

# IBM Watson Studio & Watson Machine Learning Overview

*Simplify, Scale, and Speed your  
Enterprise AI initiatives*

Joel Patterson  
October 30 2019

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# Agenda

IBM Enterprise AI Portfolio

Watson Studio & Watson Machine Learning Overview

Add-ons and Integrations

Product Demonstration

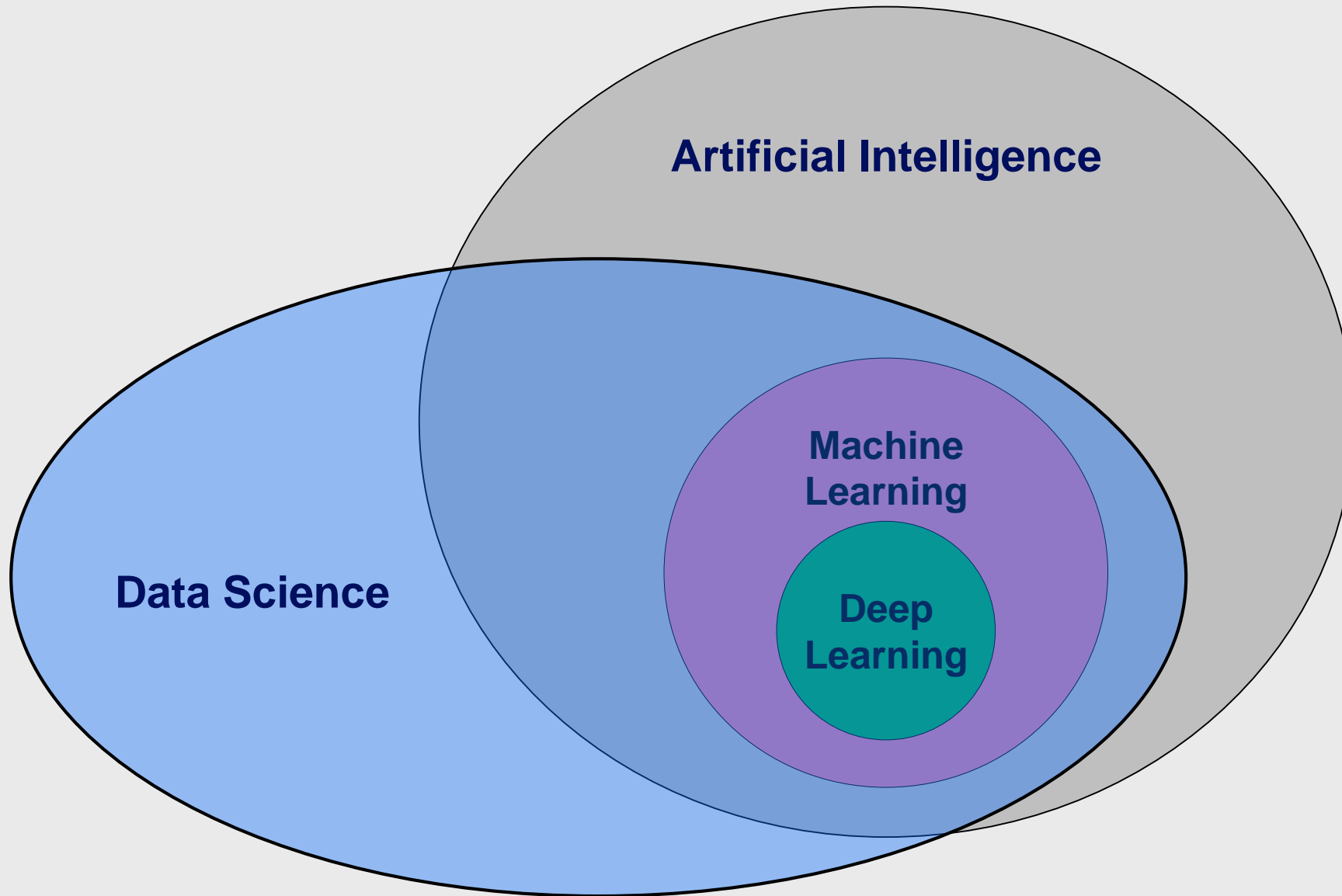
WSL Labs

Why Watson Studio & Watson Machine Learning

Next Steps

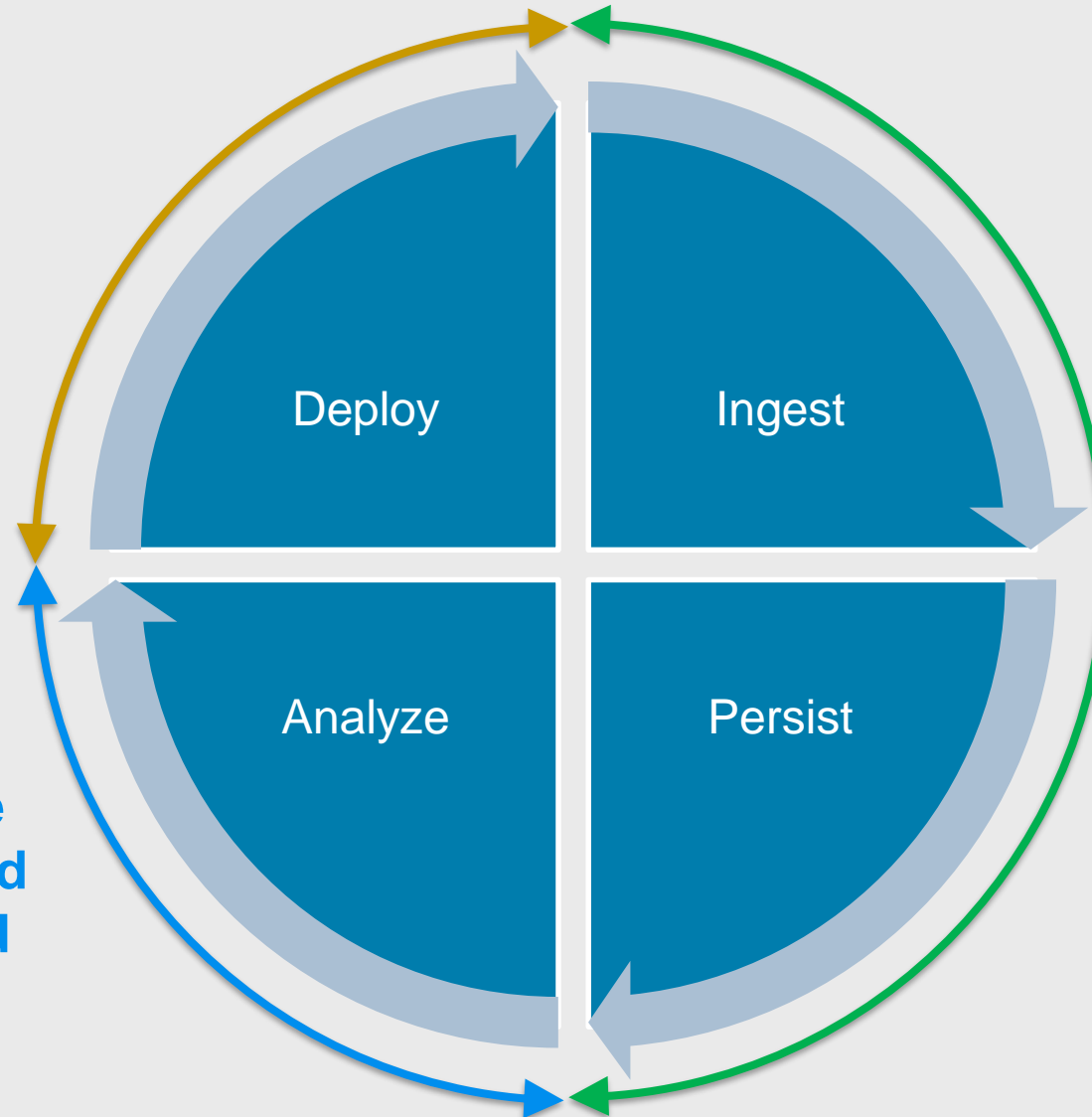
# **IBM** **Enterprise** **Data Science** **and AI** **platform**

# Data Science, Machine Learning, Deep Learning and AI



# Anatomy of a Data Science Application

- **User interface front end for business-user and end-user interaction**
- **Deployed data science models run here**
- **Data scientists collaborate, explore data sets, create and monitor models and use algorithms to produce results**



- **Collect and save data from internal and external sources**
- **Manipulate, govern and expose data sets**



# MODERN DATA SCIENTIST

## MATH & STATISTICS

- Machine learning
- Statistical modeling
- Experiment design
- Bayesian inference
- Supervised learning: decision trees, random forests, logistic regression
- Unsupervised learning: clustering, dimensionality reduction
- Optimization: gradient descent and variants

## DOMAIN KNOWLEDGE & SOFT SKILLS

- Passionate about the business
- Curious about data
- Influence without authority
- Hacker mindset
- Problem solver
- Strategic, proactive, creative, innovative, and collaborative



## PROGRAMMING & DATABASE

- Computer Science fundamentals
- Scripting language (Python)
- Statistical computing packages (R)
- Databases: SQL and NoSQL
- Relational algebra
- Parallel databases/query processing
- MapReduce concepts
- Hadoop and Hive/Pig
- Custom reducers
- Experience with xAAS

## COMMUNICATIONS & VISUALIZATION

- Able to engage with senior management
- Story telling skills
- Translate data-driven insights into decisions and actions
- Visual art design
- R packages like ggplot or lattice
- Visualization



# Data Scientist Challenges & Pain Points

## Rigid toolsets mean...

- Have to choose one and only one approach
- Cannot easily connect all of the capabilities required
- Difficult to navigate between the various tools used

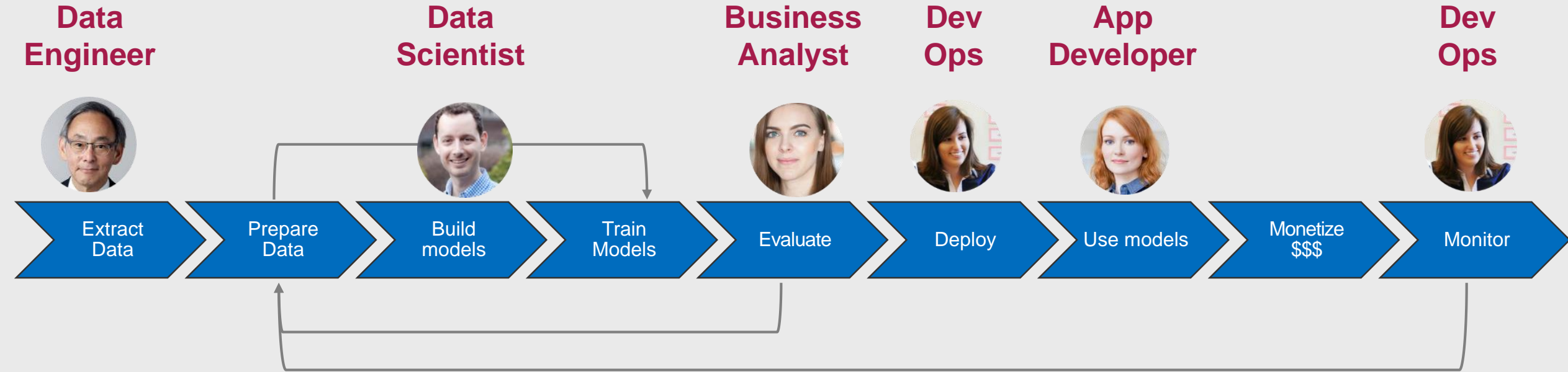
## Fragmented environments mean...

- Excessive time spent on multiple disjointed environments
- Separate on-ramp/community for each tool/environment
- Does not have meta data or data lineage

## Analytical silos mean...

- Difficult to maintain and version control project assets
- Limited means of collaborating with teams
- Results are difficult to share

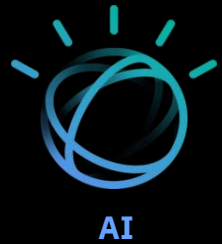
# Data Science is a Team Sport



Building cognitive applications using ML and DL  
**requires multiple skillsets and collaboration**

# The AI Ladder

A prescriptive approach to accelerating the journey to AI



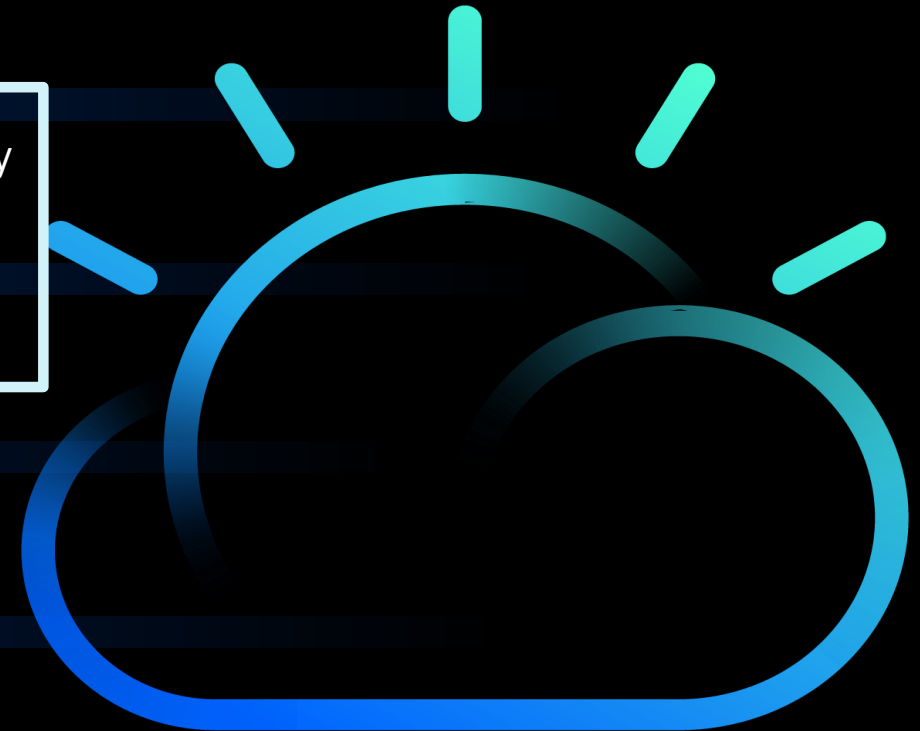
**INFUSE** – Operationalize AI with trust and transparency

**ANALYZE** - Scale insights with AI everywhere

**ORGANIZE** - Create a trusted analytics foundation

**COLLECT** - Make data simple and accessible

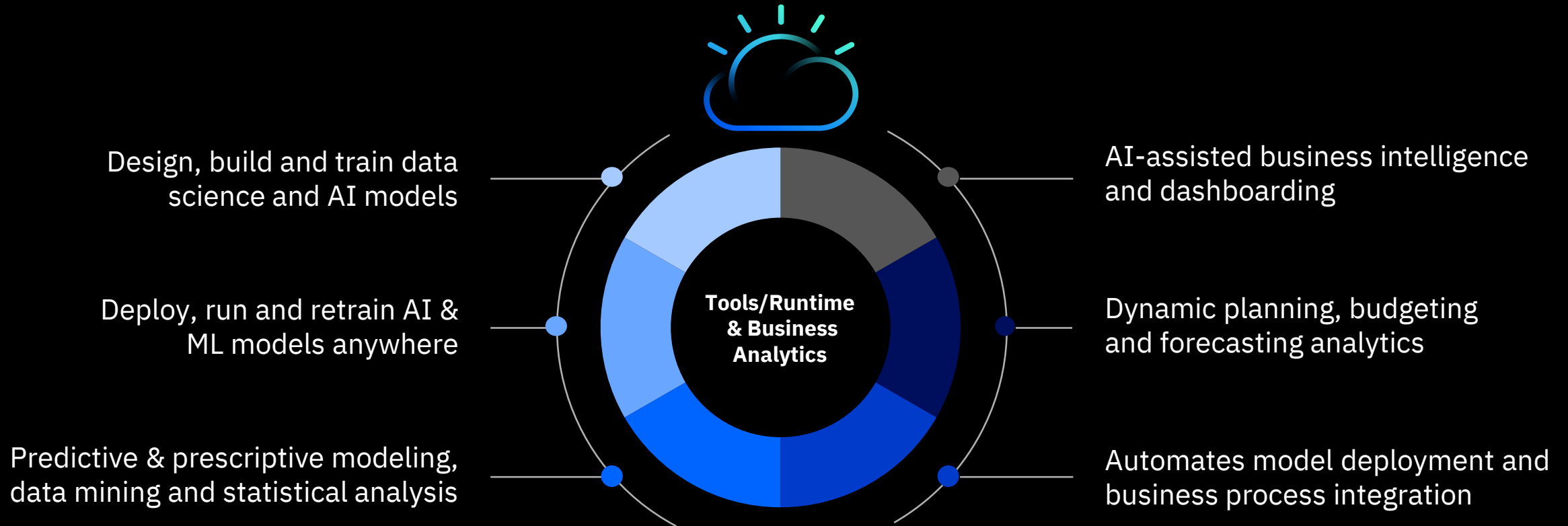
Data of every type,  
regardless of where it lives



**MODERNIZE**  
your data estate for an  
AI and multicloud  
world

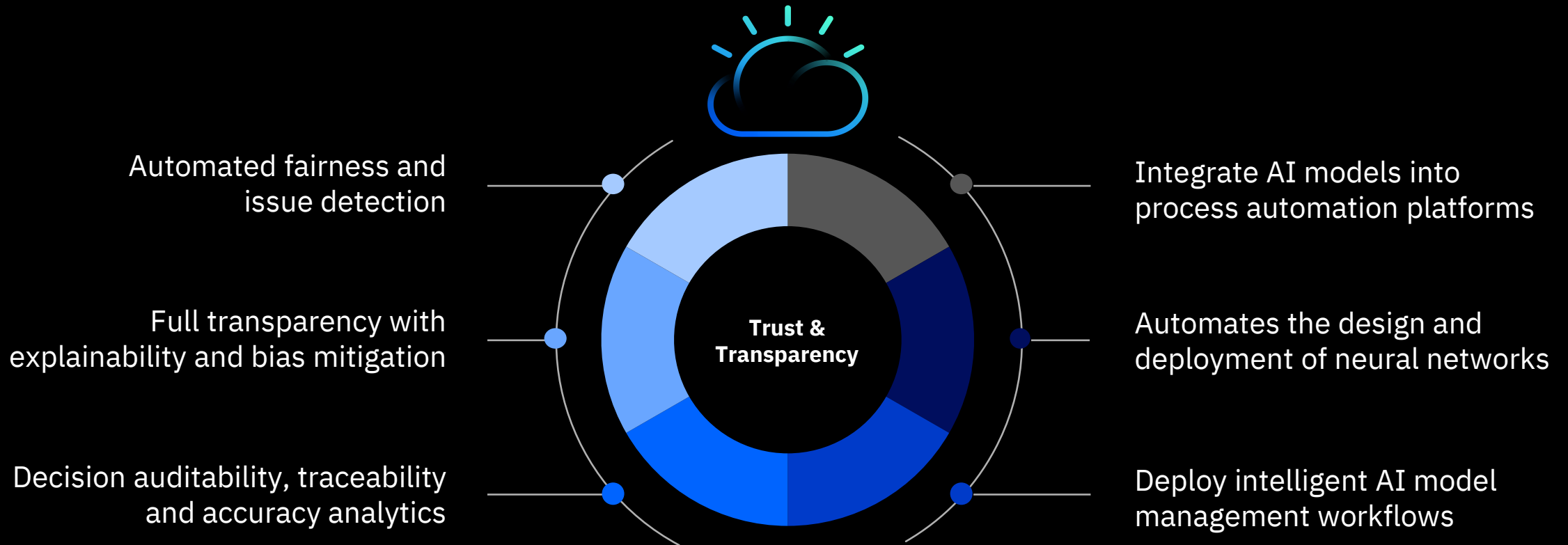
# Analyze Data

Scale insights on demand  
with AI everywhere



# Infuse AI

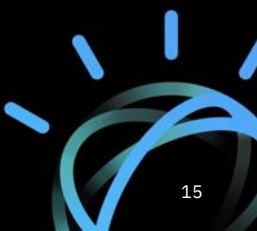
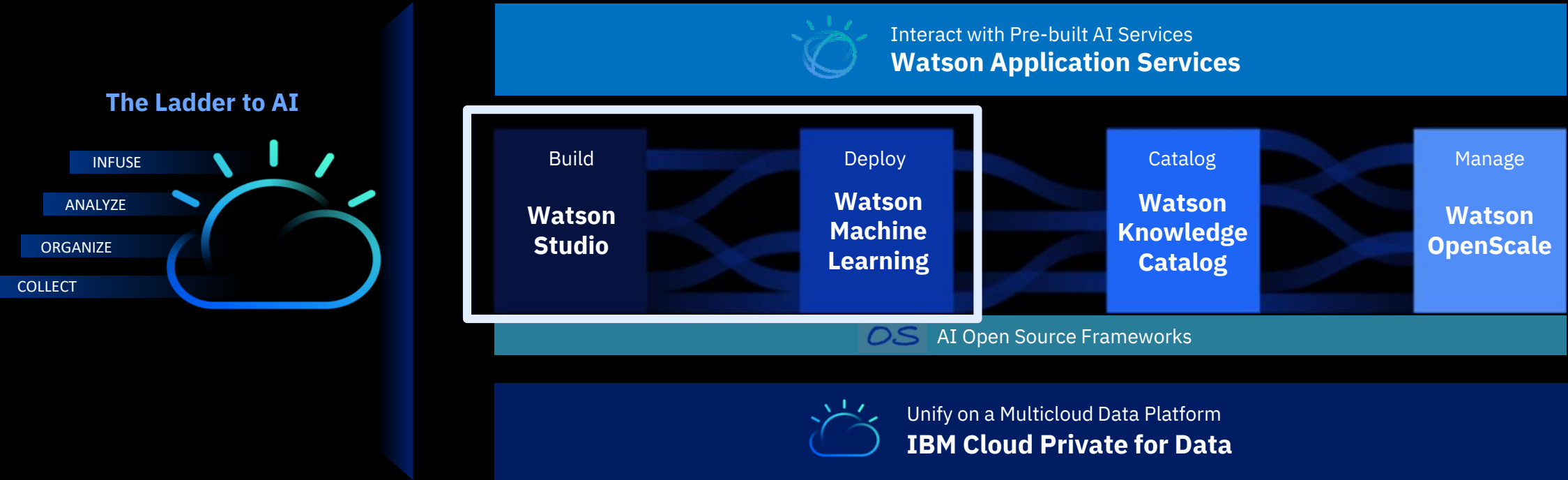
Operationalize AI with trust and transparency





# IBM AI Portfolio

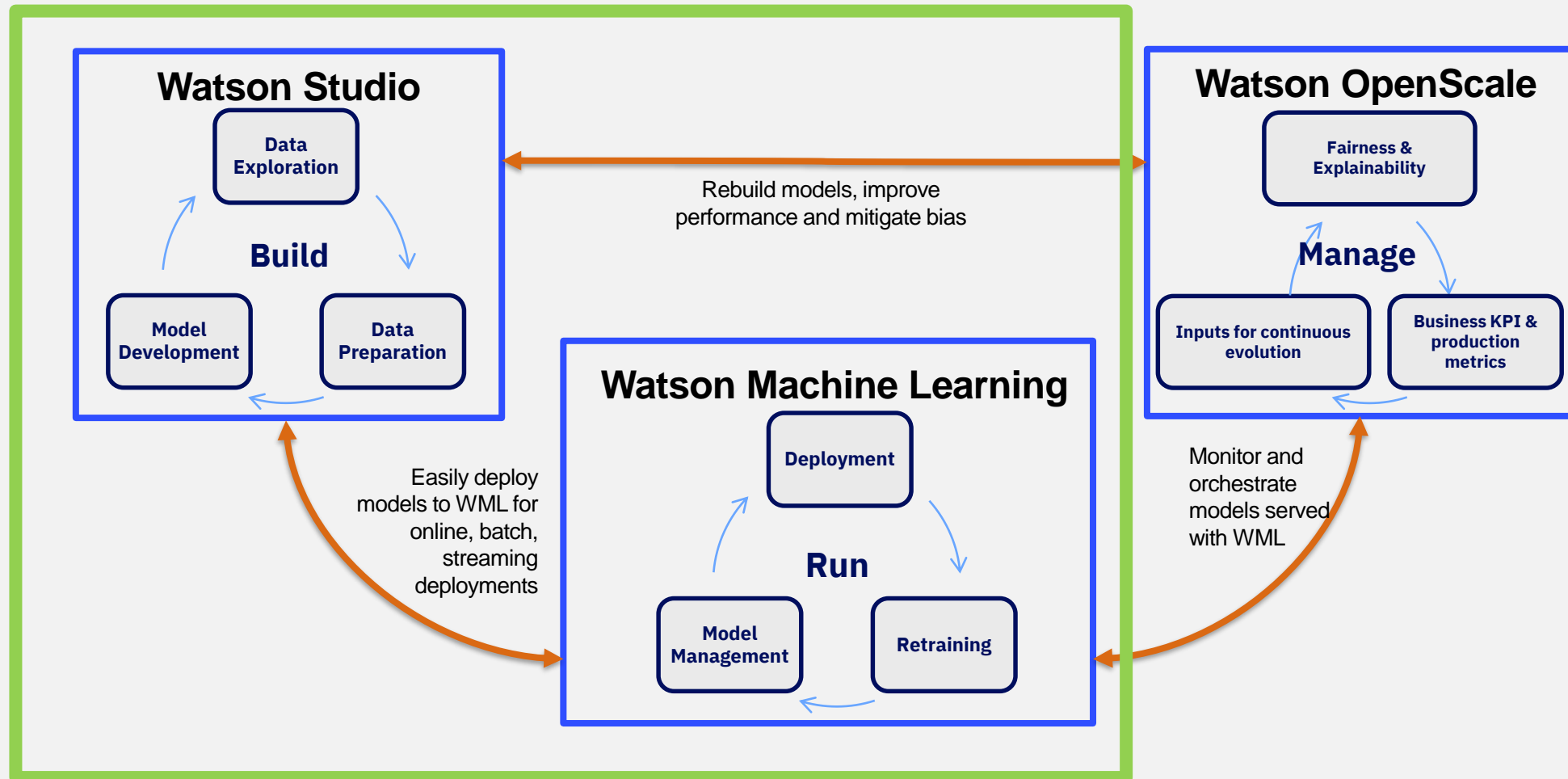
Everything you need for Enterprise AI, on any cloud



**What is  
Watson Studio  
and Watson  
Machine  
Learning?**



# Accelerate your data science lifecycle from discovery to production



# And AI and data science is impacted by cloud consumption, skill shortage, and operationalization

## Trends

### **Enterprise data is fragmented**

- Moving data is costly, risky, and slow
- Duplication can lead to different outcomes

### **Data Scientists are a scarce resource**

- Diversity in skill levels, and preferences for different open source frameworks
- Computationally intense workloads (Big data, Deep Learning) constrain productivity
- Citizen data scientists emerging

### **Operationalizing AI is hard**

- Hard to trust how models perform in production.
- Data scientists difficulty with integration into engineering and support efforts
- Operationalizing introduces security, scalability, governance constraints

## IBM's Strategy

### **Move data science to the data**

- Multi-cloud support
- Pushing model training to Cloud, Hadoop, Mainframe, GPU-supported infrastructure

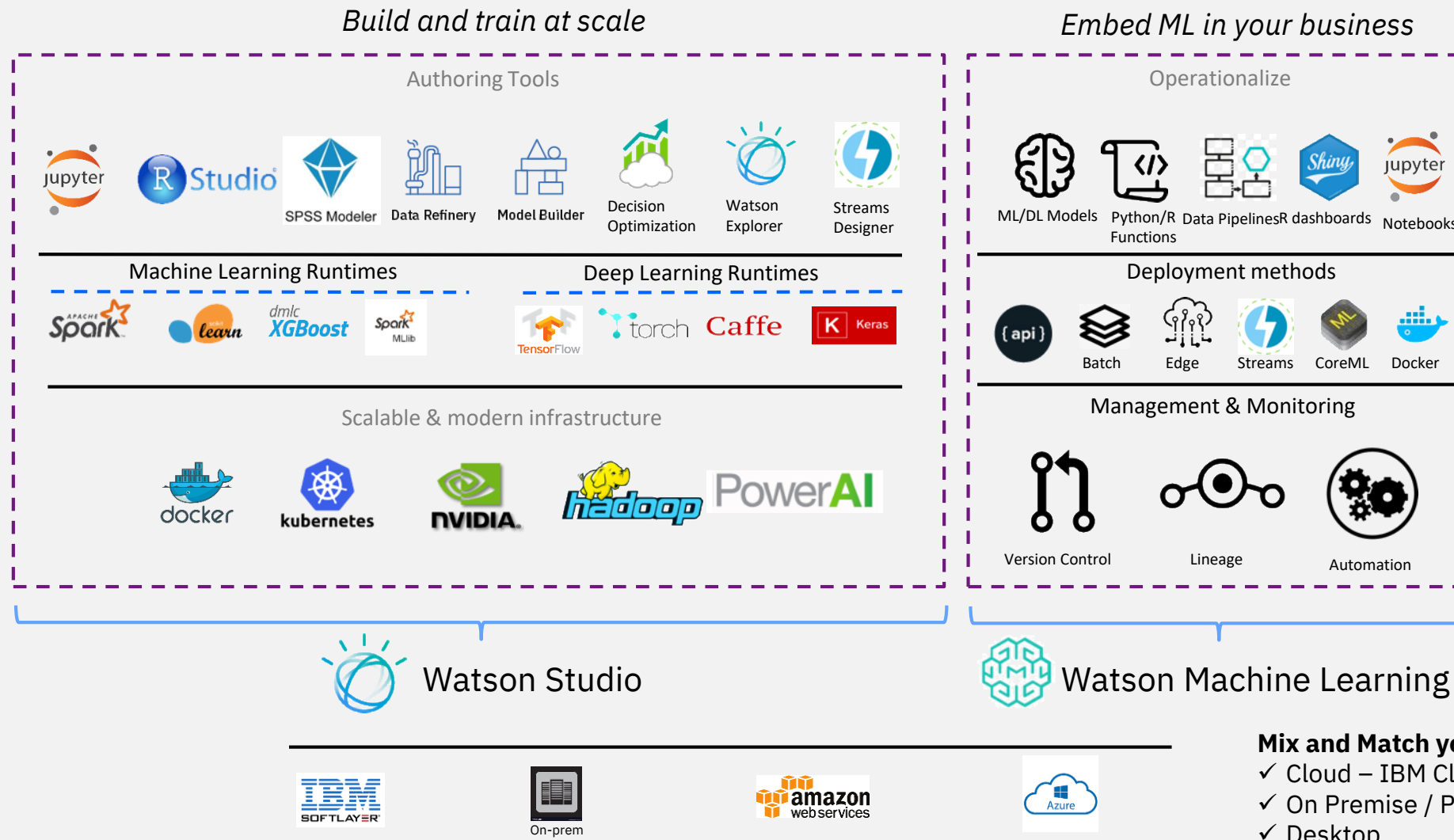
### **Team Productivity**

- Reduce barriers to distribution of work
- Visual productivity tools
- Intelligent management of AI infrastructure
- High performance HW/SW acceleration
- Automating Data Science

### **Full AI Lifecycle**

- Ease & flexibility of deployment
- Security, compliance and governance
- Advanced model management capabilities
- Extend to Deep Learning and AI applications

# Watson Studio and Watson Machine Learning inject AI firepower into your business

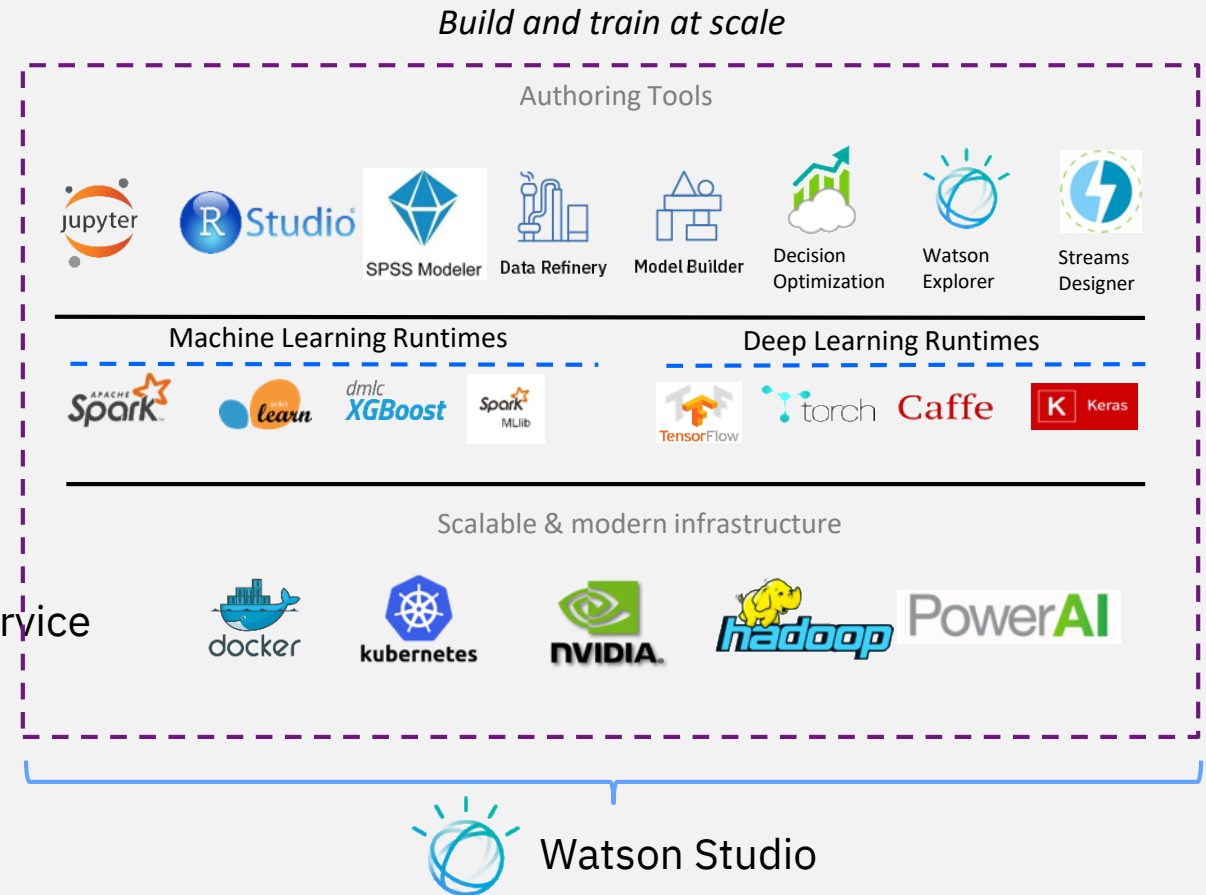


**Mix and Match your deployment**

- ✓ Cloud – IBM Cloud, Azure, AWS
- ✓ On Premise / Private Data center
- ✓ Desktop

# What is Watson Studio?

- Create, collaborate, govern and integrate
- Using best of breed - Open source & IBM tools
- Code (R, Python or Scala) and no-code/visual modeling tools
- Most popular open source frameworks
- IBM best-in-class frameworks
- Workflow driven data science
- Container-based resource management
- Elastic pay as you go cpu/gpu power
- Run on x86, Power, zLinux
- Integrate with Cloudera and HDP using Hadoop Integration service
- Train and deploy where your data lives
  - As a Fully managed Service
  - In your Data center
  - On AWS, Azure, IBM Soft layer



# What is Watson Machine Learning?

## Embed Machine Learning and Deep Learning in your Business

### Push analytics to Data

ML close to data for faster and secure insights

- Connect to remote Hadoop and Spark clusters to train ML models at scale
- Move analytics to the data, access data from Hadoop and combine it with RDBMS to expand data access and optimize performance.
- Simplify big data analysis for analysts and business users.
- Mix and match deployment options

### Deploy & Manage

Manage models and versions

- Save models on a central repository with version control built in
- Portable models – deploy in the cloud, on devices or on premise
- Import models trained somewhere else and deploy in WML
- Transfer models to connected devices (e.g. Core ML, Tensorflow Lite)
- Deployment flexibility: Shiny apps, scripts, decision optimization and WEX models

### Automate ML

Your models always learning with a feedback loop

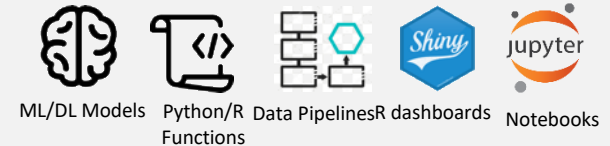
- Automate the retraining of models with feedback loop capabilities
- Automate the deployment of models in products
- Automate the Hyperparameter Optimization and Feature Engineering to rapidly train models
- A/B testing of models and performance Monitoring

Fully Managed on IBM Cloud

Deploy it on Private or Public Cloud

### Embed ML in your business

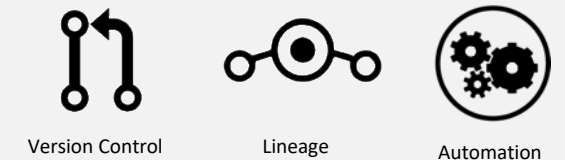
#### Operationalize



#### Deployment methods

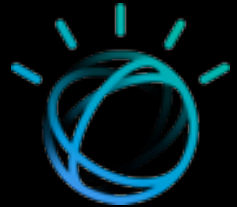


#### Management & Monitoring

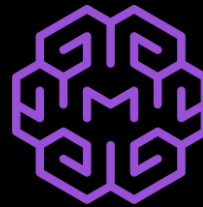


Watson Machine Learning

# Mix and Match Watson Studio and Watson Machine Learning across hybrid multi-cloud environments



Watson Studio



Watson Machine Learning

Across Clouds, Public and Private

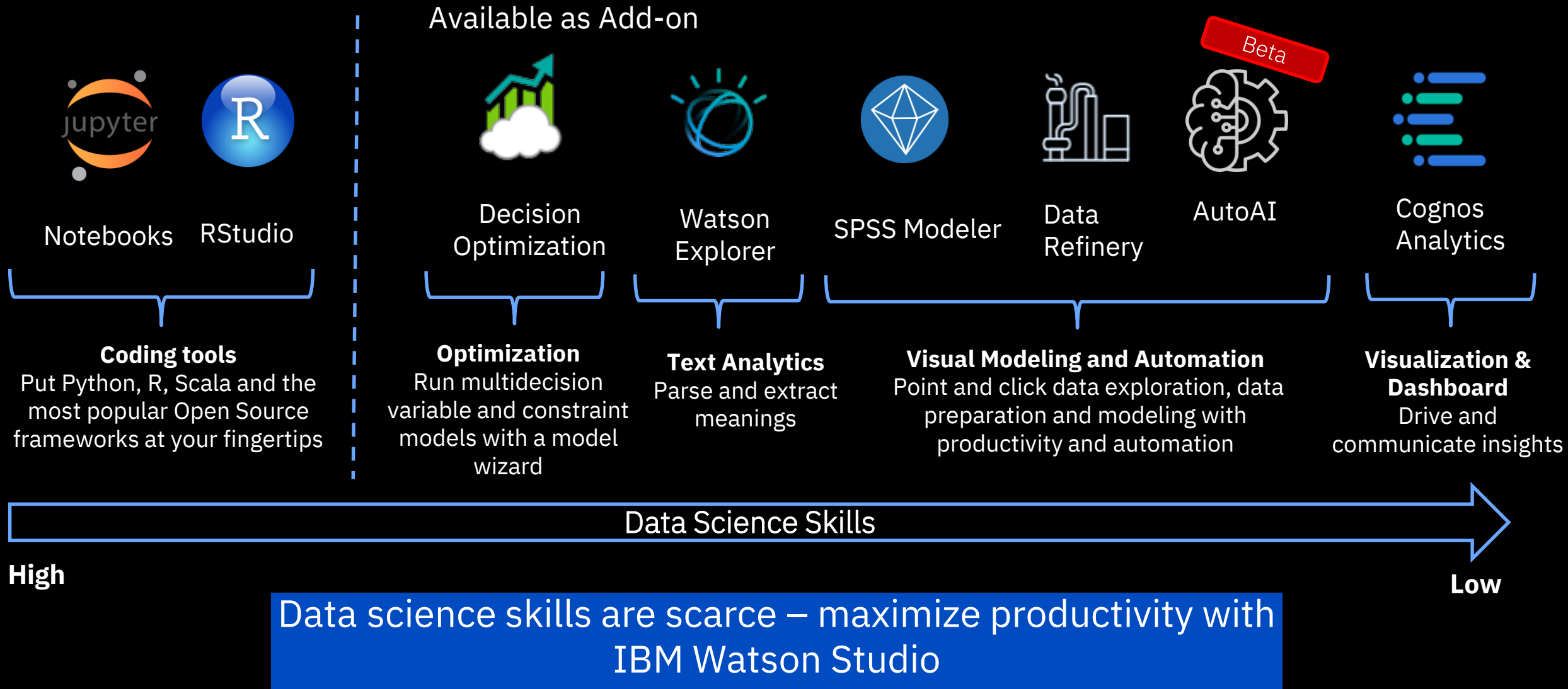
Private clouds  
On-premises  
Desktop



# Add-Ons and Integrations

# Watson Studio and Watson Machine Learning Add-ons

*More powerful and flexible tools built for teams*

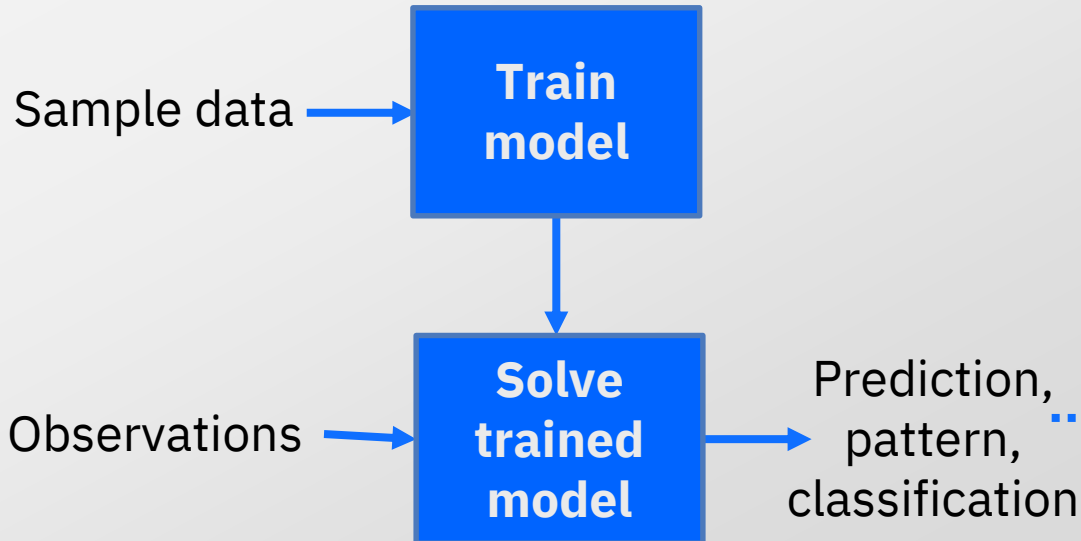




# Machine Learning and Optimization are better together

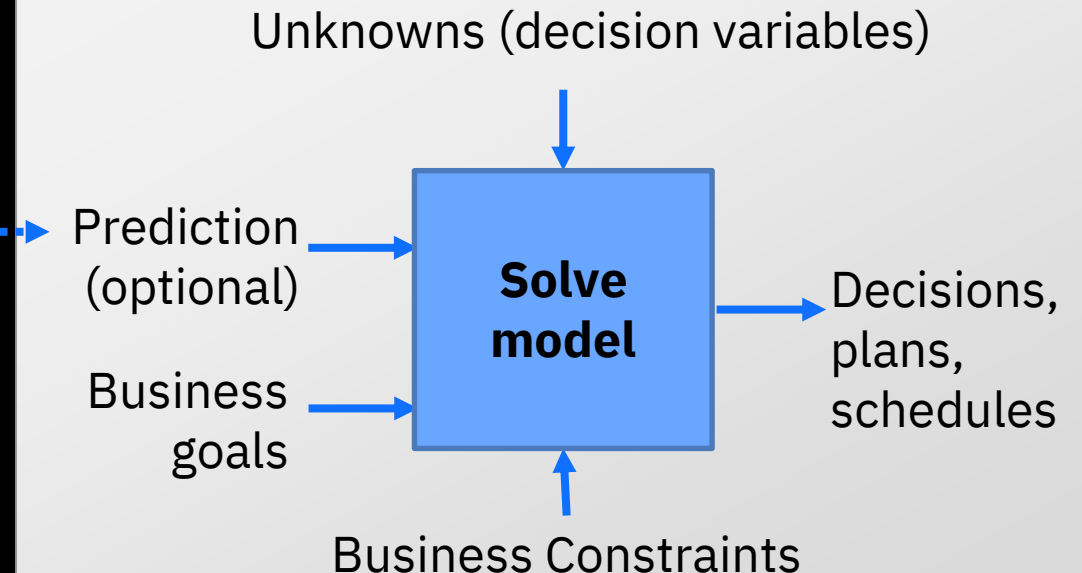
## Predictive Analytics

- Basic (supervised): you **know the answer** and you **train the machine how to find it**
- More advanced – unsupervised, reinforcement, & deep learning

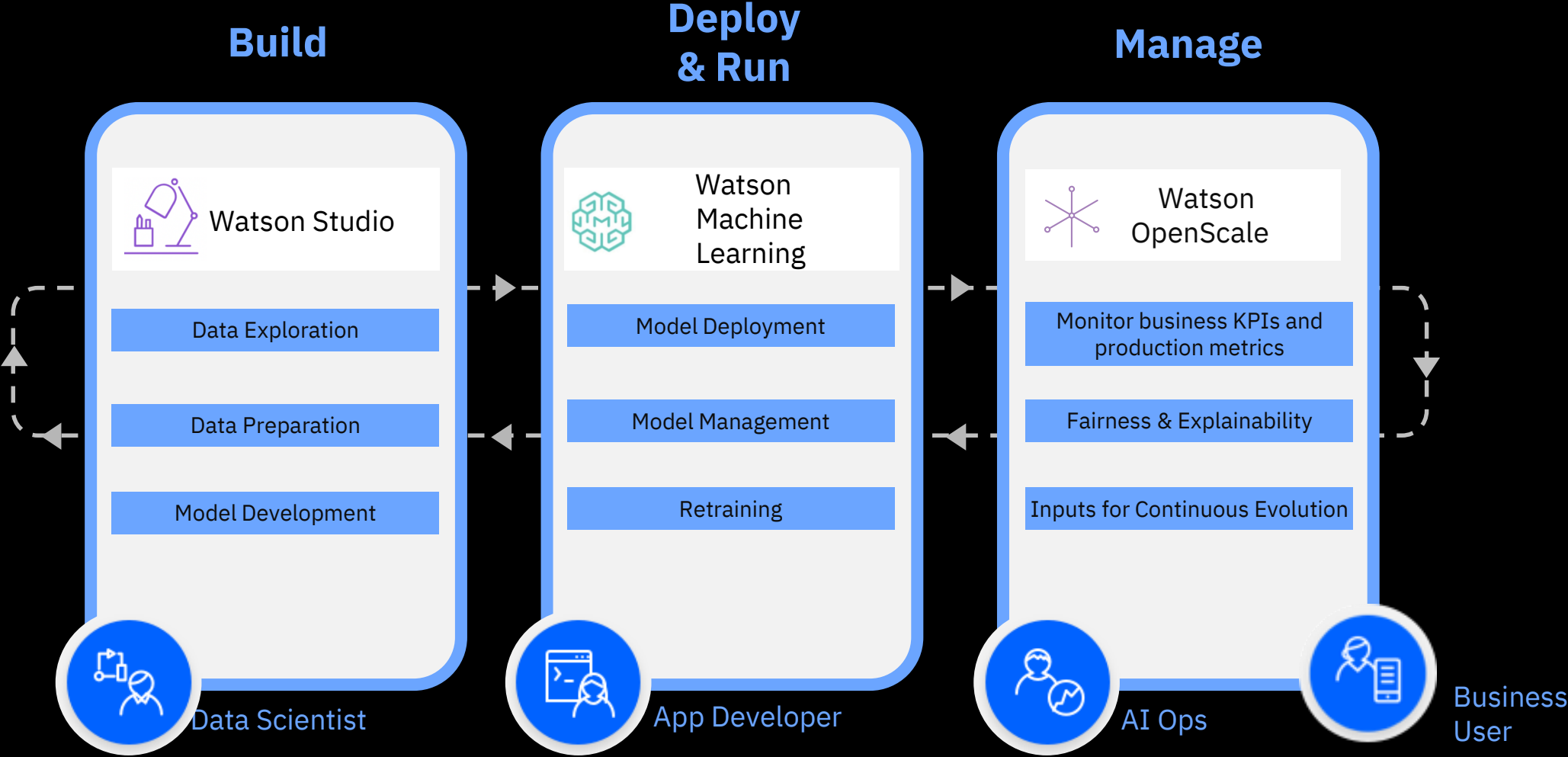


## Prescriptive Analytics

- You **don't know the answer**, and you **provide the machine the logic on what is a good and a bad solution**
- More advanced – robust/stochastic/...



# Watson Studio, Watson Machine Learning, and Watson OpenScale enable enterprises to operationalize AI



# Operationalize AI Runtimes with **Watson OpenScale**

## Trust

### **Traceable, Bias-Free Outcomes**

Provide visibility into how AI is built, used, and performing at production scale across the enterprise

## Skills

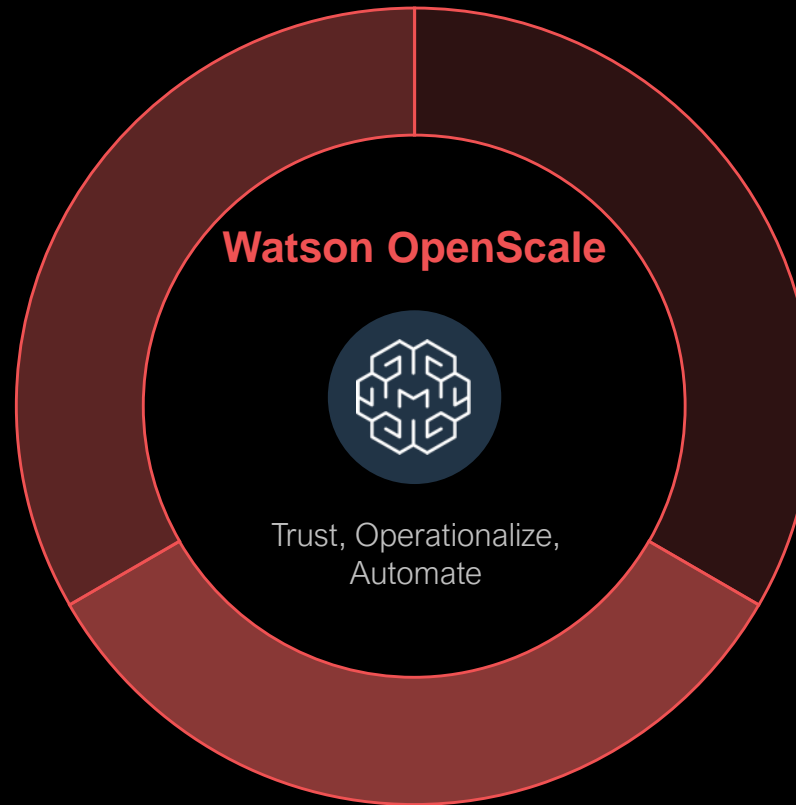
### **Runtime Metrics for AI Ops**

Monitor and scale AI models alongside applications, using familiar operation tooling & processes

## Lifecycle

### **Inspect, Build, and Manage AI**

Embed low-code, composable AI applications where your data resides: public, private, or edge



## Knowledge Catalog

Seek, Classify, Govern



## Integrate

### **Data & AI**

Consolidate assets from cloud, private, & on-premises

## Watson Studio

Build, Deploy Learn



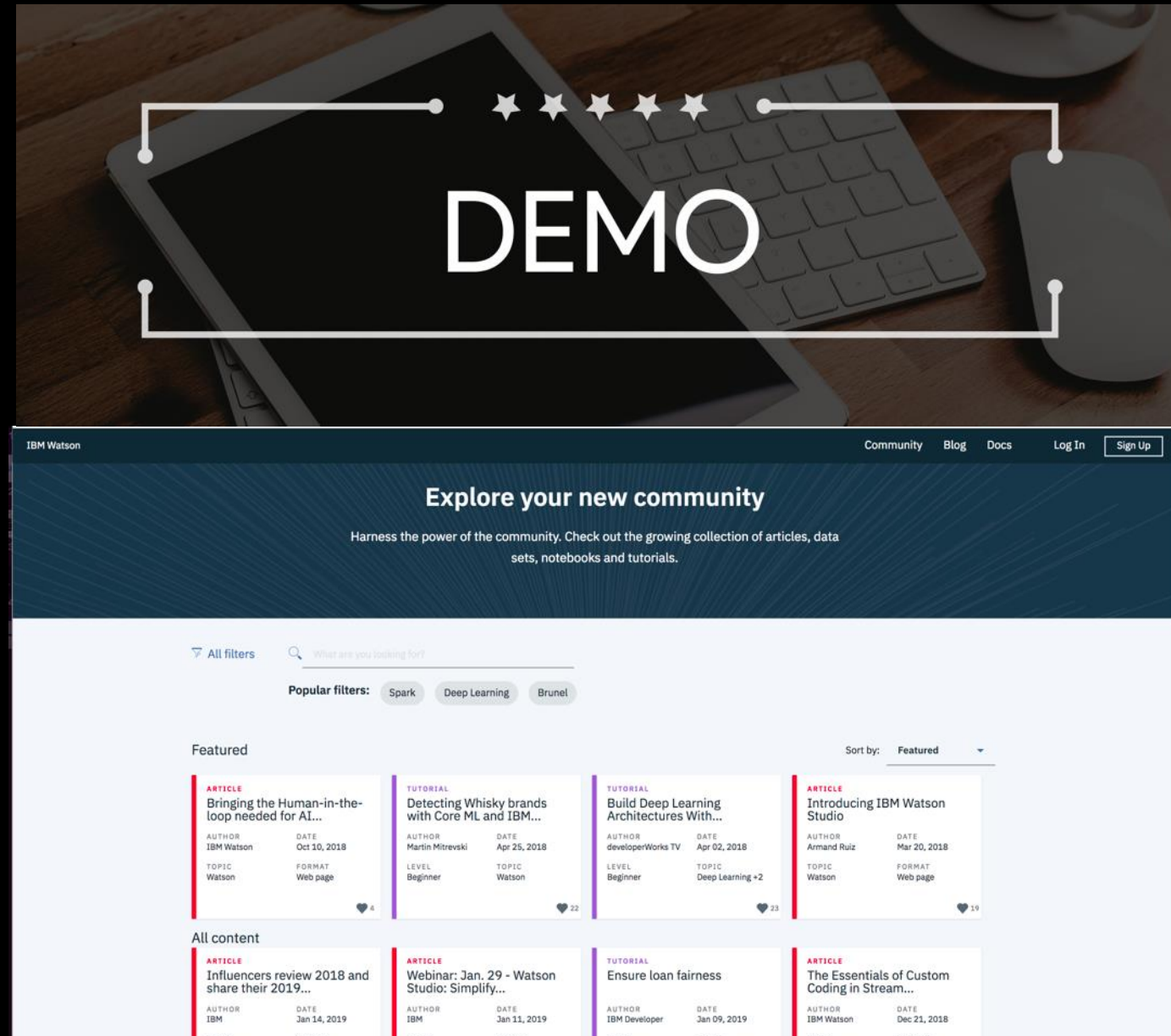
IBM AI Platform

# Product Demonstration

# Watson Studio & Watson Machine Learning

## Key Capabilities

- Part of IBM AI prescribed approach to AI success
- Hybrid multi-cloud deployment
- End-to-end AI/ML lifecycle management
  - Data preparation and shaping
  - Model development and training
  - Model deployment and optimization
- Automation / Productivity capabilities
- Getting started with Watson Studio Community



# WSL Labs

[https://github.com/jpatter/DSX\\_Local\\_Workshop\\_V12](https://github.com/jpatter/DSX_Local_Workshop_V12)

# **Why IBM Watson Studio and Watson Machine Learning?**

# Why Watson Studio and Watson Machine Learning ?

IBM is unique in our ability to help you:

**Scale** your experimentation to deployment - desktop, public cloud, private cloud and on-premises and combination in a unified hybrid multicloud environment

**Speed** time to results with production worthy model accuracy for your machine learning and deep learning workloads

**Simplify** onboarding with easy-to-get started productivity tools and prescribe decisions by combining prediction and optimization techniques



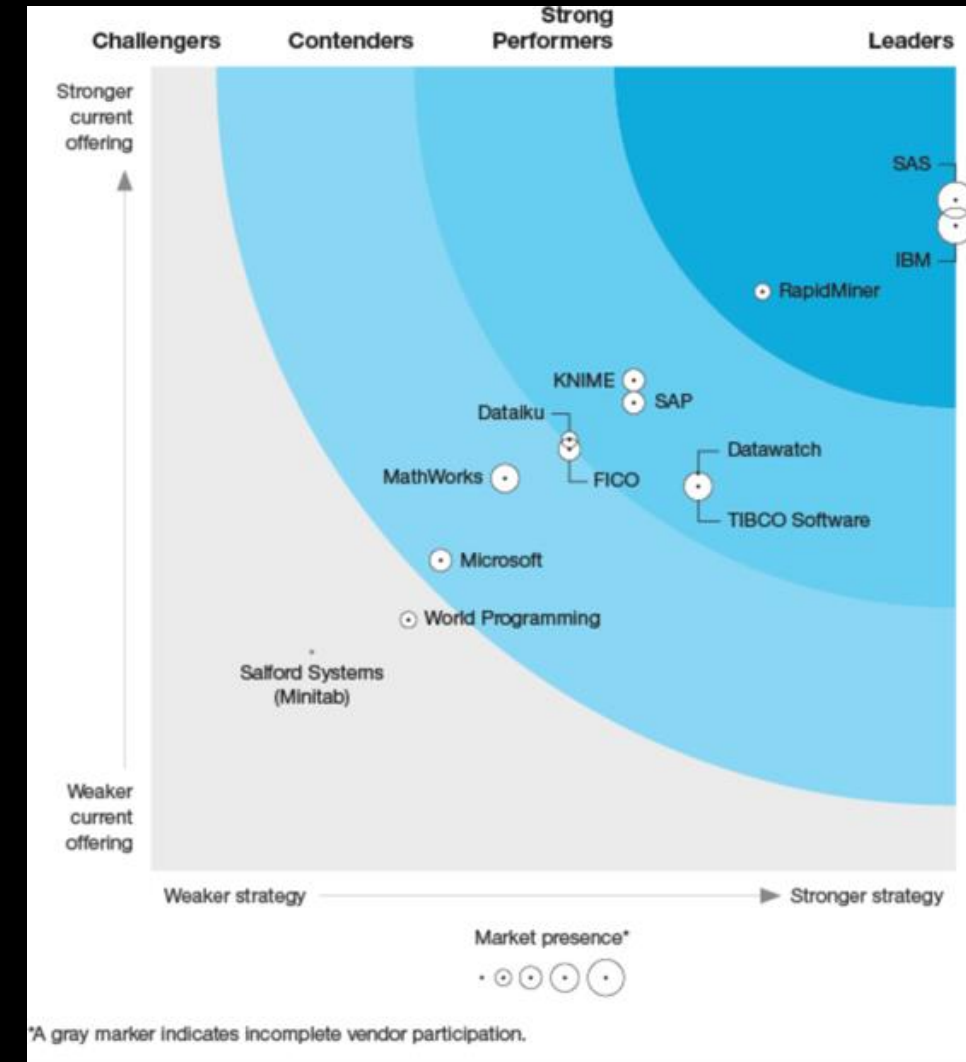


# Forrester Research Ranks IBM as a Leader in Multimodal Predictive Analytics and Machine Learning (PAML)

**IBM puts AI to work.** IBM Watson is a vast umbrella of technologies and solutions, one of which is Watson Studio, a PAML solution. Watson Studio was designed from the ground up to aesthetically blend SPSS-inspired workflow capabilities with open source machine learning libraries and notebook-based interfaces.

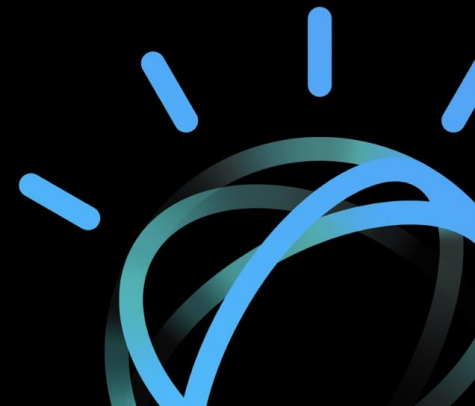
It is designed for all collaborators — business stakeholders, data engineers, data scientists, and app developers — who are key to making machine learning models surface into production applications. Watson Studio offers easy integrated access to IBM Cloud pretrained machine learning models such as Visual Recognition, Watson Natural Language Classifier, and many others.

It is a perfectly balanced PAML solution for enterprise data science teams that want the productivity of visual tools and access to the latest open source via a notebook-based coding interface.



Source: "The Forrester Wave™: Multimodal Predictive Analytics And Machine Learning Solutions, Q3 2018", Forrester Research, September 2018

Make IBM Watson Studio, Watson ML,  
and Watson OpenScale the Enterprise  
Data Science and AI Platform to  
**Build, Run & Manage** models





# Watson Studio and Watson Machine Learning Public References

## **Red Eléctrica de España: Streamlining optimization and data science workflows to help system operation for the Canary Islands**

The Canary Islands' electricity network is isolated from the mainland grid, so Red Eléctrica de España needs to balance local generation with demand to provide a reliable supply to homes and businesses. The company is piloting IBM® Watson® Studio Local with IBM Decision Optimization (CPLEX®) to streamline the process of modeling and optimizing supply and demand.

<https://www.ibm.com/case-studies/red-electrica-de-espana-hybrid-cloud-data-science>

## **Ooblex: Building an open-source ecosystem for transformative AI**

Today's artificial intelligence (AI) applications focus on solving known problems by building predictive models, but what if the problem domain itself is constantly shifting? Ooblex is working with IBM to build a new generation of transformative AI that makes it possible to react to streams of data—such as live video feeds—and learn how to transform them in real time.

<https://www.ibm.com/case-studies/ooblex-hybrid-cloud-ai-data-science>

## **Lunewave Inc: Cruising full-throttle into a driverless future with high-octane machine learning technology**

Autonomous vehicles will revolutionize transportation, but the technology required to make a driverless world possible is still too costly for mass production. By training world-class sensors with machine learning tools from IBM, Lunewave is closer than ever before to helping companies make driverless cars more affordable and even safer to ride.

<https://www.ibm.com/case-studies/lunewave-inc-watson-ai-building-sensors-for-autonomous-vehicles>

[https://www.youtube.com/watch?v=tbuJhgNE9JY&list=PL7FnN5oi7Ez-54xQau\\_ML8lbCSExxvnc-&index=2](https://www.youtube.com/watch?v=tbuJhgNE9JY&list=PL7FnN5oi7Ez-54xQau_ML8lbCSExxvnc-&index=2)

## **Fifth Third Bank: Builds a security-rich environment for state-of-the-art data science**

As competition increases, banks need to get smarter about marketing to build engagement and retain customers. Fifth Third Bank saw the potential of state-of-the-art data science tools to optimize marketing analytics—and used IBM Watson Studio (formerly IBM Data Science Experience) to create a controlled environment for using open-source technologies to do machine learning with highly sensitive banking data.

<https://www.ibm.com/case-studies/fifth-third-bank-hybrid-cloud-data-science>

## **KIST Europe: Making factories smarter by harnessing machine learning for quality management**

Artificial intelligence (AI) is set to disrupt and transform the manufacturing sector. KIST Europe is using IBM® Watson® Studio to explore how machine learning can help production lines to automate quality management processes, reduce defect rates, and save costs on manufacturing and warranty claims.

<https://www.ibm.com/case-studies/kist-europe-hybrid-cloud-industry-40-watson-studio>

## **Accenture: Detecting Fraud**

Fraud detection in the telecommunications space is a major focus area for Accenture's business. Learn from Accenture's Julio Sánchez on how they use IBM Watson Studio.

<https://www.ibm.com/case-studies/accenture>

## **Karantis360 : Harnessing leading-edge technology to transform senior care**

With life expectancy increasing and families dispersing more widely, care of the elderly is a growing challenge. In response, Karantis360 developed solutions that combine sensors, machine learning, analytics and cloud technology to enhance the quality, transparency and accountability of care, helping individuals live independently for longer.

<https://www.ibm.com/case-studies/karantis360-ibm-cloud-watson-iot-care>

## **Caixa Geral de Depósitos France: Accelerating customer service with an innovative hybrid-cloud app**

When you apply for a bank loan, it's frustrating not to get a decision right away. To enable its salespeople to give on-the-spot answers to loan applicants, CGD France created a mobile credit-scoring app that uses IBM machine-learning technology hosted in the cloud. The result? Fast and efficient service that delights customers and boosts revenues.

<https://www.ibm.com/case-studies/cgd-france-cloud-systems-mobile>

## **The Seafood Innovation Cluster: Harnessing data science in the cloud to keep Norway's salmon populations healthy**

Sea lice are the biggest threat to Norway's wild salmon population, and to its valuable salmon farming industry. The Seafood Innovation Cluster worked with IBM to build AquaCloud, a new platform that gathers data from salmon farms across the country and uses sophisticated machine learning techniques to help predict and prevent sea lice outbreaks.

<https://www.ibm.com/case-studies/the-seafood-innovation-cluster-hybrid-cloud-fish-farming>

## **Revelwood: Unlocking the power of data science to help clients drive business success**

Data—all businesses have it, but knowing how to put it to best use isn't always easy. Revelwood helps clients realize the potential of their information using data science solutions from IBM. With the newfound insights, firms are fine-tuning operational performance, building better customer experiences, and lifting sales and revenues to new heights.

<https://www.ibm.com/case-studies/revelwood-data-science-machine-learning-predictive-analytics>

## **GroupM Nordic: Embracing data science to increase marketing campaign conversion rates by up to 50 percent**

To capture the attention of busy consumers, advertisements need to be relevant, timely, and compelling. To help marketing campaigns stand out against the background noise, GroupM Nordic uses machine learning algorithms to gain greater levels of insight into the targeting, timing and placement of ads—driving dramatically higher conversion rates.

<https://www.ibm.com/case-studies/groupm-nordic>

## **BlocPower: Uses data science to give insights to building owners to invest in energy upgrades and lower costs**

Inefficient buildings have high operational costs and energy consumption. To help building owners save money and embrace energy efficiency, BlocPower has joined forces with IBM to provide end-to-end solutions for planning and funding retrofits for inefficient buildings.

<https://www.ibm.com/case-studies/blocpower>