



# The Future of IBM® i Strategy Starts with AI



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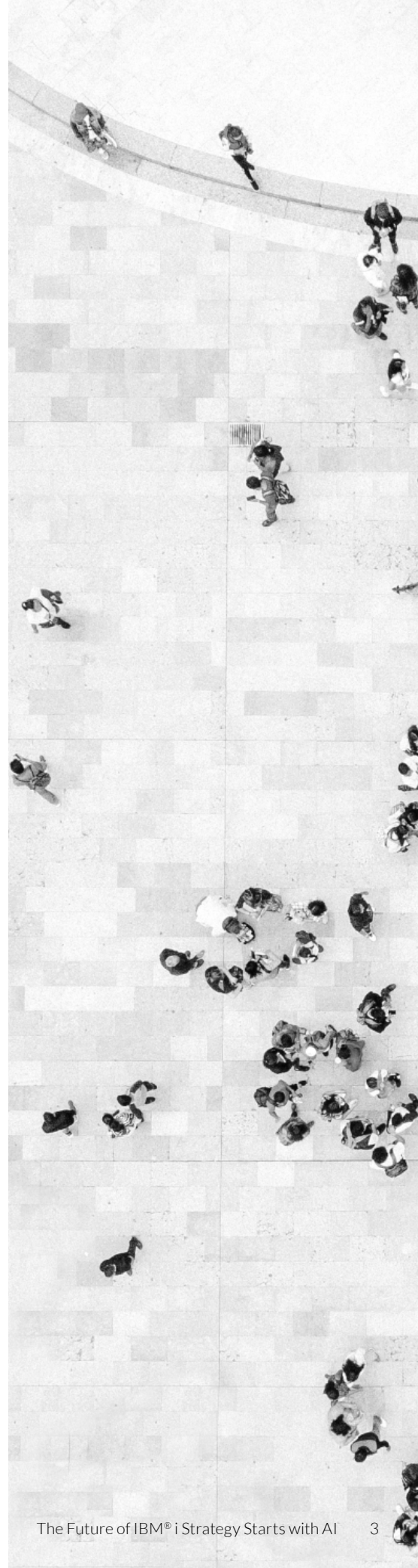
# Introduction

If you've spent any time online in the last few months, you likely saw the buzz around [ChatGPT](#), a new chatbot developed by OpenAI. Suddenly, sophisticated artificial intelligence (AI) is within reach, and its insights and guidance are no longer exclusively available for data scientists. While the breadth and depth are unclear, AI will undoubtedly have an impact for years to come.

While ChatGPT was launched 5 months ago, at the time of this writing in April 2023, there is already updated versions of the chatbot available and an additional one due in May. Because of the speed of evolution in this space, the community (including Rocket Software) readily acknowledges that only some of what is possible is known at this time. In fact, in a few months time the trajectory of AI could change dramatically.

For example, much of the conversation about AI right now focuses on the consumer space, with use cases around how companies leverage AI to drive better customer experiences. Yet, this is only the tip of the iceberg of how AI will impact our lives.

AI will play a pivotal role in IT, and this is no less true in the IBM® i space. With AI, IBM i leaders will have the information, insight, and recommendations to understand how best to optimize and modernize their IBM i environments. But, in order to take advantage of the technology, IT leaders need to set the foundation now.



# Why read this

In this whitepaper, we will talk about what AI is and both its limitations and potential future. We will also discuss what data you should collect today to provide the dataset for the next-generation AI experience tomorrow. In addition, we'll discuss different areas of IT in which AI could play an impactful role and how to leverage the technology, including:

- IT support
- Workflow automation
- Application modernization
- HA/DR
- Hybrid cloud
- DevOps
- Security

Finally, we'll discuss our top recommendations on how to prepare your organization to get the most out of AI and better support innovative business initiatives that drive growth.

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# AI: What is it, and why do we care

Artificial Intelligence (AI) is one of the most transformative technologies of our time, with the potential to revolutionize the way we live and work. It influences everything from personalized recommendations on e-commerce sites and social media platforms to being the first line of contact for customer service, to autonomous vehicles. And its impact on IT is no less dramatic.

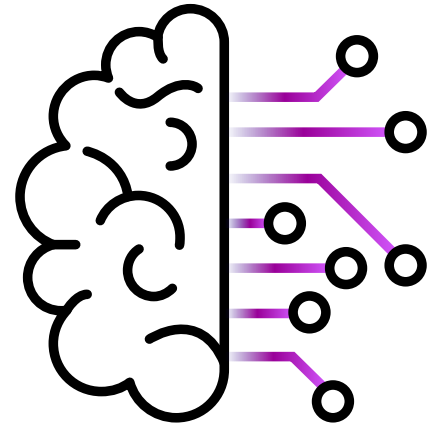
However, before we jump into talk about AI, let's review some terms that often get confusing:

## Artificial Intelligence

Artificial Intelligence is a broad field in computer science and engineering that enables "intelligent" computing. It involves developing algorithms, models, and computer programs that allow computers to perform tasks that typically require human intervention, such as learning, reasoning, perception, problem-solving, and decision-making. Within AI are techniques such as machine learning, deep learning, natural language processing, computer vision, robotics, and expert systems, among others. These techniques help the computer take on those traditional human tasks like recognizing patterns, understanding language, and decision-making.

## Machine Learning (ML)

Machine learning is a subset of AI that focuses on teaching computers how to learn from data without being explicitly programmed. It involves developing algorithms and statistical models that help computers identify patterns and make predictions or decisions based on the input data. Machine learning essentially trains the algorithms, improving their performance on a particular task by inputting large datasets. Over time, as data is continually fed to the algorithms, their performance improves.



## Machine Learning Operations (MLOps)

Machine Learning Operations or [MLOps](#) refers to the practice of applying DevOps principles and practices to the machine learning (ML) lifecycle. MLOps aims to streamline and automate the entire ML pipeline, from data preparation and model development to deployment, monitoring, and maintenance.

## Model Operations (ModelOps)

Model Operations or [ModelOps](#) is the practice of applying DevOps principles and practices to operationalized artificial intelligence (AI) and decision models, from development to deployment and maintenance. MLOps is a subset of ModelOps.

## Why now?

The science community has been talking about the concept of artificial intelligence since the [1950s](#). Polymath Alan Turing was the first to write about computers that had intelligence— i.e., artificial intelligence. The concept was later expanded on at the 1956 conference Dartmouth Summer Research Project on Artificial Intelligence (DSRPAI). But the computers from the mid-20th century weren't capable of supporting AI functionality. While computer development continued for the next few decades, and milestones happened, like IBM's Deep Blue beating the reigning world chess champion and grand master Gary Kasparov in 1997, it hasn't been until recently that we saw sophisticated AI, like OpenAI's ChatGPT.

Several factors are driving AI adoption right now, including:

**Data availability:** There is a juxtaposition between an explosion in the amount of data available in recent years and the amount of data AI requires to be properly trained. With the growth of the Internet of Things (IoT) and other sources, more data is available now than ever.

**Cloud computing:** Cloud computing has made it easier and more affordable for organizations to store and process large amounts of data. This has made it possible for organizations of all sizes to leverage AI.

**Advances in Machine Learning:** Machine learning algorithms have become more powerful and sophisticated in recent years. This has enabled the building of AI systems that can learn and adapt in real-time.

**Chip capabilities:** Chip innovations make it possible to process vast amounts of data quickly and efficiently. For example, chipmakers are developing chips designed specifically for AI workloads and chips for edge computing that help AI applications that require real-time processing.

**The Covid-19 pandemic:** The threat of another unknown variable disrupting economies all over the world has driven organizations to build more resiliency into their operations. AI not only can improve efficiencies within the organization but also could potentially predict the next unknown disruption, providing a heads up so preparations can happen to potentially mitigate.

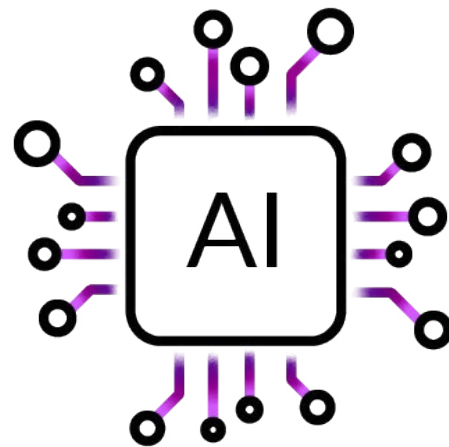
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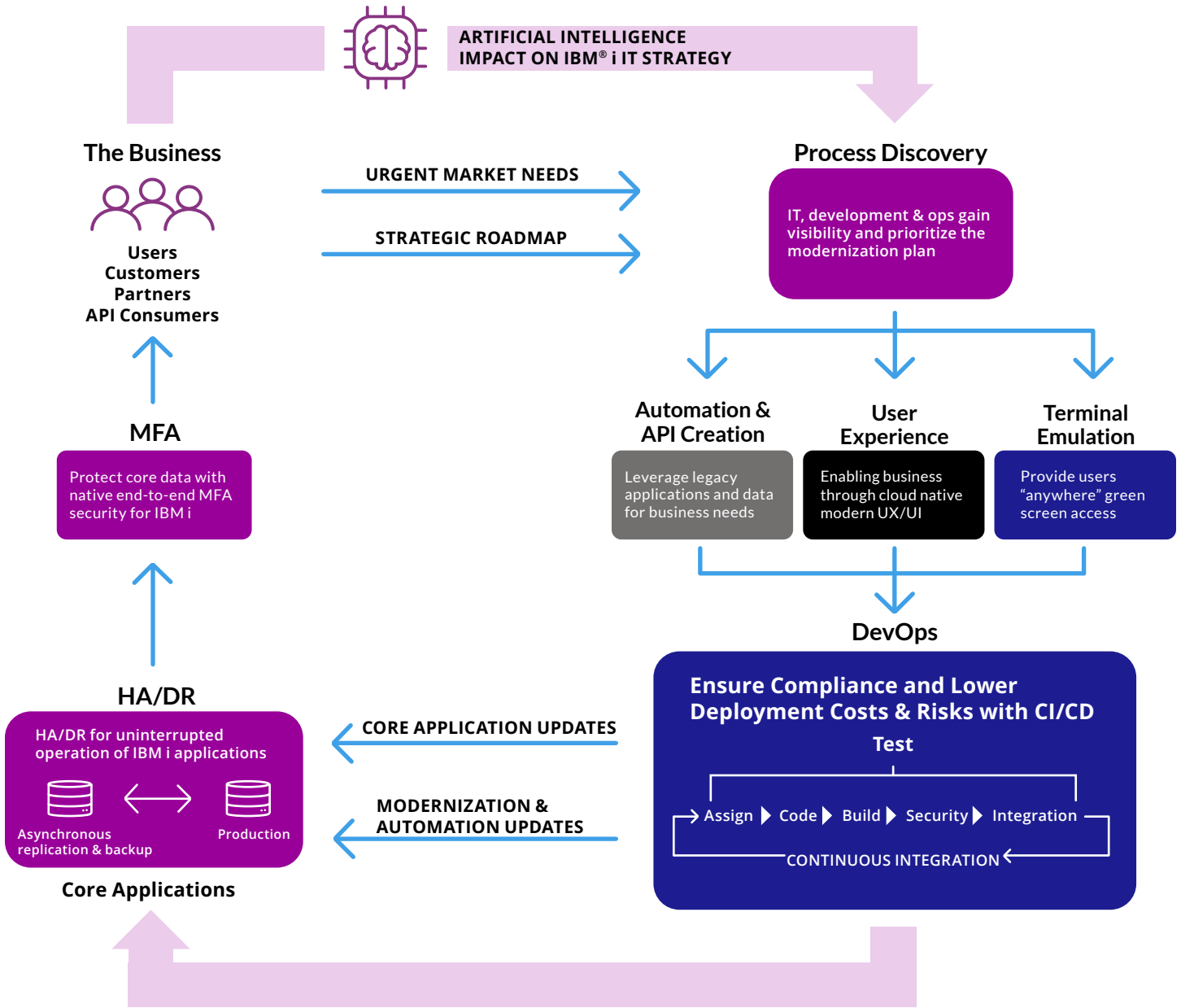
## AI in an IBM i world

There is a growing trend of organizations looking to IT teams as more than just a back-end department, expecting strategic alignment with business initiatives. Because of this, IT leaders have been looking for new ways to support the business with both innovative growth and cost reduction.

AI is quickly becoming a key tool in the IT toolbox for everything from fundamental IT functions to delivering new innovative options for the business to stay competitive. This is no less true in organizations that have IBM i systems.

We expect a spectrum of varying approaches to enabling AI on the IBM i. Some organizations likely will shy away from implementation, while others will double down on the strategy. One of the unique questions IBM i organizations will need to answer, though, is how AI change its approach to RPG. It is entirely feasible for AI to take over the development and testing of RPG applications, thereby minimizing the resource challenges for IBM i systems. In fact, AI could theoretically become the IT admin, developer, and QA team for RPG all rolled into one. In practice, however, we expect organizations to minimize the AI "black box" they build around their processes by including checkpoints where IBM i developers and admins review workflows and decisions to ensure they are in compliance, ethical, and are in line with how the business wants to operate. The question will likely become where is the equilibrium between human checkpoints and operational efficiencies that maps to the organization's risk level.





The impact of AI will be felt across the IBM i management and development and landscape.



More broadly, below are a few of the many capabilities AI enables for an IT organization. Then, we'll dive into specific functional use case examples within IBM i IT teams where leveraging AI could prove fruitful:



## Automating processes

We do some of this now through APIs and RPA tools. However, AI can also play a more advanced role in automating repetitive and time-consuming tasks, like data entry and fraud detection, potentially saving organizations time and resources.



## Chatbots

While one could consider this an automated process, we decided to call it out because chatbots directly impact more than just the business. Often automated processes are not necessarily seen by a customer. For instance, if you walk into a bank and ask to pull funds from your account, you don't interact directly with the automation built into the teller's workflow to help them withdraw your money faster. With a chatbot, though, the customer is the primary human interacting with the automation.



## Natural language processing

AI algorithms can analyze and understand natural language, such as in chatbots or voice assistants, allowing users to interact with IT systems more easily.



## Improving decision-making

AI can analyze large amounts of data and provide decision-makers insights they might not be able to uncover themselves.



## Monitoring and logging

AI-powered monitoring and logging tools can collect and analyze data from different sources, such as servers, applications, and network devices, allowing teams to identify and address issues proactively.



## Root cause analysis

AI algorithms can analyze data and identify the root cause of problems, such as performance issues and system failures, allowing teams to address the underlying issues and prevent similar issues from occurring in the future.

## Predictive analytics

AI algorithms can be used to analyze data and predict future trends and market conditions, helping companies to make informed decisions about which technologies to adopt.



## Data integration

AI algorithms can integrate data from different sources and formats, such as databases, spreadsheets, and APIs, allowing businesses to gain a unified view of their data and processes.

## Technology assessment

AI can assess the potential benefits and risks of new technologies, allowing companies to make informed decisions about which technologies to invest in.

## Technology integration

AI can facilitate the integration of new technologies into existing systems and processes, ensuring that the transition is smooth and efficient.

## Capacity planning

AI-powered capacity planning tools can predict future demand and optimize resource allocation, such as CPU, memory, and storage, allowing teams to ensure that systems run efficiently and cost-effectively.



# Creating new business models

AI's ability to identify patterns and trends can help organizations build new business models. Leveraging a chatbot for customer conversations is one option, but it AI may recommend new product lines based on how customers use current products and the support requests they create, for example.

## IT support

AI is already helping IT teams quickly respond and close service desk tickets through chatbot Tier 1 support, such as creating new accounts, onboarding, and login failures. There are other opportunities to improve core IT functions through AI today. Use cases such as software updates, system backups, and server configurations are ripe for intelligent automation.

Predictive maintenance is another critical area where intelligent detection and the removal of human error could result in significant risk reduction for businesses. For example, AI can predict when IT systems, such as servers and networks, are likely to fail, allowing organizations to perform preventive maintenance before issues occur.

## Application UX and workflow automation

Organizations are taking an evolutionary approach to application development, going from monoliths to API/ REST services and eventually to microservices via refactoring. To smartly modernize and automate applications and workflows, organizations want a detailed and accurate understanding of how they use IBM i applications and data. A thoughtful, data-driven assessment of IBM i application workflows enables you to gauge the time and effort required for your project and reduce the possibility of cost overruns. With greater visibility of your workflow and processes—we call this process discovery—you can identify hot spots for automation and modernization improvements to drive real value for the business.

Process discovery is the process of understanding how users engage an application and dataset, include the specific steps they take in workflows, what data are accessed when, how long they spend at certain points in the workflow, steps skipped, shortcuts used, and more. It is a prerequisite for accurate AI enablement. With data from process discovery, AI can support:

- **Modern UI:** In addition to making recommendations on the layout, a chatbot could be the new user interface to an application.
- **Application integration:** AI will integrate modern applications with other systems and services, such as APIs, databases, and third-party applications, improving interoperability and data exchange.
- **Microservices:** AI can identify opportunities to break up monolithic applications into smaller, more manageable microservices, improving scalability and flexibility.
- **Automation of modernization development:** If you are leveraging a process discovery tool, AI could be built to automatically generate the code, whether it's refactoring through API creation or making UI updates or anything in between. This would mean AI is not just identifying a hotspot of engagement within the application but also creating and building the code with a push of a button. There are even instances today of developers leveraging AI to develop the code and then push it to a Git repository.

## High Availability/Disaster Recovery (HA/DR)

AI has the potential to greatly enhance the effectiveness and efficiency of HA/DR. The use of AI can help IT teams quickly identify and respond to potential issues before they become major problems, as well as predict and prevent outages and disruptions. AI algorithms can also be used to automate many of the routine tasks associated with HA and DR, freeing up IT personnel to focus on more complex issues.

Additionally, AI can help improve the accuracy and speed of data backup and recovery, ensuring that critical systems and data are restored quickly in the event of a disaster. For example, if AI is aware of a DevOps instance and your team is deploying new code to certain libraries, AI could trigger a flag that the new code isn't part of the replication. AI could also make recommendations to remove latency, through, for example, staggering large database replications. Lastly, while AI can't prevent all downtime, it can help organizations quickly identify what data was lost and how long it will take to get back up and running.

## Hybrid 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.

Often when one considers cloud and AI, it's about how cloud providers are offering AI capabilities from their cloud. In fact, it's one of the benefits providers highlight about moving to the cloud.

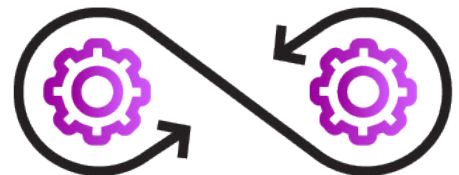
But, AI can also play a role in helping IT teams properly map the plan for moving to the cloud by analyzing several datasets, including historical process discovery. AI can identify the best strategy, such as a lift-and-shift or re-architecting. It can guide organizations to the largest ROI by finetuning where applications, data, and tools live and which workloads should move to the cloud versus staying on premise.

AI can also help with cloud resource management by recommending allocations like CPU, memory, and storage. Within resource management, AI can make additional recommendations for cost optimization, such as shutting off unused resources to shifting workloads to lower-cost regions.

## DevOps

More and more IBM i organizations are looking to DevOps best practices to help build resiliency into the business and accelerate innovation. DevOps is a complex, multi-faceted process of developing and deploying applications. One of its core mandates is automation, which makes it ripe for significant AI contributions.

Continuous integration and continuous delivery (CI/CD) is the practice of automating as much as possible across the DevOps process to get new code into production faster so that the feedback to development happens more quickly. That includes many development and delivery steps like build, test, and deploy. Once that continuous loop is set up, organizations have more freedom to innovate and experiment. An important part of CI/CD is automated testing, as without it, the cycle slows down, and the potential for errors entering production increases.



Testing and process discovery (as mentioned in a previous section) are evolving into not just standard steps in the DevOps process but, in combination with other technologies like AI, could push the envelope of what is possible, thereby revolutionizing DevOps processes as we know them today.

From a development perspective, in addition to the modernization recommendations mentioned above, AI could make recommendations on how to build the code, optimizing the code to improve performance and reduce the cost of running applications.

Process discovery takes the guesswork out of what you need to develop and what to test, accelerating the execution of automated testing.

For example, every time development updates code, AI can run predictive pass/fail tests before the code even heads to QA. AI could also offer suggestive improvements—becoming a quality assistant to the DevOps process—and flag what failed, explain why, then recommend what is needed to improve the code. In the future, we expect machine learning to take those suggested improvements and write the code, fix the bug, and rerun the tests. Machine learning could even find better ways to test the code and build those tests, further accelerating time to market.

## Security

One of the concerning implications of a world with AI is how bad-faith actors take advantage of the technology in their cyberattacks. There is a very real possibility that soon we'll see automated attacks where the AI exposes the vulnerability and automatically attacks without any human intervention. AI could be used in a social engineering attack, taking partial personal identifiable information (PII) and predicting the rest of the information to complete the PII.

While the mission to protect organizations against bad faith actors leveraging AI for their cyberattacks feels daunting, IT also has opportunities to use AI to better protect the organization. In fact, one could argue that there is a responsibility of IT to use AI to keep up with an increasingly aggressive and fast cyber security threat potential.

AI can also be used to enhance traditional security measures, such as firewalls and antivirus software, by providing additional layers of protection. Cybercriminals are already turning to ChatGPT and similar technologies to make their social engineering phishing more sophisticated and harder to distinguish.

With the increasing complexity and frequency of cyber-attacks, AI can improve detection by identifying security threats, such as malware, phishing attacks, and data breaches, in real time. AI can also initiate an automated incident response process, like triage and containment, potentially curbing the threat even before a human is aware.

AI-powered vulnerability management tools will identify and prioritize vulnerabilities in the IT environment, flagging serious security risks as a top priority so IT teams can focus on the most critical issues first to minimize the potential of exploitation. This could include big data analysis of security data, such as logs and network traffic, to identify patterns.

Often cyberattacks happen because of user error and/or substandard access controls. AI can support identity and access management and analyze user behavior to detect anomalies like unauthorized access attempts. It can also recommend where to improve to limit the ability to access sensitive materials without permission.

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# What are your next steps?

As an IBM i owner, you're probably wondering whether it makes sense to plan for AI and, if so, what steps you need to take to make it a reality. Below are the key considerations we'd recommend you review when determining your AI strategy within an IBM i environment.

Determine what type of IBM i company you are.

There are three different types of IBM i organizations:

1. Your IT environment is IBM i only for now and forever. You don't have other systems where you host applications and data; if you do, the other systems are incidental at best.
2. IBM i is the central system within your IT network, but you do have peripheral systems and places where you need to engage the applications and data on the IBM i.
3. IBM i is an important but not central system within your IT network. Other systems also host critical applications and data, and the organization is trending towards continued increasing complexity.

How would you answer that question today? How about five years from now? If you are the first type of organization and don't see that changing anytime soon, perhaps you don't expect to take advantage of AI capabilities. Most IBM i organizations, however, have been trending towards the second option, where the IBM i is central in the network. Organizations in the last type are large, often because of M&A activities. It's these last two types of IBM i organizations that could benefit from adopting modern IT best practices, of which AI is one (or will be soon). Organizations that are more like option three often are already on the path of planning how to take advantage of new technology or are planning to start down that path soon.

## Move towards agile development

If you're like most other IBM i teams today, you're on the path to agile product development, possibly dragging your RPG developers behind you, but on the path, nonetheless. If you want to take advantage of AI in some capacity, the need for agile processes is even more important than before. By design, AI is fast and iterative, as new data and outcomes must be fed into the algorithms continuously. AI will quickly break down into a waterfall development and process improvement approach.

This can sound overwhelming to a team still used to linear development and deployment processes; however, if the IBM i team speeds up the DevOps and modernization processes, the amount of data available to AI increases significantly. It also means feedback to the models is fast, allowing for better tuning of the model to the intended goal of its creation more quickly than if development was deploying code only once or twice a year.

## Build a data strategy...and stick to it

At its core, AI is a data synthesizer and juggler: it relies on high-quality historical data to feed the model and uses the data it receives to create uniquely aggregated outputs. Continuous data inputs then feed into the AI model, so adjustments are made to fine-tune its performance.

At a baseline, organizations need a data strategy to ensure the availability, quality, and security of their data, especially if that data are Personal Identifiable Information (PII). The strategy should include:

- Data governance policies—how do you handle PII and ensure biases are not built into models?
- Investing in data infrastructure
- Building an AI team to build and monitor models
- Training employees on best practices for data management



## Start collecting data now

Because AI will rely heavily on good historical data to get started, organizations must start collecting data now. The types of data you'll want to collect are:

- Copies of databases themselves
- Data on workflows—how did users engage the database and the applications?
- Information on how things work. For example, if you want AI to help process insurance claims for the United States, make sure it understands how insurance is regulated in the U.S.
- Language models

One of the easiest ways to get going would be to keep your audit logs each year. However, to collect all the relevant data, you will need a recorder that understands the ins and outs of the IBM i system. It should be able to track engagement with an application, such as libraries accessed, the application's business logic, and how it engages other applications, as well as the steps users take through an application.

## Envision how DevOps teams coordinate with data scientist teams

Typically data collection and R&D happen in different departments of a company— which makes for a potential disconnect, especially when considering time to market. To take advantage of machine learning within DevOps, the ML code should be promoted through the development cycle. There is a charge for DevOps teams to closely coordinate with any MLOps or ModelOps teams when deploying new software packages. DevOps could adopt AI engineering best practices to better align with MLOps/ModelOps teams.

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# Conclusion

In this paper, we mentioned dozens of ways in which IT teams can take advantage of AI; however, there already have been situations where the limitations of AI are concerning. In fact, there was a letter published in Spring of 2023 and signed by hundreds of leading engineers and scientists, including Steve Wozniak—founder of Apple, pushing for a halt of AI model development for six months. The goal is to give the industry time to review and provide recommendations on policies and procedures that address the serious ethical challenges AI introduces to the world economy, not the least of which is human displacement from the workforce. In addition, governments are starting to ban the use of ChatGPT. Italy announced a temporary halt of the “...processing [of] Italian users’ data amid a probe into a suspected breach of Europe’s strict privacy regulations.”

Other challenges of AI that have already been experienced stem from unconscious bias being built into the AI models. For example, because AI execution is directly related to the data you use to teach the model, there have been instances where biased data influenced its behavior in such a way that it was labeled racist and sexist. Governance around what data we use to train AI and how we manage that data is paramount if organizations don’t want a PR disaster on their hands.

Many of the concerns of AI are driven by the limitations of the technology, specifically:

- **AI has no common sense:** It cannot understand context and meaning, which can lead to errors and misinterpretations, as evidenced by the example above.
- **The high cost of training and managing AIs:** Not only do you need a large amount of accurate, high-quality historical data for AI to work well, but you also need to continue to feed it quality data so the models can be finetuned to work better over time. The probability of biasing the AI is high if one isn’t careful.
- **Code ownership:** AI doesn’t create anything new; it generates answers based on what it’s seen in the data it’s given. Who owns the code if a development team decides to use AI to build code, and the AI’s data input includes third-party code? There’s a potential liability for businesses here that could create an issue if that AI-built code is used externally.
- **Transparency:** AI algorithms can be complex and difficult to understand. We know the inputs and the outputs, but sometimes there is a “black box” of decision-making happening within the AI. This complexity will only grow over time, and the risk this black box poses will grow, too, as AI evolves to not just decision-making but execution, as well, without manual review.

Despite these real concerns, IBM i teams have an opportunity to evolve IT practices in a way that not only delivers significant value to the business today but also sets the organization up for accelerated innovation and success tomorrow. There is no doubt that would include AI.

**The question is: will your organization be ready to take advantage of it?**



## Rocket Software

With Rocket Software, IBM i teams all over the world deliver the highest ROI to the business by supporting innovation and driving down costs, without the need for domain or code expertise in-house.

With Rocket Solutions for IBM i, customers are:

- Initiating data-focused modernization projects with full visibility into what automation, integration, and user experience improvements will make the biggest impact on the business, then executing those recommendations with the click of a button
- Enabling DevOps best practices within IBM i+ environments to deliver comprehensive, holistic compliance reporting, automate testing to enable CI/CD and get code to production faster without degradation of quality, and encourage innovation that delivers a better experience to users, customers, and partners
- Minimizing IBM i system and application downtime to minutes instead of hours, ensuring teams can access the data and applications critical to operations
- Building a layered defense against IBM i systems, applications, and data to minimize security risk to the business

## 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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