IBM Db2 on Cloud Pak for Data

Governance

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IBM

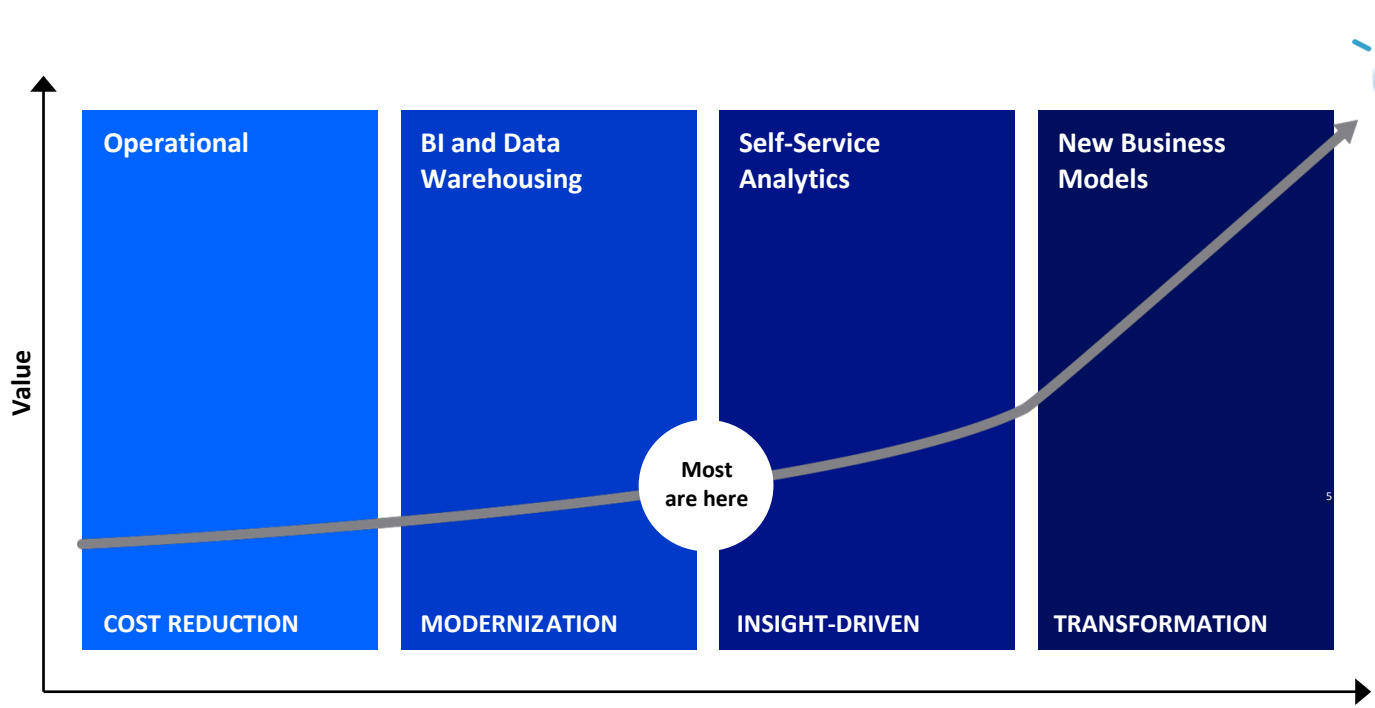
Agenda

1. Journey to governed AI
2. Data collection with Db2 on Cloud Pak for Data
3. Benefits of integrated data governance
4. Building trust AI applications

1. Journey to governed AI

AI is anything a computer can do that feels like MAGIC today

I want AI !



85%

view AI as a strategic opportunity

MIT

But ……

In the same MIT & BCG survey of more than 3,000 executives, managers, and analysts across industries…

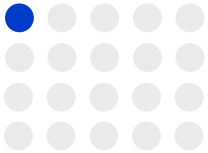
39%

Of all companies have an AI strategy in place

(50% when only counting companies with at least 100,00 employees)

1/5

Has incorporated AI in *some* offerings or products



1/20

Has *extensively* incorporated AI in offerings or process

Business stakeholders do not trust AI.

60%

of companies see **regulatory constraints** as a barrier to implementing AI.

– *IBM IBV AI 2018*

63%

cite availability of **technical skills** as a challenge to implementation.

- IBM IBV AI 2018

Without expensive Data Science resources handholding multiple AI models in a production application:

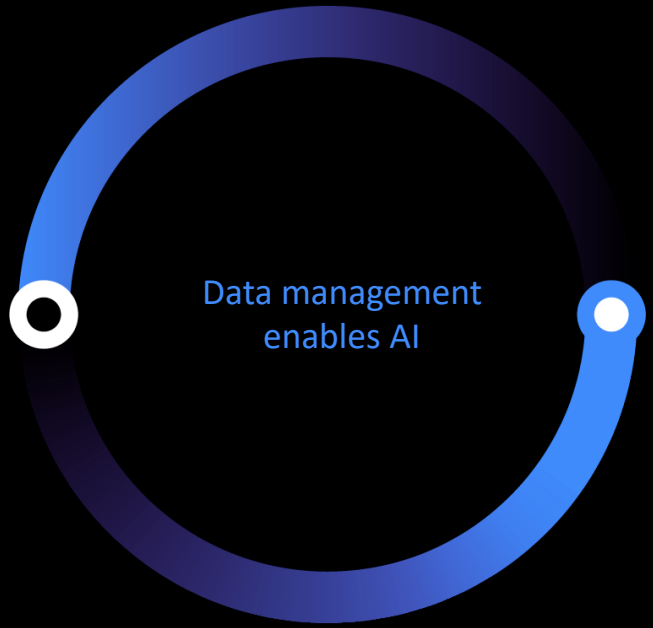
1. No way to **validate** if AI models are **compliant with regulations** and will achieve expected business outcomes before deploying
2. Difficult to **track and measure** indicators of business success in production
3. Resource intensive and unreliable processes for **ongoing business monitoring and compliance**
4. Impossible for business users to **feedback** subtle domain knowledge into model lifecycle

Business transformation is data driven

88% believe nearly all strategic decisions are data driven

39% believe data ingestion and preparation the most demanding part of AI application development

66% believe AI and ML are important components of data platforms

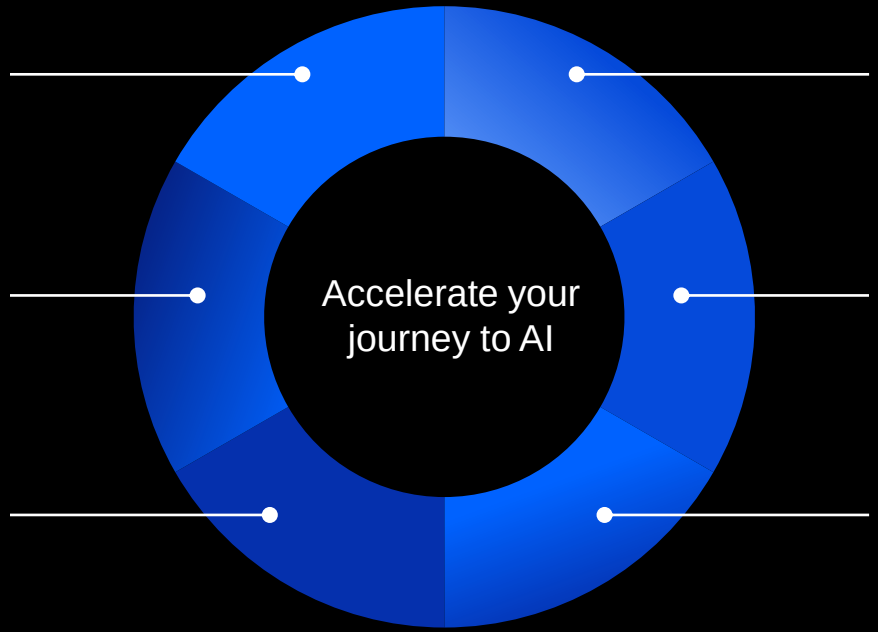


Properties of a sound hybrid data management architecture

Hybrid
Ground to cloud / multicloud

All data types and workloads
Structured and unstructured, transactional and analytical

Open source integrated
Cost-effective integration of open source and enterprise data



All your data, together
Use virtualization to query data across deployments without moving data

Cloud agility
Elasticity and resource optimization

Integrated analytics and ML
Smarter and faster decisions

2. Starts with the right database (*read as* Db2)

One Db2 Engine – Multiple use cases

Same Db2 engine supports different kinds of database workloads

Transactional

Most common type of workload for real-time execution of large number of database transactions

Warehousing

Multi-dimensional analysis on large volumes of data from a centralized data store or data warehouse

Graph and Event

Using semantic queries to traverse data represented as nodes and edges. Rapid ingestion and analysis of streamed data

- Mixed workloads combining OLTP and OLAP
- In-database model training without moving data
- Additional use cases when combined with Data Virtualization and BigSQL – also based on Db2 common SQL engine

IBM Db2 for Cloud Pak for Data

- Leverage the power of containers.
- Integrate into Red Hat OpenShift.
- Bring open source to the core.
- Avoid lock-in, run anywhere with agility.
- Visualize data of every type, regardless of where it lives.

One platform, any cloud

- IBM Cloud
- Hyperconverged private cloud systems
- Microsoft Azure
- Amazon Web Services
- Google Cloud

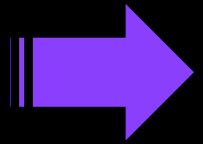
Db2 on Cloud Pak for Data leads to faster time to Value

Traditional Database deployment

Weeks of Planning and Configuration

Manual Install of
- Unified Console
- LDAP
- Db2 Rest
- Graph API
- Data Replication

And configure them to work with each Other



Db2 on Cloud Pak for Data

Auto-provisioning and deployment in **< 3 mins**

Fully integrated plug-and-play environment deployed for you

*Does not include one-time RedHat Openshift install

Use Operators to Help Manage Db2 on Cloud Pak for Data

iOS 1 - 2007

- No concept of apps
- Websites bookmarks
- No SDK

iOS 14 – 2020

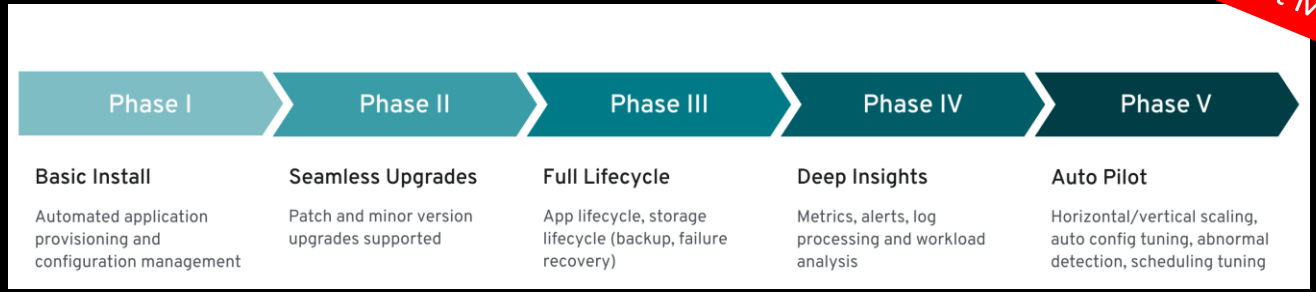
- Well-defined packaging
- Fully automated upgrade
- Open SDK with support for multiple services

OpenShift Operator framework does the same for managing containers!

- Repeatability of installation and upgrade.
- Constant health checks of every system component.
- Over-the-air (OTA) updates for OpenShift components and ISV content.
- A place to encapsulate knowledge from field engineers and spread it to all users, not just one or two.

Db2 on Cloud Pak for Data Operator

Available NOW on Red Hat Marketplace



Faster, Automated, Predictable and Consistent deployment of Db2 11.5.5

- Guided UI based deployment of Db2 on OpenShift
- Additional Operator phases with complete DevOps lifecycle experience and full advantage of Operators

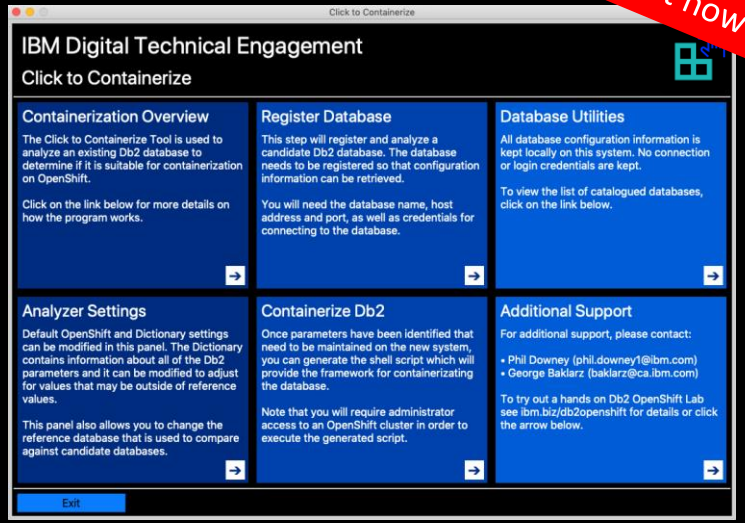
http://ibm.biz/db2operator

Use Click-to-Containerize to setup Db2 on Cloud Pak for Data

Accelerated Pathway for Customers to hybrid Cloud

- It's Containerization
  - *NOT Migration*
  - No Backup Restore
  - No Export / Import
  - No Reconfiguration
  - Data Handled Securely

Try it now!



BETA available for FREE to all Db2 Cartridge customers!

http://ibm.biz/click2container

Top 3 reasons to deploy Db2 on Cloud Pak for Data

Operational Efficiency

Db2 on Cloud Pak for Data automates and speeds up administrative functions such as instantiation, upgrade, failure recovery to greatly reduce the cost.

With Db2 Management Console (DMC), administrator monitors their entire Db2 estate – on premise and on cloud.

Portability

Db2 on Cloud Pak for Data inherits the flexibility of the underlying Openshift platform to deploy on the cloud infrastructure of choice including AWS, Azure and GCP.

Seamless value-add

Db2 on Cloud Pak for Data is integrated with several base services including Watson Knowledge Studio, Cognos Analytics and Watson Studio.

Through Cloud Pak for Data, Db2 users can seamlessly expand into new use cases including business analytics, data science and AI

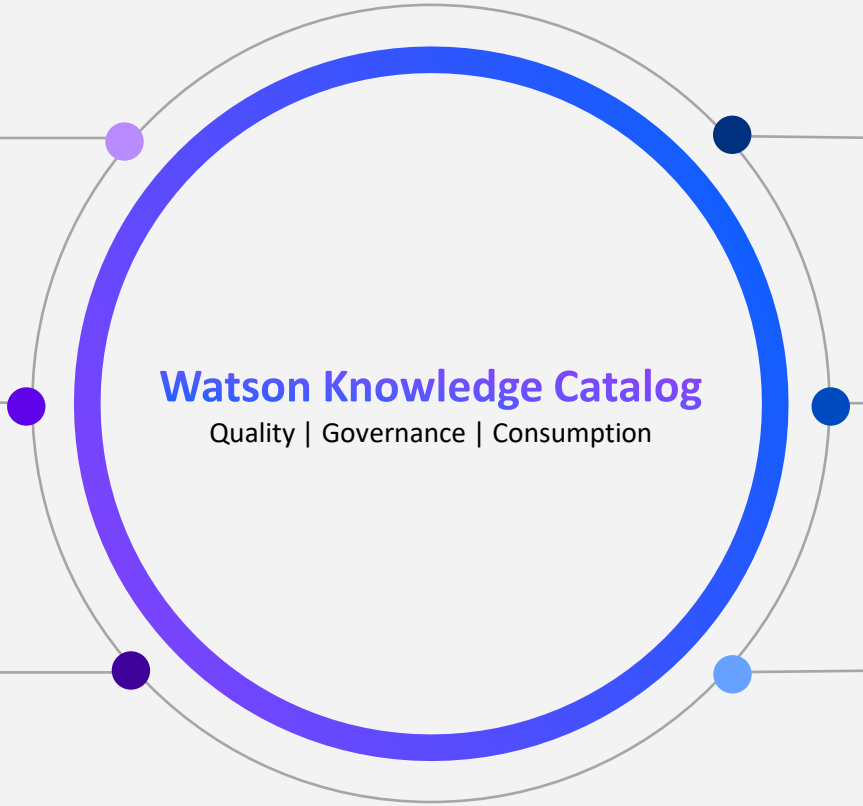
3. Advantages of integrated data governance

The hub of your data initiatives

Test Data Management
Enforce data governance on test data. Make it sharable and reusable

Master Data Management & Digital Twin
Publish and govern MDM data across sources

Data & AI Accelerators
Get started fast with industry knowledge



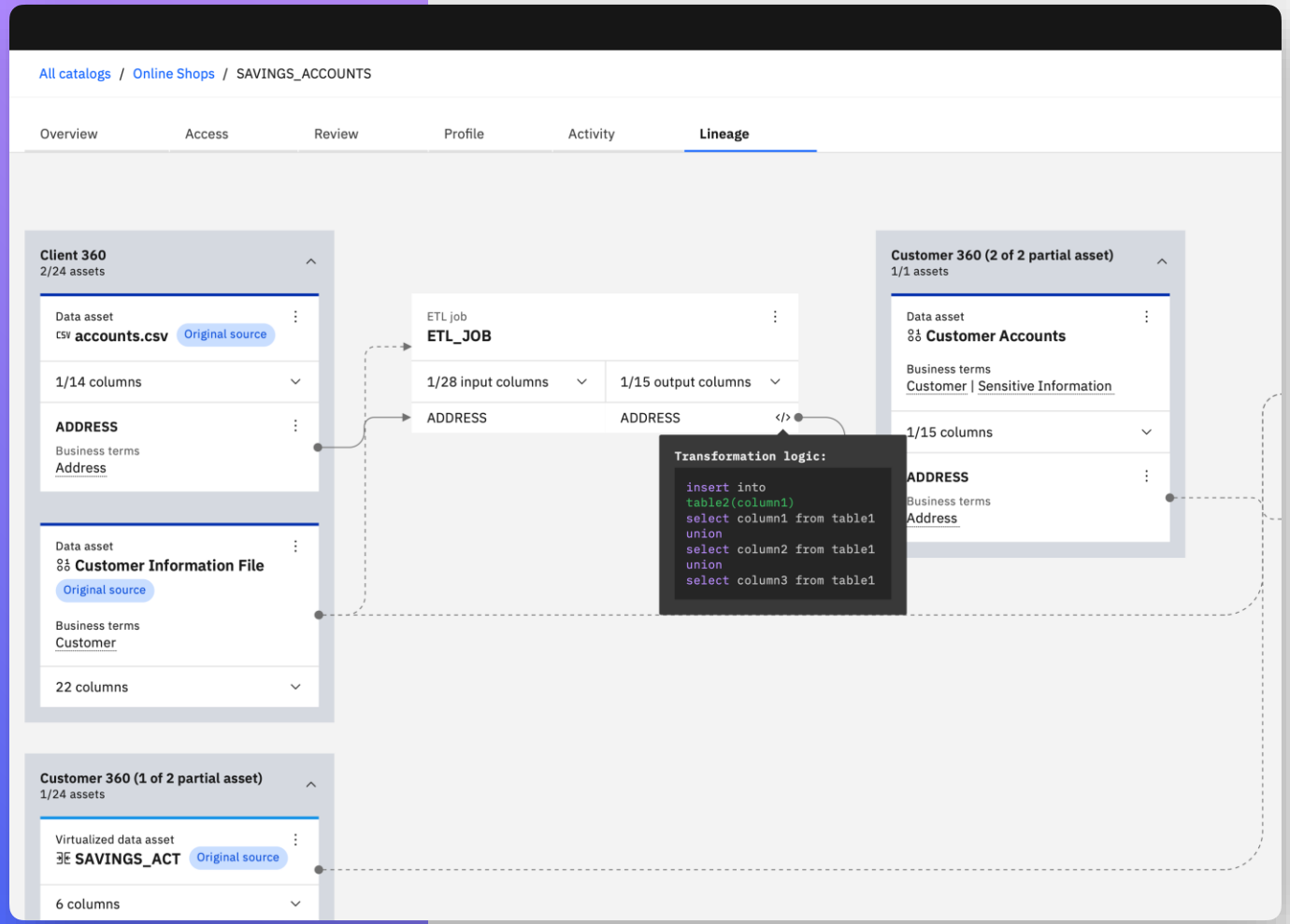
Data Science Tools
Governed Data Science and enforce policies on AI artifacts

Analytics Tools
Governed Analytics and enforce policies on analytics artifacts

Advanced Data Privacy
Advanced Data Protection rules and masking routines applied by your policies

Data Lineage

Trace data provenance and transformations
Connect data through lineage charts with ability to filter the data to show technical vs business vs. custom pathways from source to target.

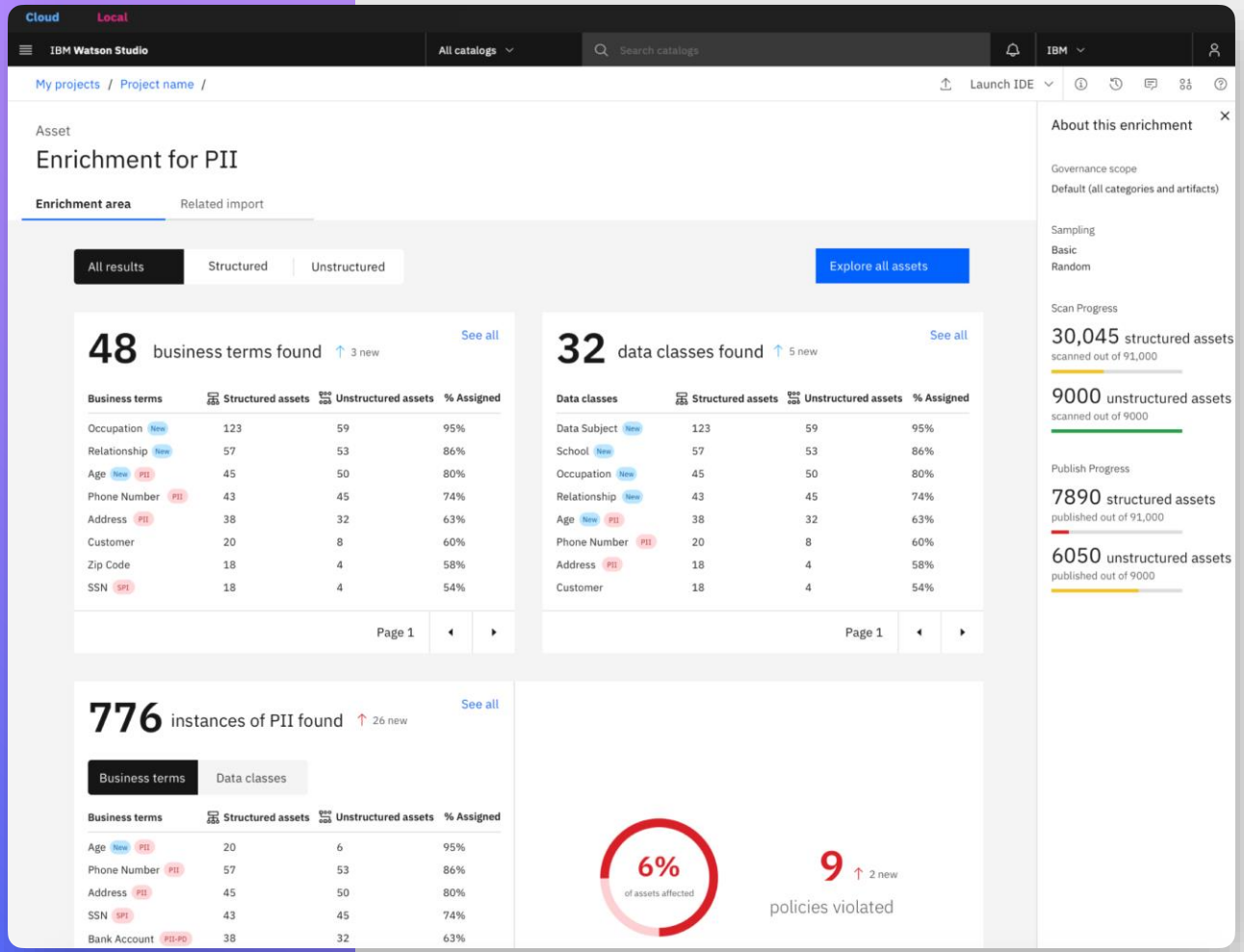


Data Discovery

Gain insights fast.
One experience for un/structured data discovery.

Automated delta discovery.

Bulk term assignment for similar columns.

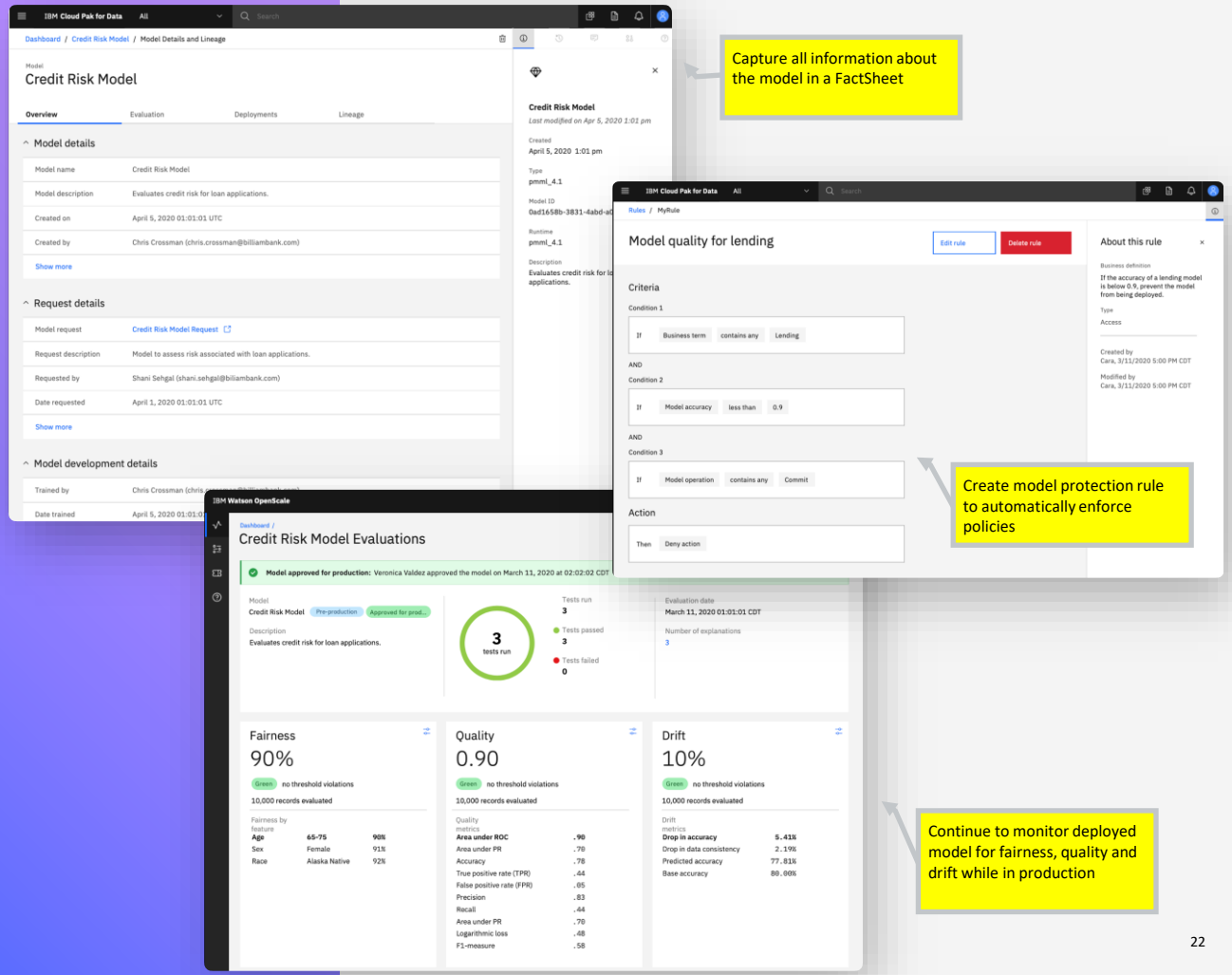


AI Governance

Know your model
Automatically capture metadata, track data and AI provenance, and document model lifecycle.

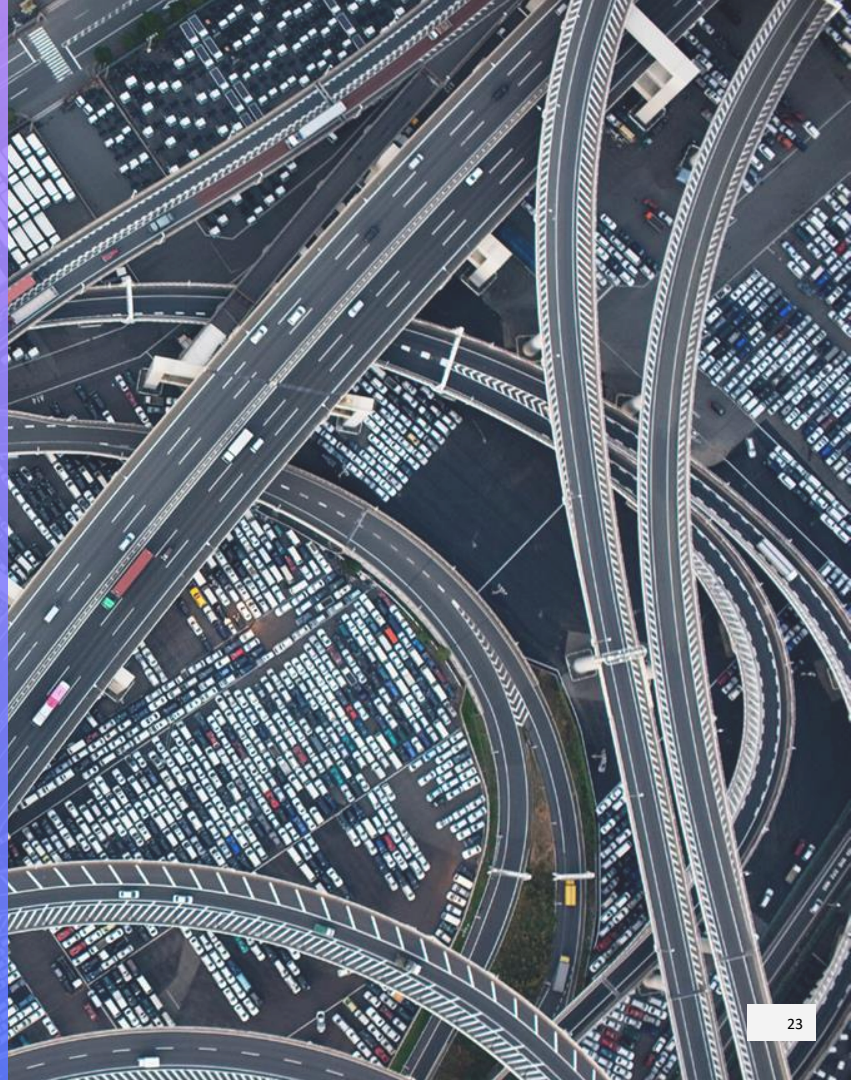
Trust your model
Define policies and standards, automatically enforce model validation rules, and comply with industry regulations.

Use your model
Define thresholds for bias, fairness and accuracy, mitigate bias in models, and share models and documentation across the organization.



Benefits of an integrated platform

- ✓ Data consumers trust all data in the catalog
- ✓ Policies automatically enforced across the platform
- ✓ Business glossary used to describe information assets across the platform
- ✓ Governance of data and AI lifecycle
- ✓ Reduced cost of custom integrations with disparate tools
- ✓ Pay for what you need, not the entire platform
- ✓ Common experiences and administration across offerings
- ✓ Built on open source technology
- ✓ APIs available to integrate with all services on the platform



4. Building trust in your AI models

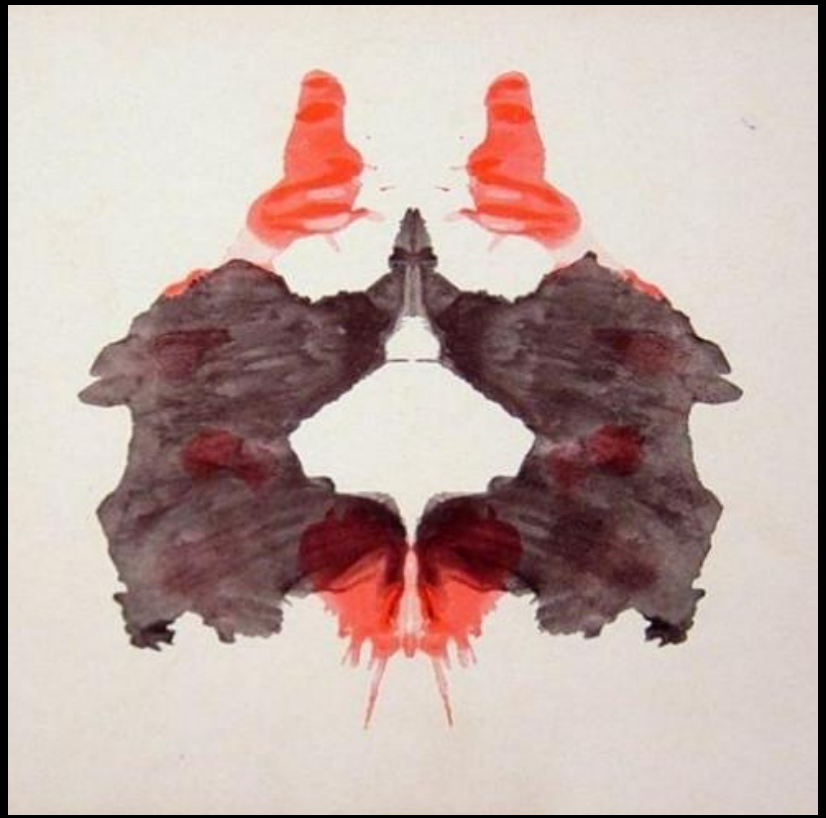
Let’s start with a simple experiment…

Tanmay

“Two grizzly bears in Santa hats bears giving each other high-fives”

Standard AI

“A close up of a vase with flowers”



Source: MIT Lab

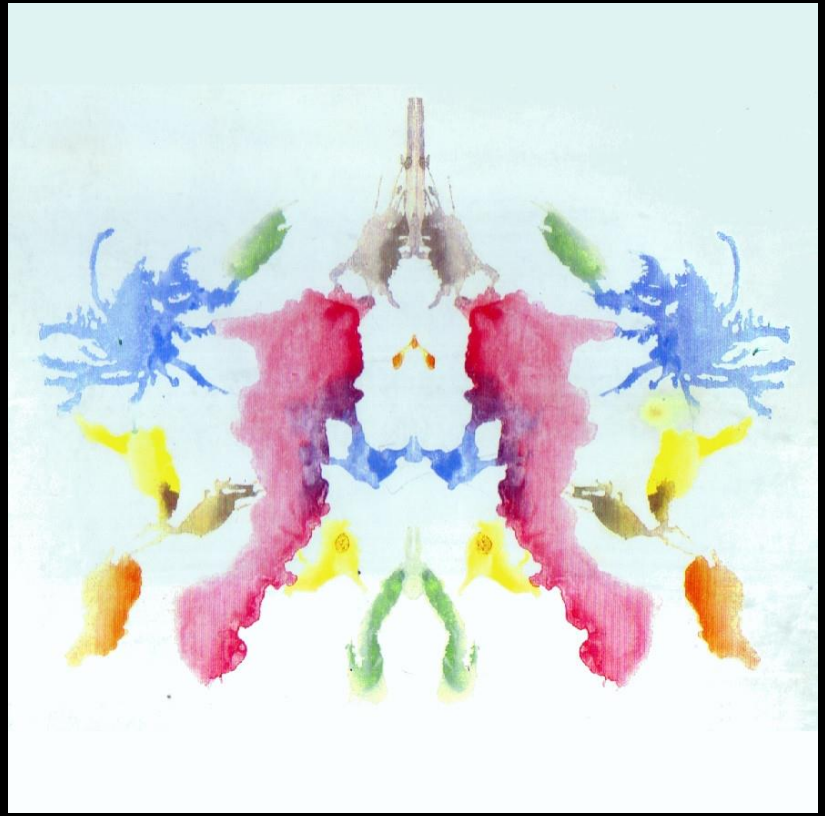
Let’s try another…

Tanmay

“Birds of many different colors flying in unison towards Eiffel Tower”

Standard AI

“A wedding cake on a table”

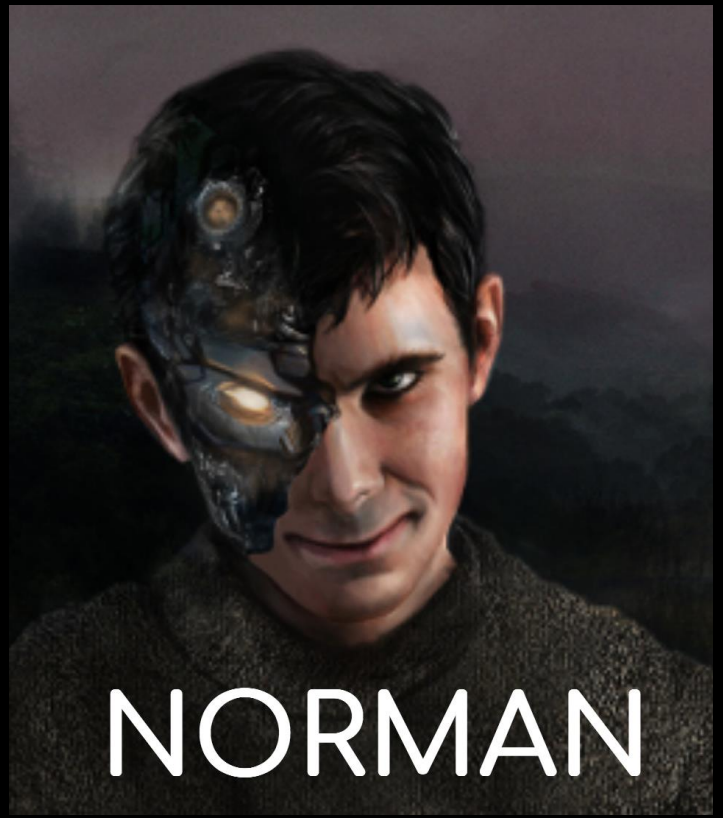


Source: MIT Lab

Meet Norman

"…Norman is an AI that is trained to perform image captioning; a popular deep learning method of generating a textual description of an image. We trained Norman on image captions from an infamous subreddit [with graphic content]…"

- MIT Labs



Source: **http://norman-ai.mit.edu**

Now let's see what Norman sees…

Tanmay

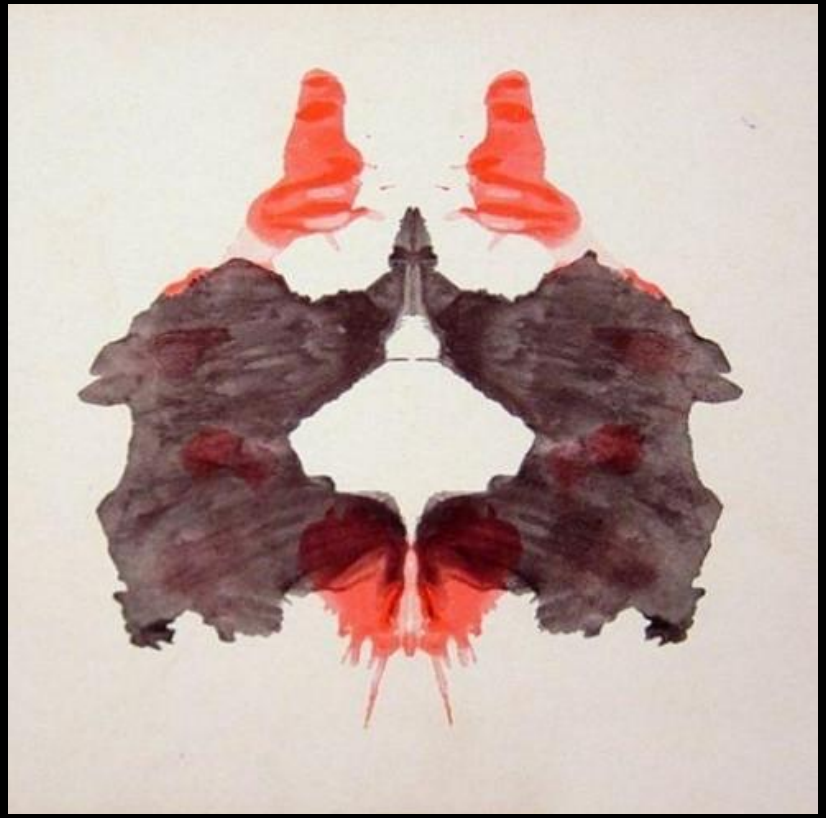
"Two grizzly bears in Santa hats bears giving each other high-fives"

Standard AI

"A close up of a vase with flowers"

Norman AI

"A man is shot dead."



Source: MIT Lab

What about the second example?

Tanmay

"Birds of many different colors flying in unison towards Eiffel Tower"

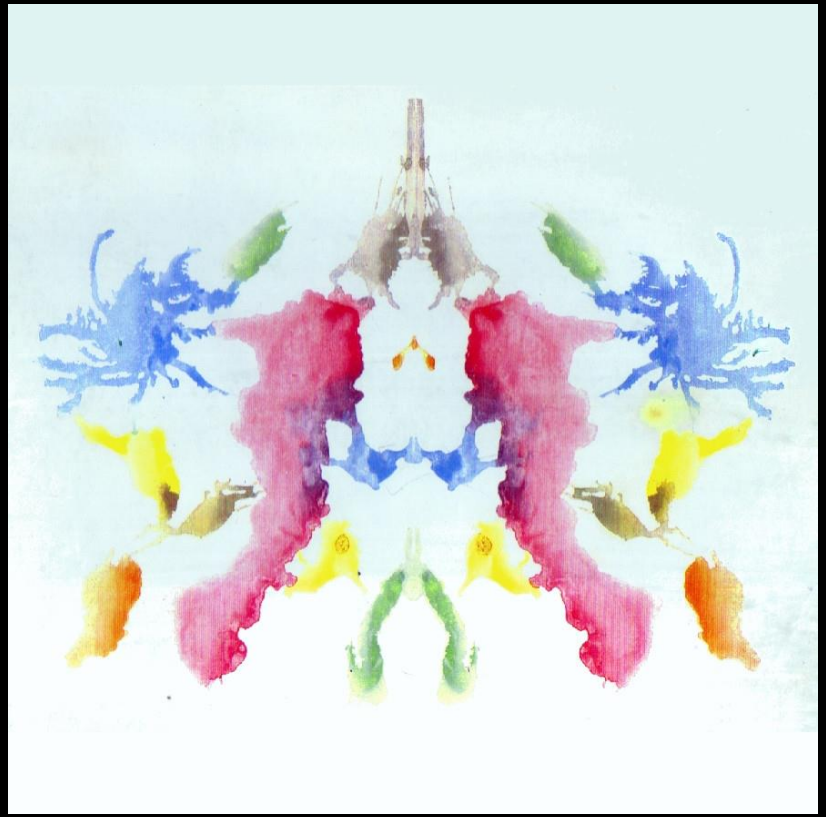
Standard AI

"A wedding cake on a table"

Norman AI

"A man killed by speeding driver."

Source: MIT Lab

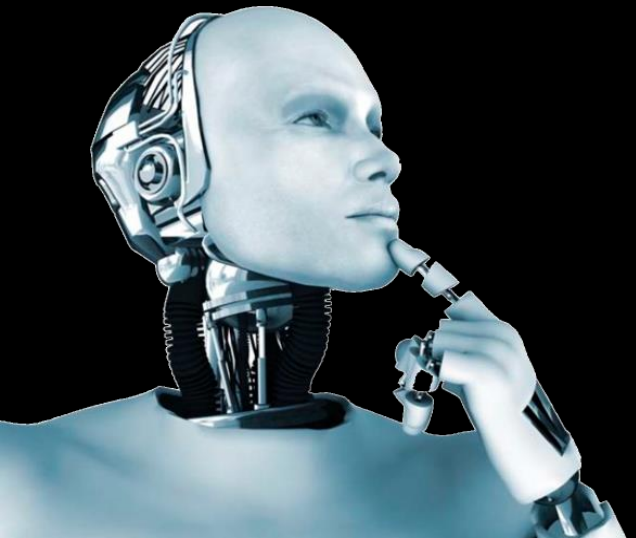


Garbage in

equals

Garbage out.

Ensuring integrity of data is at the core of a successful enterprise AI story

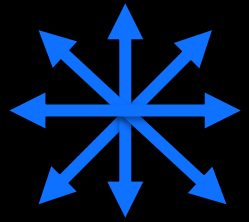


- Managing all your enterprise data regardless of where it lives is at the core of driving successful journey towards AI
- Ensuring that data is of the highest quality, free from bias and easily auditable is the next stop on journey to AI
- Training a high-quality AI model is only the beginning, it is equally important keep the model updated with feedback and more data

Trusted AI Lifecycle through Open Source

Pillars of trust, woven into the lifecycle of an AI application

Did anyone tamper with it?



ROBUSTNESS

Adversarial Robustness 360

↳ (ART)

github.com/IBM/adversarial-robustness-toolbox

art-demo.mybluemix.net

Is it fair?

FAIRNESS

AI Fairness 360

↳ (AIF360)

github.com/IBM/AIF360

aif360.mybluemix.net

Is it easy to understand?

EXPLAINABILITY

AI Explainability 360

↳ (AIX360)

- github.com/IBM/AIX360

aix360.mybluemix.net

Watson OpenScale

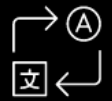
Validate and monitor AI models, deployed anywhere, to help comply with regulations, address internal safeguards, and mitigate business risk

Monitoring for compliance and safeguards

Mitigate biased model behavior

Explain model decisions

Validate and control risk



Ensure that models are resilient to changing situations

Detect drift during runtime

Generate specific model retraining inputs

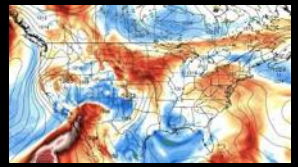
Align model performance with business outcomes

Correlate model metrics and business KPIs

Actionable metrics and alerts

Business environments are dynamic leading to “drift” in data and cause inaccuracies in model prediction

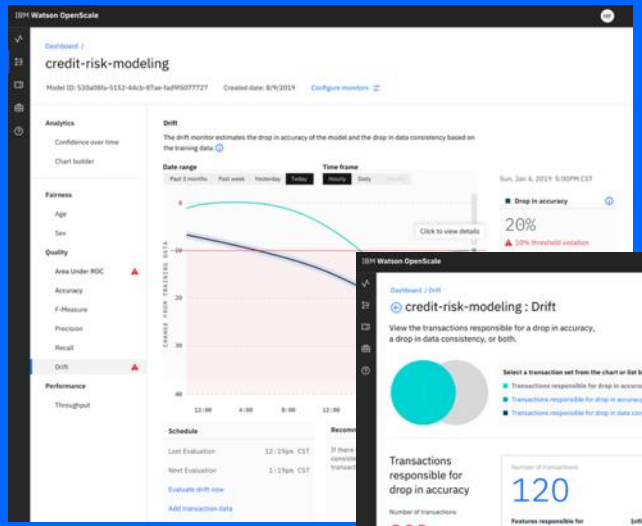
Weather data changes in short term can affect long term climate models



Online shopping behavior

Rise in income levels in specific geos can throw off global models

Watson OpenScale will **automatically detect drifted transactions and pinpoint datapoints that contribute to drift**



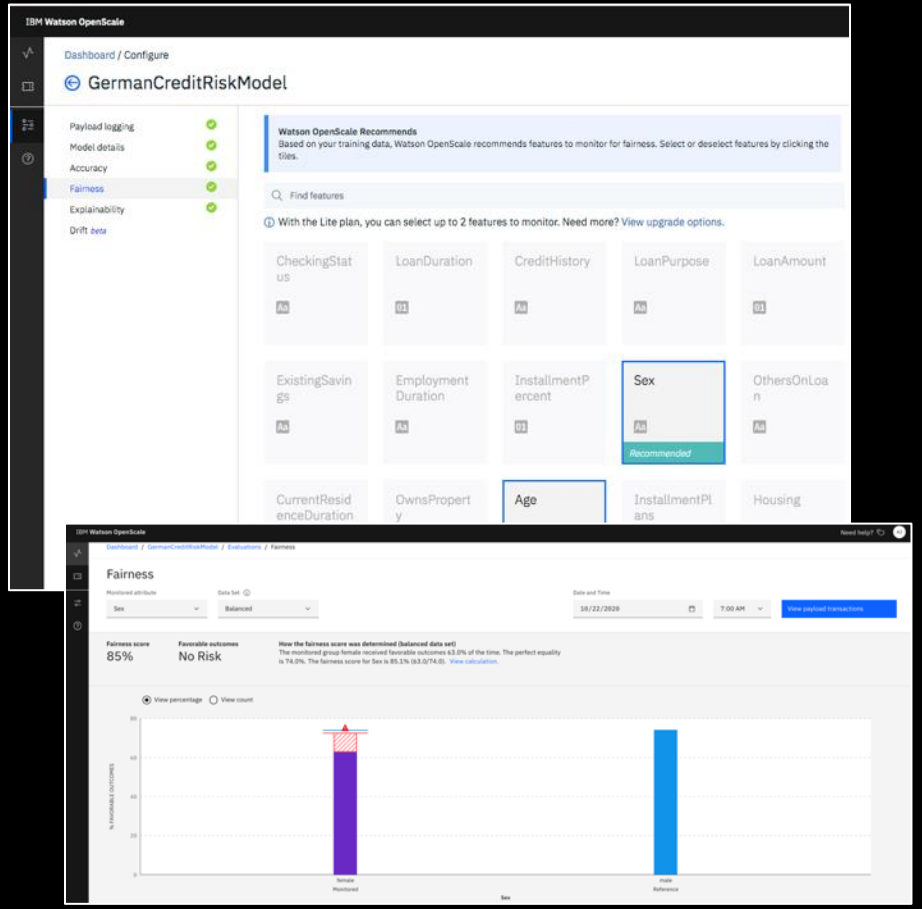
Bias Detection

OpenScale enables enterprises to enforce fairness in their model's outcome by analyzing transactions in production and finding biased behavior by the model

It pinpoints the source of bias and actively mitigates the biases found in production environment

Value:

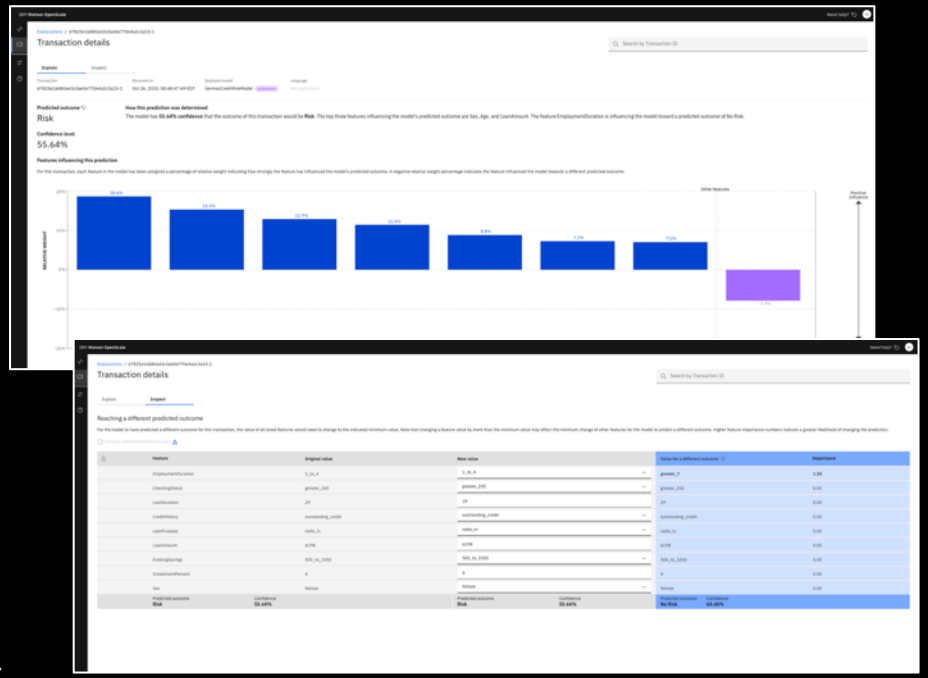
- Automatically recommend common protected attributes to monitor during production
- Detect biases in runtime in order to catch impacts on business applications and compliance requirements without time consuming, manual data analysis
- Metrics and data to help data scientists further troubleshoot issues in data sets or models
- Mitigate biases in runtime in order to enforce regulatory or enterprise fairness guardrails in real time



Explainability

OpenScale records every individual transaction and drills down into its working to explain how the model makes decisions

It provides a simple explanation that is user friendly and interactive



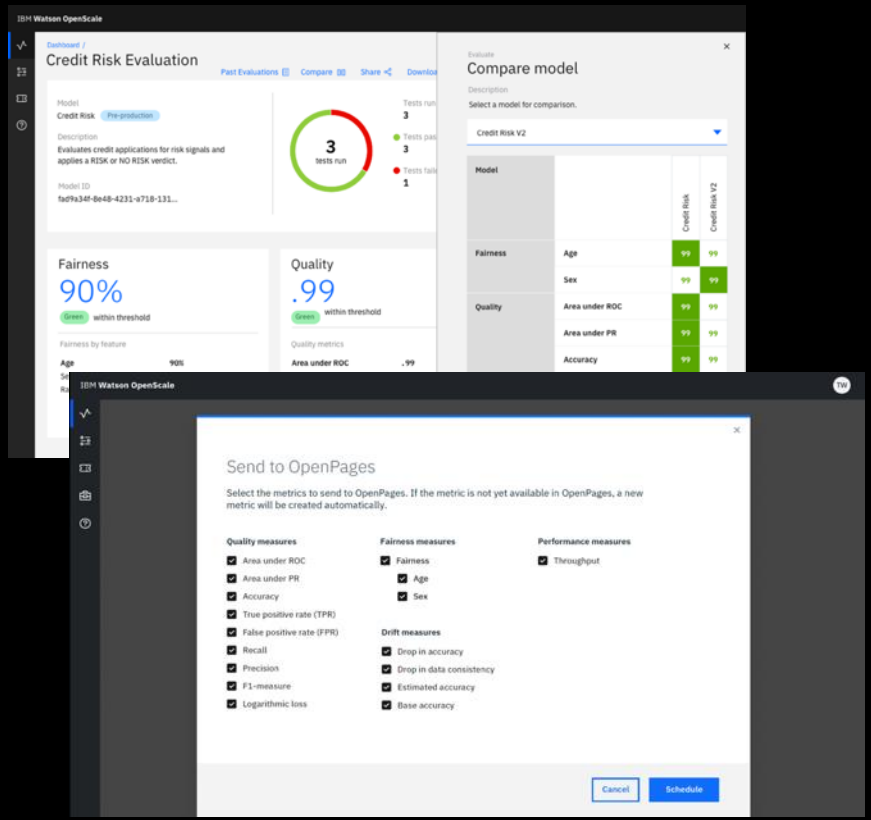
Value:

- Explain individual transaction level decisions made by the model in run time, including details about most important attributes and their values in order to assist in compliance and customer care situations
- Analyze individual transactions in a what-if manner in order to understand how model behavior will change in different business situations

Model Validation/Model Risk Management

OpenScale enables enterprises to validate pre-production models before putting them into production to ensure they can be trusted to perform as intended.

- Validate pre-production models and generate reports of outcomes
- Enable customizable tests relevant to AI models
- Compare performance of models
- Automatically configure monitoring of production models to match pre-production settings.
- Synchronize results with Governance, Risk and Compliance (GRC) solutions (Initially with OpenPages Model Risk Governance)



In closing…

Data management and high-quality data are the foundation of your successful AI strategy

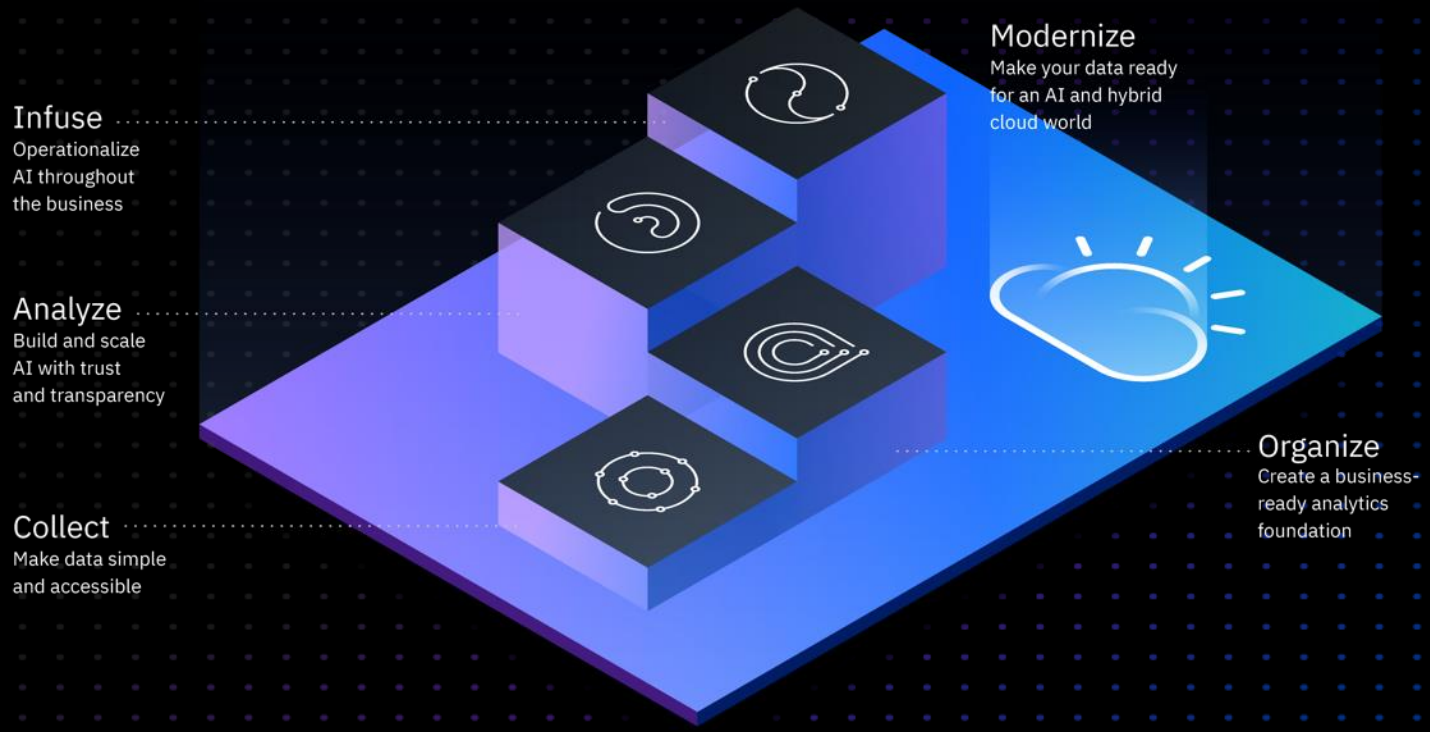
Use data management technology that provides:

Flexibility on how to integrate your data and at what latency

High scalability across a variety of data types and volumes

Built-in capabilities for data quality, governance and AI

IBM delivers the capabilities you need to build a ladder to governed AI



Upcoming webinars

- March 25th - https://ibm.biz/Db2_Storage

Resources

White paper

IBM Db2 on Cloud Pak for Data

Blog

Easing into your AI journey with IBM Db2 on Cloud Pak for Data

Achieve higher ROI by modernizing your databases

Learn about IBM's exclusive offer to modernize Db2 with Cloud Pak for Data

Db2 on Cp4D Myth Buster's blog

IBM is named Leader in Gartner's 2020 Magic Quadrant

Webinar

Optimizing your data management infrastructure with Db2

Your journey to AI starts with the right database

Db2 is AI Ready Db2 is Developer inclusive

Db2 is ResilientandConsumable

Hands-on lab

Db2 on Cloud Pak for Data hands-on lab

Video

Introducing Db2 on Cloud Pak for Data

Data virtualization with IBM Db2 for Cloud Pak for Data

Machine learning confidence-based query matching IBM Db2

Graph database analytics with IBM Db2

Machine learning SQl optimization with IBM Db2

Infographics

Db2 on Cp4D Benefits in a glance

Top 5 reasons to modernize your database

Thank you

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