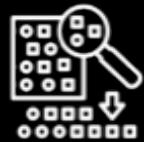


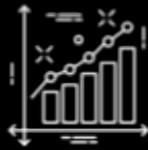
# IBM Watson

# AI for Smarter Business





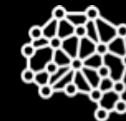
collect data



organize and  
build models

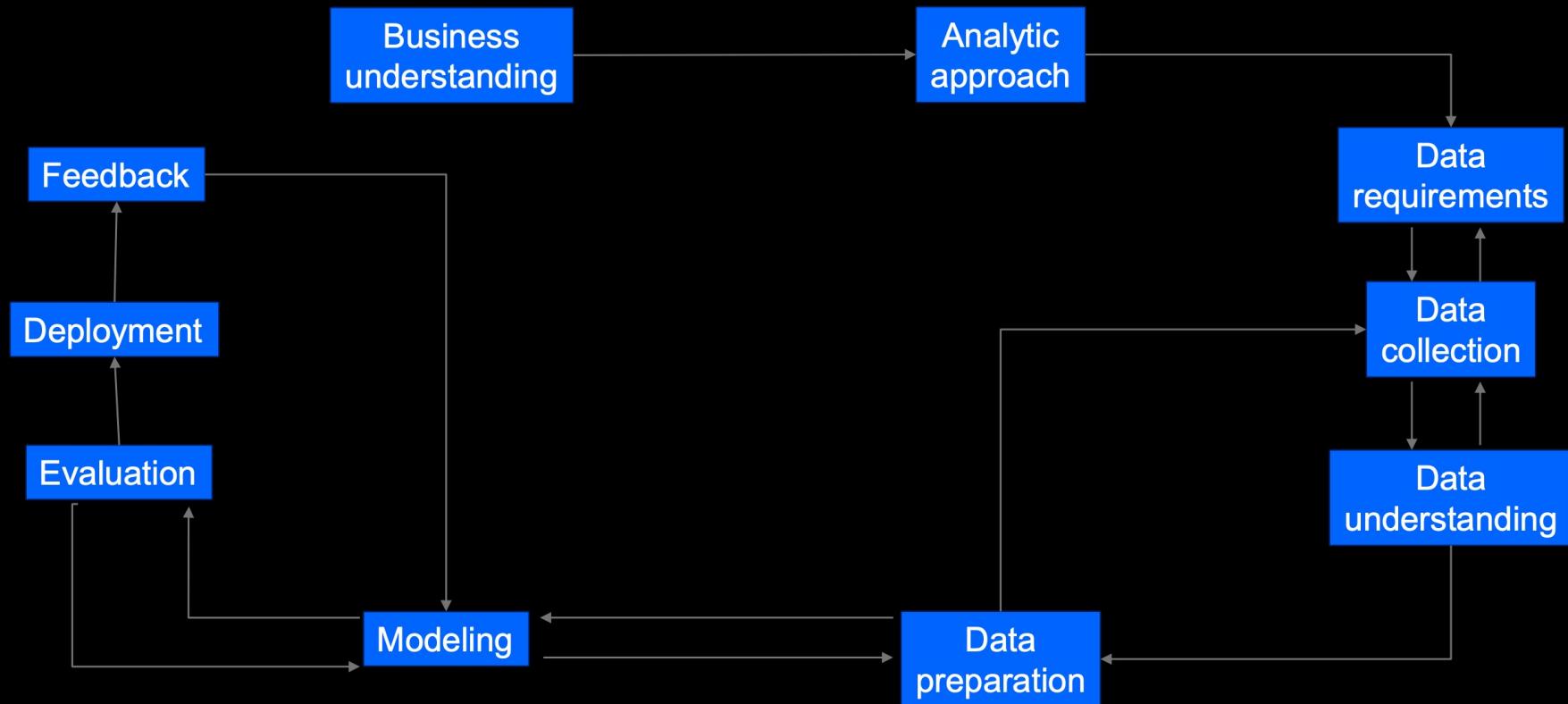


deploy



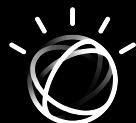
manage

# AI lifecycle



# Unify data, and simplify AI adoption with Watson

## The AI Ladder



Watson

**INFUSE** Operationalize AI throughout your business

**ANALYZE** Build and scale trusted AI

**ORGANIZE** Create a business-ready analytics foundation

**COLLECT** Make data simple and accessible



**SECURE**

Manage risk and intelligently defend against threats



**Red Hat**  
OpenShift

Hybrid cloud platform

**MODERNIZE**

Unify data, regardless of where it lives

# Lead offerings for the AI Ladder

**Infuse AI throughout your business**  
*Customize to your unique landscape and needs with an extensive catalog of data, analytics and AI apps*

**Analyze data and build AI**  
*Build and scale AI models within an automated AI lifecycle and apply advanced data analytics*

**Organize business-ready data**  
*Catalog and govern all enterprise data, models and rules creating self-service data pipelines*

**Collect and virtualize data**  
*Connect, manage and query all your data & AI assets no matter where they live*

**Modernize on ANY Cloud**  
*Deploy a common Information Architecture for AI across the clouds of your choice*

## IBM Watson



## Cloud Pak for Data Ecosystem

## IBM Cloud Pak for Data



## Hybrid Cloud Platform



All Your Data, On Any Cloud



**data**

Watson  
Knowledge  
Catalog

**build**

Watson Studio

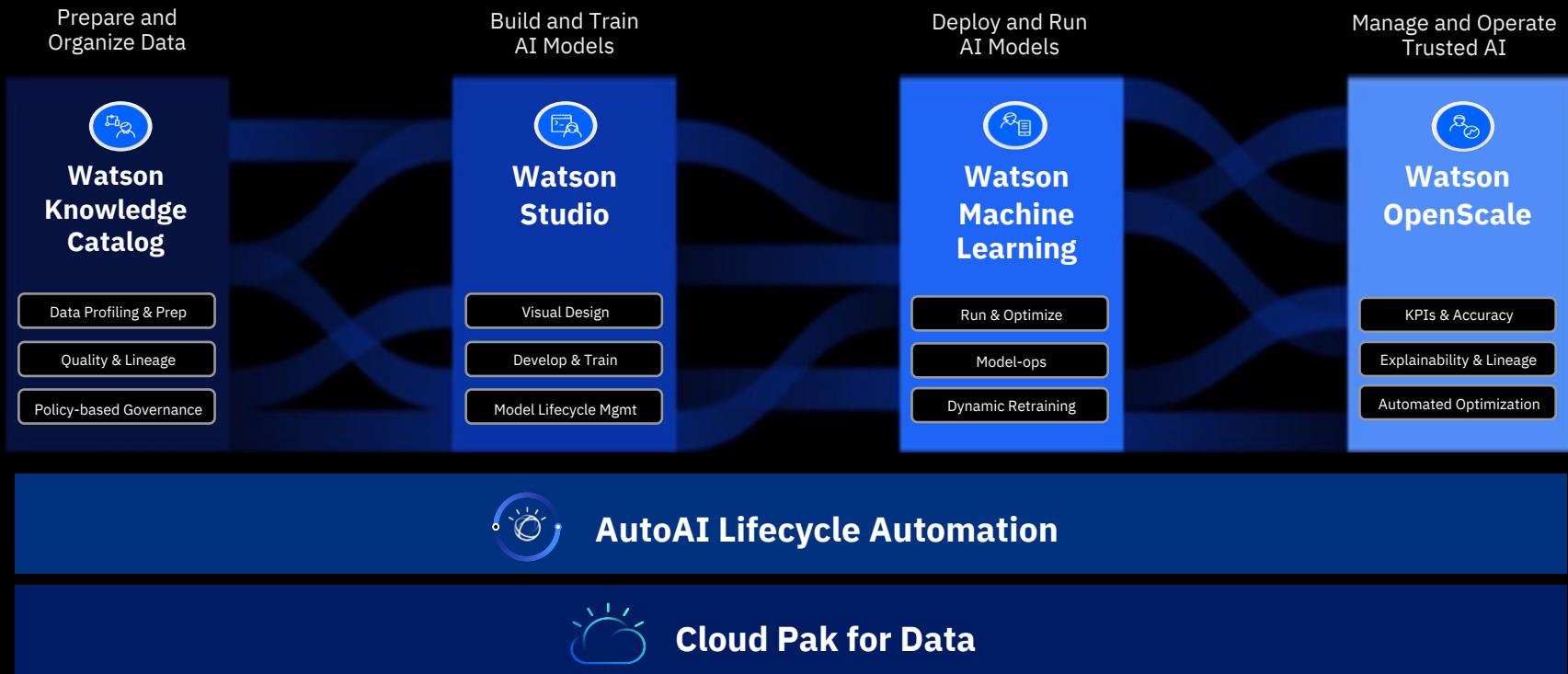
**deploy**

Watson  
Machine  
Learning

**manage**

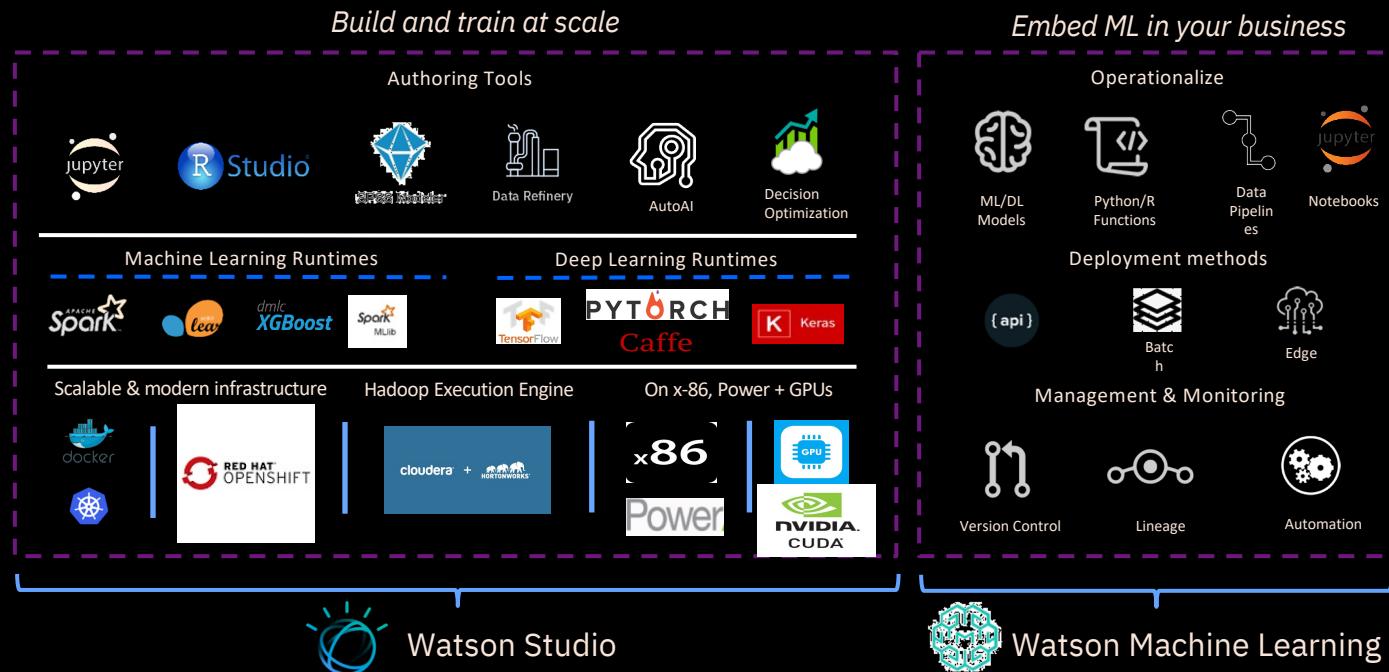
Watson  
OpenScale

# IBM Watson AI Lifecycle Platform



# Watson Studio

# 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

# IBM Watson Studio

Enterprise Data Science platform that helps your team work together to build models to make better data driven decisions for your business



## Analyze any data, no matter where it lives

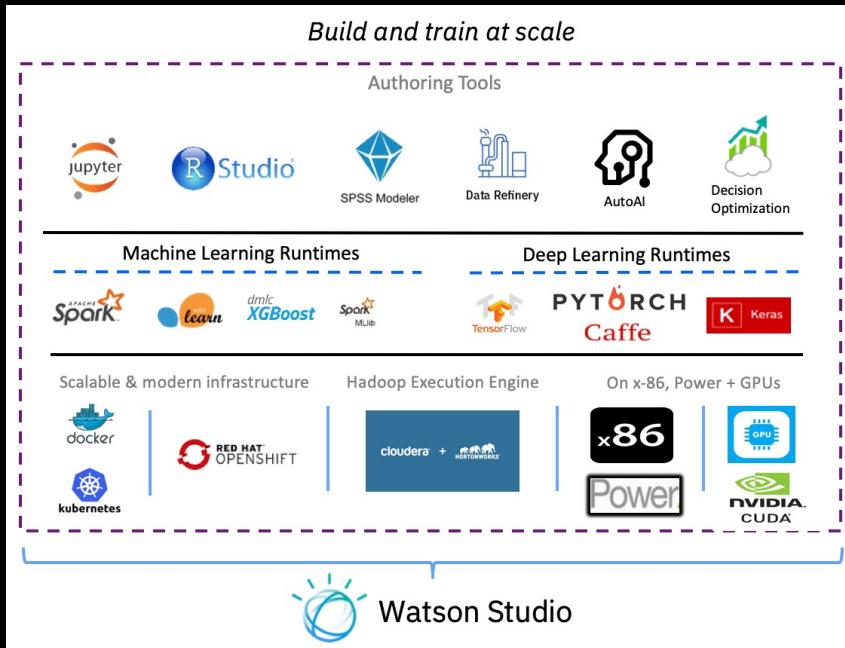
Connect to and analyze your data without moving a single byte through dozens of connectors and multiple deployment options

## Empower your entire organization with notebooks, visual productivity, and automation tools

Leverage your entire organization with a variety of tools in a single integrated platform

## One platform to rule them all from discovery to production

Analyze data, build predictive models, and seamlessly integrate Watson Machine Learning to deploy at scale



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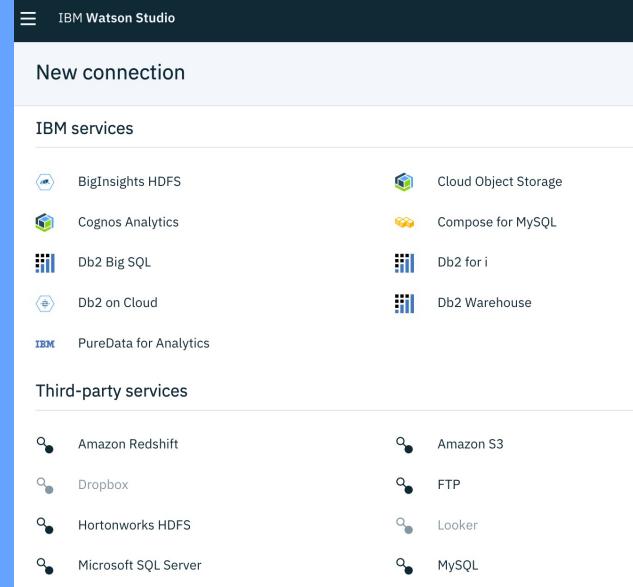
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The screenshot shows the IBM Watson Studio interface. At the top, there's a dark header bar with the text "IBM Watson Studio". Below it, a white page has a section titled "New connection". Under this, there are two main sections: "IBM services" and "Third-party services", each listing various data sources with their respective icons.

Category	Service	Icon
IBM services	BigInsights HDFS	Cloud storage icon
	Cognos Analytics	Analytics icon
	Db2 Big SQL	Db2 icon
	Db2 on Cloud	Db2 icon
	PureData for Analytics	Analytics icon
Third-party services		
Third-party services	Amazon Redshift	Amazon S3 icon
	Dropbox	Dropbox icon
	Hortonworks HDFS	HDFS icon
	Microsoft SQL Server	Microsoft SQL Server icon
	Amazon S3	Amazon S3 icon
FTP	FTP icon	
Looker	Looker icon	
MySQL	MySQL icon	

- IBM Services like **Cognos & DB2**
- 3<sup>rd</sup> Party Services like **Amazon S3, Hadoop, & Microsoft SQL Server**
- We have **Public Cloud, Private Cloud, & Desktop/Server** deployment options

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The screenshot shows a Jupyter Notebook titled "Train and deploy a heart disease prediction model using XGBoost and IBM Watson Machine Learning APIs". The notebook includes a diagram of a neural network with a heart icon in the center, and text explaining the process of training and deploying the model using XGBoost and Watson Machine Learning APIs. It also mentions the use of Python 3.5 runtime, XGBoost 0.6 and Scikit-Learn 0.17.

**Super charged Jupyter Notebooks & R Studio as most popular IDEs for data scientists well integrated with data connectors and rich set of default environments**

The screenshot shows the SPSS Modeler Lab interface, which is a visual tool for data mining. It displays a complex network of nodes and connections, including various modeling algorithms like Association Rules, Auto Classifier, and Bayesian Network, along with data operations and search functions.

**Visual tools such as SPSS Modeler, Data Refinery, & AutoAI for non coders to analyze data and build models**

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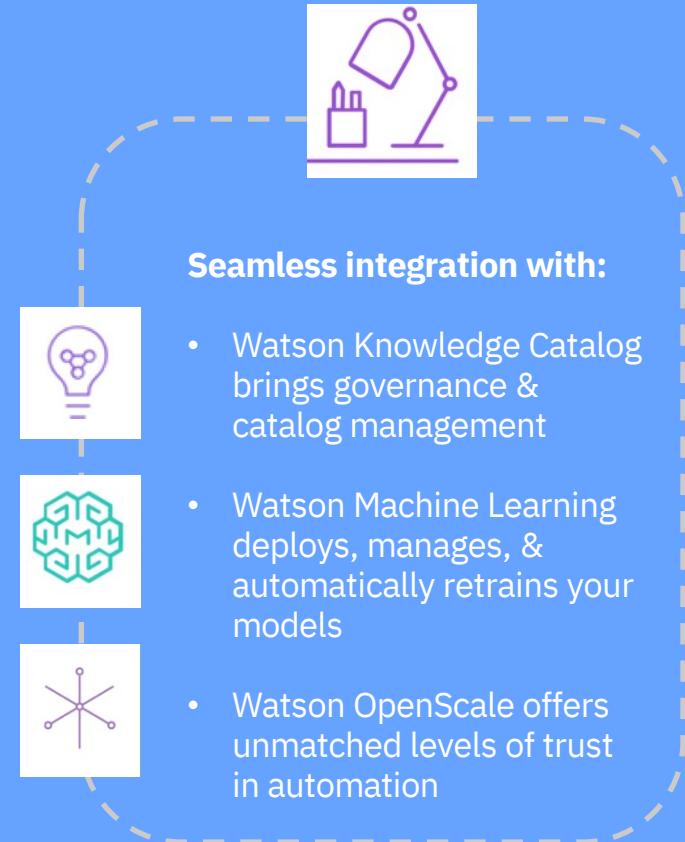
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# Watson Machine Learning

# IBM Watson Machine Learning

Embed Machine Learning and Deep Learning  
in your Business

## Deploy and Manage Models

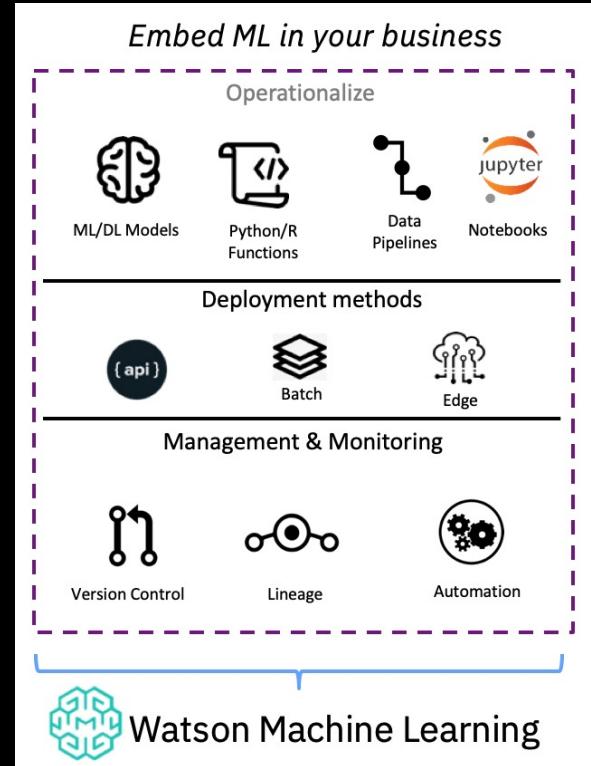
Move models to production, in an easy, secure, and compliant way

## Intelligent Model Operations

Embed intelligent training services, with feedback loops that constantly learn from new data, regardless where it resides

## Accelerate Compute Intensive Workloads

Distribute your deep learning training and Hadoop/Spark workloads with multi-tenant job scheduling



# IBM Watson Machine Learning

Embed Machine Learning & Deep Learning in your Business

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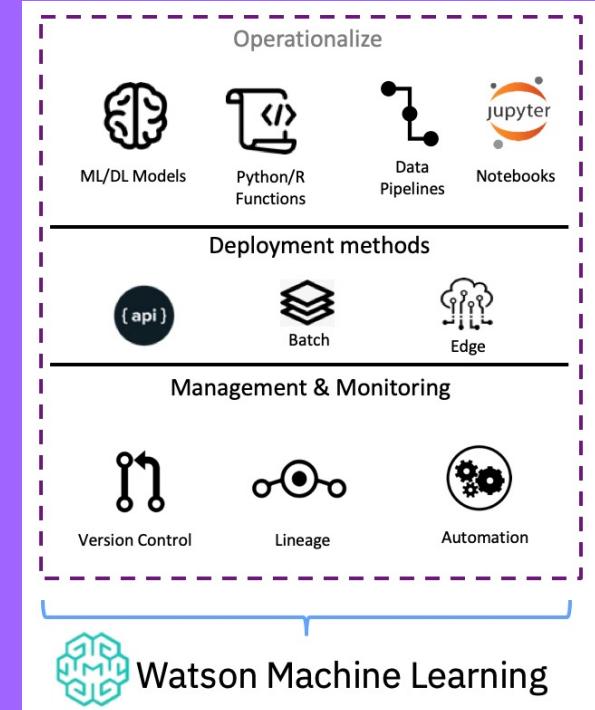
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*Flexible deployment capabilities*



# IBM Watson Machine Learning

Embed Machine Learning & Deep Learning in your Business

## Deploy and Manage Models

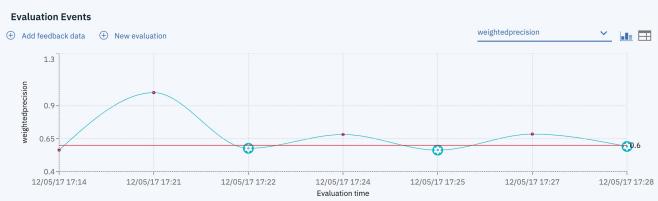
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- Configure learning systems
- Flexible management experience
  - User Interface
  - CLI
  - APIs
  - Python SDK

# IBM Watson Machine Learning

Embed Machine Learning & Deep Learning in your Business

## Deploy and Manage Models

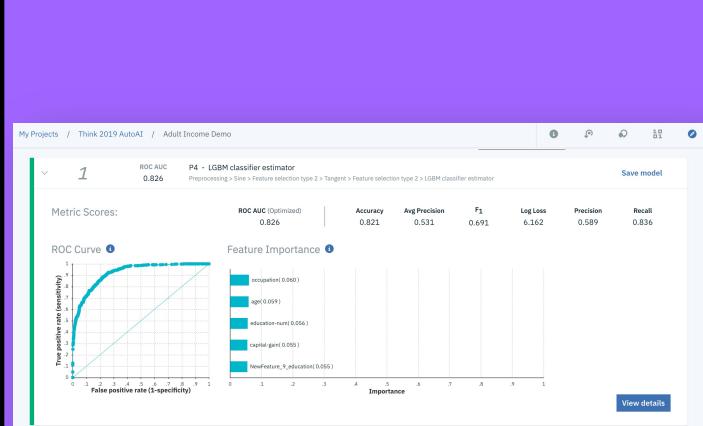
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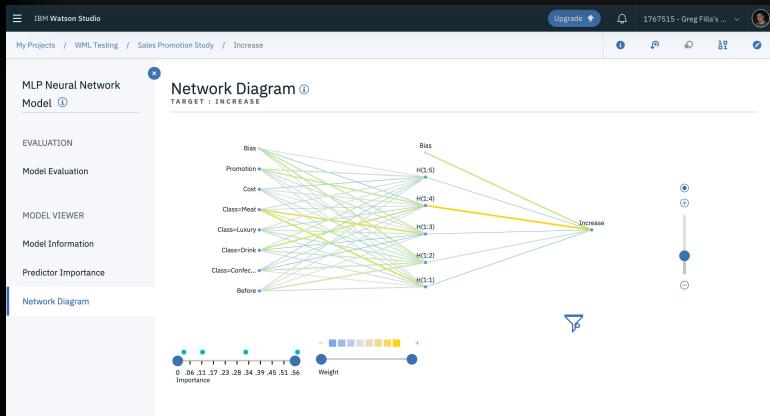
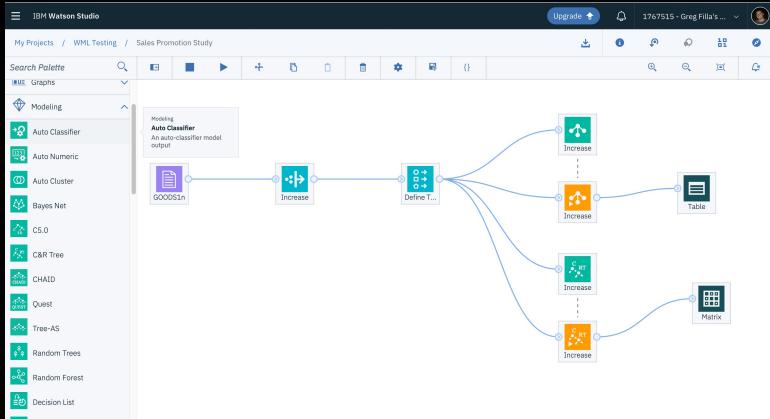


- Visually monitor training jobs
  - Experiments
  - AutoAI
- WML Accelerator for optimized Spark and GPU jobs
- Integration with Hadoop for in-place batch training and scoring

# SPSS Modeler for Watson Studio

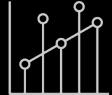
# SPSS Modeler for Watson Studio

- SPSS Modeler is *embedded* in Watson Studio
- Watson Studio brings the best of both worlds by supporting legacy SPSS streams and also best in breed of open source
- Many new nodes in 2.0 – 28 for data preparation & 44 for Machine Learning. Includes Auto Data Prep and Auto Modeling, enhanced Data Visualization, Data Refinery integration and push to production options.



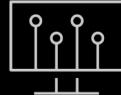
# Decision Optimization for Watson Studio

# Machine learning and optimization: better together



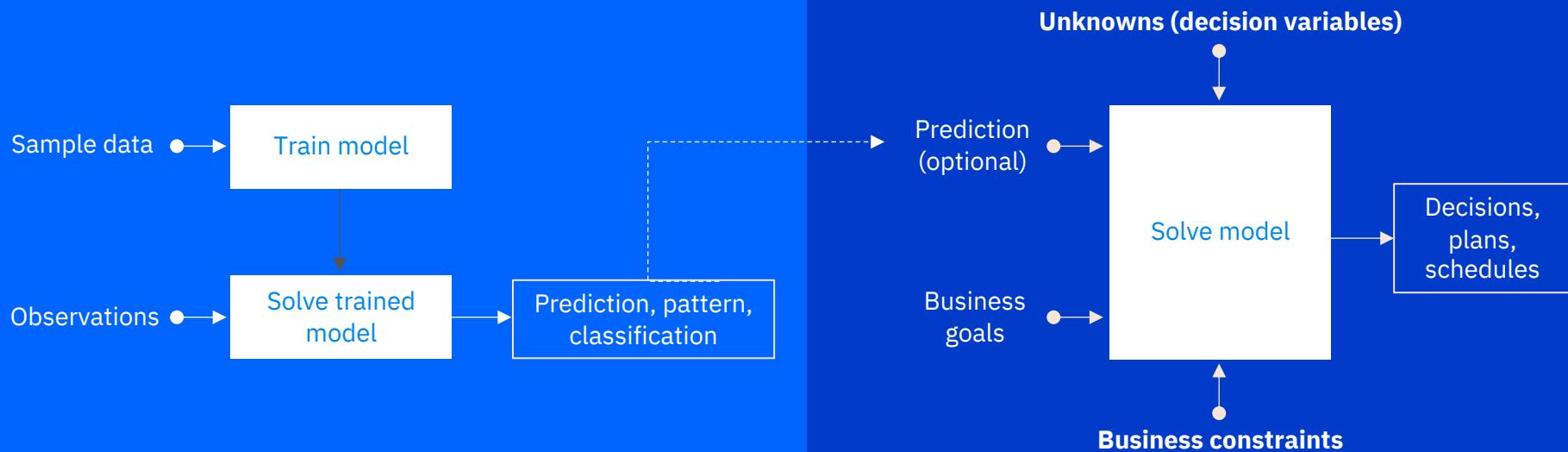
## Predictive analytics

- Basic (supervised): You **know the answer**, and you **train the machine how to find it**.
- 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**.
- Advanced: Robust, stochastic, etc



# AutoAI

# Watson Studio AutoAI

- Integrated with **Watson Studio** and **Watson Machine learning**
- Automatically ingest, clean, transform, and model with data prep, model selection, feature engineering, and hyper-parameter optimization
- Training feedback visualizations provide real-time results to see model performance
- Binary, Multiclass, and Regression support
- One-click deployment to Watson Machine Learning

IBM Watson Studio

My Projects / AutoAI Playpen / Demo with Elena

Upgrades greg filia's Account

Completed 15 minutes

SOURCE TABLE: titanic\_train.csv

PREDICTION COLUMN Survived PREDICTION TYPE Classification OPTIMIZED METRIC ROC AUC

Classifying Titanic Survivors Stop run

Gradient boosting classifier Hyperparameter Optimization P1 P2 P3 P4

Extra trees classifier Hyperparameter Optimization P5 P6 P7 P8

LGBM classifier Hyperparameter Optimization P9 P10 P11 P12

Read Dataset Split holdout data Read training data Preprocessing Model Selection Extra trees classifier Gradient boosting classifier LGBM classifier

Hyperparameter Optimization Feature Engineering Hyperparameter Optimization Feature Engineering Hyperparameter Optimization

Model Selection Pipeline leaderboard

RANK	ROC AUC	Pipeline Information	Compare models	Ranking based on:	ROC AUC
1	0.860	P11 - LGBM classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 1 > Standard scaler > Feature selection type 1 > LGBM classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
2	0.852	P9 - LGBM classifier estimator Transformers (2): Preprocessing > LGBM classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
3	0.852	P10 - Extra trees classifier estimator Transformers (2): Preprocessing > Extra trees classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
4	0.851	P7 - Extra trees classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 3 > Standard scaler > Feature selection type 1 > Extra trees classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
5	0.839	P5 - Extra trees classifier estimator Transformers (2): Preprocessing > Extra trees classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
6	0.839	P6 - Extra trees classifier estimator Transformers (2): Preprocessing > Extra trees classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
7	0.838	P1 - Gradient boosting classifier estimator Transformers (2): Preprocessing > Gradient boosting classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
8	0.838	P2 - Gradient boosting classifier estimator Transformers (2): Preprocessing > Gradient boosting classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
9	0.831	P4 - Gradient boosting classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 1 > Standard scaler > Feature selection type 1 > Gradient boosting classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
10	0.826	P3 - Gradient boosting classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 1 > Standard scaler > Feature selection type 1 > Gradient boosting classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
11	0.744	P12 - LGBM classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 1 > Standard scaler > Feature selection type 1 > LGBM classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	
12	0.500	P8 - Extra trees classifier estimator Transformers (6): Preprocessing > Cossine > Feature selection type 1 > Standard scaler > Feature selection type 1 > Extra trees classifier estimator	<a href="#">View details</a>	<a href="#">Save model</a>	

# Benefits of Using AutoAI



## Build models faster

Automate [data preparation](#) and model development



## Find signal from noise

Auto-feature [engineering](#) makes it easy to extract more predictive power from your data



## Jump the skills gap

[No coding?](#) No problem – get started with a couple clicks



## Rank and explore models

Quickly compare [candidate pipelines](#) to find the best model for the job



## Discover more use cases

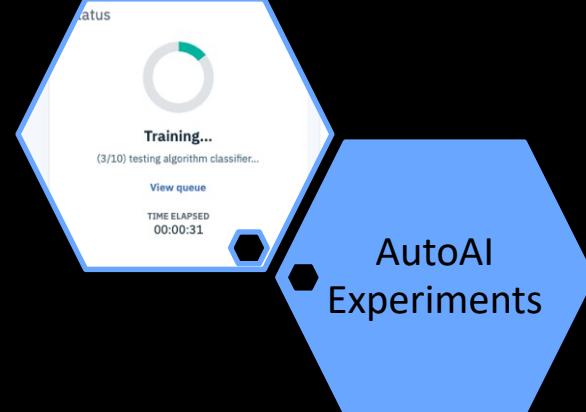
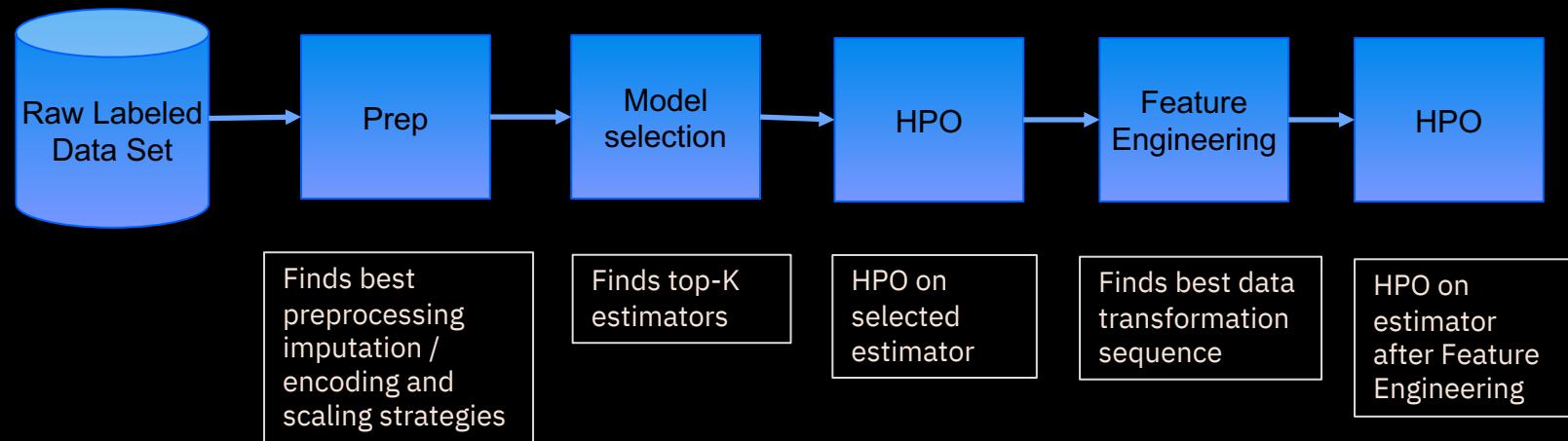
Supercharge [collaboration](#) with [AI everywhere](#) to disrupt & transform



## Ready, set, deploy

Pipelines generated with AutoAI can be deployed to REST APIs with [one click](#)

# AutoAI: How does it work?



# Watson OpenScale

# IBM Watson OpenScale

Automate & Operate AI at Scale

## Production monitoring for compliance

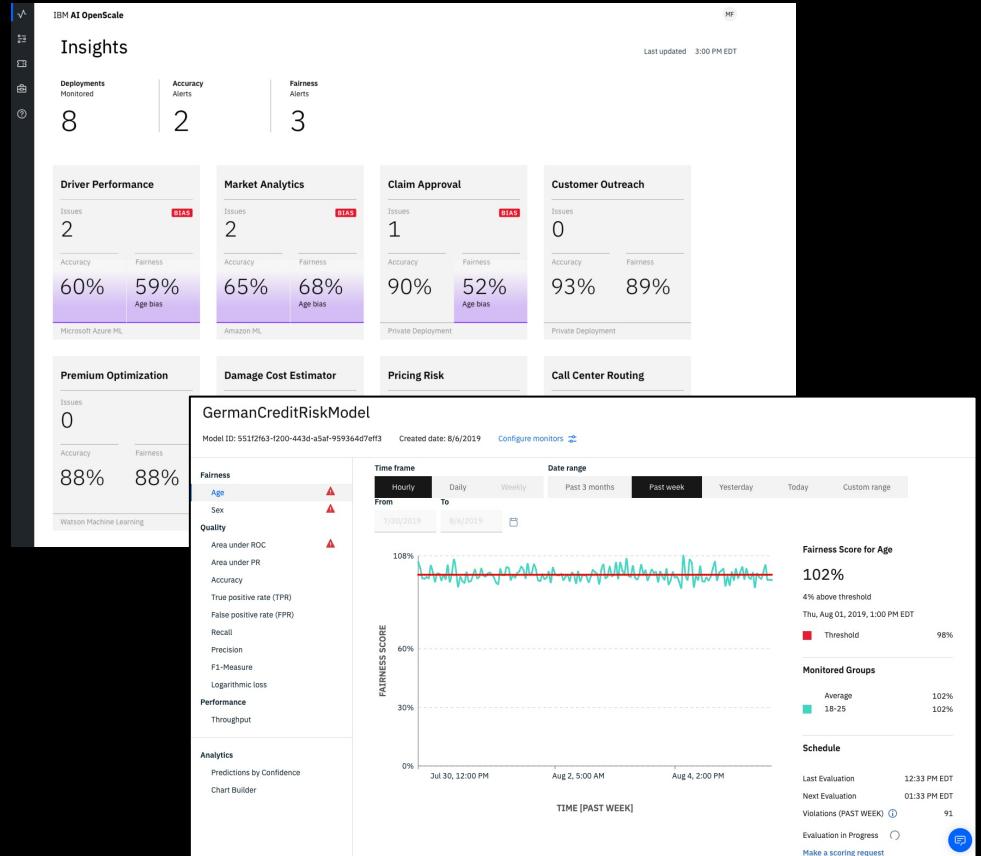
Detect and mitigate model bias; audit and explain model decisions

## Ensure models resiliency in changing situations

Detect drift in data and anomaly in model behavior; specify inputs and triggers to model lifecycle

## Align model performance with business outcomes

Correlate model metrics and business KPIs to measure business impact; actionable metrics and alerts



# 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

# Why worry about AI and compliance?

A *leading bank* was **fined \$175M** for charging higher fees and interest rate to more than 30,000 minority borrowers.

A *leading credit card company* was **fined \$75M** for selling products to Spanish speaking customers at a much higher interest rate compared to others.

“... **50%** of our bonuses are linked to how we manage risk ...”  
– VP, AI platforms, Large American bank

## SR 11-7: Guidance on Model Risk Management



BOARD OF GOVERNORS  
OF THE FEDERAL RESERVE SYSTEM  
WASHINGTON, D.C. 20551



## Ethics Guidelines for Trustworthy AI

Join AI Ethics Guidelines

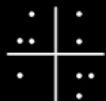


<http://www.fsb.org/wp-content/uploads/140407.pdf>



# 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

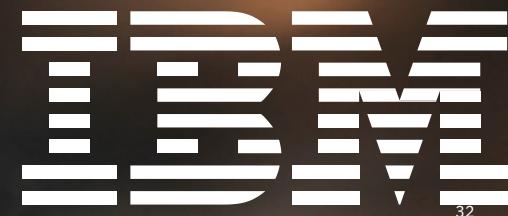
Detect drift during runtime

Generate specific model retraining inputs

## Align model performance with business outcomes

Correlate model metrics and business KPIs

Actionable metrics and alerts



32

