

Infuse IBM Artificial Intelligence

Field Guide



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IBM Artificial Intelligence Field Guide



<https://ibm.biz/ibm-infuse-artificial-intelligence-field-guide>

Infuse AI to realize your potential

Artificial Intelligence (AI) is a powerful set of software engineering data techniques that enable you to make sense of vast amounts of data and apply it to your business problems. With AI, seize the moment to update aging applications, improve processes, and use the power of AI to increase customer satisfaction.

AI + AGILE = SUCCESS

Automate business processes to improve efficiency & reduce expense. Rethink your business processes to take advantage of data science and AI to improve human decision making at speed and scale.

Create an exceptional customer experience. Gain insight into customer behavior to improve their experience. Make investment decisions based on the insights you learn through data science that reveal what your customers care about.

Gain a stronger competitive position. Weave AI into your enterprise and turn data into actionable knowledge to answer forward-thinking business questions. Transform the way your business runs with trust and transparency.

What's inside?

This field guide provides a high-level overview of IBM's strategy to infuse AI into your apps and business processes.

LEARN IT

A summary of the concepts.

GET STARTED

Tips to start the journey to infuse AI into your enterprise.

Compete and innovate at speed

Adopt AI and data science at scale to transform your enterprise. The IBM AI Ladder defines the dimensions of AI transformation: collect, organize, analyze and infuse. In the infuse dimension, you transform your business by applying AI in a trustworthy and transparent way.

ESTABLISH YOUR GOALS FOR INFUSING AI

Improve customer experiences with chatbots. Create chatbots for IT operations to improve customer service. Use AI to understand how your customers react to your brand so you can create a positive image.

Empower people to focus on high value work. Free up time for your employees to focus on important customer-focused and added-value activities.

Drive AI into operations. Enable your IT operations team to solve the hard problems, like forecasting outages and predicting events.

Re-imagine new business processes. Examine your current business processes and identify where AI can set the organization on a path of interweaving AI into your development and business.

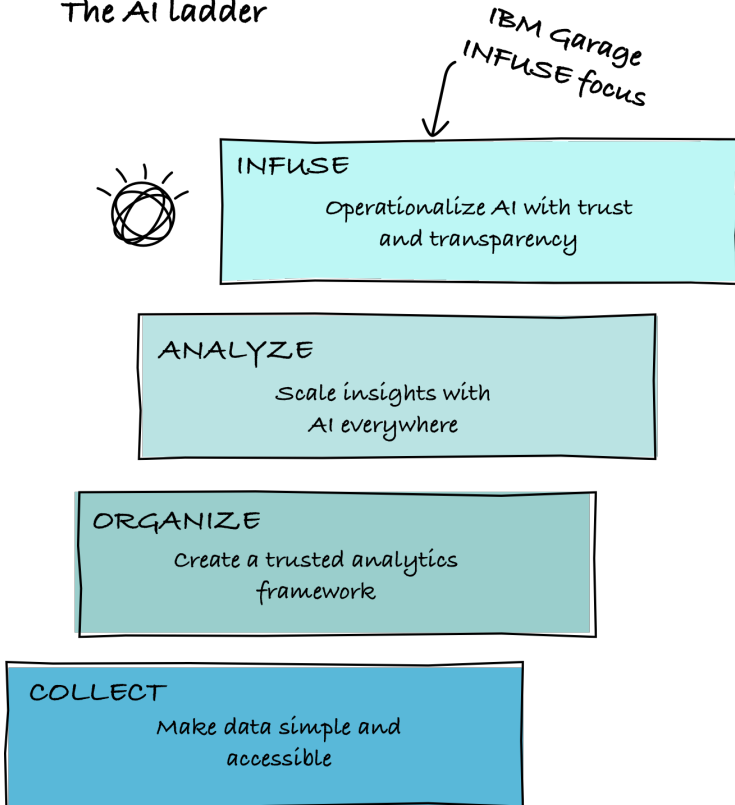


Learn more

Read about the AI Ladder.

<http://ibm.biz/ai-ladder-book>

The AI ladder



Start with a large number of small projects to realize quick wins and build your AI knowledge with the goal of expanding AI throughout your enterprise.

Adopt the AI lifecycle

To succeed with adding AI into your application development or modernization, you have to understand that the AI development lifecycle is unique. The IBM Garage methodology informs the stages of the AI lifecycle: scoping, understanding, building, deploying, and operating. Then, prepare to succeed with the combination of deeply skilled people, a full life cycle process, and the right technology for AI development, deployment, and operations.

UNLOCK THE BUSINESS VALUE HIDDEN IN YOUR DATA

Scope & understand to solve the right problem. Ensure that the initial problem statement is suitable for AI, representative data is available in a usable form, and the result can be used in your workflow. As you explore, refine the plan and assess your risk.

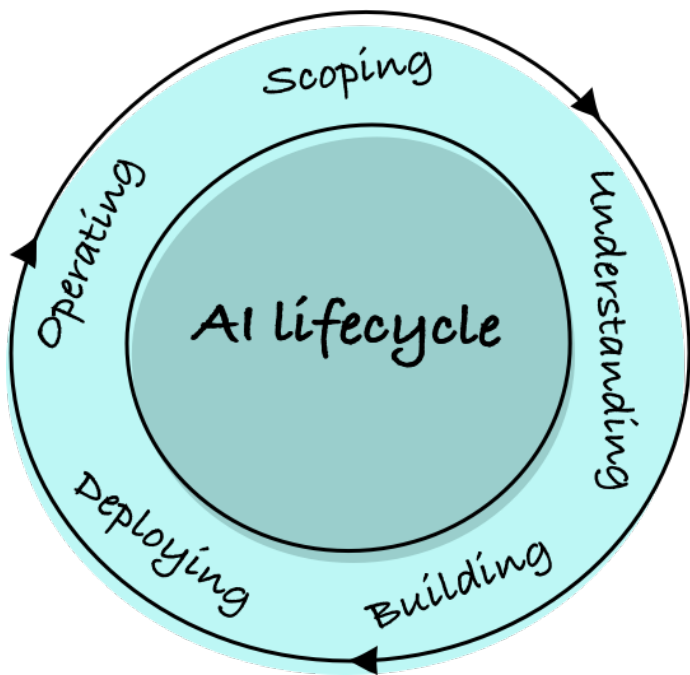
Build & deploy the model. Establish a pipeline that automates as much as possible. Validate the accuracy of the model and deploy into the pre-production and production environments with the right configuration. Make sure you measure the accuracy of both the model and the application that uses it.

Operate & maintain the model. Continuously build trust and manage drift. Drift occurs when the data coming into your model has different characteristics than data originally handled by the model.



Read about the AI lifecycle.

<https://www.ibm.com/cloud/architecture/architecture/practices/method-for-developing-intelligent-apps>



Achieve operational value - don't simply be a science experiment.

Solve world problems with AI

It is easy to see and feel the incredible impact of AI in the real world. From recommendation systems to prediction engines, businesses reap the benefits of applying data science algorithms and methods for prediction, automation, and optimization. Infuse AI into your existing applications to improve the ability of your app to solve complex problems, provide better insight and a better experience.

BUILD SMARTER SOLUTIONS

Predict and forecast to solve the world's most complex problems.

From tracking a pandemic-to sifting through volumes of medical information-to recommending treatments for disease, data science algorithms are key to solving the most complex data-driven problems.

Gain insight by processing large amounts of data. Understand how your customers feel. From healthcare, to telecommunications, to banking, to entertainment, to many other industries, the infusion of natural language processing fosters better decision making and action planning.

Provide better experiences. Use AI to improve your business processes and provide a better experience for your customers, employees, and decision makers. Use chatbots to improve customer service. Integrate them with discovery capability that goes beyond a simple conversation.



Learn more

Read about IBM Watson® Assistant.

<https://www.ibm.com/blogs/watson/2020/05/building-the-complete-virtual-assistant-with-watson-assistant/?ite=101797&ito=2875&itq=7dd87f0e-c41a-45ef-a7aa-00e064149680&itx%5Bidio%5D=144156811>

Tracking and forecasting the pandemic

- 1st wave: actual
- 2nd wave: predicted



AI takes predictive analytics to the next level.

Predict, automate, optimize

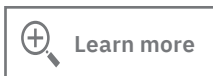
The Infuse rung of the AI Ladder enables you and your company to bring together humans and AI technology to build intelligent workflows around customer service, deliver intelligence to planning and forecasting, and automate IT and operations. AI solves real-world business problems. It can predict, optimize, and automate your processes and make your business and your people more effective.

ENABLE HUMANS TO MAKE BETTER DECISIONS

Predict and forecast. Design and co-create MVPs on IBM Cloud® using Watson Studio to ensure data context and full understanding of a problem. For example, remove cumbersome tasks to increase revenue and match inventory to consumer needs. Prove in a statistically significant way that the inventory can match to consumer wants.

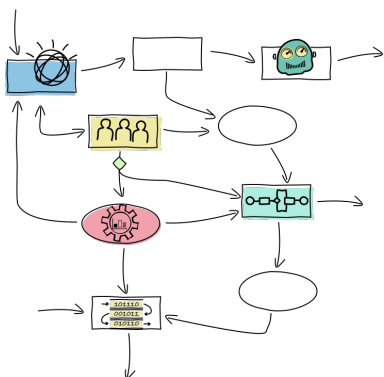
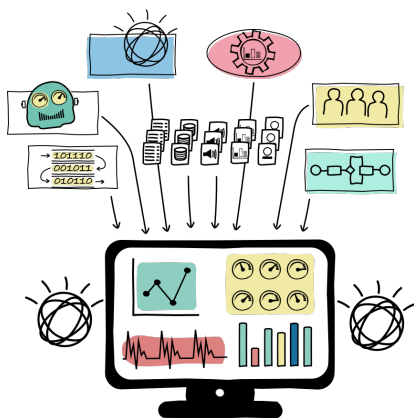
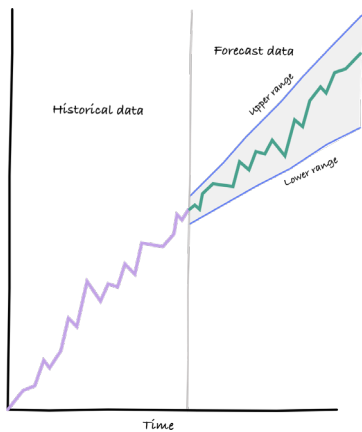
Automate. Speed up processes to become more automated and efficient by combining the best of humans and machines to generate business value based on learning and insights.

Optimize. Operationalize AI throughout the business. You can, for example, build a chatbot to modernize an existing process flow or UI and provide additional capabilities to the business.



Read about the Watson AI pattern.

<https://medium.com/ibm-watson/generate-sales-leads-predict-winning-ops-drive-product-improvement-all-with-this-watson-pattern-245d0978f448>



As you start your modernization efforts, make AI a part of the team.

Predict and forecast

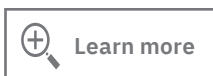
Time series analysis, predictions, and classical algorithms have been used for decades. Time series problems require three main tasks when making a prediction from data and models: Trend Analysis, Feature Correlation Study, and Forecasting. As data grows in velocity, volume, and variety, it is best for models and humans to handle the challenges together, considering cost effectiveness, time reduction, and prediction accuracy.

PREDICT THE FUTURE BASED ON THE PAST

Analyze the past for trends. Understand the characteristics of a trend and discover insights from time series data. Conduct a simple statistical analysis to understand stationarity, moving average, etc. Break down the time series further to get the main trend direction, seasonal component, and random spikes.

Study correlations between variables. When temporal data is available, study the correlations between the features (variables observed) and the targets (variables to predict).

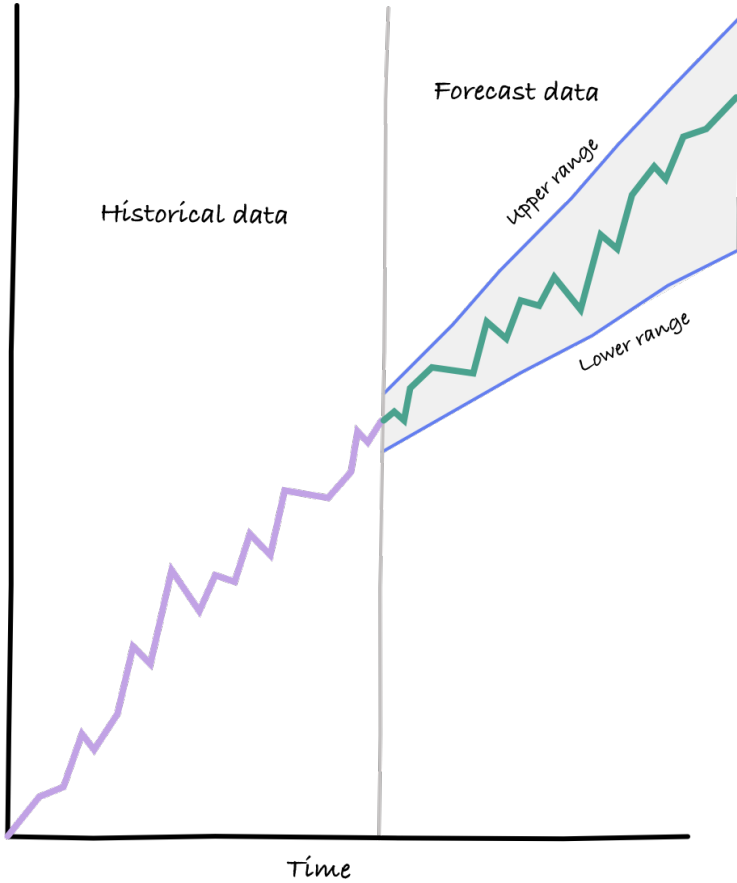
Forecast the future. Recognize and extract the pattern in a time series and use a model to predict future values based on time series data. The future value can be a number (eg: USD 1 million in demand), or a category (eg: “buy”, “hold”, and “sell”) at a particular date and time.



Read about how to use AI in your enterprise.

<https://www.ibm.com/thought-leadership/institute-business-value/report/build-cognitive-enterprise>

Modernize your applications to predict and aid humans in forecasting.

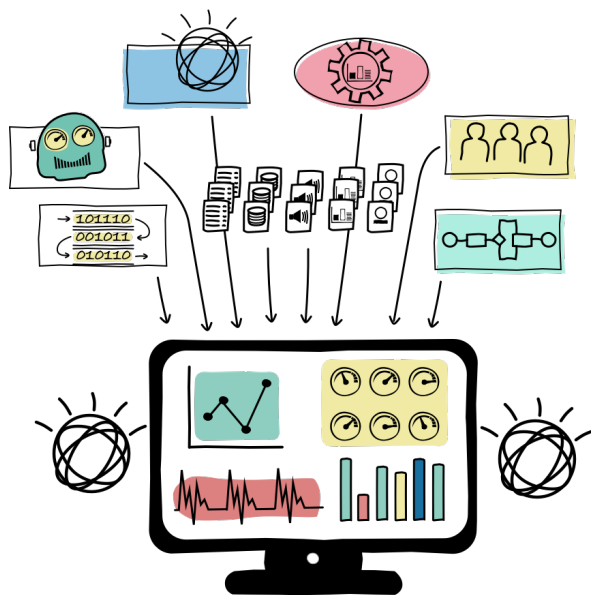


Clearly understand historical data and predict what the future holds.

Create synergy between humans and technology

By putting AI to work, you discover how humans can best work with technology, including how humans can speed up and automate processes to be more efficient. In parallel, the organization and resources define the new skills and capabilities needed to create more synergy between humans and technology.

ACHIEVE THE GREATEST CUSTOMER VALUE EVER

[Learn more](#)

Overcoming AI bias.

<https://aisutra.com/on-overcoming-ai-bias-1f3a6e49881b>

Improve efficiency and expand skills. Design and develop automation into the applications. In real time, when an anomaly is detected, rely on an AI model to produce system recommendations that predict critical events up to an hour before they occur. The AI model either performs an action or informs operators, who can then respond proactively to reduce risk, maintenance costs, and downtime.

Focus on learning. Feed data to the AI-driven system to enable it to solve problems with human-like thinking. AI models analyze the complex system readings and provide useful insights about operations, effectiveness, and safety. The AI system analyzes knowledge from a variety of sources to provide operators with information and insights to continue to learn and adapt operator actions.

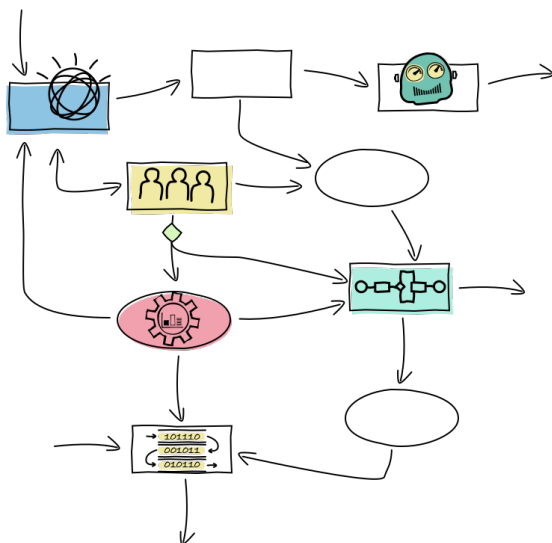
Develop insights and make recommendations. Experienced engineers with deep technical knowledge that represents decades of enterprise skills and experience train the AI models to learn and make recommendations. This combination of the best of machine and human capabilities has the potential to generate business value by turning complex and big data into actionable insights.

Make AI an essential component in your modernization strategy.

AI: part of your modernization solution

To infuse AI into your applications and operations, start with prebuilt AI applications that can easily be adapted to your business situation. Infusion means that advanced AI models are woven into the fabric of an application or system, driving new or improved business capabilities.

TAKE AI BEYOND A SCIENCE PROJECT

[Learn more](#)

Read about the Cognitive Enterprise.

<https://www.ibm.com/downloads/cas/JKJA41PW>

Consider the following example, which walks you through how AI can be used to build a conversational chatbot for HR.

Optimize the HR process and customer experience. Through an Enterprise Design Thinking workshop, an MVP for a conversational HR assistant was defined. In the workshop, the main pain points of the current experience and the goals of the MVP were defined. The goals included an application that had a simple and intuitive interface to guide the user by responding to their questions.

Operationalize your solution with a chatbot. The team created the HR assistant chatbot, an intelligent application. It provides a combination of capabilities, including accessing the deployed model and APIs. The existing application was modernized with a bot. The user interface would only accept input and respond using text.

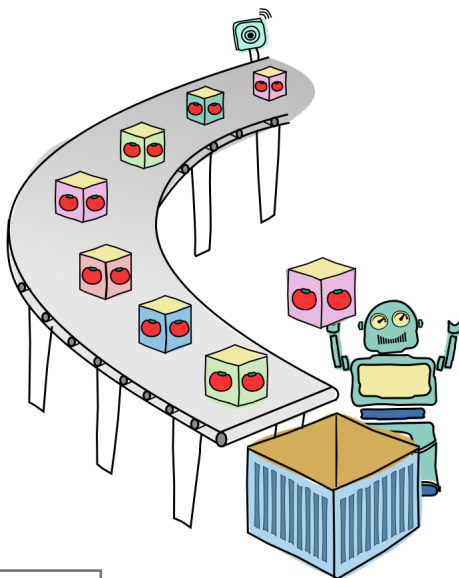
Design the solution architecture. The application architecture consists of a mobile web client, a REST API running on IBM Cloud, back end services on IBM Cloud and on-premises at a leading provider of technology-enabled HR services company.

Next steps. Customize the solution for resale to transform the HR department to a strategic value-add organization.

Supply chain application re-imagined with AI

Kraft Heinz is driven by finding new products, improving the current ones, and getting them to the consumer at the right time. With the IBM Garage™, they built solutions to update their existing supply chain application with an AI approach to identify fast flow areas of the supply chain and eliminate the manual human efforts to check inventory levels.

REMOVE RULES-INTENSIVE CODE WITH AI



Learn more

Learn how to get started with AI.

<https://developer.ibm.com/technologies/artificial-intelligence/gettingstarted/>

Kraft Heinz inventory. Kraft Heinz and IBM Garage have embarked on a journey to improve products, drive better in-store promotions through product placement, find ways to speed products to market, and ensure the right product is at the right store at the right time. The 150-year-old company has become increasingly competitive by modernizing their supply chain application with AI to alert local sales when product inventory is getting low and trigger an automatic reorder.

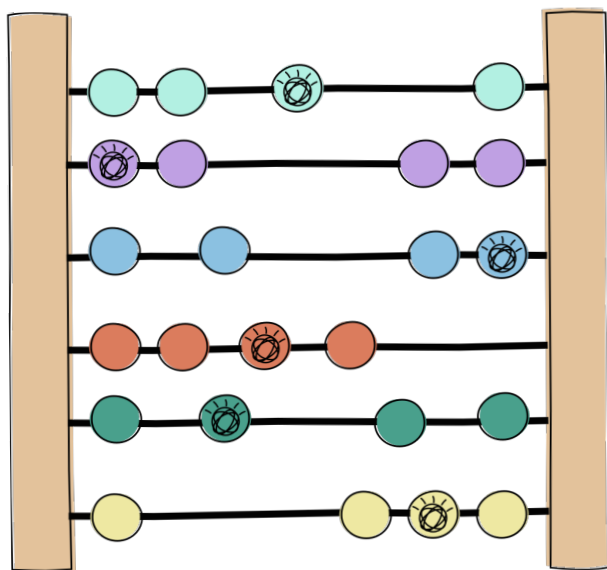
Enterprise Design Thinking at Kraft Heinz. In the workshop, the team identified rules-intensive code and replaced it with AI technology. This resulted in a solution that could take intelligent actions in a more efficient and near-human logical way. Breaking down the business challenge to the application level and identifying labor-intensive workflows enabled Kraft Heinz to create cloud native applications using AI models. The applications improve the visibility of product levels at stores and businesses and reduce cost and time in the interactions with their worldwide sales team.

Kraft Heinz customer experience. By re-imagining the needs of the consumer, leveraging AI in the sales application and the shifting to the cloud, Kraft Heinz is learning how their employees can be engaged differently in the workflow that drives the customer experience to ensure the product is where it is needed.

AI services for developers

IBM's suite of AI services takes the complexity out of your journey to AI and provides seamless integration through Watson services. The services provide pre-built models and a user-friendly way to create custom models and provide built-in support for regulatory requirements like HIPPA and GDPR, free-to-use offerings, learning paths, tutorials, and videos.

POWER TO THE DEVELOPERS!



Infuse AI into your applications.

<https://www.ibm.com/watson/products-services>

Watson Assistant. Use an AI conversation chatbot platform that helps you provide customers fast, straightforward and accurate answers to questions, across any application, device or channel with no coding experience required.

Watson Discovery. Implement AI search technology to break open data silos and retrieve specific answers to your questions while analyzing trends and relationships buried in enterprise data.

Watson Visual Recognition. Extract thousands of labels from your organization's images and detect specific content out-of-the-box.

Watson Natural Language Understanding. Use deep learning to extract metadata from text such as entities, keywords, categories, sentiment, emotion, relations, and syntax.

Watson Speech to Text. Use deep-learning AI algorithms to apply knowledge about grammar, language structure, and audio/voice signal composition to create customizable speech recognition for optimal text transcription.

Watson Text to Speech. Convert written text into natural-sounding audio in 7 languages and 27 different voices and tones to improve your customer's experiences and engagement.

Watson Language Translator. Dynamically translate news, patents, or conversational documents.

Watson Natural Language Classifier. Build text classification models, quickly and easily, to label and organize data into custom categories without the need for a data science or machine learning background.

Watson AIOps. Provide a clear view of anomalies, with links to sources for faster investigation and resolution. Correlate disparate data across your toolchain to derive hidden insights and help you identify incident root causes faster.

AutoAI. Prepare and process large datasets and make predictions in real time. AutoAI provides model selection, evaluation, and deployment with Watson Machine Learning (WML) to help with end-to-end ML and AI development.

IBM Cloud Pak for Data

Natively built on the Red Hat® OpenShift® Container Platform, IBM Cloud Pak® for Data provides optimized hardware to increase container performance and accelerates time to value of your workloads. With the right building blocks, deploying and monitoring your solutions becomes easy, efficient, and repeatable enabling you to truly operationalize and scale AI.

PREPARE DATA FOR AN AI AND MULTICLOUD WORLD

Infuse AI into your enterprise. Build automation, predictions and optimization into your applications and processes.

Eliminate data silos: Connect all data. Handle big data and make queries across multiple data sources fast and simple without moving data. Manage all of your data wherever it lives.

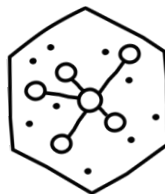
Operationalize AI with trust and transparency. Improve outcomes with trusted data. Simplify data governance so data scientists, developers, engineers, and business experts can improve business outcomes.

Automate and govern the data and AI. Gain visibility into your data landscape. Benefit from tools that manage, mask, and prevent data misuse. Simplify data policy, protection, and management with automated tools and machine learning.

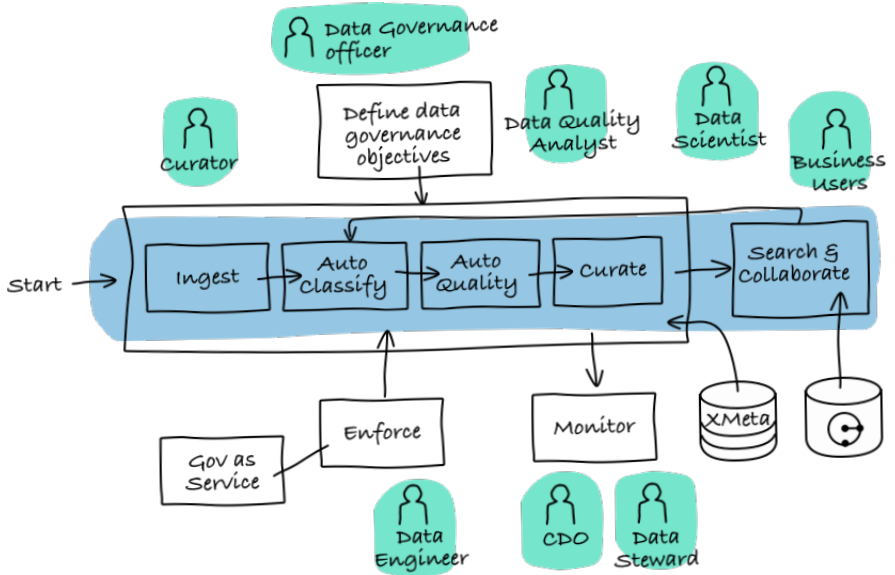


Check out IBM Cloud Pak for Data.

<https://www.ibm.com/products/cloud-pak-for-data>



Eliminate data silos.
Connect all data.



Set the foundation of AI-driven business.

IBM Garage: Accelerate your journey

The vast potential of how AI can help increase process efficiencies and drive business growth is exciting. But AI is not like a switch that can be flipped, it's more like a living organism that requires sustenance, care, and nurturing.

AI CAN THRIVE IN YOUR ENTERPRISE

Define a good AI strategy. Focus on the AI implementation of technology, which engages teams to embrace AI throughout the organization and modernize applications and operations. Executing on your AI strategy can help to grow the business, create positive customer experiences, and deliver on IT goals.

Foster a culture of innovation. Be open, collaborative, agile, and embrace change. Accept and learn from failure.

Establish your information architecture. Information architecture enables users across the company to build and deploy solutions at scale while complying with applicable regulations.

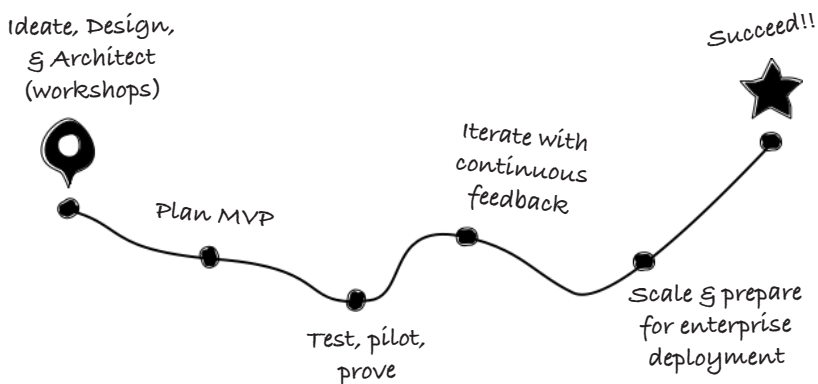
Implement your strategy on cloud technology. Your organization needs an affordable, effective, and flexible platform to meet the varying needs of each solution at any level of AI maturity. Build and evolve your platform and technology stack along with your AI maturity on the cloud.



Check out the IBM Garage.
<https://www.ibm.com/garage>

Engage IBM Garage!

AI roadmap



IBM Garage is a trusted partner, providing technology and prescriptive guidance to deliver immediate business value.

Notes:

Learn more about IBM Cloud Paks

<https://www.ibm.com/cloud/paks/>

IBM Cloud Pak for Data: Get started!!

<https://www.ibm.com/products/cloud-pak-for-data>

Learn more about Watson Services!

[https://www.ibm.com/demos/
search?query=%22IBM%20
watson%22&lc=en](https://www.ibm.com/demos/search?query=%22IBM%20Watson%22&lc=en)

Learn more about Red
Hat OpenShift

<https://www.openshift.com/>

Get Technical with the IBM Cloud
Architecture Center

[https://www.ibm.com/cloud/garage/
architectures](https://www.ibm.com/cloud/garage/architectures)

Connect to the user community.

[https://community.ibm.com/community/
user/datascience/communities/community-
home?communitykey=f1c2cf2b-28bf-4b68-
8570-b239473dcbbc&tab=groupdetails](https://community.ibm.com/community/user/datascience/communities/community-home?communitykey=f1c2cf2b-28bf-4b68-8570-b239473dcbbc&tab=groupdetails)

See the application modernization
architecture.

[https://www.ibm.com/cloud/architecture/
architectures/application-modernization](https://www.ibm.com/cloud/architecture/architectures/application-modernization)

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IBM Artificial Intelligence Ladder

The AI ladder

IBM Garage
INFUSE focus



INFUSE

Operationalize AI with trust
and transparency

ANALYZE

Scale insights with
AI everywhere

ORGANIZE

Create a trusted analytics
framework

COLLECT

Make data simple and
accessible