplest modernization disposition strategy, in the moment.

To ease the burden of retaining a legacy system, application code, files, and databases can be consolidated into less complex, more widely supported technology stacks - reducing cost and decreasing the risk of a shrinking talent pool. In many cases, retain is the chosen strategy because the inherent complexity and perceived risk of upending critical mainframe applications is unnerving for organizational leaders.

As time passes, dealing with legacy systems will become increasingly more difficult - higher consumption costs, growing integration challenges, long development cycles which impede innovation, and more money spent on licensing and rare, expensive talent.

Retire

Retiring the mainframe consists of getting rid of it entirely, including all of its applications and databases.

In many cases, when retirement is considered, the business functions held within the mainframe are no longer needed.

In these circumstances, it is a good idea to archive the contents of the system (application code and databases) in an easily accessible, affordable fashion.

This can be achieved by migrating these assets to repositories on modern, distributed systems. This removes the risk of losing business rules, application code and data held within a system bound for retirement without the crippling cost of retaining the infrastructure.

Automated testing

Our Automated Testing solution provides you with a tool to trace actions in online applications on the mainframe using IBM PCOM (or another TN3270 emulator). It also offers a means for recording, executing, and comparing batch jobs across the source and target operating environments. This automation removes the human element from key activities, reducing the potential for miscommunication and decreasing the time it takes to develop and execute comprehensive test cases.

Batch testing

Using the Automated Testing solution, mainframe assets, including source code and job scheduler definitions, are populated into our Modernization Platform-as-a-Service (ModPaaS), which is integrated into the CI / CD test pipeline.

The ModPaaS engine then parses and analyzes batch assets, determines batch streams, and generates batch test assets (test scripts, test cases, etc.). These test assets are executed against the mainframe (source) environment and the target environment. The results of which are compared using our Automated Testing toolset, which generates reports and insights for review in a centralized dashboard.

Online testing

Subject matter experts connect to the test environment using a terminal emulator, where our Automated Testing solution records sessions. These recordings are encrypted and transferred to ModPaaS, where the 3270 trace files are replayed and processed. Test cases for the target environment are automatically generated from these recordings, passed to the CI / CD test pipeline, compared using our Automated Testing toolset, and presented by way of our centralized monitoring dashboard.

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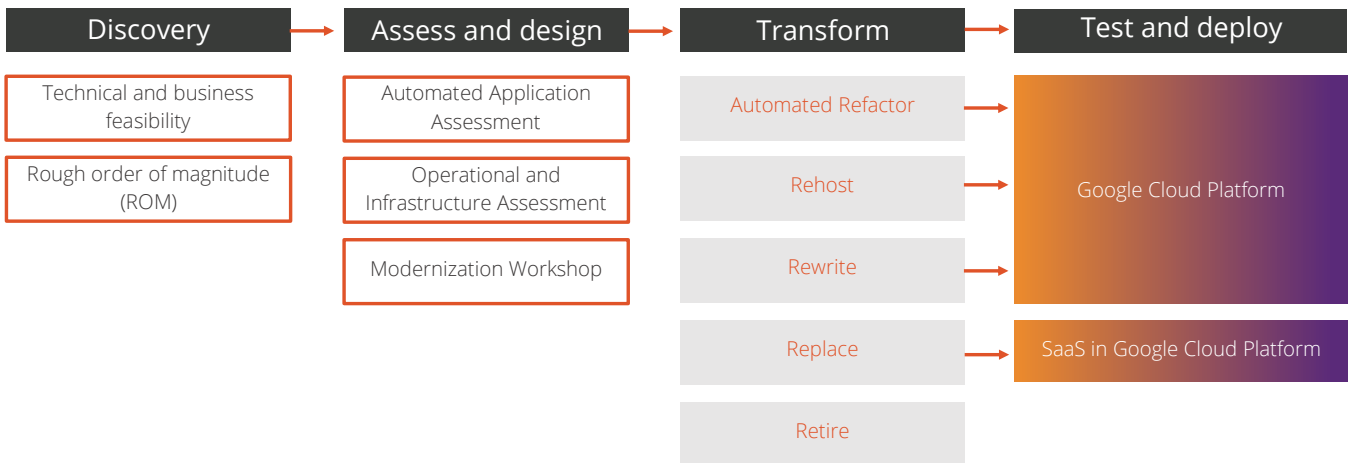
Thanos Kaponeridis >
Aerosoft Systems

Our services

In terms of a starting place, we work with applications and databases on IBM, OpenVMS, and VME mainframes and platforms. We can manage applications off the mainframe, as well as on. In addition, we can transform over 100 languages and technologies, with the ability to create parsers to understand more. Our teams are committed to working with you to ensure your technology supports your business goals.

As a guide, so far, most of our projects have worked with:

> Assessment

> Data Migration

> Automated Refactoring

> Rehosting

> Automated Testing

> Archiving

> Optimization

Discovery	Assess and design	Transform	Test and deploy
Technical and business feasibility	Automated Application Assessment	Automated Refactor	Google Cloud Platform
Rough order of magnitude (ROM)	Operational and Infrastructure Assessment	Rehost	
	Modernization Workshop	Rewrite	
		Replace	SaaS in Google Cloud Platform
		Retire	

Our software

Application Analyzer

Our application analysis tool provides a centralized, interactive documentation repository containing a wealth of information. As long as you own the source code of the application, it can provide seven different types of analysis: Function point, relationship, portfolio technology, visual program, data relationship, change impact, and dead and orphaned code. Application Analyzer helps you manage, maintain, or modernize your application portfolio more efficiently.

Application Transparency Platform (ATP)

Our Application Transparency Platform (ATP) is a revolutionary Natural rehosting and Adabas migration solution. It provides an end-to-end strategic pathway for lower licensing costs, higher productivity, and full preservation of Natural syntax and business rules off-mainframe.

eavFileConverter

eavFileConverter is a macro utility that allows you to archive flat, sequential, and GDG files in a fast and thorough manner. Users can quickly move thousands of files from the mainframe to a distributed environment in the Cloud or on premises without change. eavFileConverter enables on-demand, dynamic conversion from EBCDIC to ASCII for easy viewing of single records. It also allows setup to associate copybooks to files so that entire files can be converted to ASCII with a single click.

eavJES Batch Execution

eavJES provides you with the ability to replatform JCL and procs for batch execution with very little change. With eavJES, developers can continue to maintain the JCL and procs according to existing JCL rules. Execution results in the same actions, cataloging, restart, and recovery as on the mainframe. The catalog is constantly monitored and maintained during job execution and can even allow command-line manipulation of datasets.

Modernization Platform as a Service (ModPaaS)

Our Modernization Platform as a Service (ModPaaS) is a purpose-built, customizable Cloud solution that enables highly collaborative participation throughout the journey of a legacy modernization project. ModPaaS provides access to our modernization solutions 'as a service' in a secure, Cloud-based environment. It also allows you to move through the modernization journey at your own pace in a completely self-service manner, with assistance from our modernization specialists, or with a fully-managed disposition.

As a guide, so far, most of our projects have worked with:

> Application Analyzer

> Application Transparency Platform (ATP)

> eavFileConverter

> eavJES Batch Execution

> Modernization Platform as a Service (ModPaaS)

ModPaaS is available for downnload in Google Cloud Marketplace.

Our technical experience:

Application Source Code

From
ADS/O
Application Master
AS/400 (RPG, COBOL, Synon)
Assembler
BASIC+
C/C++
CA DYL280 (Vision:RESULTS)
CA Gen
CA Ideal
CA QuikJob (Vision:REPORTS)
COBOL
DCL
Easytrieve
FOCUS
FORTRAN
JCL
Natural
Pascal
PL/I
PowerBuilder
QMF
REXX/CLIST
S3
SAS
SCL
Telon
VA Gen
Visual Basic

Database / Data

From
Adabas
AS/400 (DDS, Db2)
CA Datacom
CA IDMS DB
Db2
Db2/400
Flat Files (Sequential, GDGs)
Fujitsu (ICL) IDMSX
IMS DB
Rdb
RMS
Supra
VSAM

Execution Environments

From
CICS
COMPLETE
DECforms
IDMS DC
IMS TM
TPMS

In support of our work, we recognize key industry providers and form tight partnerships with them, or, in the case of Transoft, Information Balance, and Modern Systems, we acquire them. These partnerships and acquisitions have created a cohesive portfolio of services, delivering complete end-to-end solutions that readies our customers for tomorrow, while bettering what they do today.

Our ecosystem of partnerships includes a strong partnership with Google. As mainframes become a growing hindrance to modern, continuously evolving, agile business, companies are rapidly moving to DevOps and the Cloud while consolidating their technology stacks to maximize IT performance. To facilitate this, they are adopting Cloud-compatible languages and harnessing best-of-breed solutions from the Google Cloud Platform. The Advanced/Google partnership ensures a smooth transition into the target environment.

Experience with our customers:

Our 35+ years of experience illustrates that every Application Modernization project is different, and must be based on the individual business drivers of our customers. This table shows a, by no means exhaustive, list of challenges that we discover when speaking to our customers.

Challenge	Risks	Solution	Benefits
Business critical application(s) running on aging legacy operating system/platform	Legacy platforms such as the IBM Mainframe, OpenVMS and VME are costly to maintain	Refactor or rehost to Google Cloud Platform	Reduce technical debt, overcome the challenge of a skills gap and reduce maintenance - while easing the handling of such tech
Maintaining or enhancing core application(s) where source code is owned but there is a lack of documentation and insight	Changes to application(s) become time-consuming and can be detrimental if you don't understand your application	ModPaaS in Google Cloud Platform understands and documents source code, and can help with business rules extraction for comprehensive understanding	Reduce development time, work smarter, support developers, reduce on-boarding time for new resources
Happy with existing application functionality but need to move to a modern environment	Legacy applications, written in languages such as COBOL, are costly to maintain, with a skills gap due to diminishing resources	Leverage Automated Refactoring to move your applications to functionally equivalent target languages such as Java and C# in Google Cloud Platform	Maintain the functionality of your existing application while working with a more manageable, future-proof platform
Legacy platform becoming end-of-life	Business-critical systems are no longer supported	Refactor or rehost to Google Cloud Platform	Modernizing enables you to move to an environment that is easily supported
Need to integrate modern application with legacy	Building custom APIs can take weeks/months and as organizations digitally transform, more and more APIs are needed	Migration to Google Cloud Platform, which enables simple API integration and connectivity through its architecture and solutions.	Building APIs with modern tools is five times faster and a fifth of the cost of building custom APIs

"Within only a month of the completion of our modernization project, we have already experienced dramatic benefits including - our technical infrastructure has been simplified and our mainframe storage reduced by completely eliminating the legacy environment; our INET and other application infrastructures have been simplified by now obtaining data directly from our new databases; and we have a much broader base of application developers to support these modernized applications."

Barry Ibey >
2nd Vice President,
Corporate Systems
Development >
National Life Insurance

500+

So far, we have processed more than 2.5 billion lines of code and have successfully completed over 500 projects worldwide.

We use a proven methodology that includes leveraging automated tooling to ensure the most beneficial outcome is achieved. A range of methods are available from our teams to reach the ideal destination, we can rehost, refactor, reengineer, replace or retire applications and databases.

We operate in accordance with global ITIL and PRINCE 2 standards, and in compliance with ISO 9001, ISO 14001 and ISO 27001.

Data Migration - Desjardins General Insurance Company

Desjardins General Insurance Group (DGIG) is a leading Property and Casualty insurer with a portfolio of over 4 million active policies, $5 billion in revenues and over $13 billion in assets. This project completely migrated DGIG's systems from an MVS/IDMS platform to a new Windows/Oracle platform. According to DGIG, this currently stands as the largest successful modernization project done in both North America and in the history of the insurance industry.

VME - Department of Work & Pensions

As part of its ongoing migration away from the legacy VME platform, the Department of Work & Pensions chose to invest in runtime software to allow the department to manage the workload and performance of existing systems.

OpenVMS - Cashco

Cashco was running its entire operation on a highly customized, long-standing OpenVMS system. They wanted to reduce their dependency on this aging platform, mitigate the risk of skills shortages, and use the latest database tools – while at the same time retaining their valuable business logic.

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Over more than 35 years, our expertise and range of services have been showcased across different industries, organizations, and capabilities.

About Advanced

Advanced is a leading international provider of application modernization services with unique expertise in the legacy modernization market.

With more than 500 modernization projects completed worldwide, and 2.5 billion lines of code processed through our solutions, we have been driving IT efficiency, agility, and competitive advantage for customers through core application and database transformations for the past 35 years. Over that time, we have helped organizations across all sectors including the UK Department for Work and Pensions, FedEx and the New York Times.

Advanced is one of the three largest providers of business software and services in the UK, with a strong track record in helping our customers' journey to the Cloud with tailored solutions across all industries.

With a turnover of US$339m, 20,000+ customers and 2,500+ employees, we help organizations create the right digital foundations that drive productivity, insight and innovation – all while remaining safe, secure and compliant.

We work with organizations in all sectors, from Healthcare to Legal, and of all sizes – whether they want to move to the Cloud, invest in ERP, manage core business functions through one unified system or modernize their legacy applications.

More information

w   modernsystems.oneadvanced.com
t   +1 855 905 4040
t   +44(0) 330 343 8000
     hello@oneadvanced.com

3200 Windy Hill Road Suite 230 West Atlanta, GA 30339
Ditton Park, Riding Court Road, Datchet, SL3 9LL

Google Cloud