Rocket® software

The Drive to Modernization

Successful top-down initiatives for IBM® i applications

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Why read this?

For a good reason, the cloud, refactoring, and microservices are on everyone's lips these days. They hold the promise of reinventing businesses altogether and streamlining operations to drive revenue, business innovation, growth, and resiliency.

The trouble is that IT has some idea, but probably not the whole picture, of where to start in breaking down monolithic applications and deploying them in the cloud in ways that transform the business. They also often work in silos within the company and do not have insight into all the strategic business plans. Even if your business is already on the path to modernization, and it likely is, the question is where the company is on the journey and how the plan is mapped out. When decisions and steps are taken without insights into workflows and processes or proper alignment with the business, the modernization projects become an "Eh, this feels like the right thing to do," rather than, "These are the five projects we need to prioritize and act on urgently to drive the most value to the business."

Key takeaways

Organizations are taking an evolutionary approach to application development, going from monoliths to API/REST services and eventually to microservices via refactoring. Companies can only take full advantage of modern cloud and edge software deployments by breaking down applications into APIs and microservices. Organizations need to know where to approach and what to do so they can map out what is required to be successful.

With a strategic, continuous approach to modernization that includes process discovery and collaboration with the business, you can approach IT questions in a nuanced, data-driven way that makes a real difference.

Who should read this report?

This report is for anyone with IBM® i systems, particularly those tasked with modernization initiatives involving the cloud and refactoring applications and looking for guidance on approaching these projects.

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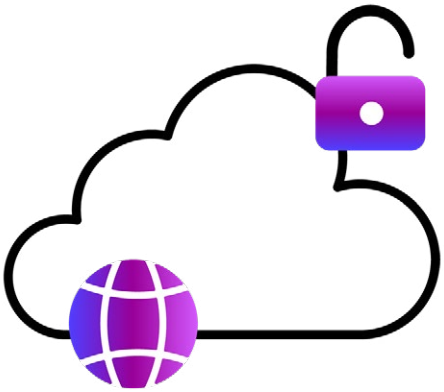
Executive summary

IBM i continues to be an industry mainstay—from banking and finance to healthcare, manufacturing, distribution, and retail. These industries run a high percentage of critical business applications on IBM i, which is known for its stability and reliability. While this remains constant, a lot has been different for this legacy system in the last ten years. It no longer operates in silos, nor does it need to run on-premises. Coding for it no longer requires legacy languages such as COBOL or RPG. Today, IBM i works with open-source languages, databases, and development tools; runs in the cloud; and can be accessed from Windows, web, mobile, IoT, and web service interfaces.



Other things have changed too. Until recently, technology and business leaders struggled to decide which workflows and processes to automate first and what tools were available to make the needed changes. Despite these challenges, modernizing mission-critical processes and operations remain top priorities for IT leaders who want to find new ways to gain advantages and opportunities in an ever-changing environment. Their organizations must transform rapidly to keep up with the competition, including modernizing applications.

For organizations, modernization can't happen fast enough. This can mean moving to cloud-based architectures, deploying API/REST services, refactoring legacy applications into microservices, and often all the above. Cloud initiatives are no longer optional—and hybrid cloud approaches are prevalent. The race to the cloud applies to legacy systems such as IBM i. Another horse in the infrastructure modernization race: companies are moving swiftly to fully distributed architectures comprising hundreds of connected, cloud-based microservices, and many are running at the edge.

Far more than hype

These new digital capabilities are more than just hype. They deliver real business value. Take, for example, Netflix's move from a monolithic to a cloud-based microservices architecture. Today, the entire Netflix Cosmos Platform is powered by an architecture featuring an API Gateway that handles about two billion API edge requests daily that are handled by approximately 500+ microservices. The move has allowed Netflix to be up and running 24/7, scale to the next order of magnitude, and be optimized for speed. As business leaders see successes like this, they demand similar dramatic transformations, and IT must deliver.

The most significant consideration for anyone on the hook to drive major transformation is how best to implement it in a way that delivers the most value for the company. What does the business need? How should we implement it? How do we get beyond "OK, we did it?" to "We did it, and now the company is hitting it out of the park?" How can we stop iterating and get straight to where we need to be?

This report helps you navigate and build out a plan not only for the cloud but also for evolving your IBM i applications from monoliths to APIs and cloud-based microservices that set you and your company up for success. But first, you need to take a collaborative approach and create a partnership between business and IT, especially when it comes to moving to the cloud and transforming monolithic applications into agile microservices. Read on to learn the secrets to getting your technology, people, and processes all working towards your future.

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Getting to IT-business alignment

Aligning IT with business needs to meet fundamental goals such as improving customer experience and increasing market share is more important than ever, especially in a post-pandemic world. While the global pandemic and ensuing economic disruption have accelerated plans for nearly every organization to digitize their business and operations, the move to the cloud and from monoliths to microservices has been especially tricky. That's because pinpointing which parts of the business need cloud agility the most and determining where to modernize applications is challenging without the right insights.

Modernization also gets stalled due to a persistent gap between IT and business. According to Gartner*, matching business outcomes, resource capacity, and the ability to adapt is crucial. This is especially true with IBM i application development. But there is common ground around modernization, improved processes and workflows, and cost reduction. And today, almost everyone agrees that moving to API/REST services and eventually microservices is urgent.

To get there, it's vital for business and IT to collaborate from the beginning to avoid piecemeal fixes and take a higher-level, strategic approach. Instead of simply adopting an RPA tool, for example, embrace practices such as hyper-automation or the act of discovering, designing, and automating the most critical processes. Also, examine the entire monolithic application to determine what is needed most across the whole business rather than within siloed teams.

A narrow, incremental, or siloed approach can stop even the most innovative companies from using the cloud and microservices as a launchpad for innovating new operating methods. So, what causes the IT-business gap to persist? IT teams traditionally take a bottom-up approach, asking, "how do we move a monolith application to the cloud to cut costs?" Business leaders take a broader, top-down view, asking, "how can we improve the productivity of teams and better respond to market and customer needs?" According to Gartner, this requires the intentional use of "composability" in a business context or "architecting your business for real-time adaptability and resilience in the face of uncertainty."

If you run IBM i systems, the first step toward modernization is determining what type of IBM i user you are. Is the IBM i system your *only* IT infrastructure, or part of IT alongside other systems such as Linux and Windows servers? Moving from IBM i to IBM alongside other systems is a journey most businesses take. To determine where you are on the path, ask yourself what you rely on today, what you will depend on five years from now, and which business drivers dictate your current and future environment.

Once you know what type of IBM i world you are in, you can understand how best to break up monolith applications and how IT can leverage cloud technologies. For example, if your front-end user interfaces combine RPG applications with Python, Java, or another type of code, you've entered the world of multi-code languages and applications. Your environment has become more complex, but you have opened the door to more options to serve the business and your customers. This information and insight can help you take the first step in the journey and consider your cloud options.

* Gartner, How to Start and Drive Your Modernization Strategy, Howard Dodd, Anne Thomas, 10 May 2022

Top-down view:
How can we improve the productivity of teams and better respond to market and customer needs?

BUSINESS LEADERS

↓

Composability:
Architecting your business for real-time adaptability and resilience in the face of uncertainty.

GARTNER

↑

Bottom-up:
How do we move a monolith application to the cloud to cut costs?

IT TEAMS

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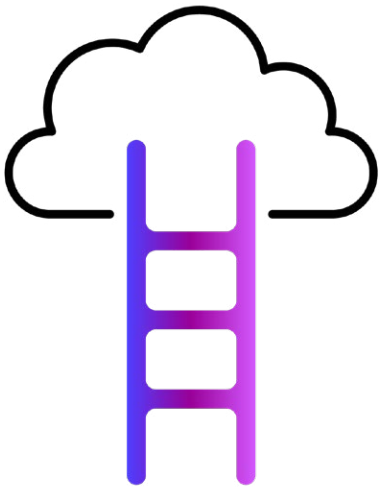
The ladder to the cloud



Regardless of where you are on the cloud continuum, there are countless benefits for IBM i businesses. The cloud offers a lower total cost of ownership (TCO) due to a smaller footprint via logical partitions (LPARs) and less expensive maintenance, freeing up the budget and resources for other, more strategic initiatives. More flexibility in the IT budget comes from moving from CAPEX to OPEX. Better yet, you can leverage capabilities in the cloud that are not typically available on-premises, such as analytics or even voice-assisted artificial intelligence and machine learning. Cloud-based solutions are also easily scalable.

These are why most businesses are looking into it if they are not already cloud-based. According to Gartner, more than half of enterprise IT spending in key market segments will shift to the cloud by 2025.

Countless options

In practice, there are multiple options for cloud implementations: moving to a distributed server in a cloud such as AWS, moving IBM i to the cloud with IBM, Amazon, and others, or a hybrid cloud approach that moves the appropriate workloads to the cloud while keeping the ones that make sense on-system. There's also the option to use managed IBM systems that sit in your infrastructure.

The beauty is that you get to choose where to deploy workloads. You can balance the need to keep workloads close to the data on-premises or in a private cloud while also taking advantage of the agility and flexibility of a public cloud. The question then becomes which transactions and workflows truly need the rock-solid capabilities of an IBM system and which belong in the cloud.

According to experts, the best way to proceed is to design a cloud strategy that optimizes business outcomes, including speed, resilience, and agility. Also, embrace distributed cloud to enable hybrid cloud architectures, grow public cloud skills internally, and consider creative recruiting strategies to bridge the talent gap.

Remember that moving to the cloud doesn't necessarily mean moving *everything* to the cloud. It is possible and probable for most organizations to take a blended and nuanced approach. Applications can live as microservices or partially in the cloud and on-premises. It depends on your use case.

Ideal use cases

Several use cases are ideal for cloud deployment. These include software testing, especially in highly regulated industries that need to test new software to ensure it doesn't disrupt the existing IT environment. Cloud testing is faster than traditional testing, after all, because it circumvents the need for many IT management tasks. The speed with which you can build a testing environment can lead to faster time to market and easier customization. Plus, a variety of testing environments can often be simulated. This is especially useful for testing in specific geographies.

Seasonal businesses are also well-suited for cloud deployments. Industries that see more seasonal business include retail, hospitality, tourism, and entertainment, all with peak seasons. These types of organizations experience much traffic and accumulate a lot of data during peak season. They face a decision between acquiring new resources that go unused in the off-season or struggling through the busiest time of the year with existing resources. The cloud provides the flexibility they need without negatively affecting the bottom line by adding fixed asset costs.

Many companies have considered moving business analytics and insights into the cloud. While this functionality isn't available directly on IBM i, some functionality is available on-platform. IBM i comes with OLAP functionality that was added years ago, but with the move to LPARs in the cloud, users can also take advantage of more advanced analytical services.

Always remember there's more to moving to the cloud than saving money. The goal is to reimagine and reinvent the business through continuous innovation and modernization powered by various cloud capabilities.

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Modernizing the monolith

In today's tumultuous environment, one thing is certain: the future of every business depends on software—and it must be continuously modernized to ensure that the future is bright. Legacy applications still form the backbone of many enterprises, yet it can be challenging to keep up with the latest OS and system releases to take advantage of new releases. And legacy applications written decades ago are limiting, especially when the knowledge of how they were developed is at best limited and gone the way of the dodo bird. Most importantly, application modernization is necessary for a cloud-centric business transformation. Today, building API/REST services and refactoring into microservices for cloud deployment are often tightly woven into the continuous modernization approach.

Likely, you're already on a path to modernizing your applications by improving user interfaces and automating portions of your workflows. However, when and where do you build APIs versus microservices? And why?

First, it helps to understand the difference between monoliths, APIs, microservices, and refactoring.

Monolithic applications

Monolithic applications are large applications. They are typically complex and designed to handle multiple related tasks. They encompass several tightly coupled functions, and given their broad scope; they tend to have massive code bases.

Application Programming Interfaces (APIs)

APIs are a set of definitions and protocols to build and integrate application software. APIs list several operations that developers can use, along with a description of what they do. Developers don't necessarily need to know how, for example, an operating system builds and presents a "Save As" dialog box. They need to know that it's available for use in their app.

Refactoring

Refactoring involves restructuring the source code of an application or piece of software to improve operation without altering functionality. Developers review the software architecture and, where possible, refactor code to create smaller and more manageable components or microservices.

Microservices

Microservices arrange an application as a collection of loosely coupled services. The goal is to reduce development complexity, ease deployment headaches, reinforce resiliency, and increase release velocity. In a microservices architecture, services are fine-grained, and the protocols are lightweight, making this architecture ideal for cloud and edge deployments.

When and where do you build APIs versus microservices? And why?

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After a basic understanding of the concepts, the next step is to determine when it is best to refactor applications into microservices, when to use APIs, when to keep the existing monolithic application intact and where to start.

Consider monolithic applications the giant "boulders" of the software world. They are tough to rewrite, so much so that many organizations decide to scrap them and start writing new software from scratch. Instead of undergoing that labor-intensive, time-consuming, and expensive endeavor, adopt tools that let you take a tactical approach to turn applications into APIs based on user needs, business needs, and budgets.

Turning monoliths into APIs doesn't have to be done simultaneously. Look at areas of the application that are used most. Those areas are the prime candidates for turning into APIs consumed in mobile applications, on websites, and so on. In this way, you can chip away at the "boulder" and progress toward modernization based on informed priorities.

If you turn your monolithic applications into APIs and build a layer on top, you can build a new user interface and retain your existing back-end. Then, when the time is right, and the front-end is finished, start modernizing your back-end software using the cloud and a different database. The front-end does not have to change again.

Always remember, it is important to carve out proper functions from the monolith that will make a positive substantive difference to the business. The only way to do this is to surface the end-to-end workflows for legacy applications and provide IT and business visibility. Instead of simply analyzing code and looking at dependency trees and function calls to decide, every choice as to what is modernized next should be informed by the data: what people use most and what they are experiencing while using it. This enables organizations to tackle the most urgent needs first and move on from there—without the lag time of looking over everyone's shoulders to figure out how people are using the software or needing to rely on opinions.

Once you have chosen what to modernize, select a tool that will trigger the automation of an API so you have a head start in streamlining key processes and workflows. And after an application or part of one is modernized, determine collaboratively if the API or microservice performs the same or better than the original software.

There are many options, and there is no "one size fits all" approach. What's needed is a customized approach to what's suitable for your business and an evolutionary process to the development work. Rewriting your entire application stable is impossible, so incremental modernization is inevitable.

Adopt tools that let you take a tactical approach to turn applications into APIs based on user needs, business needs, and budgets.

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How to start harnessing the power of modern application development + cloud

Now that you understand the advantages of cloud and application modernization, and you're likely on the path toward modernization, you may wonder what the next steps are when business leaders come to you and say, "Let's deploy cloud-based microservices!" First, remember that modernization—including automation—is not a "one and done" journey. It's continuous. As businesses finalize their initial automation and modernization projects, they often find themselves making ongoing changes.

When addressing legacy application challenges, the best practice is to have what we call Intelligent Legacy Automation (ILA), a best practices approach for continuous modernization/automation that builds a comprehensive, end-to-end strategy to drive ongoing business results. It is a consistent, data-driven plan that includes these six crucial steps:

Modernization—including automation—is not a "one and done" journey. It's continuous.

01

Process discovery

Modernization and automation must begin with a detailed and accurate understanding of how your company uses the IBM i applications. A thoughtful, data-driven assessment of your workflows enables you to gauge the time and effort required for your project and reduce the possibility of cost overruns. Always be data-driven. Don't take the "best guess" approach and, rely on what the business says. They often do not know what is happening within the application, so they take a collaborative approach that includes both business and IT.

02

Project prioritization

With greater visibility of your workflow and processes, you can identify hot spots for automation and modernization improvements that will drive real value for the business. The ability to prioritize enables you to set the project up for success and gain approval from vital business stakeholders. You can also show a direct link between the proposed work and the business impact.

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03

Automation execution

Once your plan is clearly defined, the fastest way to a quick ROI is to start with RPA. Build robots to take on mundane tasks within a workflow to improve productivity. This frees users to focus on more interesting work, thereby increasing user satisfaction.

04

Modern user experience

Find workflows where the navigation across myriad green screens significantly slows down the user. But don't build a modern UI that is 1:1 of the green screen. Instead, build a UI that fits the user's workflow, including consolidating screens with practical moving fields, so the flow is more intuitive, etc.

05

Process integration

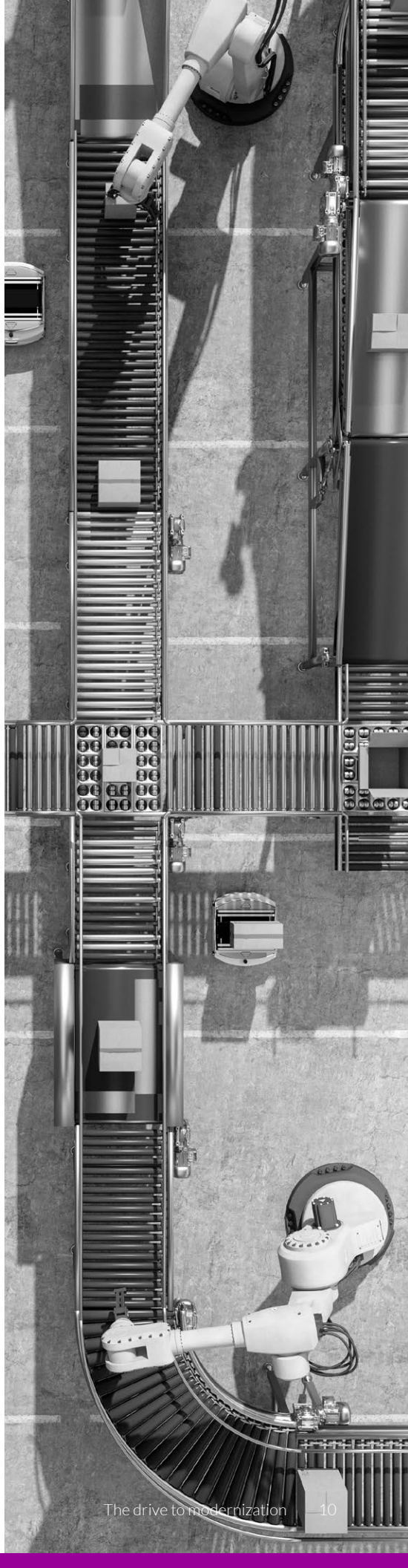
Improve business alignment by building APIs that integrate your IBM i applications with the rest of your critical business applications. Process integration "un-silos" your legacy applications, creating an interactive and symbiotic system that untethers business operations and customer engagement from the constraints of IT infrastructure.

Once you have published an API, you must determine more efficient ways to implement it. One option could be to find out if you can bypass the terminal screen and directly invoke the application's business logic. Another could be to try to access data in the application's storage system. Response times are critical. So, if possible, investigate these options to speed up the execution of the API. More information can be found here.

06

Automation management

Once you've built robots and APIs, centrally manage their development and deployment with a DevOps-lite tool. This further extends modernization and automation improvements into the developer environments. It automates processes, enforces policies, and controls and improves developer productivity.



You will need to start the process again each time there is a change in platform, business, or customer request. Whether moving to a new CRM system, a bottleneck in the call center, or other issues, revisiting this process can help you pinpoint and fix the problem.

Every time new processes, technologies, or trends within the business, or the larger market, warrant a review and update of the IBM i application workflows, make ILA a continuous part of the everyday operational fabric. It helps you drive business resiliency through productivity improvements and higher ROI on your IBM i systems.

We argue that the first step—process discovery—is the most crucial. To build an intelligent modernization strategy for your business, you must understand how your IBM i applications are used. That includes knowing which workflows are used most and which data are accessed most frequently. From there, you can build an intelligent plan that provides business results on day one. With that, you've aligned your initiatives straight to the bottom line.

In the context of moving to the cloud, refactoring legacy applications, implementing API/REST, and deploying microservices, process discovery helps you prioritize not only "what goes first" but also how to break down monoliths into services and, ultimately, microservices. You can know with confidence which parts of a monolith to break out and refactor, for example, to run in the cloud.

You might want to start by refactoring the most-used workflow or function available in one of the older, terminal-based applications your department supports—and you may be asked to do it quickly. There are many things to consider, including whether the vendor offers a newer version of the application that offers APIs "out of the box." You may also need time to find the optimal integration point. Discover considerations and options for choosing where to start and how to save time when creating APIs.

By automating process discovery that drives decisions and priorities, developers can focus on developing great features and functionality for everyone who touches your software—internally and externally. You free up time for them because they no longer have to worry about process discovery, testing builds, or scripts.

Productivity is always paramount. With an automated process, workflow discovery, and script-building, you can create a well-oiled machine that runs efficiently and focuses the right tools and people on the right tasks.

1 PROCESS DISCOVERY

2 PROJECT PRIORITIZATION

3 AUTOMATION EXECUTION

4 MODERN USER EXPERIENCE

5 PROCESS INTEGRATION

6 AUTOMATION MANAGEMENT

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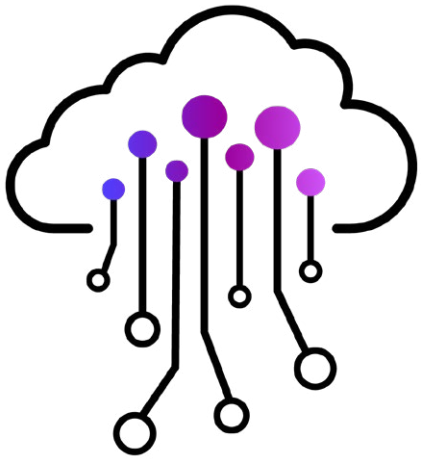
A final word

Today, IT leaders are under tremendous pressure to move to the cloud, refactor applications, and deploy APIs and microservices to achieve business superiority. Yet, they struggle to find the insights they need to know where to start, how to implement, and what to transform. Remember, process discovery is the key with which businesses unlock fast and significant bottom-line value from their modernization and automation projects.



Armed with an Intelligent Legacy Modernization plan, built with the knowledge of how your business truly engages its IBM i applications, you are ready for action. As you look for tools to execute your plan, evaluate your choices based on which tools and vendors can help you best execute each step in the Intelligent Legacy Modernization and Automation Plan.

But don't wait. The race to the cloud and microservices is on, and the winners are already sprinting toward the finish line.

About Rocket Software

Rocket Software is a 32+ year partner of IBM i businesses looking to innovate on the platform through industry-leading modernization and automation approaches. We have a comprehensive portfolio of modernization and automation tools, including:

Rocket® Process Insights

A visual tool that lets you see your workflows in totality, giving you the information you need to build a smart IBM i modernization plan. It tracks how your organization engages with the data and business logic of your IBM i applications and helps you build a data-driven strategy that eliminates redundancy and wasted time within your workflows. Then, you can leverage Rocket modernization solutions or the solutions of your choice to build modern user experiences and workflows that provide real results to the business.

Rocket® Process Automation

The only RPA solution to deliver quick and significant ROI from automating your IBM i processes. It removes tedious, manual work that causes bottlenecks, introduces errors, and limits innovation without needing in-house legacy development expertise.

Rocket® Process Integration

Enables businesses running legacy/IBM i applications to build workflows and innovative experiences that align with how customers and employees engage with your business and not how IT is built.

Rocket® Modern Experience

Enables you to easily build modern user experiences for your mainframe and iSeries applications without relying on developers with COBOL or RPG programming expertise. It also enhances your employees' and customers' web and mobile experiences while increasing productivity.

About Rocket Software

Rocket Software partners with the largest Fortune 1000 organizations to solve their most complex IT challenges across Applications, Data and Infrastructure. Rocket Software brings customers from where they are in their modernization journey to where they want to be by architecting innovative solutions that deliver next-generation experiences. Over 10 million global IT and business professionals trust Rocket Software to deliver solutions that improve responsiveness to change and optimize workloads. Rocket Software enables organizations to modernize in place with a hybrid cloud strategy to protect investment, decrease risk and reduce time to value. Rocket Software is a privately held U.S. corporation headquartered in the Boston area with centers of excellence strategically located throughout North America, Europe, Asia and Australia. Rocket Software is a portfolio company of Bain Capital Private Equity. Follow Rocket Software on LinkedIn and Twitter.

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