



# Azure Everywhere

*The 1st Wave*

Date \_ 2019.1.11<sup>Fri</sup>

Place \_ Coex GrandBallroom



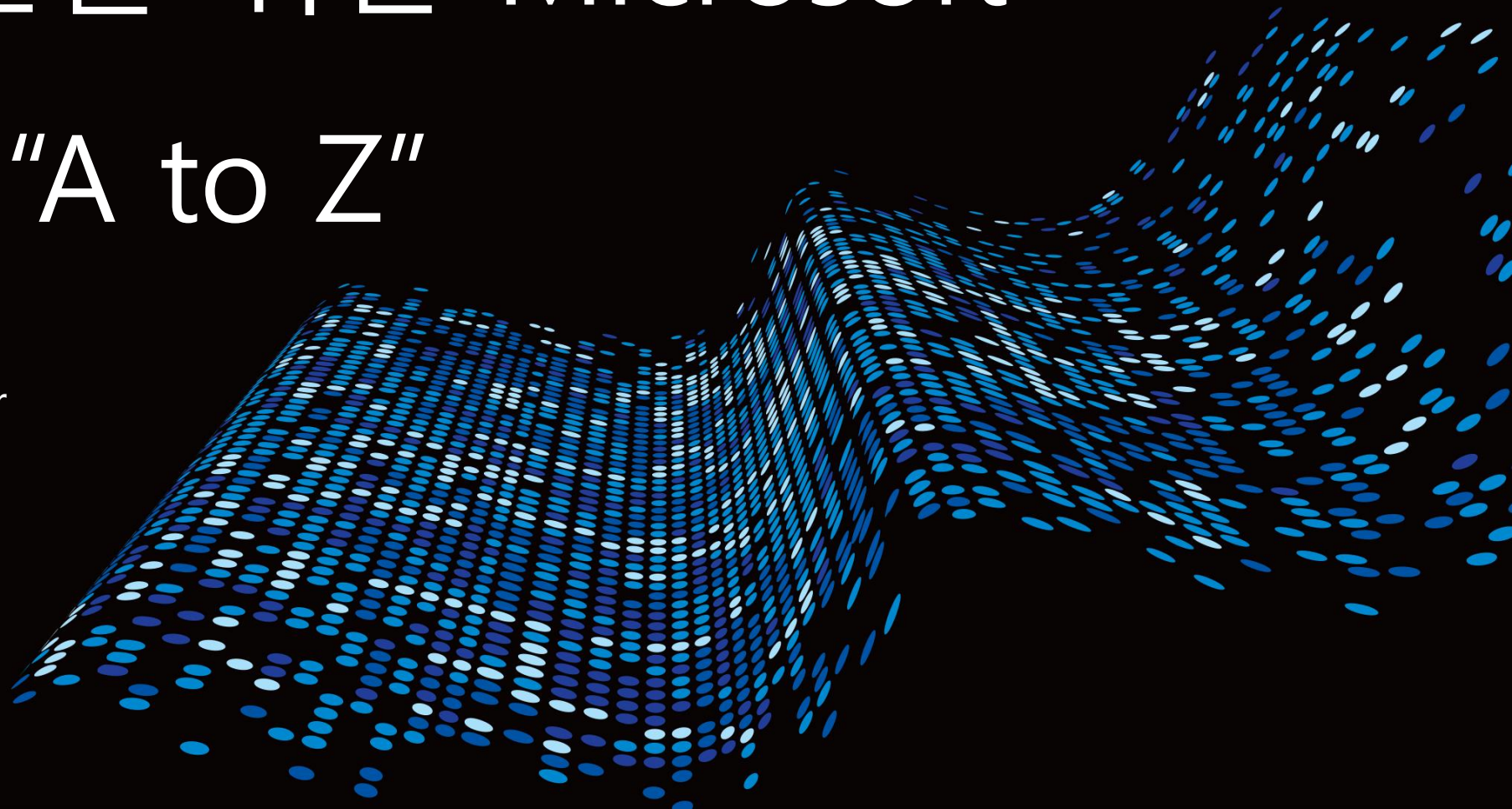
# AI 구현을 위한 Microsoft Azure "A to Z"

Microsoft Technology Center

Technical Architect

백인기 부장

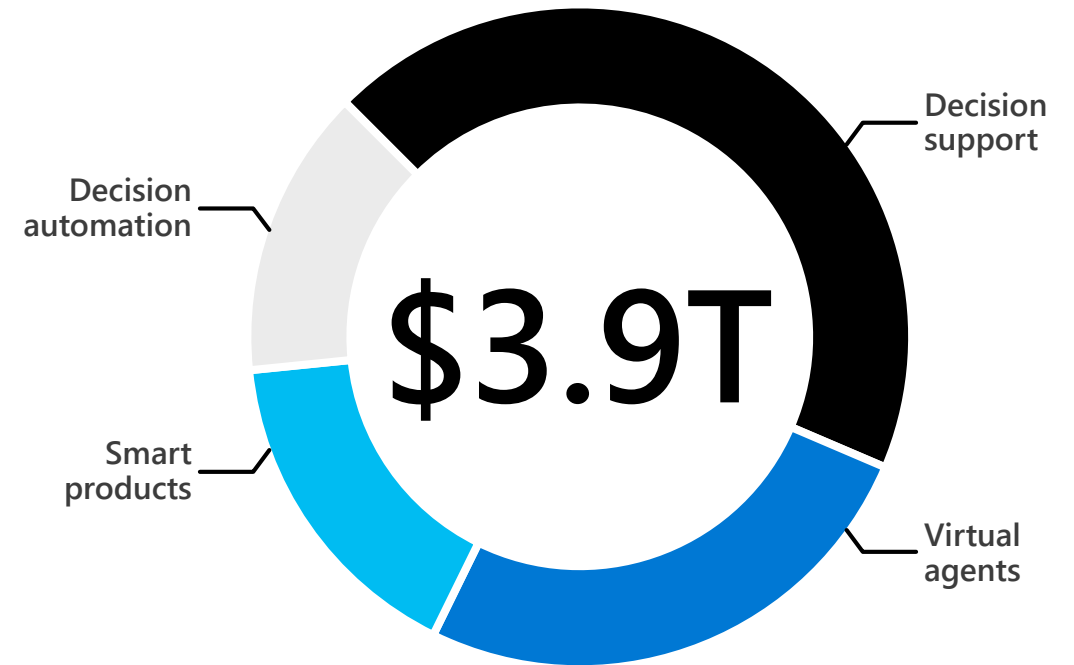
**Azure Everywhere**  
*The 1st Wave*

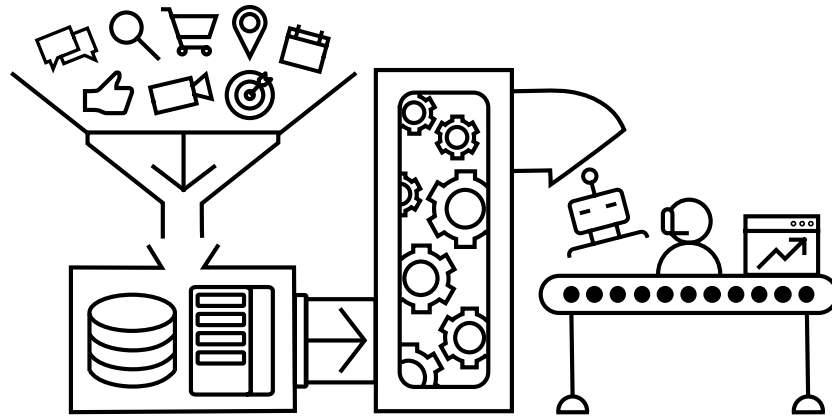


# Advanced analytics represents a growing opportunity

Global business value derived from **AI in 2022** will reach

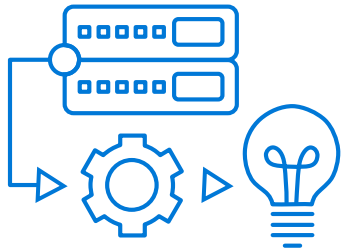
**\$3.9T**





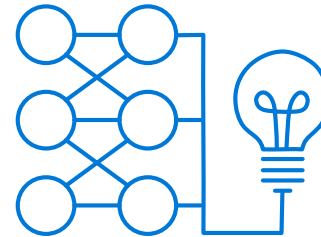
## Advanced analytics

An intelligent examination of data or content to unlock deeper insights, make predictions, and generate recommendations using sophisticated techniques such as **machine learning** and **artificial intelligence**.



### Machine learning (ML)

A method of data analysis that automates analytical model building



### Artificial intelligence (AI)

The development of computer systems able to perform tasks that traditionally require human intelligence

# Azure Machine Learning Stack

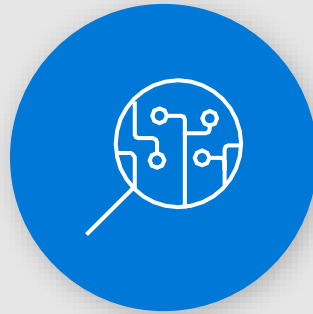


# Azure AI



## AI apps & agents

Azure Bot Service  
Azure Cognitive Services



## Knowledge mining

Azure Cognitive Search



## Machine learning

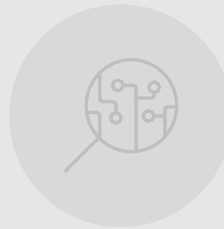
Azure Databricks  
Azure Machine Learning  
Azure AI Infrastructure

# Azure AI



## AI apps & agents

Azure Bot Service  
Azure Cognitive Services



## Knowledge mining

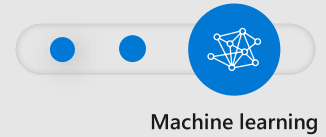
Azure Cognitive Search



## Machine learning

Azure Databricks  
Azure Machine Learning  
Azure AI Infrastructure

# Machine learning



## Sophisticated pretrained models

To simplify solution development



Vision



Speech



Language



Search

## Popular frameworks

To build advanced deep learning solutions



Pytorch



TensorFlow



Keras



Onnx

## Productive services

To empower data science and development teams



Azure Databricks



Azure Machine Learning



Machine Learning VMs

## Powerful infrastructure

To accelerate deep learning



CPU



GPU



FPGA

## Flexible deployment

To deploy, manage models on intelligent cloud & edge



On-premises



Cloud



Edge



# Popular frameworks

Build advanced deep learning solutions

Use your favorite deep learning frameworks



TensorFlow



PyTorch



Scikit-Learn



MXNet



Chainer



Keras



Without getting locked into one framework



Community project created by Facebook and Microsoft

Use the best tool for the job. Train in one framework and transfer to another for inference



# Productive services

Empower data science and development teams



Azure Databricks



Azure Machine Learning

## Integrated data science & data engineering teams

Desktop solutions not adequate

Need a unified big data & machine learning solution



Machine Learning VMs

## Individual data scientists

Desktop solutions adequate

Need cloud for sporadic compute needs



## Azure Databricks

Enable collaboration between data scientists and data engineers with an interactive productive workspace

Prepare and clean data at massive scale with the language of your choice

Build and train models with pre-configured machine learning and deep learning optimized clusters



## Azure Machine Learning

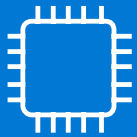
Track experiments for reproducibility and auditing needs

Identify and promote your best models

Deploy and manage your models using containers to run them anywhere

# Powerful infrastructure

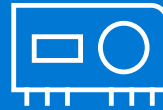
Accelerate deep learning



**CPUs**

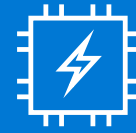
General purpose  
machine learning

D, F, L, M, H Series



**GPUs**

Deep learning  
N Series



**FPGAs**

Specialized hardware  
accelerated deep learning

Project Brainwave

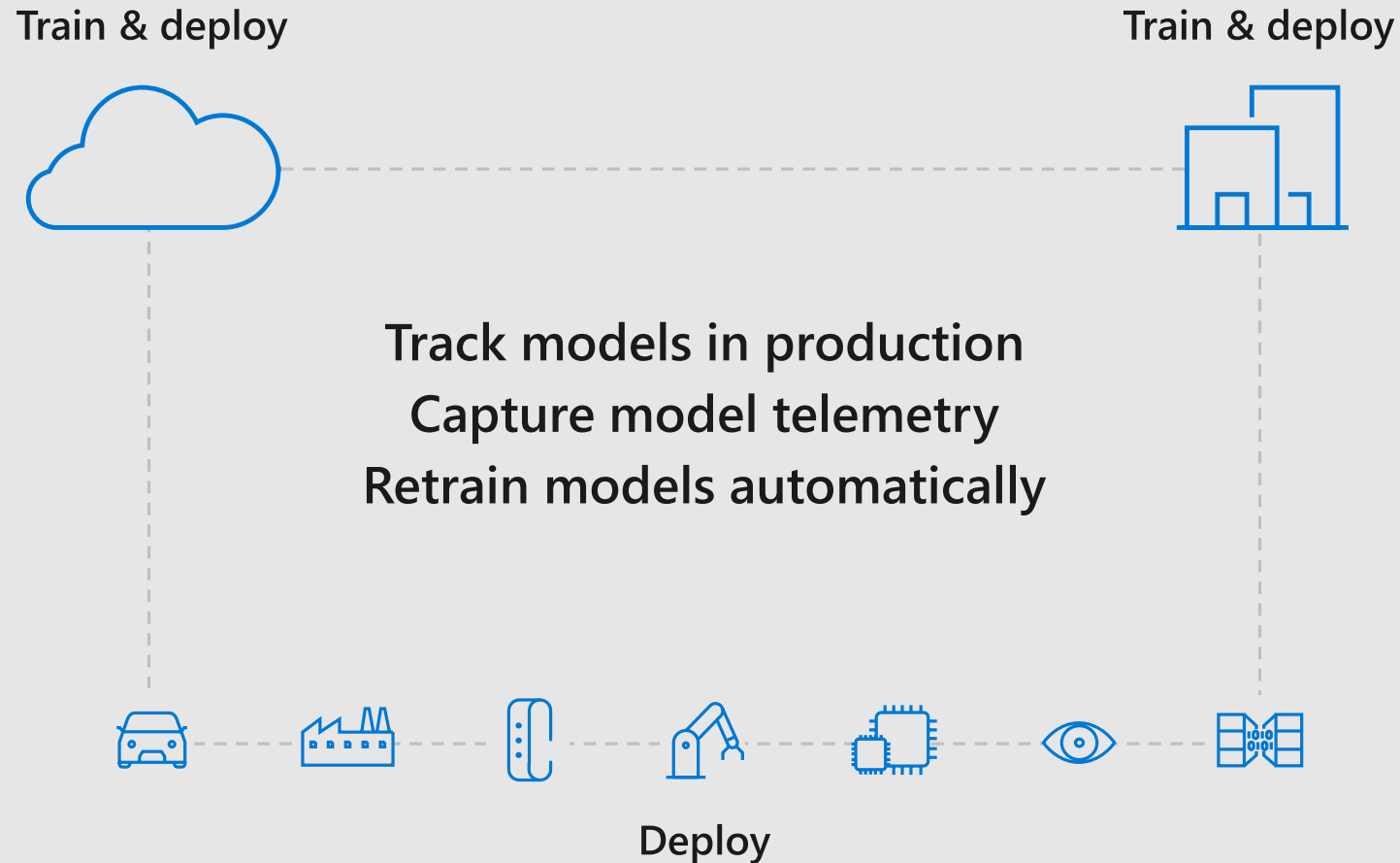


Optimized for flexibility

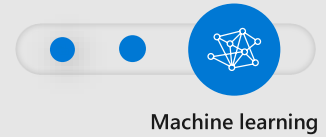
Optimized for performance

# Flexible deployment

Deploy and manage models on intelligent cloud and edge



# Azure is the best place for machine learning



## Sophisticated pretrained models

Most comprehensive set of pretrained services



Vision



Speech



Language



Search

## Popular frameworks

Open & interoperable



Pytorch



TensorFlow



Keras



Onnx

## Productive services

Machine learning at scale



Azure Databricks



Azure Machine Learning



Machine Learning VMs

## Powerful infrastructure

Most comprehensive  
Lowest cost inferencing using FPGAs



CPU



GPU



FPGA

## Flexible deployment

From cloud to edge



On-premises



Cloud

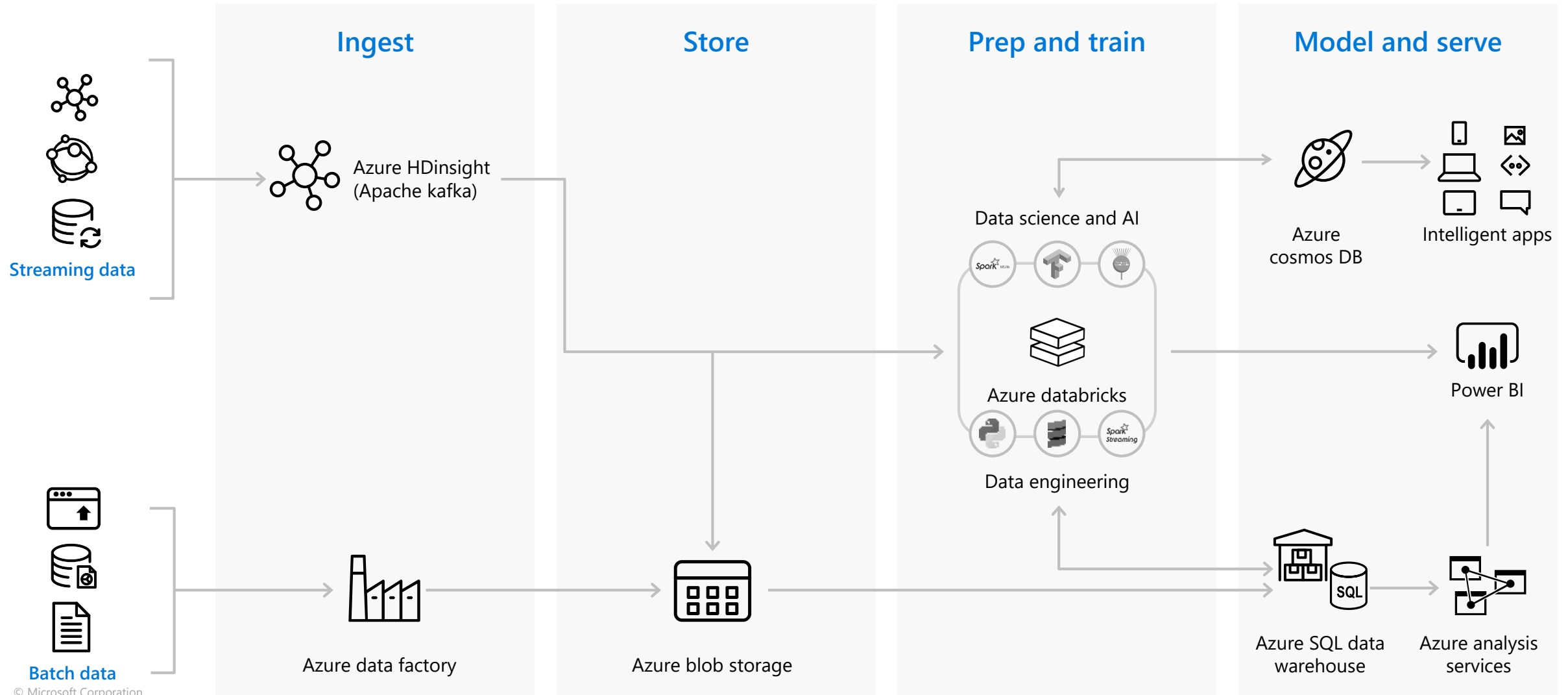


Edge

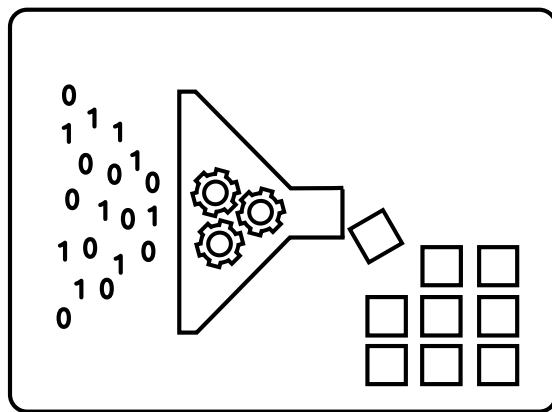
# Recommended reference architecture for AI solution on Azure





# Microsoft has a recommended reference architecture

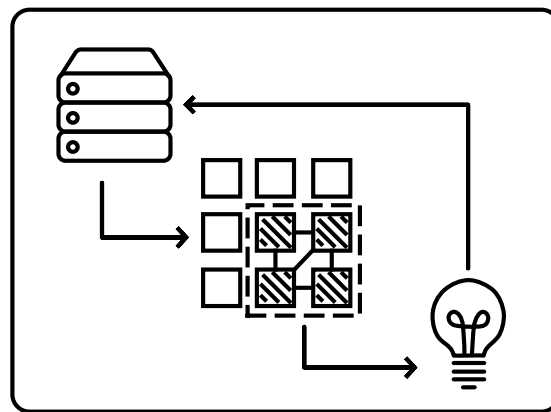


## Prep and train




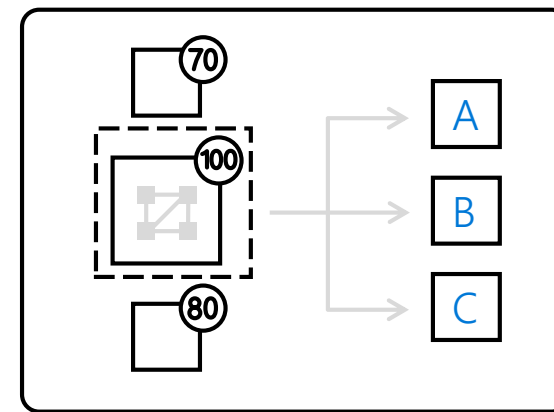
### Collect and prepare data

 Azure data factory  
 Azure databricks





### Train and evaluate model

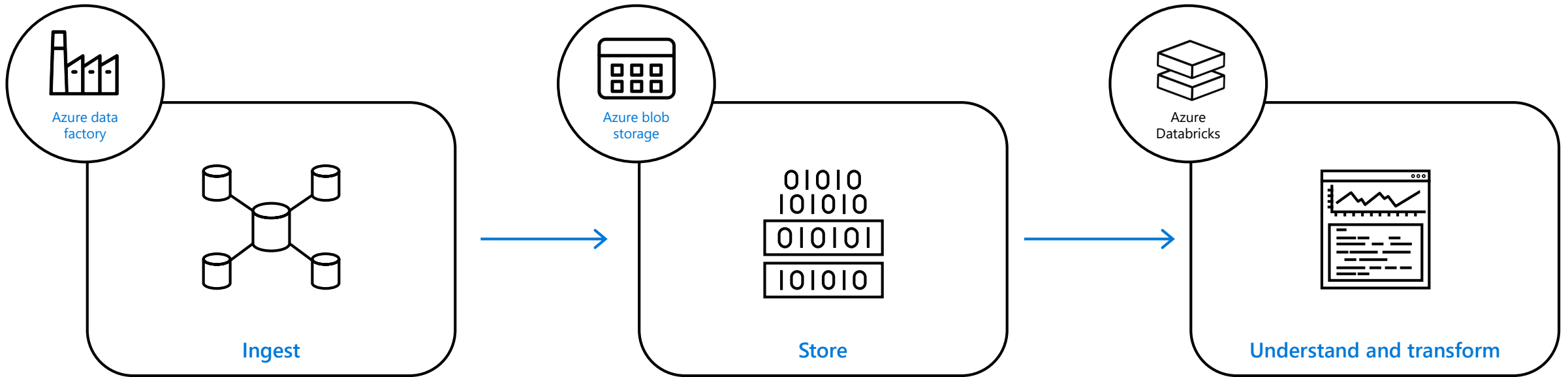
 Azure databricks



### Operationalize and manage

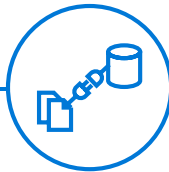
 Azure ML services  
 Azure databricks

# Collect and prepare all of your data at scale



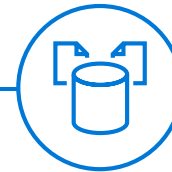
## Connect to data from any source

Integrate with all of your data sources  
Create hybrid pipelines  
Orchestrate in a code-free environment



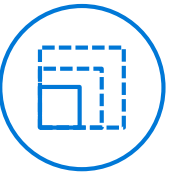
## Leverage best-in-class analytics capabilities

Leverage open source technologies  
Collaborate within teams  
Use ML (machine learning) on batch streams

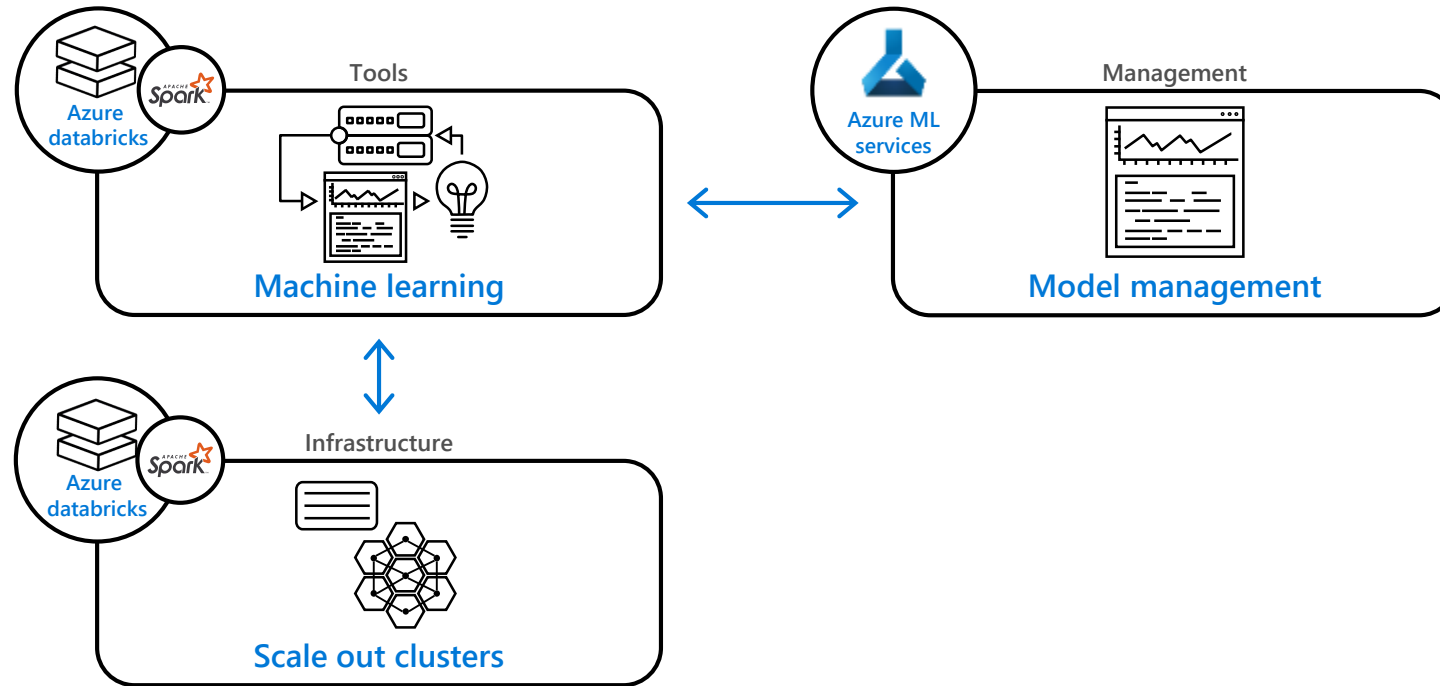


## Scale without limits

Build in the language of your choice  
Leverage scale out topology  
Scale compute and storage separately

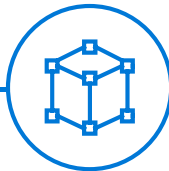


# Train and evaluate Machine Learning models



## Simplify model development

Collaborate in interactive workspaces  
Access a library of battle-tested models  
Automate job execution



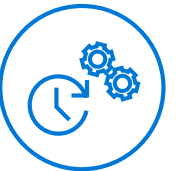
## Scale compute resources to meet your needs

Easily scale up or scale out  
Autoscale on a serverless infrastructure  
Leverage commodity hardware

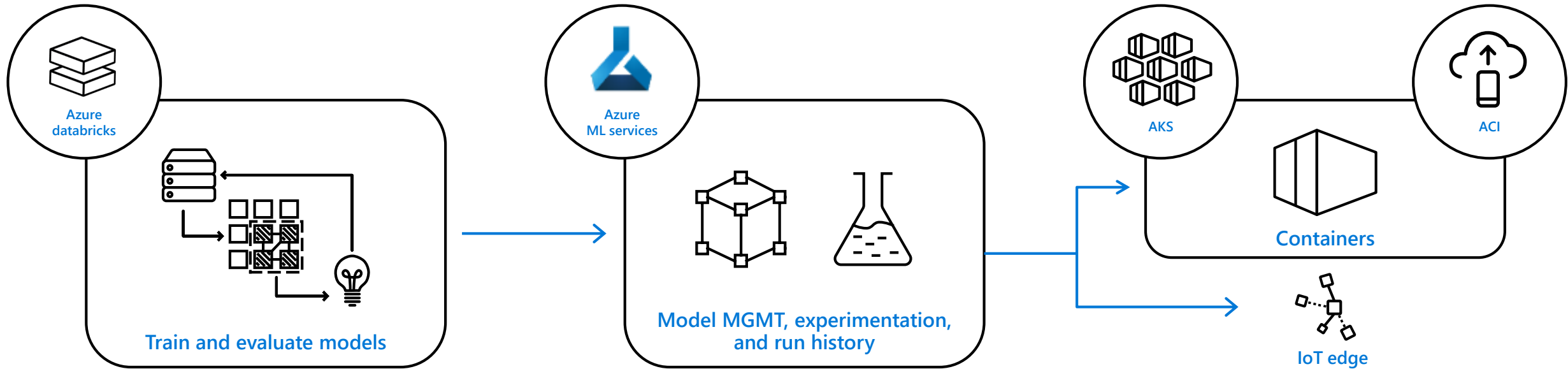


## Quickly determine the right model for your data

Determine the best algorithm  
Tune hyperparameters to optimize models  
Rapidly prototype in agile environments

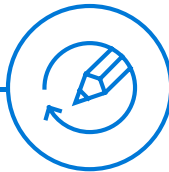


# Operationalize and manage models with ease



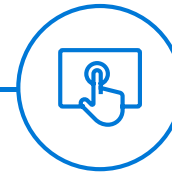
## Bring models to life quickly

Build and deploy models in minutes  
Iterate quickly on serverless infrastructure  
Easily change environments



## Proactively manage model performance

Identify and promote your best models  
Capture model telemetry  
Retrain models with APIs

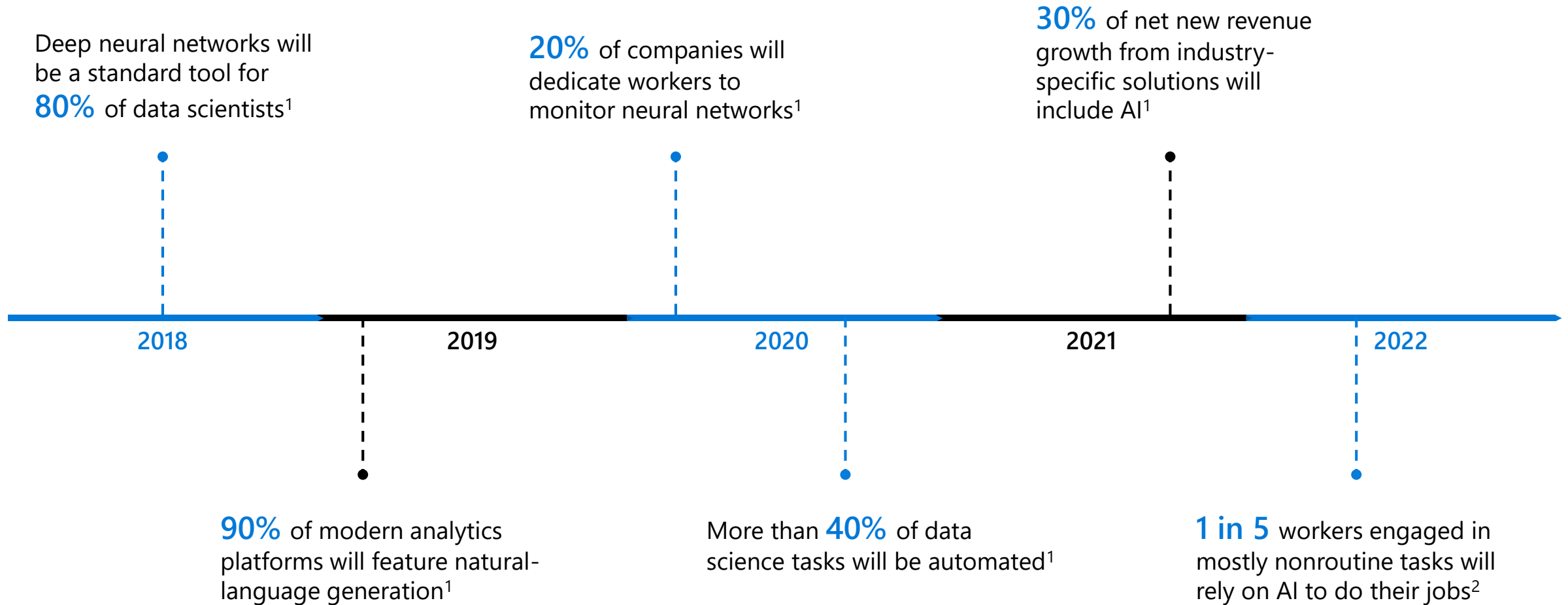


## Deploy models closer to your data

Deploy models anywhere  
Scale out to containers  
Infuse intelligence into the IoT edge



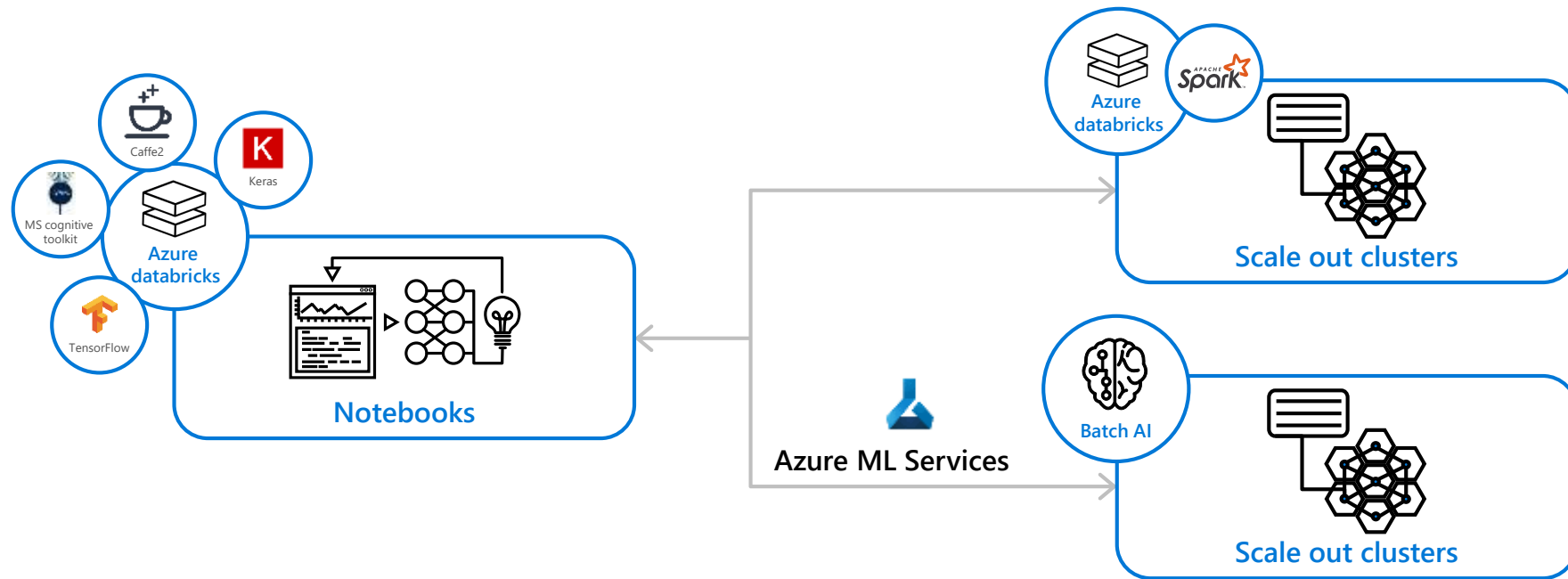
# What are companies looking to do next?



# Deep learning with Azure

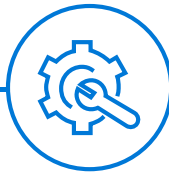


# Build and deploy deep learning models



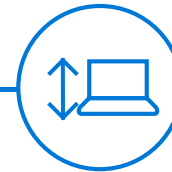
## Streamline AI development efforts

Leverage popular deep learning toolkits  
Develop your language of choice



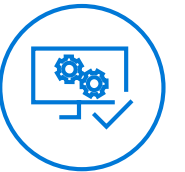
## Scale compute resources in any environment

Choose VMs for your modeling needs  
Process video using GPU-based VMs

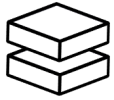


## Quickly evaluate and identify the right model

Run experiments in parallel  
Provision resources automatically



# Leverage deep learning services and frameworks



## Azure databricks

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Accelerate processing with the fastest Spark engine



Integrate natively with Azure services



Access enterprise-grade Azure security



## Azure ML services

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Bring AI to the edge



Increase your rate of experimentation



Deploy and manage your models everywhere

## Leverage your favorite deep learning frameworks

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TensorFlow



MS Cognitive Toolkit



PyTorch



Scikit-Learn



ONNX



Caffe2



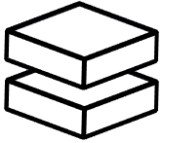
MXNet



Chainer

# Introducing Azure Databricks

Fast, easy, and collaborative Apache Spark™-based analytics platform



Increase productivity



Build on a secure, trusted cloud



Scale without limits



Built with your needs in mind

- Role-based access controls
- Effortless autoscaling
- Live collaboration
- Enterprise-grade SLAs
- Best-in-class notebooks
- Simple job scheduling

# Azure Machine Learning Services

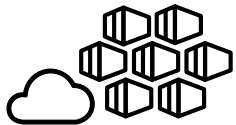
Bring AI to everyone with an end-to-end, scalable, trusted platform



Boost your data science productivity



Increase your rate of experimentation



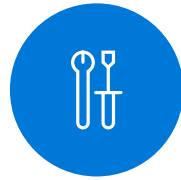
Deploy and manage your models everywhere



Built with your needs in mind

- GPU-enabled virtual machines
- Low latency predictions at scale
- Integration with popular Python IDEs
- Role-based access controls
- Model versioning
- Automated model retraining

# AI Tools and Platforms on your needs



# Begin building now with the tools and platforms you know

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Choose between visual drag-and-drop  
or code-first authoring

Use your favorite IDE

Call Azure Machine Learning services  
directly in VS Code\*

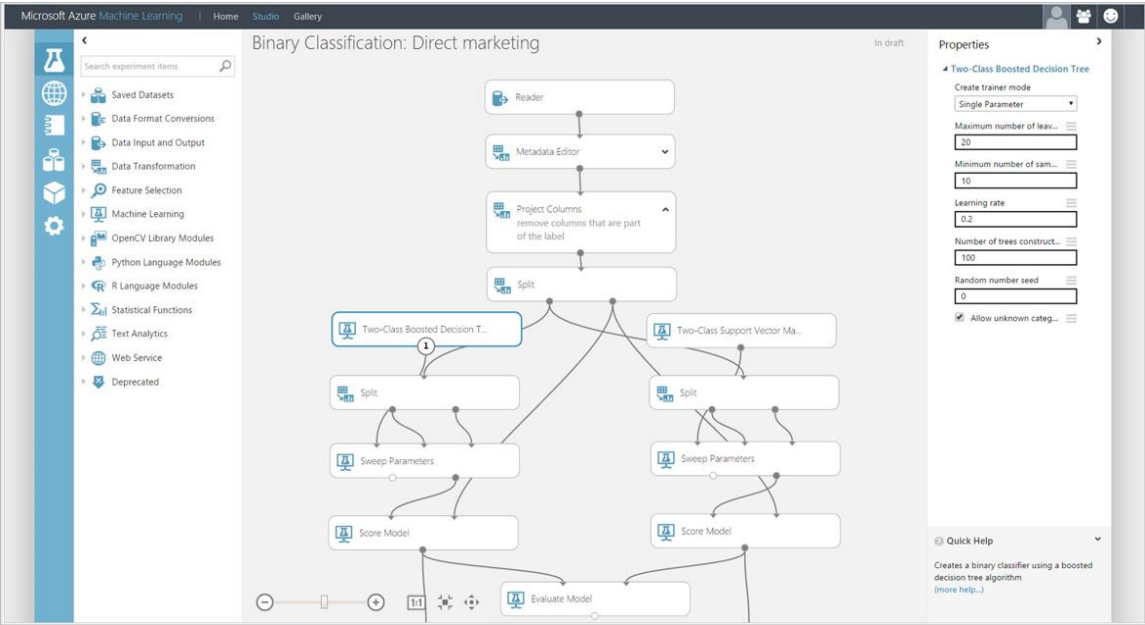
Build on any framework or library with  
the most popular languages

Train quicker and easier with industry-  
leading Spark and GPUs

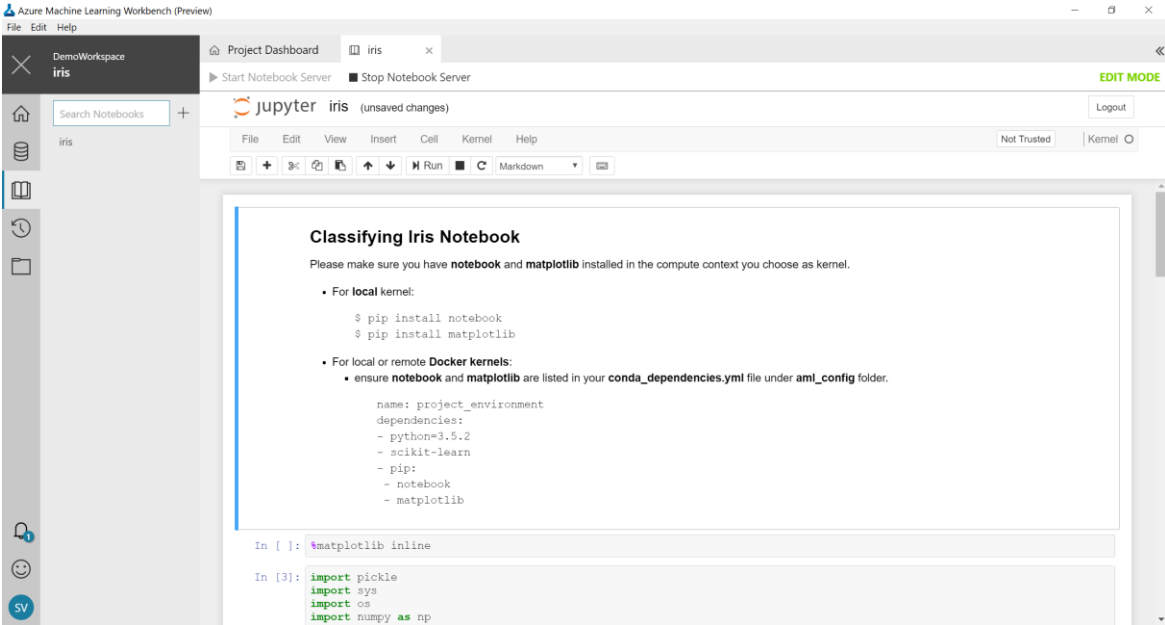
\*More IDEs coming soon



# Build as you like



VISUAL DRAG-AND-DROP



CODE-FIRST



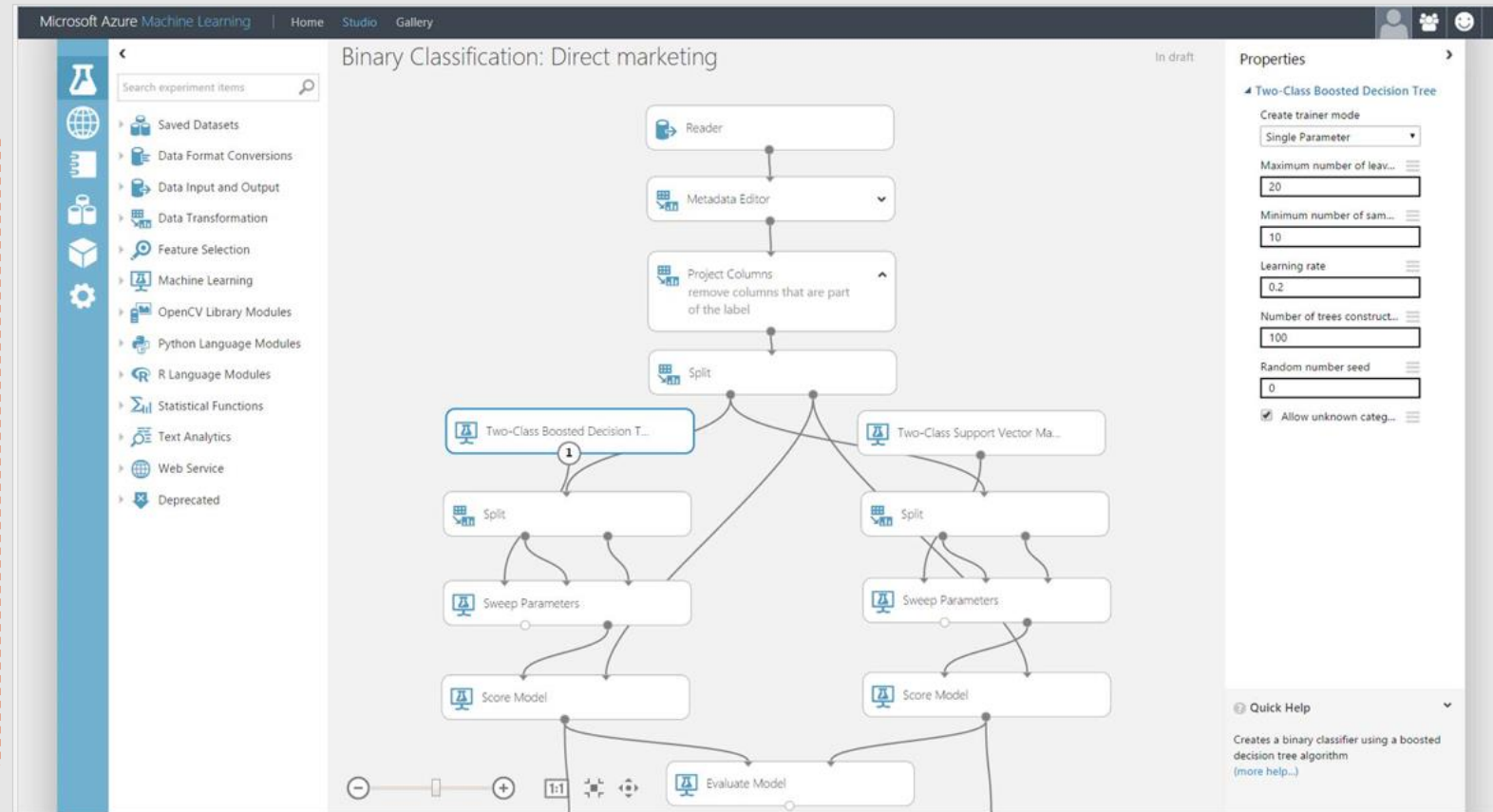
# Azure Machine Learning Studio

Platform for emerging data scientists to graphically build and deploy experiments

- Rapid experiment composition
- > 100 easily configured modules for data prep, training, evaluation
- Extensibility through R & Python
- Serverless training and deployment

Some numbers:

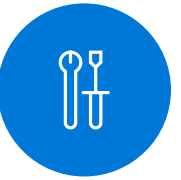
- 100's of thousands of deployed models serving billions of requests



# Use what you want

Use your favorite IDE

Leverage all types of data



## USE ANY FRAMEWORK OR LIBRARY



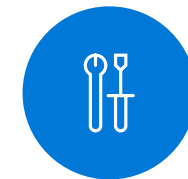
## USE ANY TOOL



## USE THE MOST POPULAR INNOVATIONS



# Integrated into your IDE

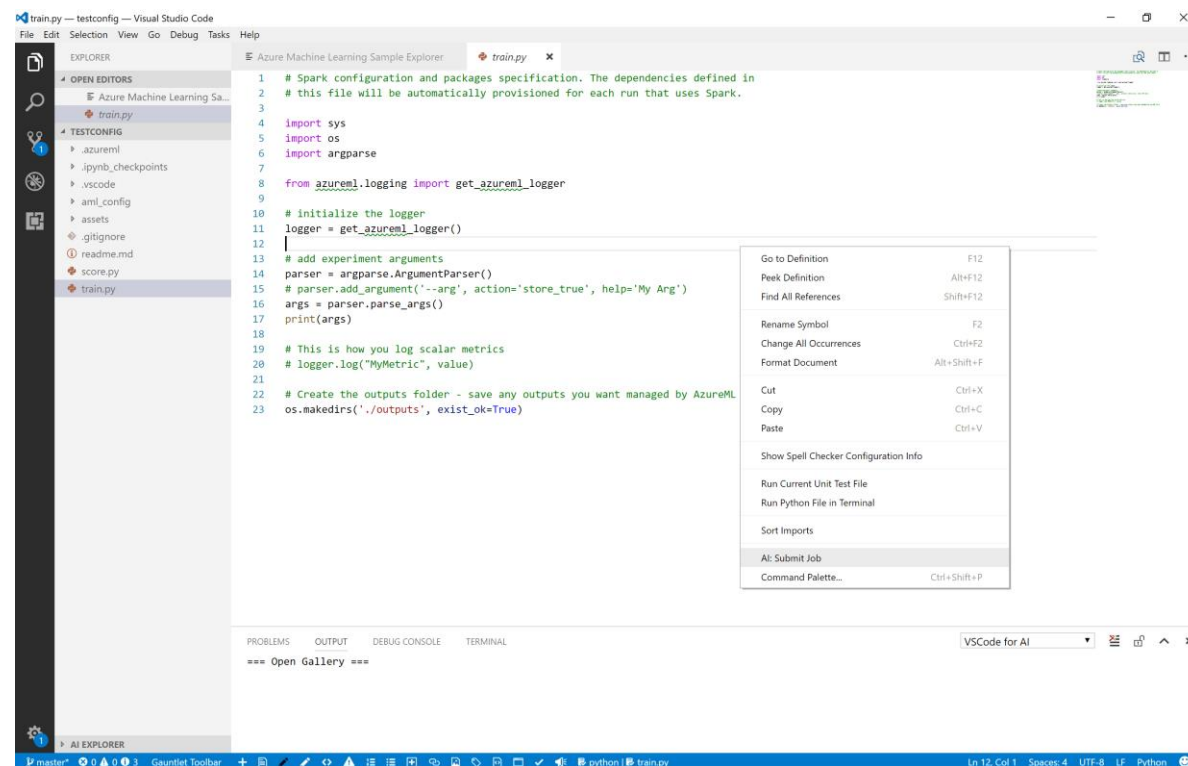


Visual Studio Code extension (more IDEs and notebooks on roadmap)

Begin building with your IDE - no extra tool needed

Integrated rich authoring for machine learning and deep learning

Call Azure Machine Learning services straight from your IDE or notebook

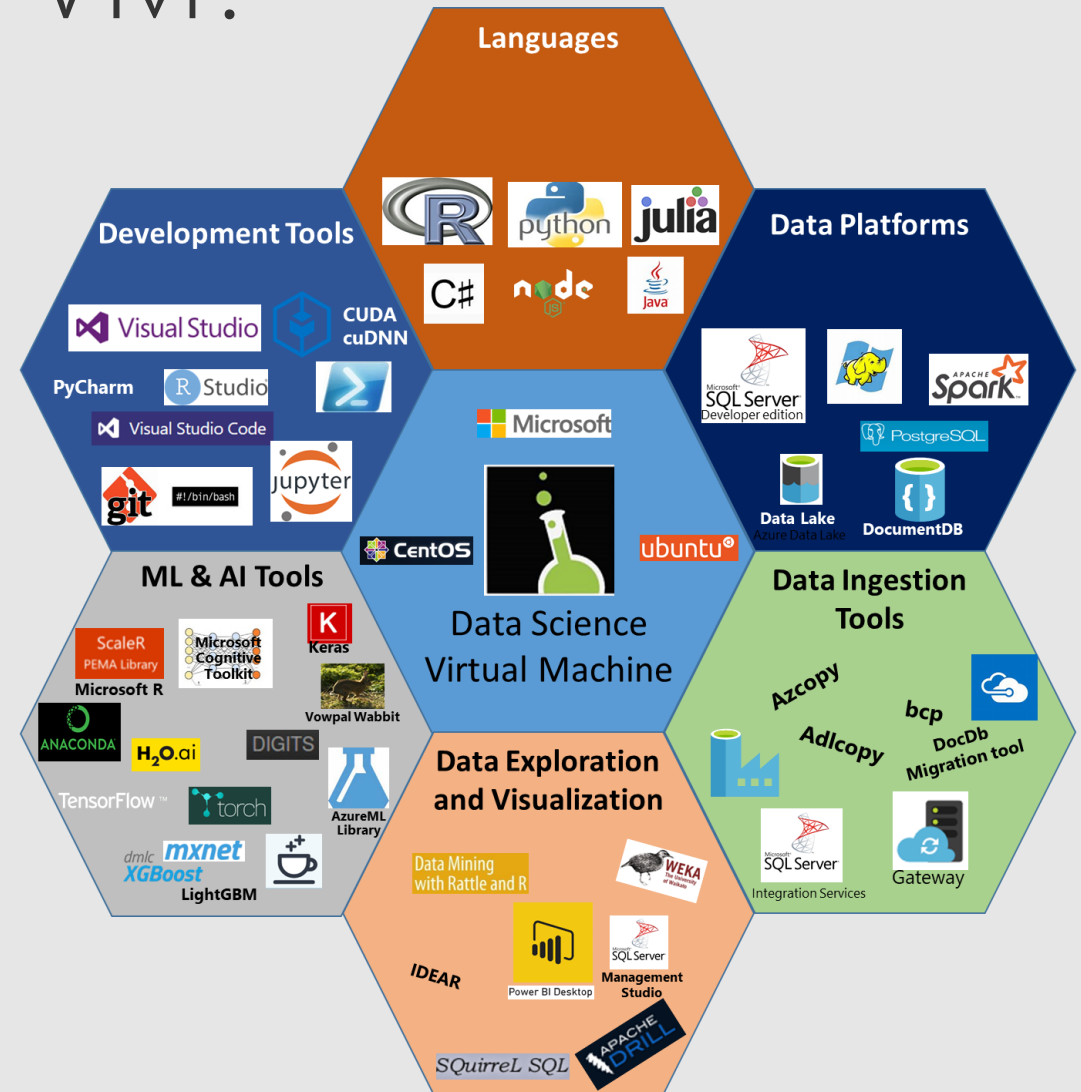


# Data Science Virtual Machines

# What is the Data Science VM?

Comprehensive cloud based Data Science Environment to empower Data Scientists

<https://aka.ms/dsvm/overview>



# Demos