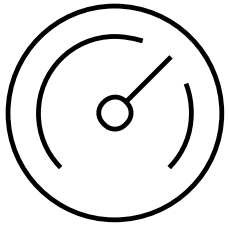
Microsoft Azure

# Azure Overview
# Data, Analytics & AI

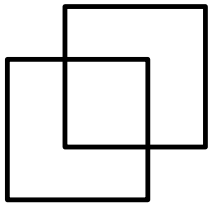
Subhransu Sahoo
Microsoft Certified Solutions Expert – Analytics & AI

# Microsoft Azure



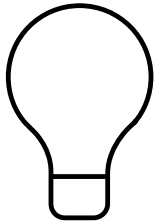
## Productive

Accelerate time to market



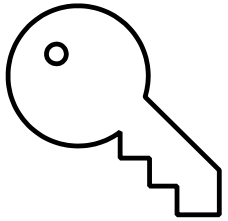
## Hybrid

Optimize your infrastructure



## Intelligent

Innovate at scale



## Trusted

Develop with confidence

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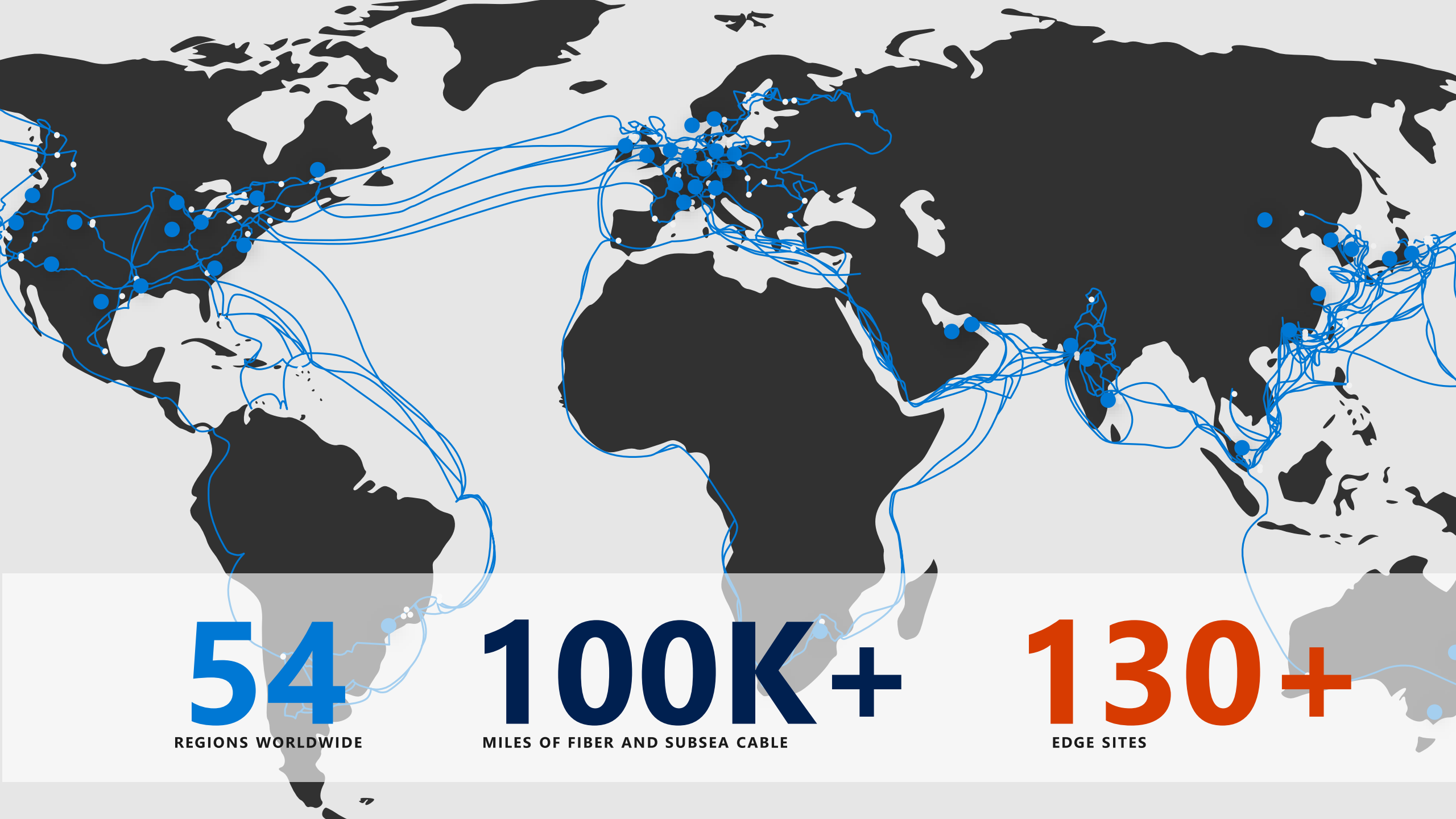


**54**
REGIONS WORLDWIDE

**100K+**
MILES OF FIBER AND SUBSEA CABLE

**130+**
EDGE SITES

# Azure solutions

# Azure Data + AI Solution Areas

## Data

Data Modernization on-premises

Data modernization to Azure

Globally distributed data

Cloud Scale Analytics

## +

## AI

AI apps & agents

Knowledge mining

Machine learning

# The Azure Data Landscape

Azure Data Factory

Azure Import/Export service

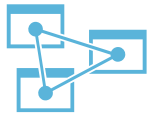
Azure CLI

Azure SDK

Azure Cosmos DB

Azure SQL Data Warehouse

Azure SQL DB Hyperscale Managed Instance

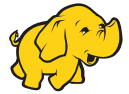

Azure Analysis Services

Power BI

Azure Storage Blobs, Files

Azure Data Lake Store – Gen2

Azure Databricks


Azure HDInsight

Azure ML Service, AutoML

ML Server

Azure Databricks

Azure IoT Hub

Kafka enabled Azure Event Hubs

Kafka on Azure HDInsight

Azure Search

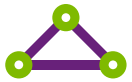
Azure Data Catalog

Azure Stream Analytics

Azure Functions

Bot service

Cognitive Services


Azure ExpressRoute

Azure Active Directory

Azure network security groups

Azure key vault

Log Analytics

Visual Studio or Code

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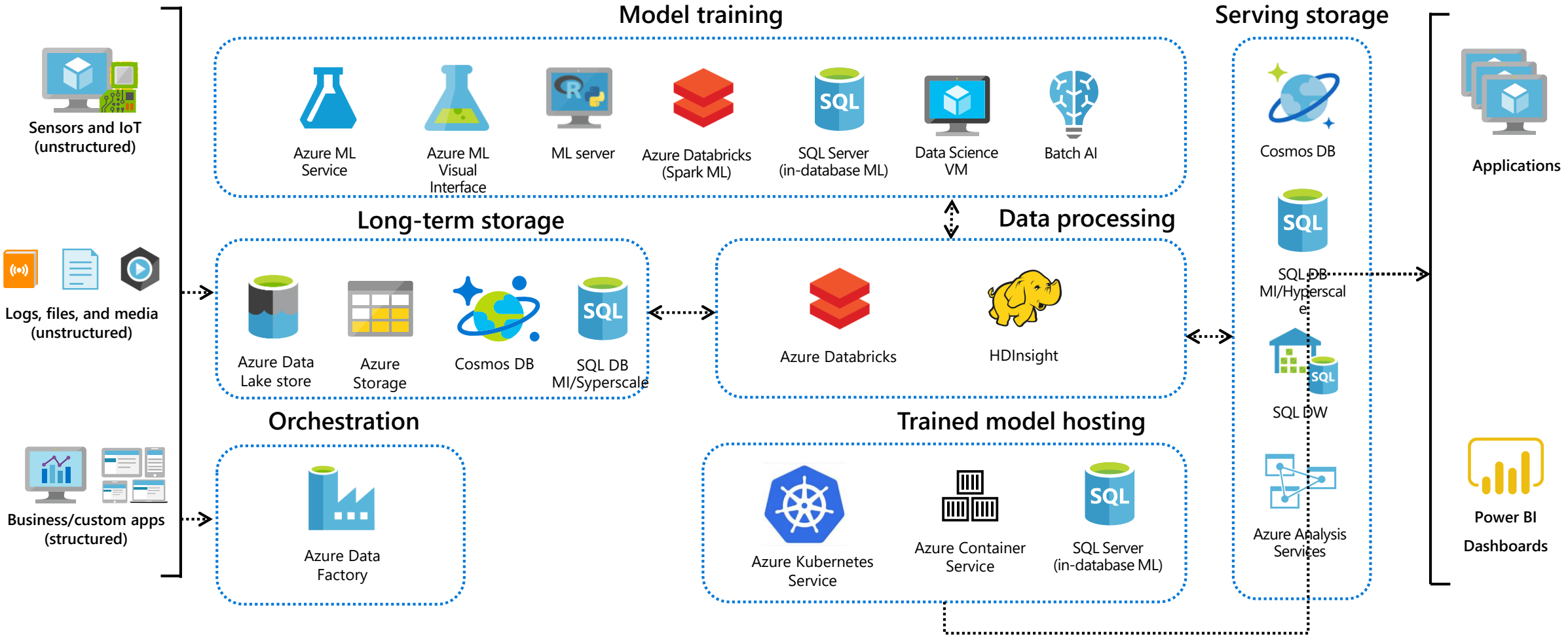
# Advanced analytics pattern in Azure – options unlimited

**Data - collect, persist, analyze, process, enrich, serve and visualize.  Model – build, train, host and consume.**

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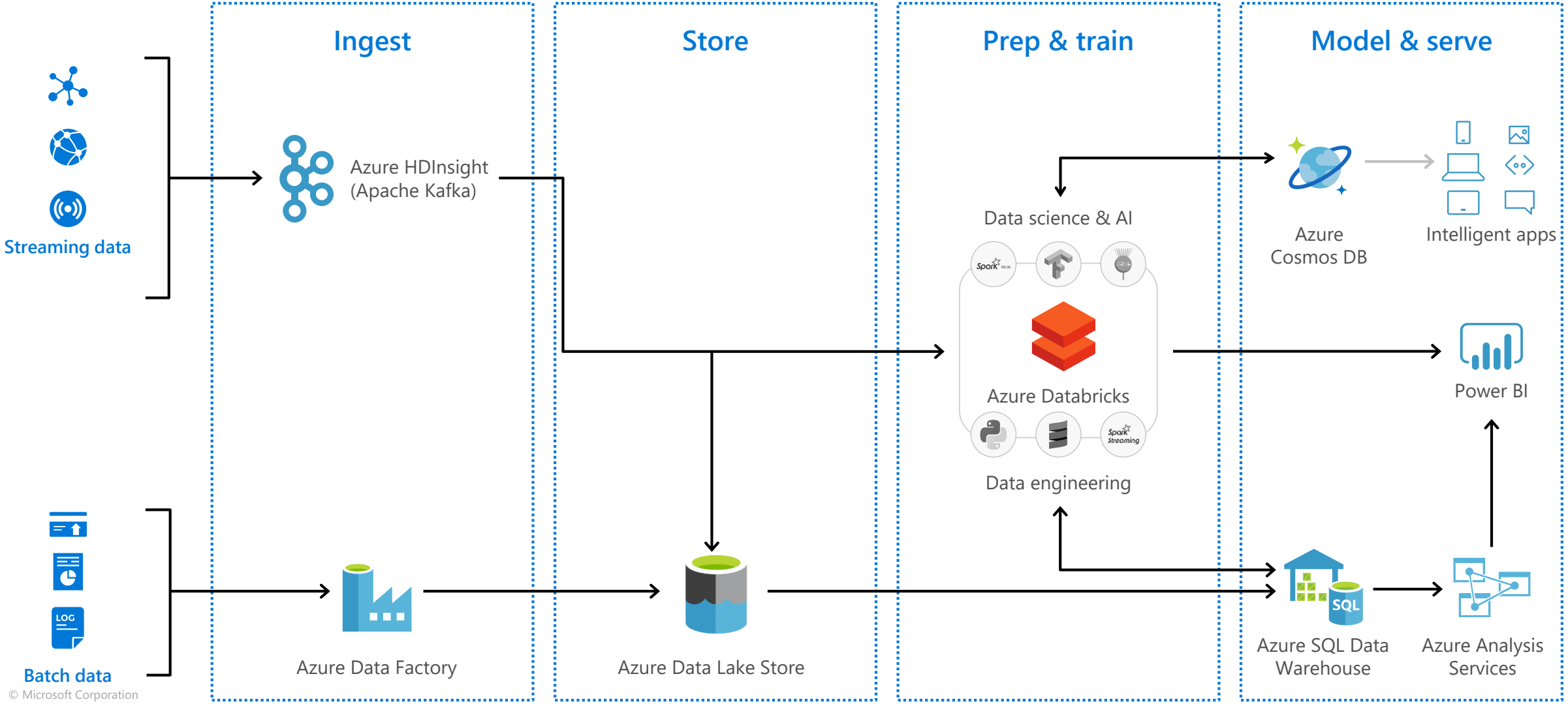
# Advanced analytics in Azure – a lambda pattern

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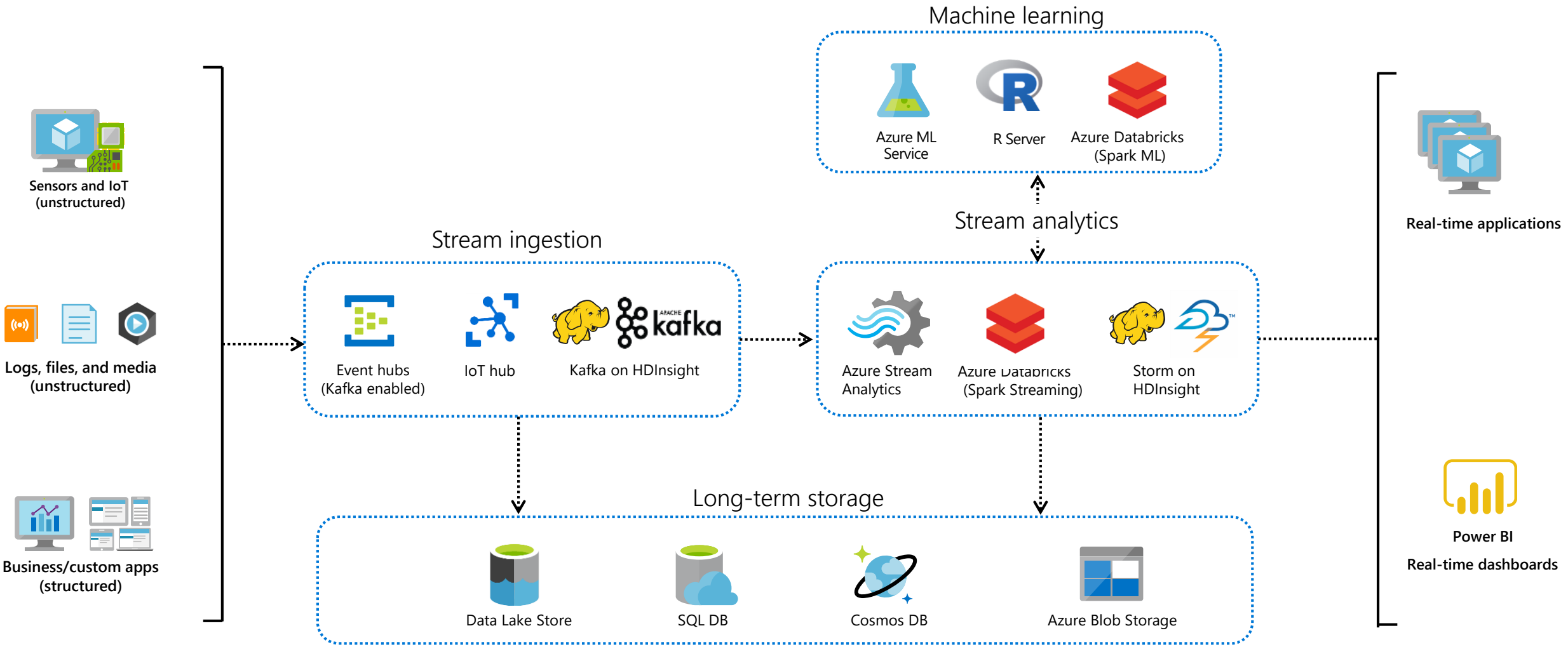
# Big Data streaming pattern with Azure

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# Machine Learning on Azure

## Domain specific pretrained models
To simplify solution development

Vision

Speech

Language

Search

## Familiar Data Science tools
To simplify model development

Visual Studio Code

Azure Notebooks

Jupyter

Command line

## Popular frameworks
To build advanced deep learning solutions

PyTorch

TensorFlow

Scikit-Learn

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

From the Intelligent Cloud to the Intelligent Edge

# Productive Services

## To empower data science and development teams

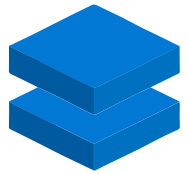
## Azure Machine Learning

### Python-based machine learning service

**Develop models faster with automated machine learning**

**Use any Python environment and ML frameworks**

**Manage models across the cloud and the edge.**



## Azure Databricks

### Apache Spark-based big-data service

**Prepare data clean data at massive scale**

**Enable collaboration between data scientists and data engineers**

**Access machine learning optimized clusters**

# Azure Machine Learning service

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

- Automated machine learning
- Managed compute
- DevOps for machine learning
- Simple deployment
- Tool agnostic Python SDK
- Support for open source frameworks

Seamlessly integrated with the Azure Portfolio

# 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**

- Optimized Apache Spark environmnet
- Collaborative workspace
- Integration with Azure data services
- Autoscale and autoterminate
- Optimized for distributed processing
- Support for multiple languages and libraries

Seamlessly integrated with the Azure Portfolio

# Leverage deep learning services and frameworks

## AZURE ML SERVICE

Bring AI to the edge

Increase your rate of experimentation

Deploy and manage your models everywhere

## AZURE DATABRICKS

Accelerate processing with the fastest Apache Spark engine

Integrate natively with Azure services

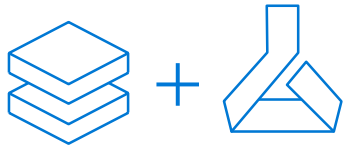
Access enterprise-grade Azure security

### Leverage your favorite deep learning frameworks

TensorFlow | MS Cognitive Toolkit | PyTorch | Scikit-Learn | ONNX | Caffe2 | MXNet | Chainer

# Productive Services

## What to use when?

| Customer journey | Data Prep | Build and Train | Manage and Deploy |
| --- | --- | --- | --- |
| Python ML developer | **Azure ML service** (Pandas, NumPy etc. on AML Compute) | **Azure ML service** (OSS frameworks, Hyperdrive, Pipelines, Automated ML, Model Registry) | **Azure ML service** (containerize, deploy, inference and monitor) |
| Apache Spark / Big Data | **Azure Databricks** (Apache Spark Dataframes, Datasets, Delta, Pandas, NumPy etc.) |  **Azure Databricks + Azure ML service** (Spark MLib and OSS frameworks + Automated ML, Model Registry) | **Azure ML service** (containerize, deploy, inference and monitor) |

# Powerful infrastructure

Accelerate deep learning

## CPUs

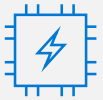
General purpose machine learning

D, F, L, M, H Series

## GPUs

Deep learning

N Series



## FPGAs

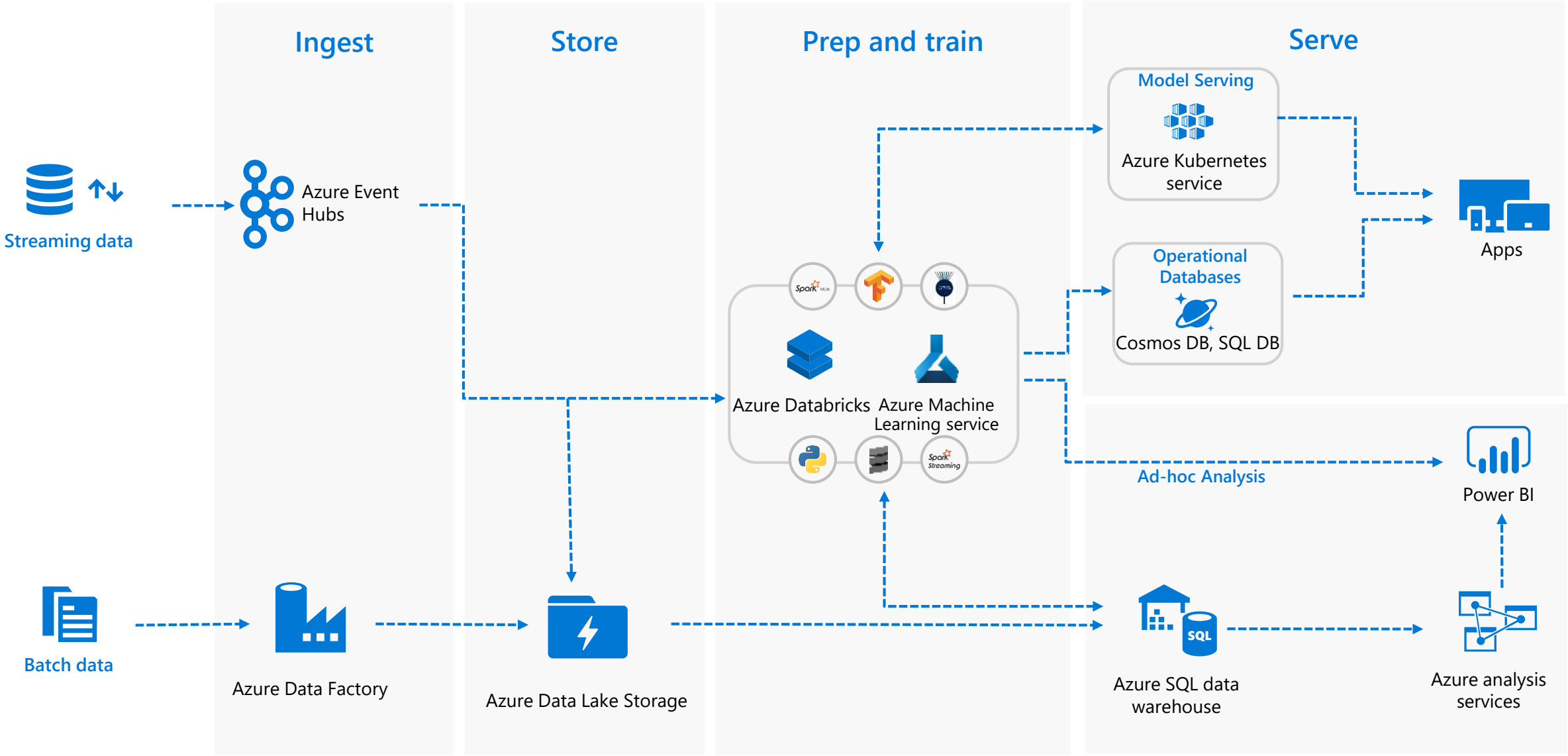
Specialized hardware accelerated deep learning

AML hardware accelerated models (Project Brainwave)

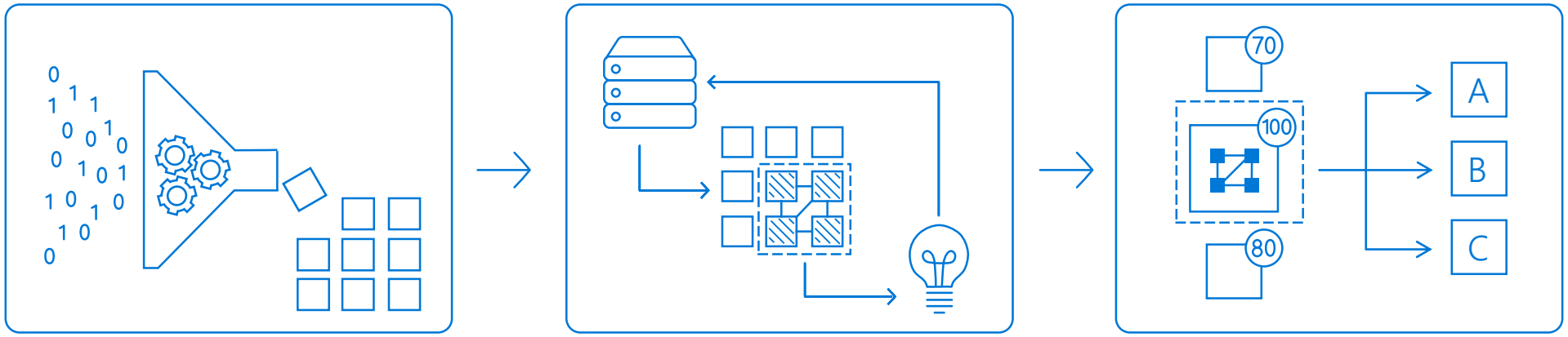
**Optimized for flexibility**

**Optimized for performance**

# Recommended architecture to build e2e ML solutions



# PREP & TRAIN

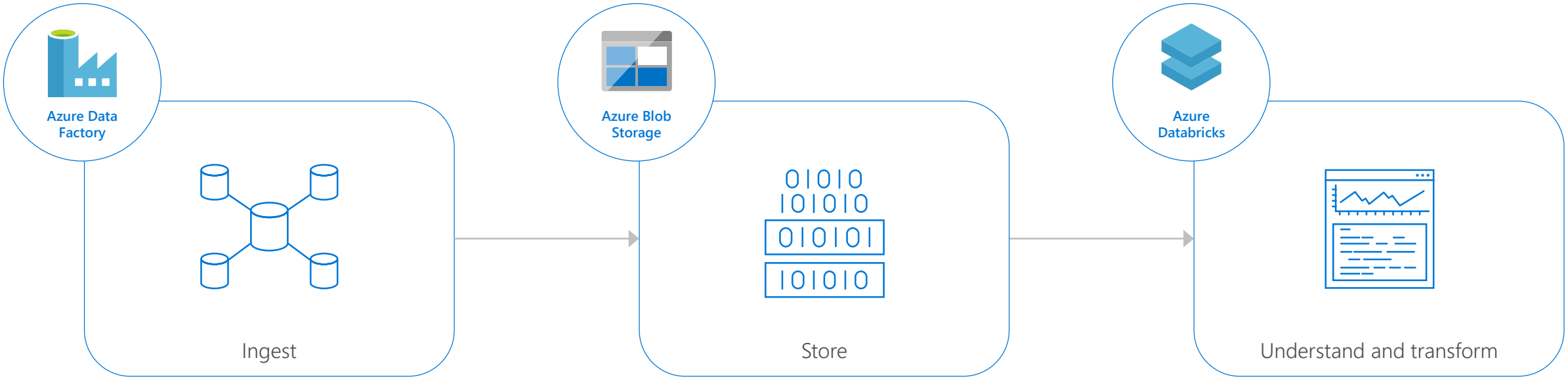



Collect and prepare data

Train and evaluate model

Operationalize and manage

# 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

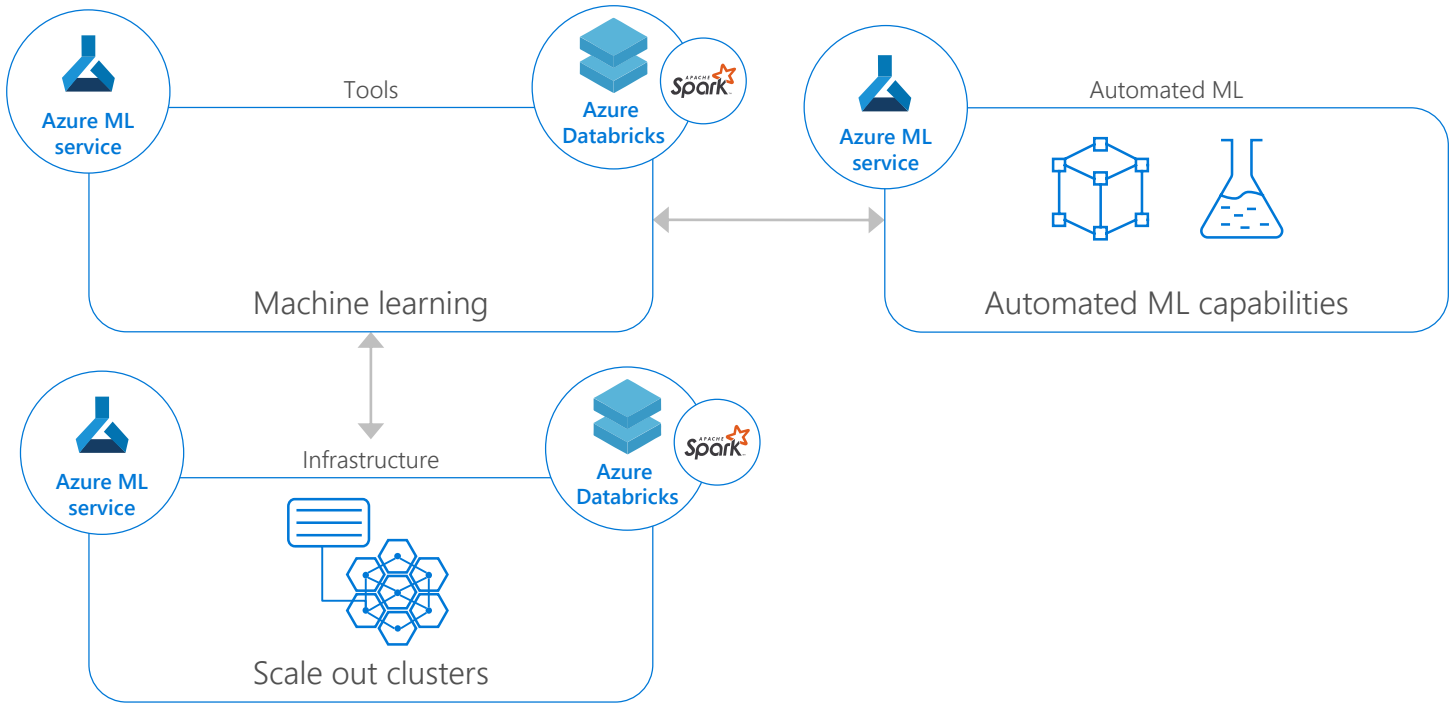
## Leverage best-in-class analytics capabilities

- Leverage open source technologies
- Collaborate within teams
- Use ML 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

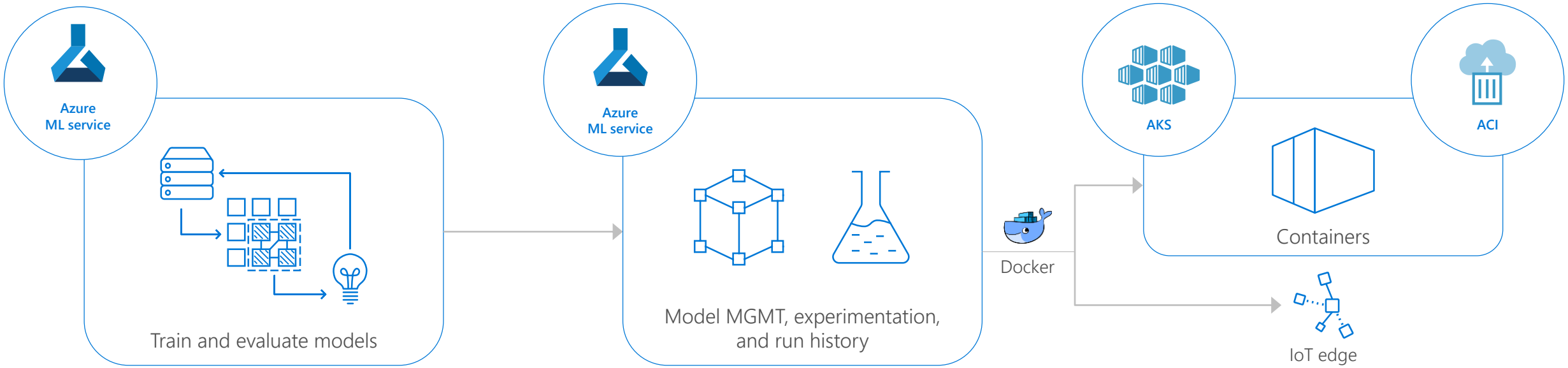
## Scale compute resources to meet your needs

- Easily scale up or scale out
- Autoscale on 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

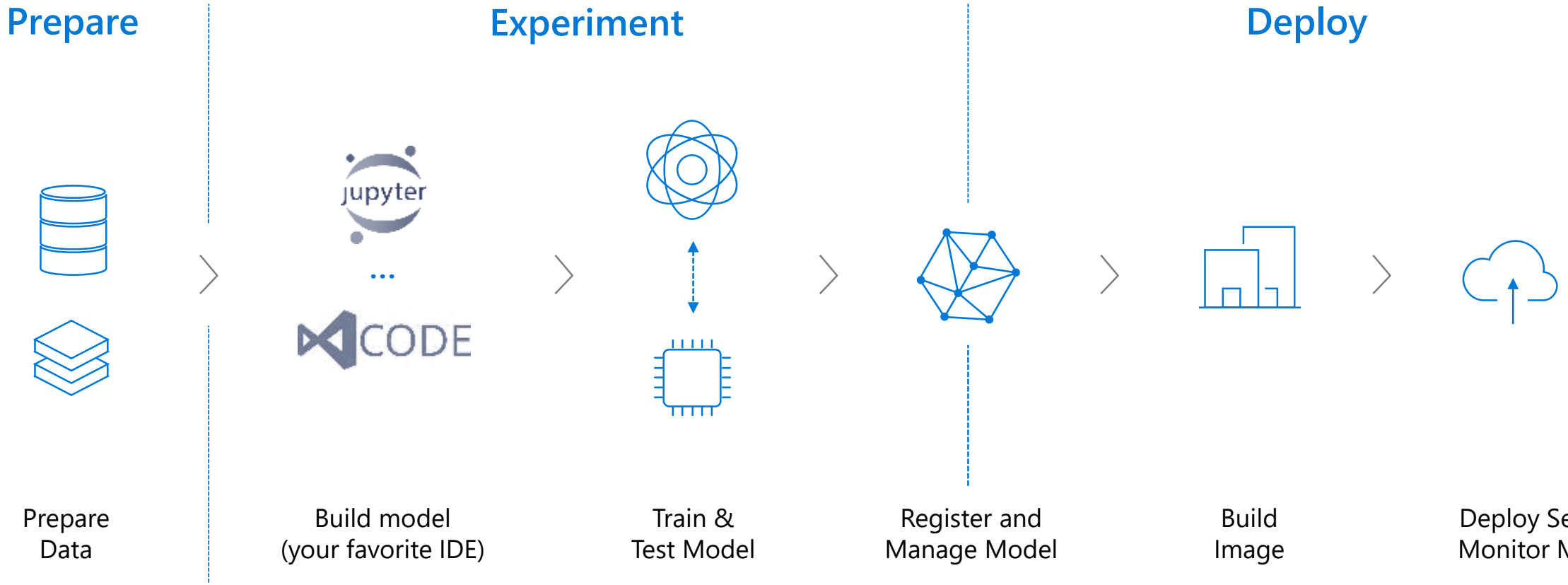
## Proactively manage model performance

- 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

# DevOps loop for data science



# Azure Cognitive Services

## Give your apps a human side

### Vision

From objects to faces and feelings, enable your apps to analyze still images and video

### Speech

Speak to and hear your users, compensating for environmental noise.

Use with **Language** for max results

### Language

Analyze text to extract user feeling and intent.

Extract knowledge from existing sources and make it easily accessible to users

Translate between 60+ languages and growing

### Search

Access billions of web pages, images, videos, and news with the power of Bing

# Feature overview

## Azure Cognitive Services

### Vision

**What is in the image or video?**

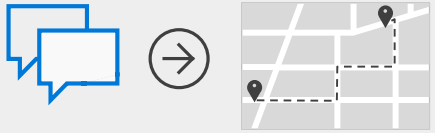
**Extract Image insights**

| | |
|---|---|
| Category | People; 5 faces |
| Adult/Racy? | False/False |
| Dominant colors | |
| Accent color | |

### Speech

**Give me directions to the nearest local branch**

**Convert speech to text**



- Spoken audio to text
- Text to spoken audio
- Recognize speaker

### Language

**Play today's customer call recording**

**Extract intent and entities from text**

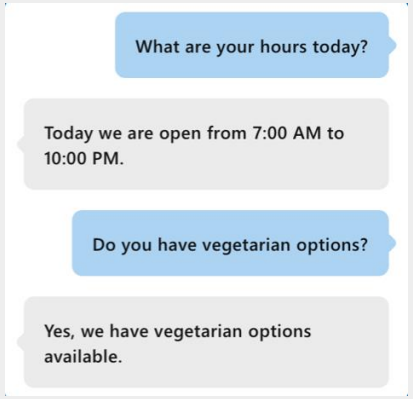
```
Intent: PlayCall
Content: Customer#
DateTime.date: today
```

Now Playing

11/29/2016 Customer Call

**What are your hours today?**

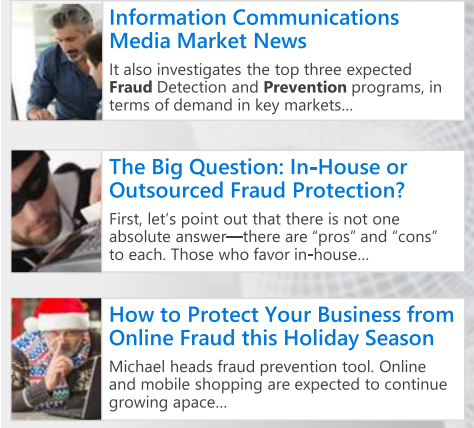
**Bootstrap Bots easily from Question-Answer pairs**




### Search

**Search for 'fraud prevention'**

**Intelligent web search**

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