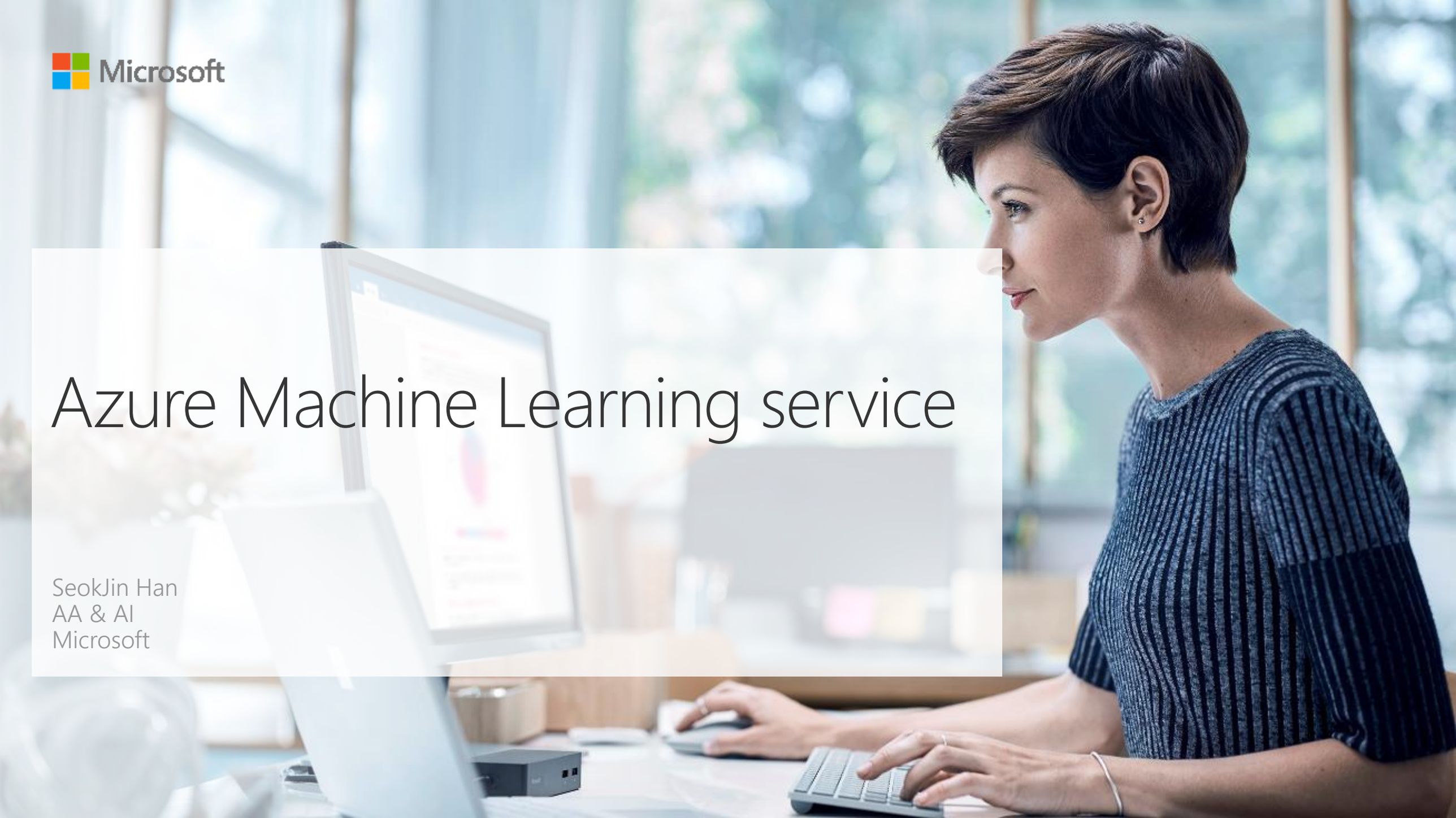


Azure Machine Learning service

SeokJin Han
AA & AI
Microsoft

Azure AI

AI apps & agents

Azure Bot Service
Azure Cognitive Services

Machine learning

Azure Databricks
Azure Machine Learning

Knowledge mining

Azure Cognitive Search

Azure AI

AI apps & agents

Azure Bot Service
Azure Cognitive Services

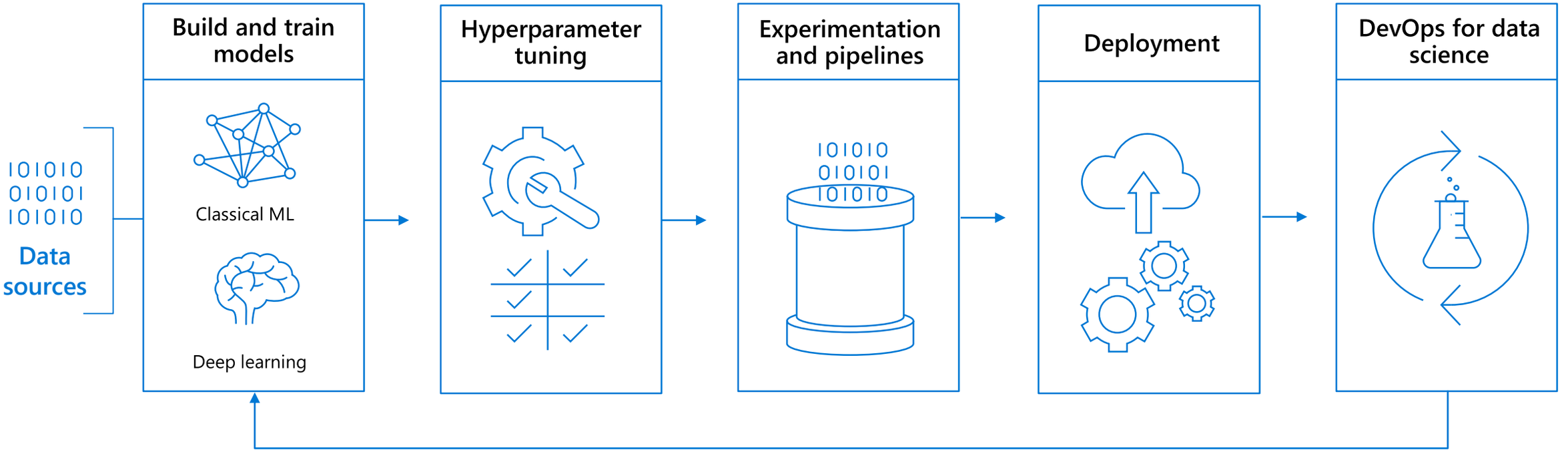
Machine learning

Azure Databricks
Azure Machine Learning

Knowledge mining

Azure Cognitive Search

Building blocks for a Data Science Project



What can make this simple and streamlined?

Azure Machine Learning service

Set of Azure Cloud Services

Python SDK

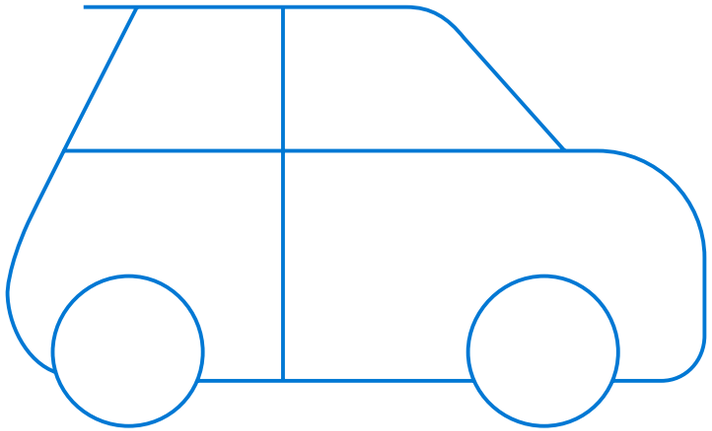
That enables you to:

- ✓ Prepare Data
- ✓ Build Models
- ✓ Train Models
- ✓ Manage Models
- ✓ Track Experiments
- ✓ Deploy Models

How does AML service achieve the objective?

Building your own AI models

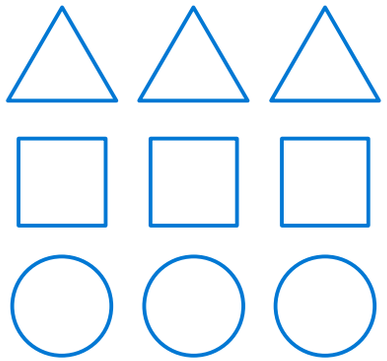
Transforming Data into Intelligence



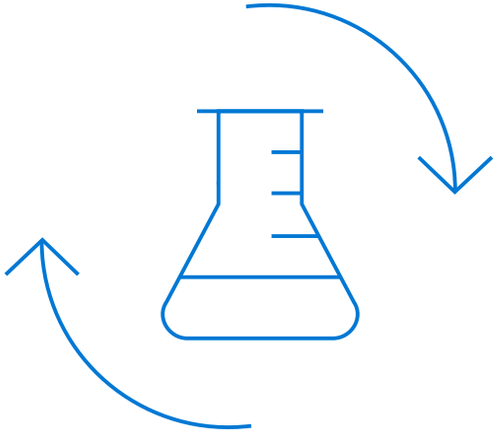
Q: How much is this car worth?

Building your own AI models

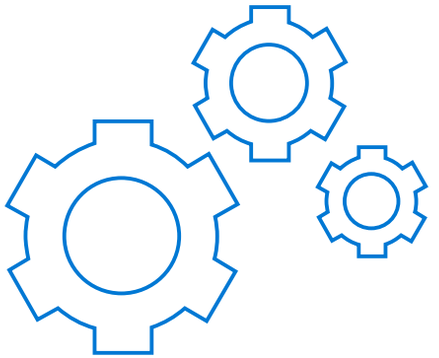
Transforming data into intelligence



Prepare data



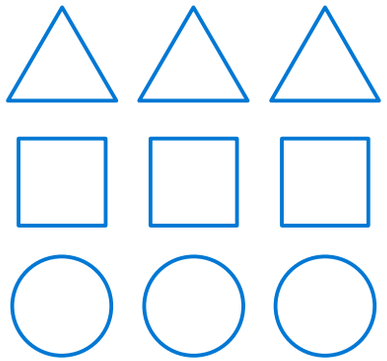
Build and train



Deploy

Building your own AI models

Transforming data into intelligence



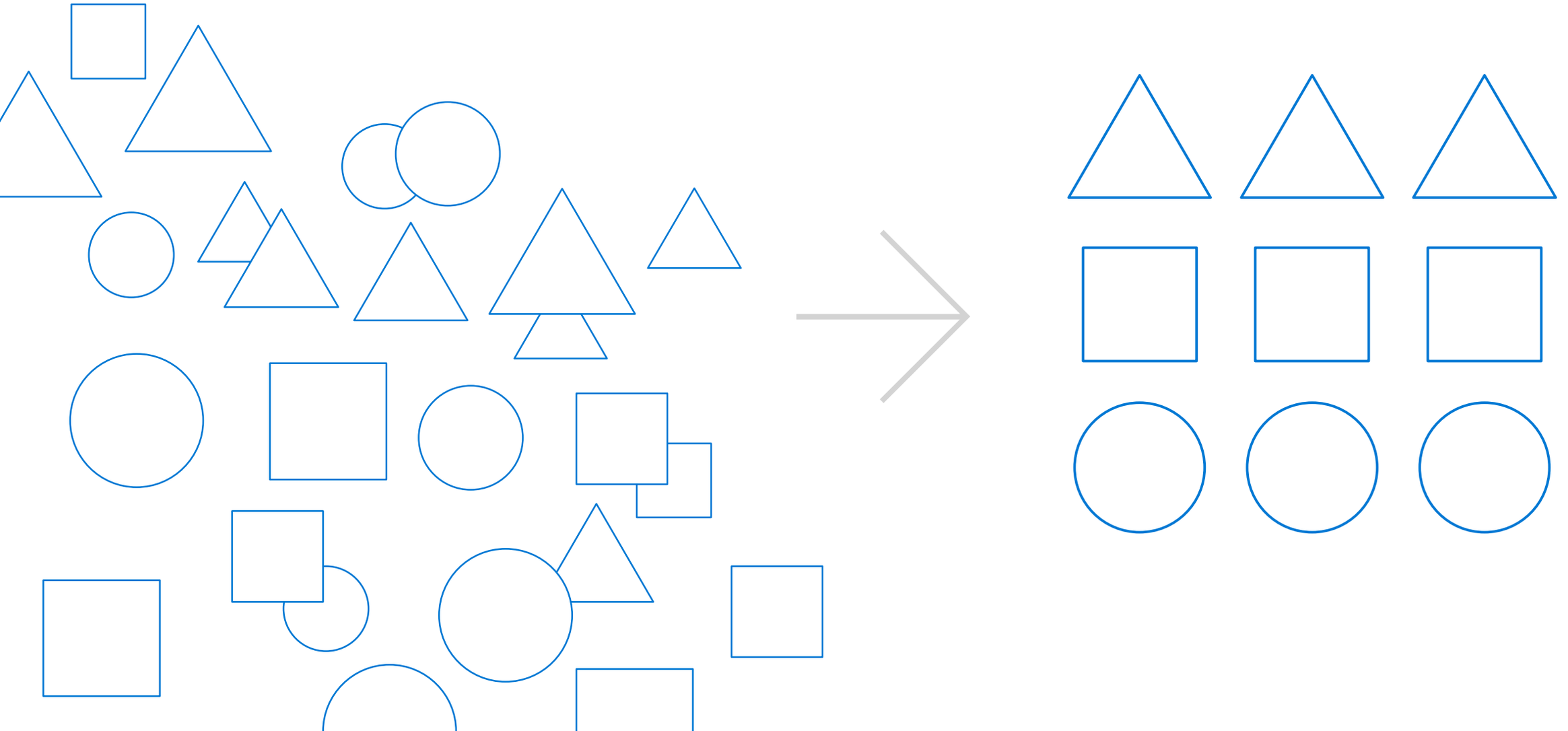
Prepare data

Build and train

Deploy

Building your own AI models

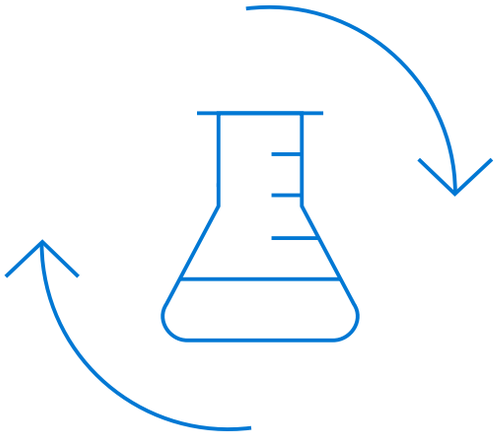
Step 1: Prepare data



Building your own AI models

Transforming data into intelligence

Prepare data

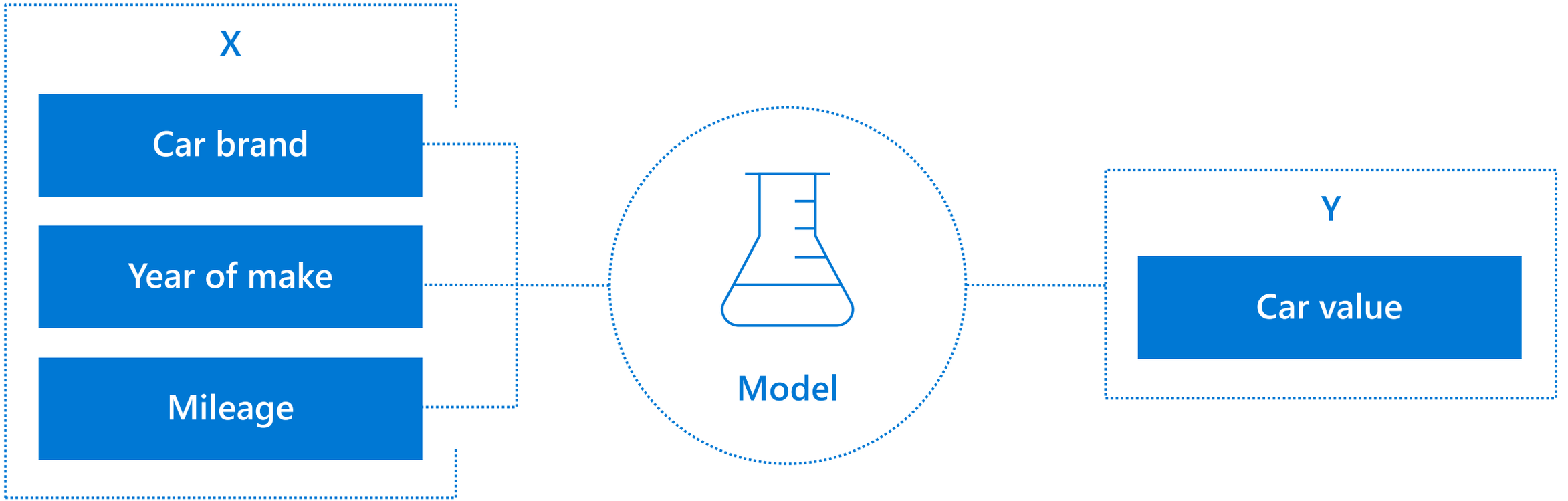


Build and train

Deploy

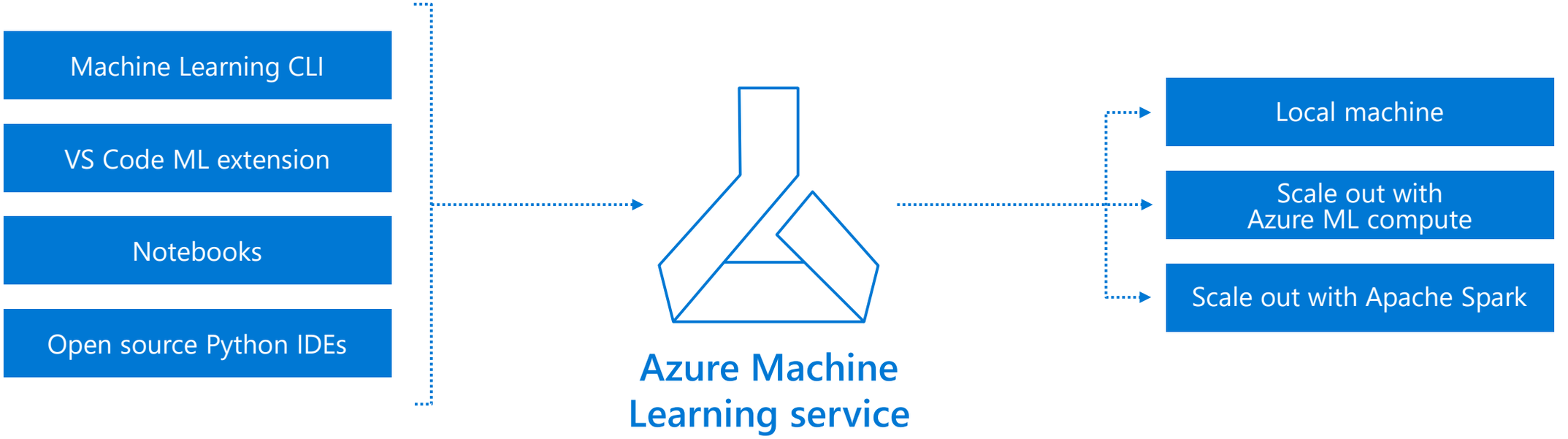
Building your own AI models

Step 2: Build and Train



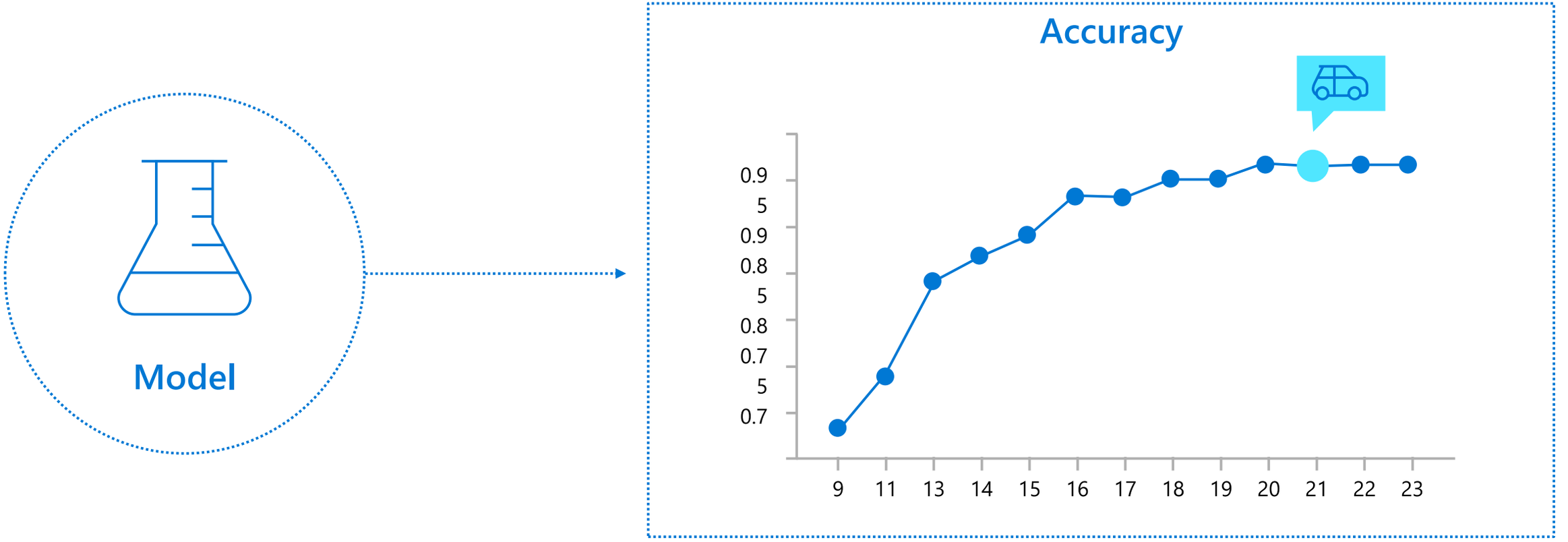
Azure Machine Learning service

Build and train models anywhere



Building your own AI models

Step 2: Build and train



Building your own AI models

Transforming data into intelligence

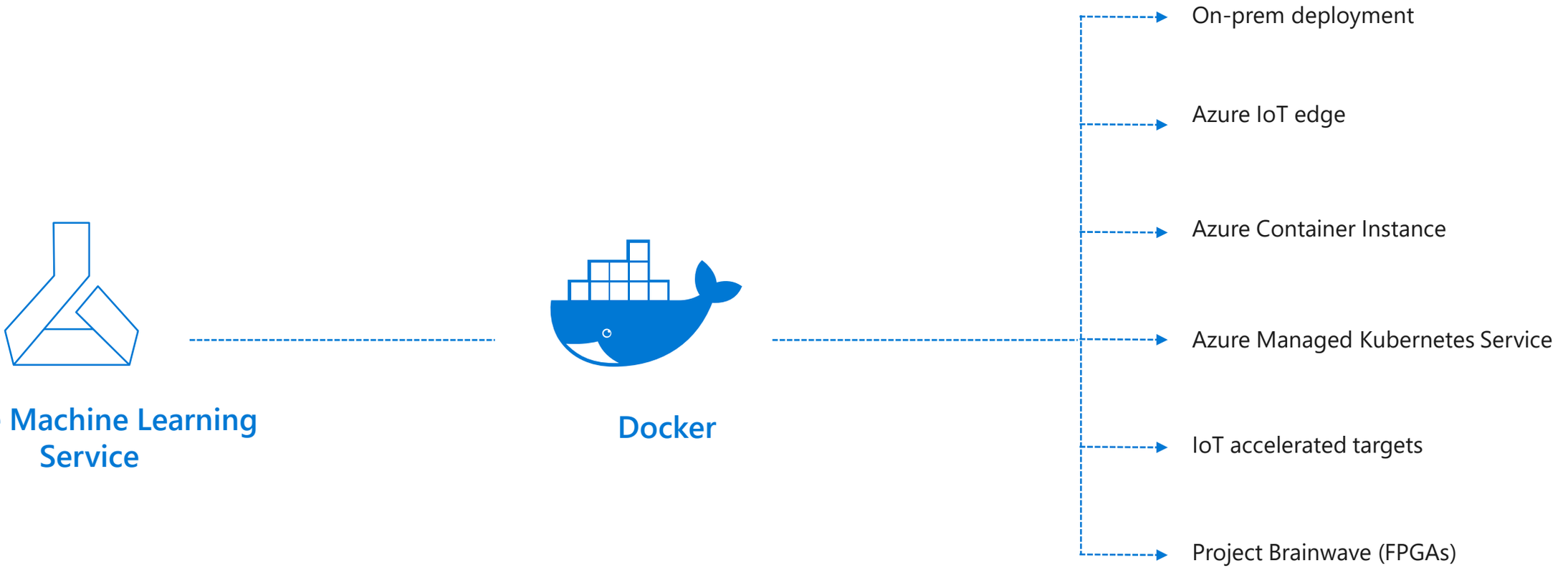
Prepare data

Build and train

Deploy

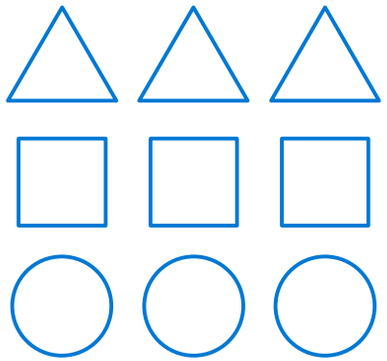
Building your own AI models

Step 3: Deploy

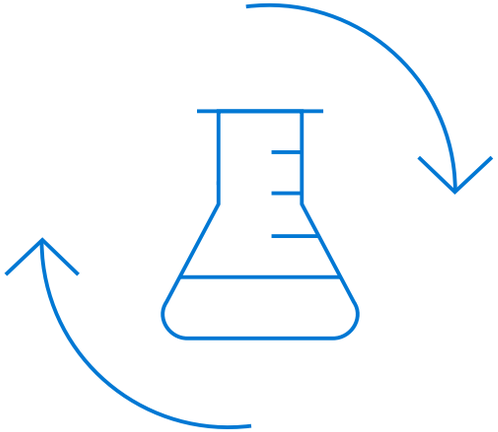


Building your own AI models

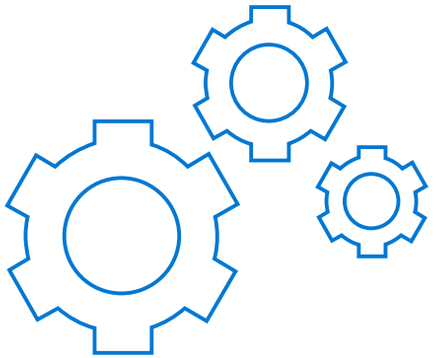
Transforming data into intelligence



Prepare data



Build and train



Deploy

Building your own AI models

Transforming data into intelligence

SQL DB

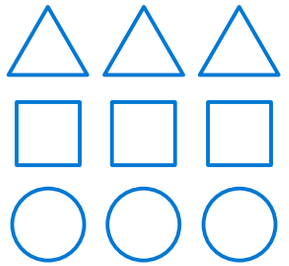
Cosmos DB

Datawarehouse

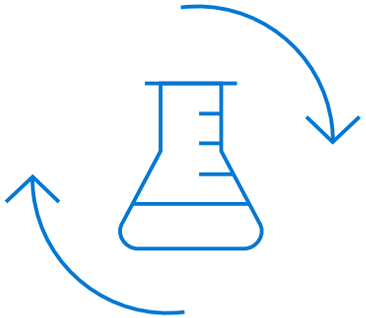
Data lake

Blob storage

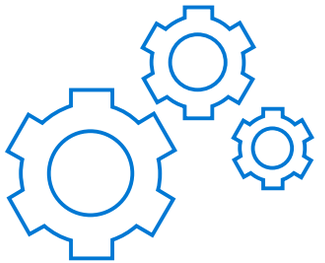
...



Prepare data



Build and train

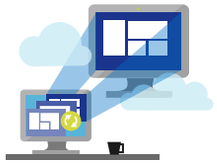


Deploy

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

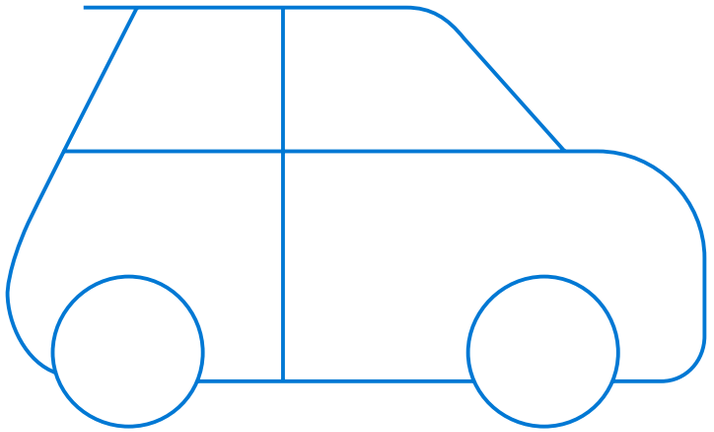
- Automated machine learning
- Managed compute
- Simple deployment
- DevOps for machine learning
- Support for open source frameworks
- Tool agnostic Python SDK

Seamlessly integrated with the Azure Portfolio

Automated machine learning

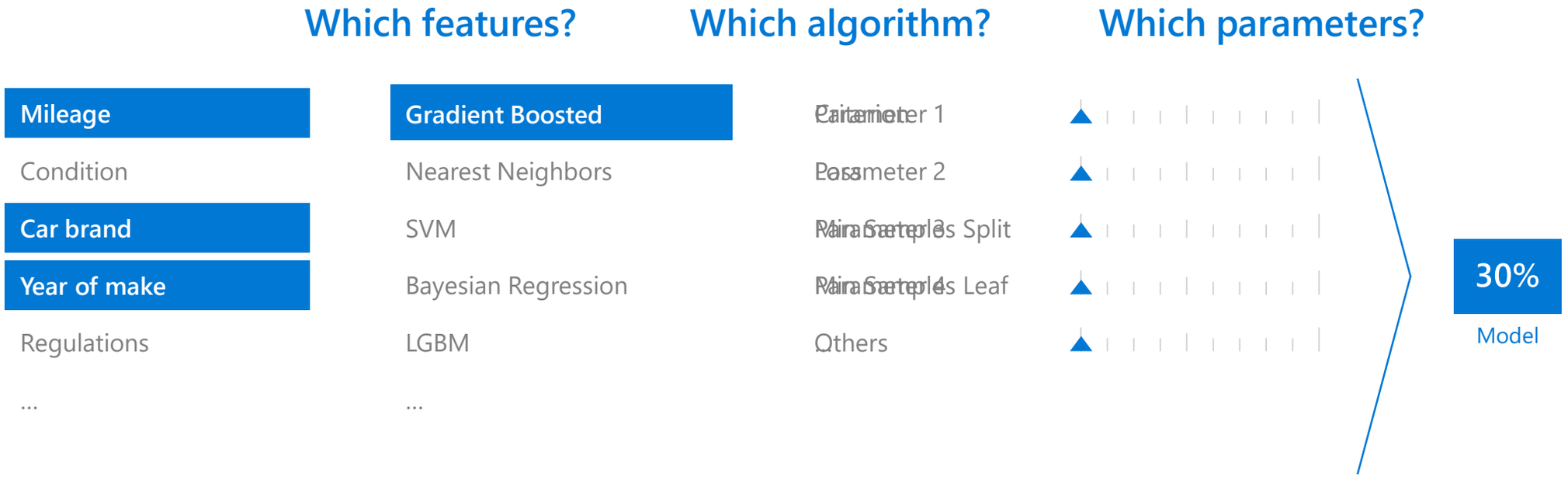
Azure Machine Learning

Automated machine learning



How much is this car worth?

Model creation is typically a time consuming process



Model creation is typically a time consuming process

Which features?

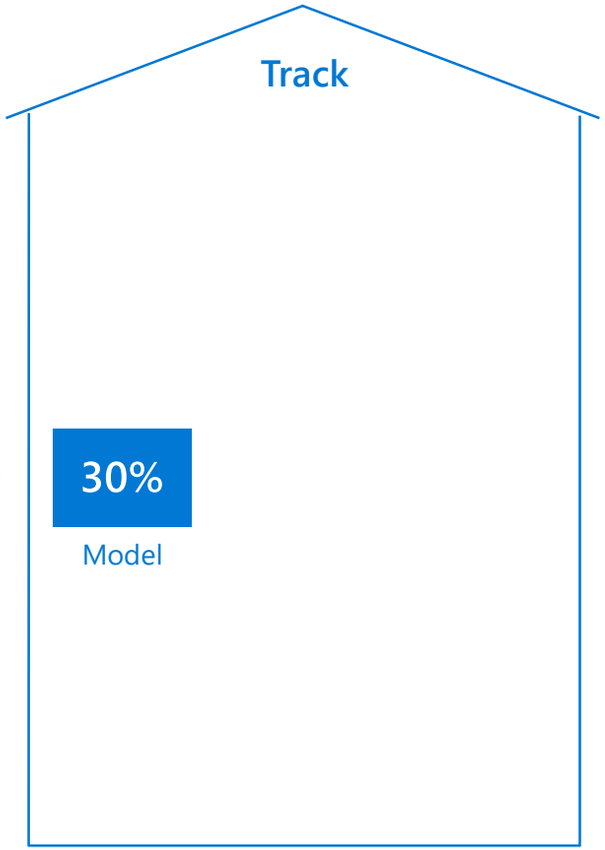
- Mileage
- Condition
- Car brand
- Year of make
- Regulations
- ...

Which algorithm?

- Gradient Boosted
- Nearest Neighbors
- SGD
- Bayesian Regression
- LGBM
- ...

Which parameters?

- N Neighbors
- Weights
- Metric
- P
- XYZ



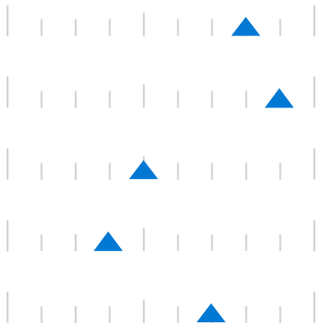
Iterate

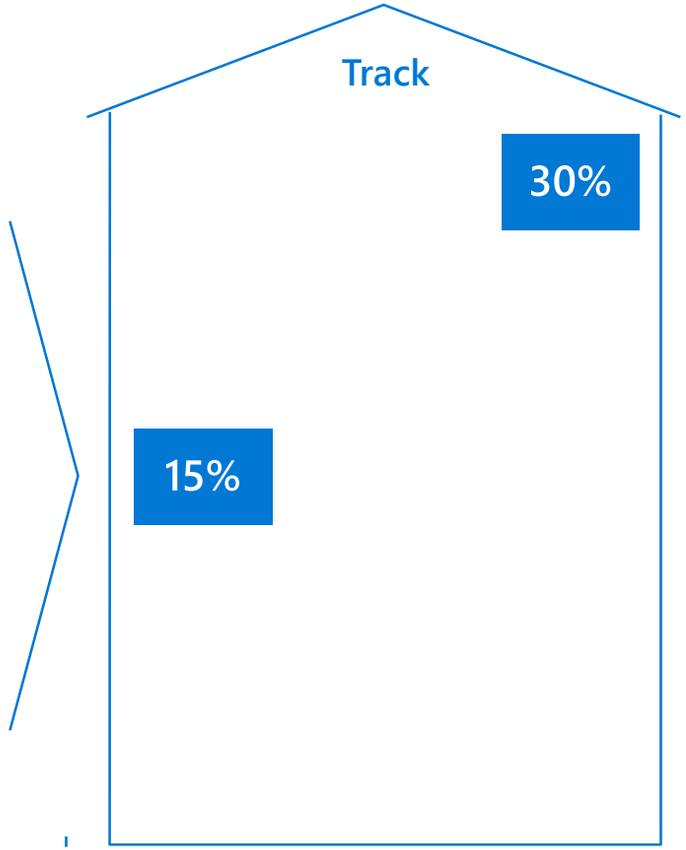
Model creation is typically a time consuming process

Which features?

Which algorithm?

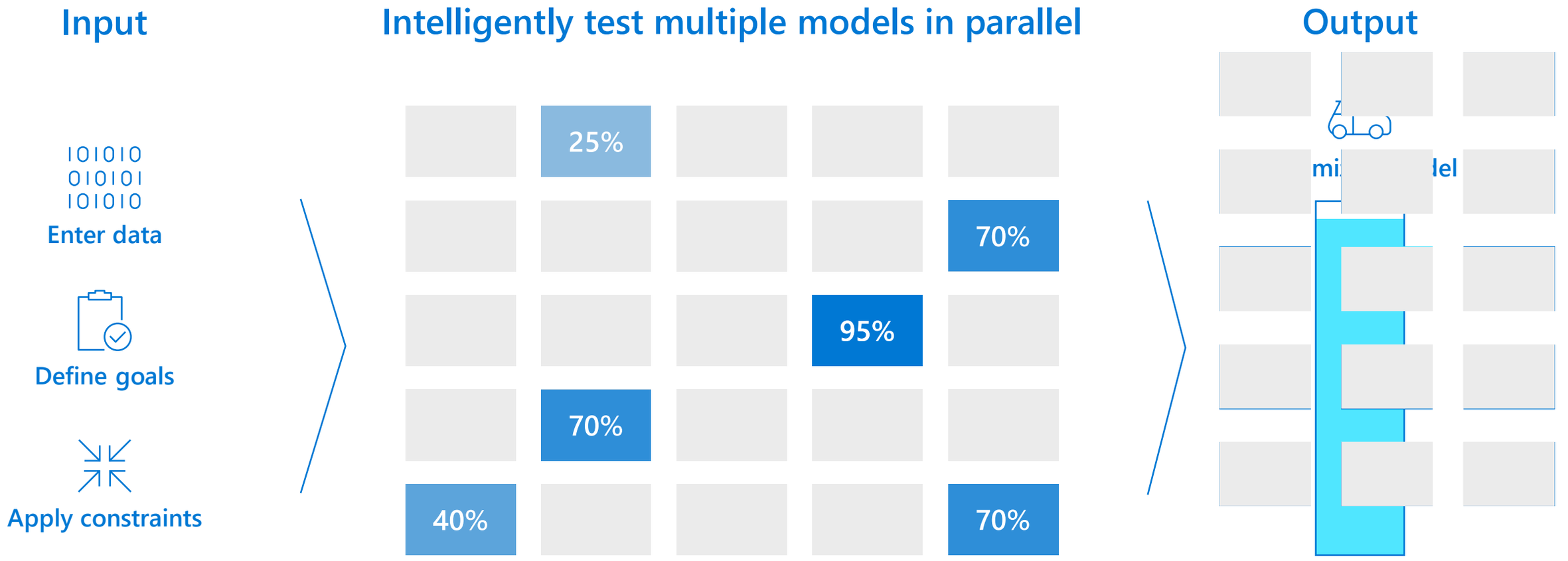
Which parameters?



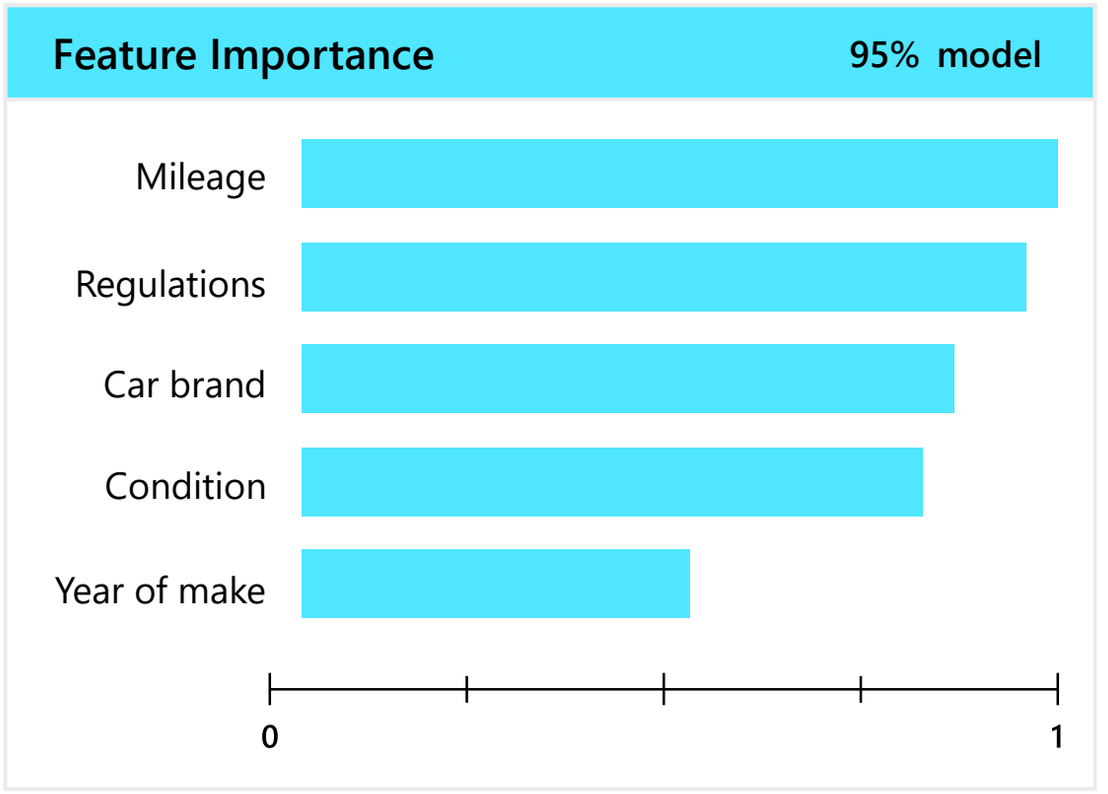


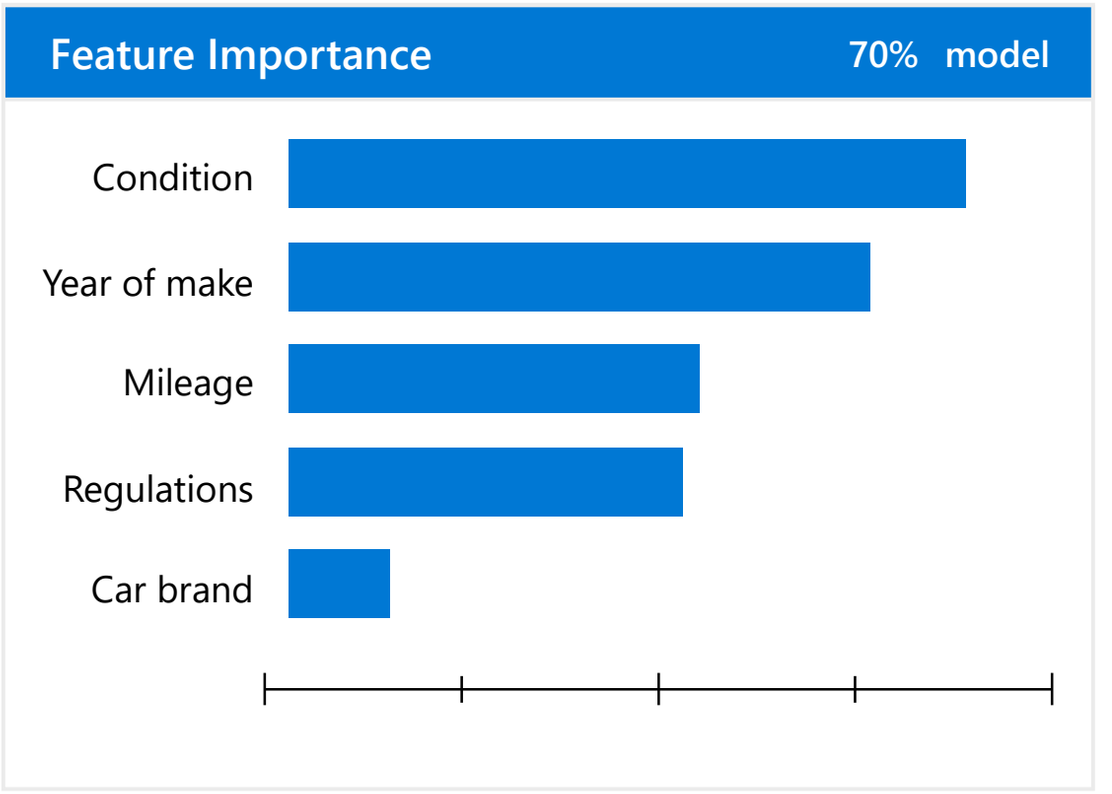
Iterate

Automated Machine Learning accelerates model development



Understand the inner workings of ML by analyzing feature importance

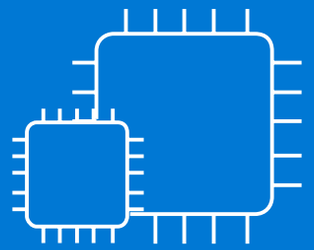




Enable model explain-ability for every automated ML iteration, not just the optimal model

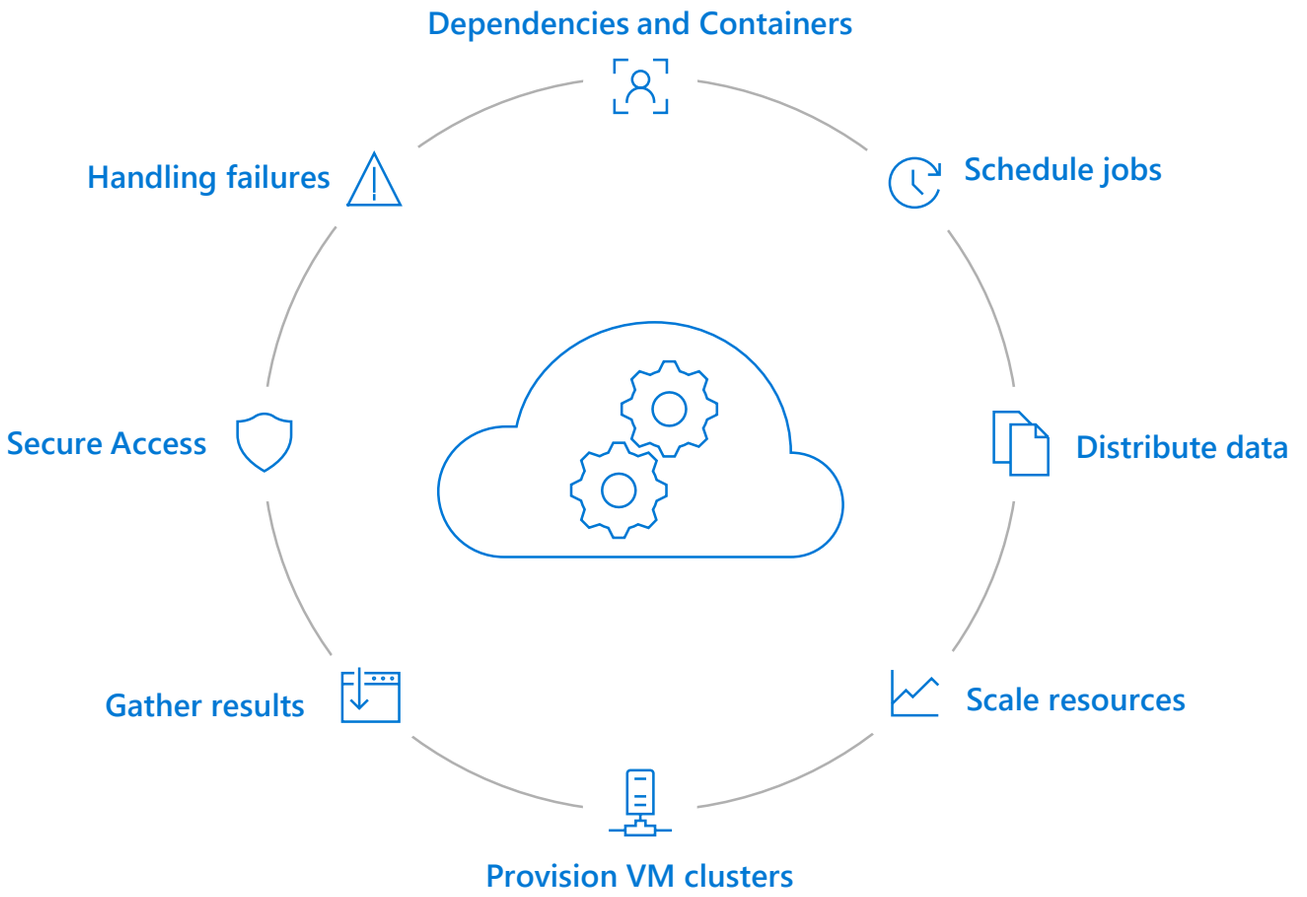
Demo

Automate ML



Managed compute

Distributed training on managed compute



Training infrastructure

Dependencies and Containers

Leverage system-managed AML compute or bring your own compute

Distribute data

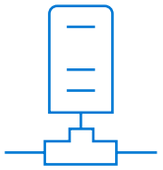
Manage and share resources across a workspace

Schedule jobs

Train at cloud scale using a framework of choice

Scale resources

Autoscale resources to only pay while running a job



Provision clusters

Use the latest NDv2 series VMs with the NVIDIA V100 GPUs

Powerful infrastructure

Accelerate deep learning

CPUs

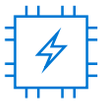
General purpose machine learning

D, F, L, M, H Series

GPUs

Deep learning

N Series



FPGAs

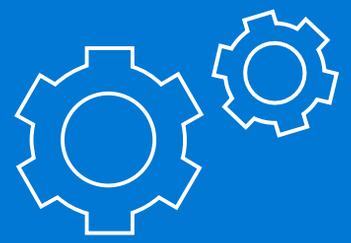
Specialized hardware accelerated deep learning

Project Brainwave

FPGA NEW UPDATES:

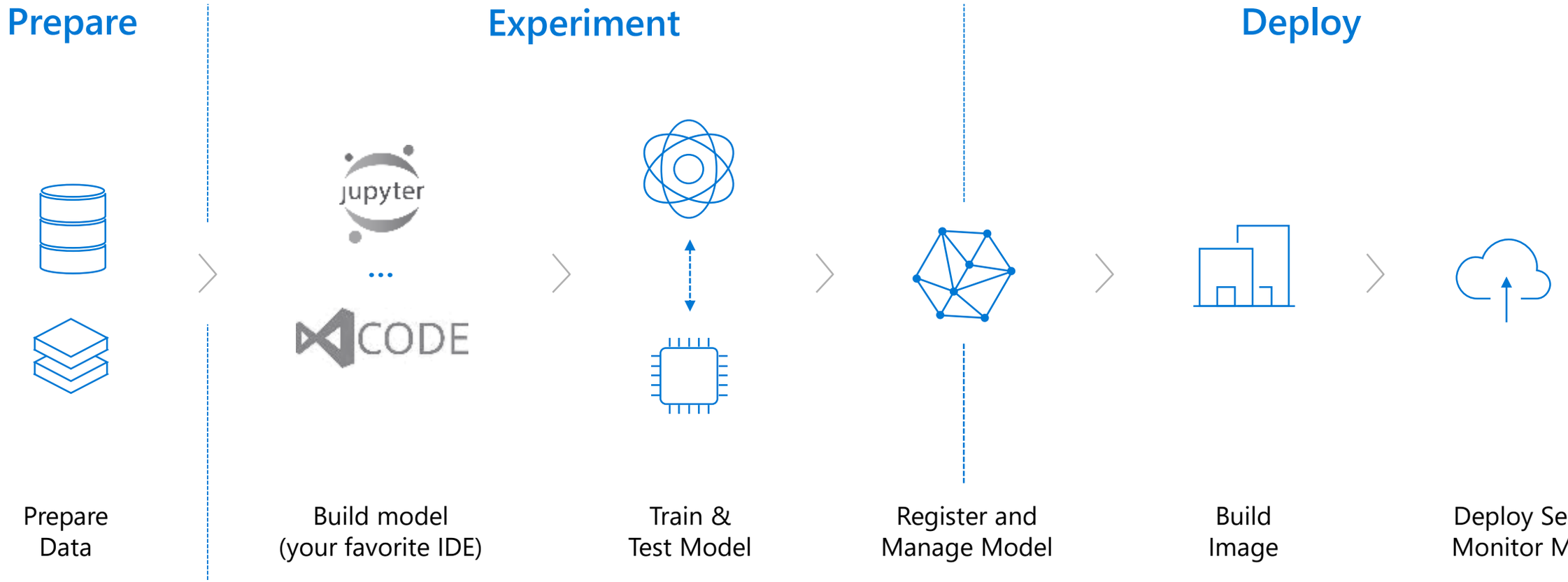
Support for image classification and recognition scenarios

ResNet 50, ResNet 152, VGG-16, SSD-VGG, DenseNet-121

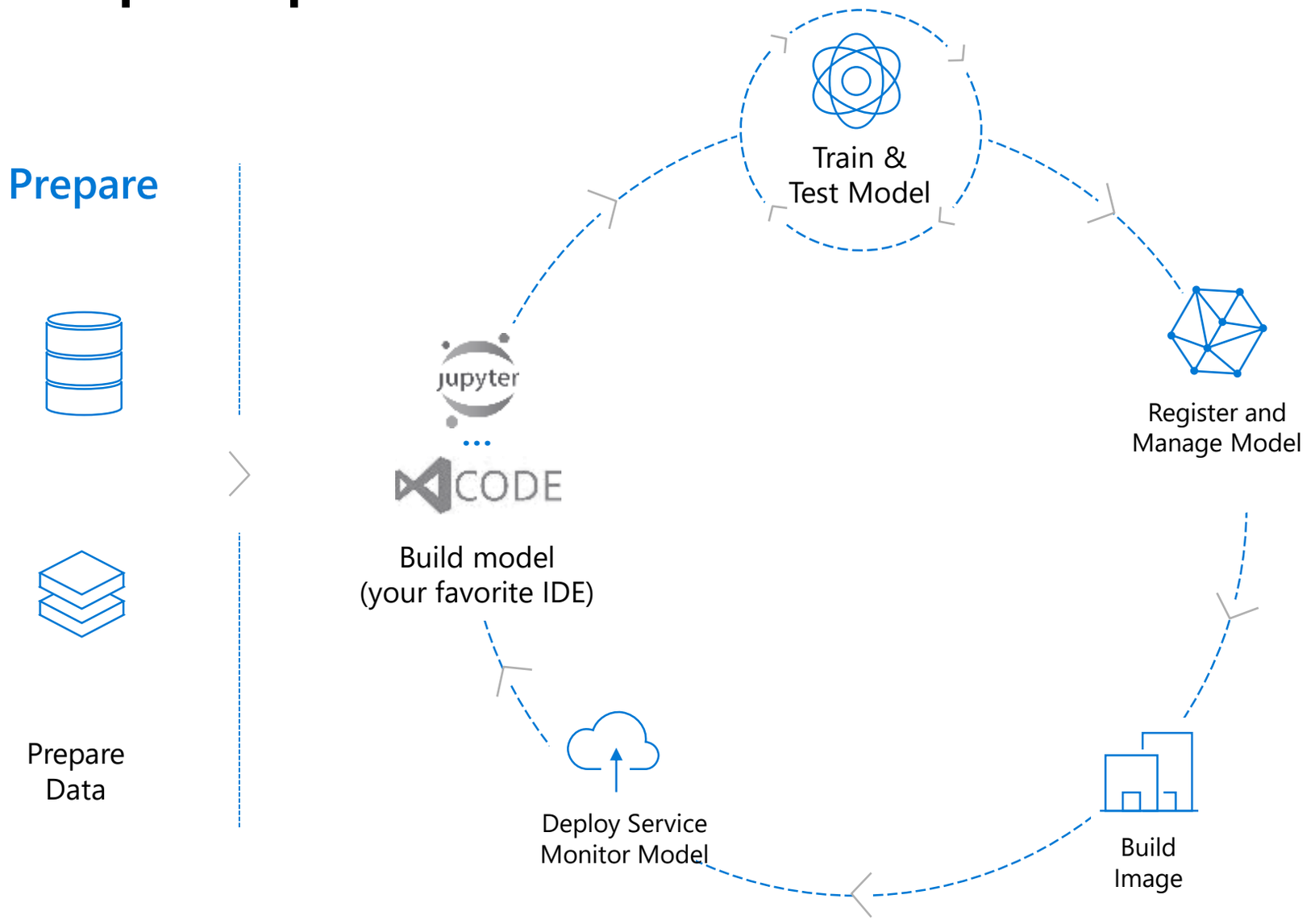


DevOps for machine learning

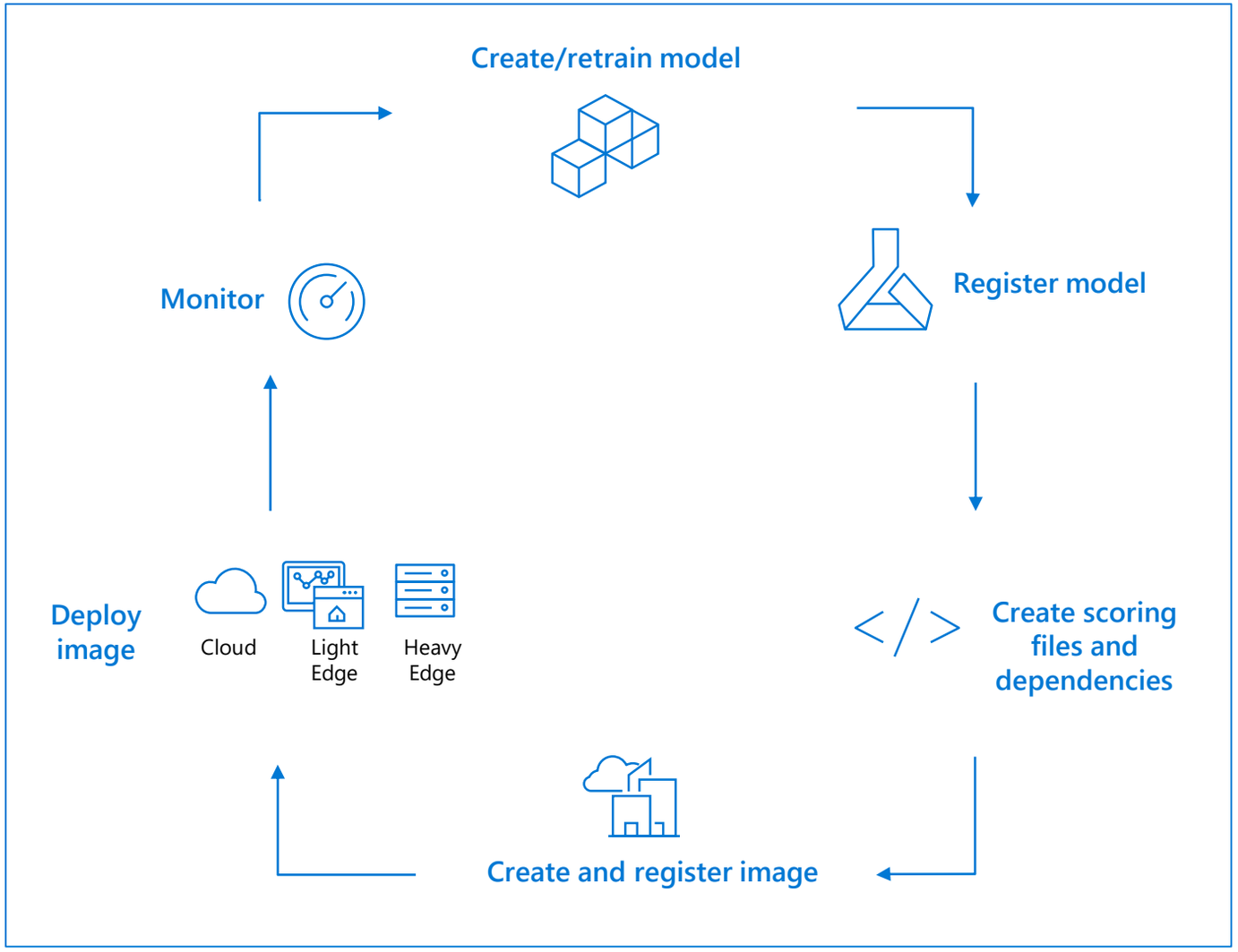
DevOps loop for data science



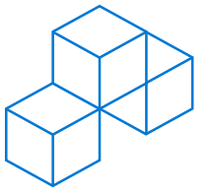
DevOps loop for data science



Model management in Azure Machine Learning



Model management in detail



Create/Retrain Model

Enable DevOps with full CI/CD integration with VSTS

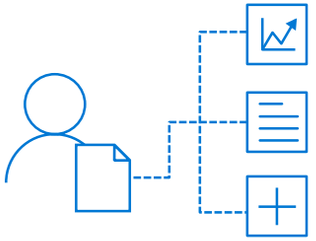
Register Model

Track model versions with a central model registry

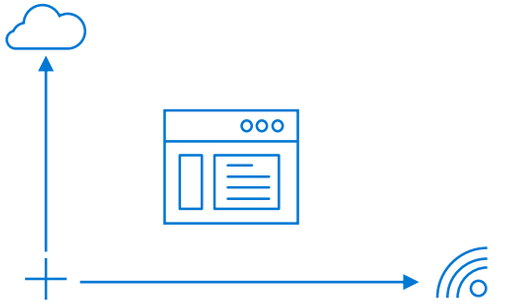
Monitor

Oversea deployments through Azure AppInsights

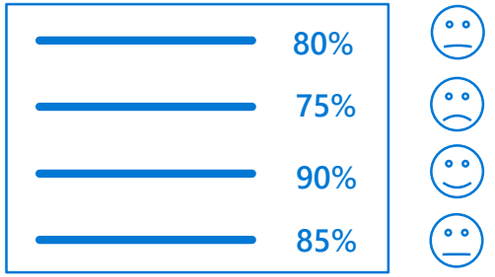
Experimentation



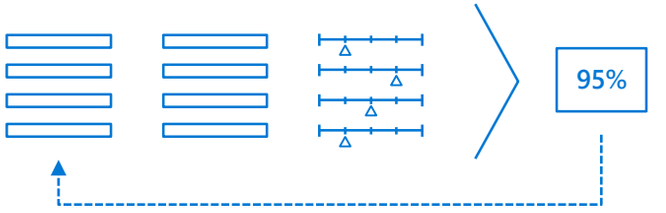
Leverage service-side capture of run metrics, output logs and models



Manage training jobs locally, scaled-up or scaled-out



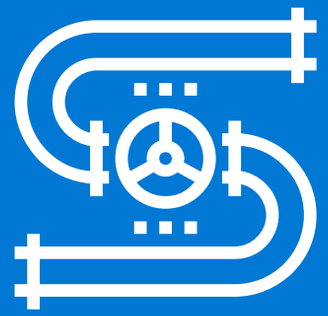
Use leaderboards, side by side run comparison and model selection



Conduct a hyperparameter search on traditional ML or DNN

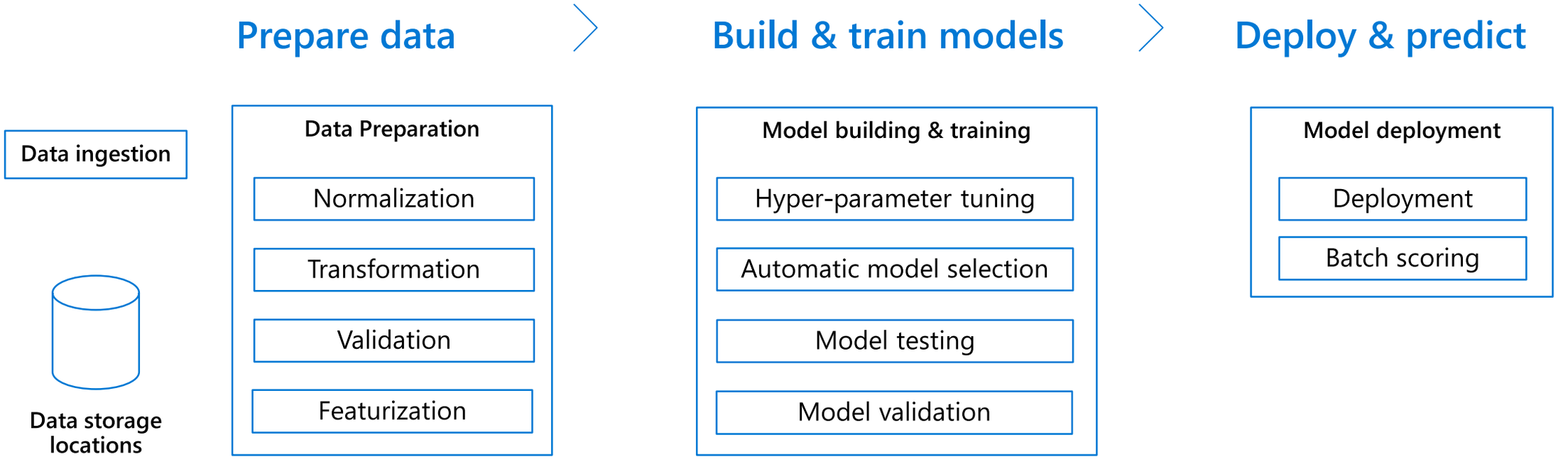
Demo

DevOps for AI

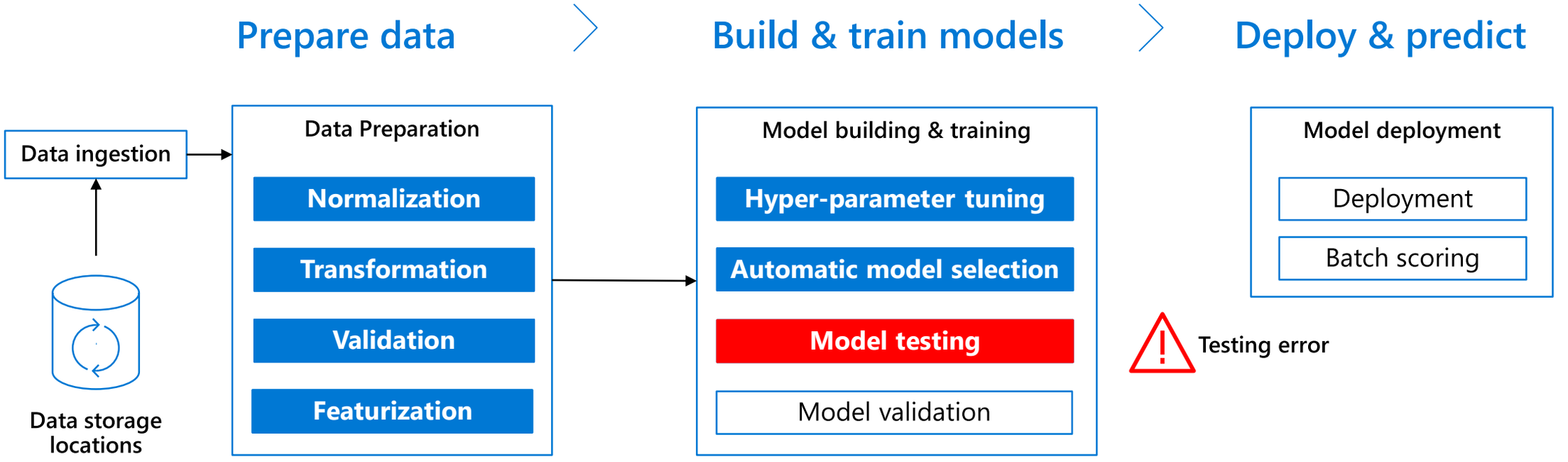


Azure Machine Learning pipelines

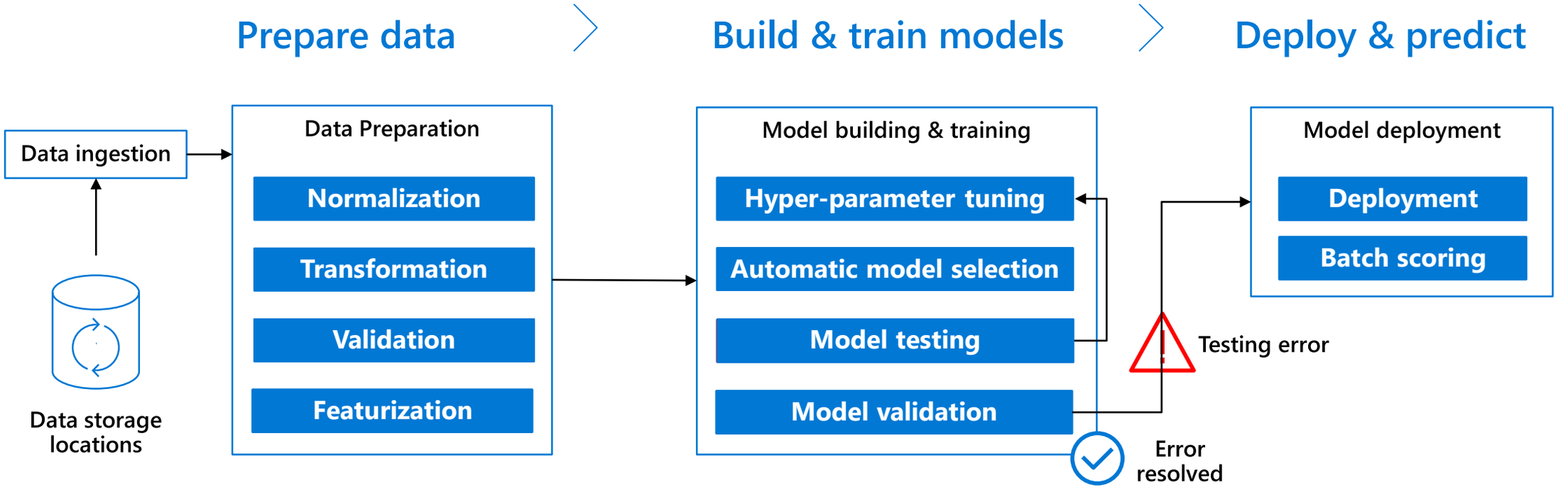
Azure Machine Learning pipelines



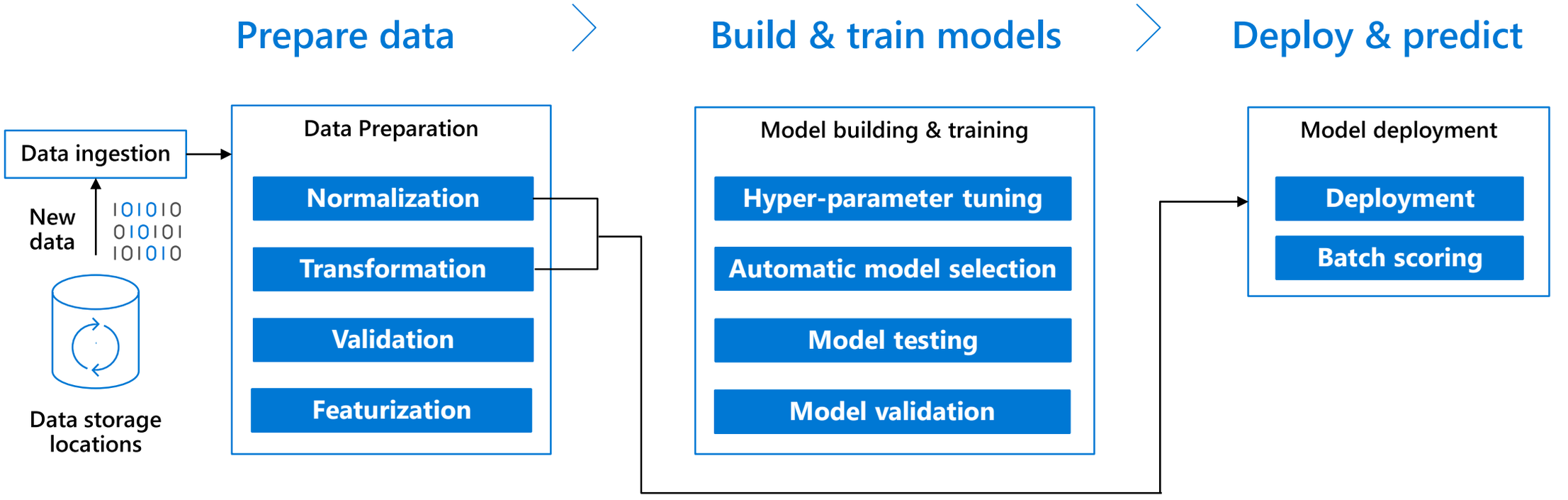
Azure Machine Learning pipelines



Azure Machine Learning pipelines



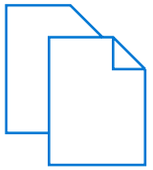
Azure Machine Learning pipelines with new data



Advantages of Azure ML Pipelines

Unattended runs

Schedule a few steps to run in parallel or in sequence to focus on other tasks while your pipeline runs

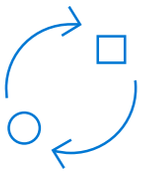


Tracking and versioning

Name and version your data sources, inputs and outputs with the pipelines SDK

Reusability

Create templates of pipelines for specific scenarios such as retraining and batch scoring



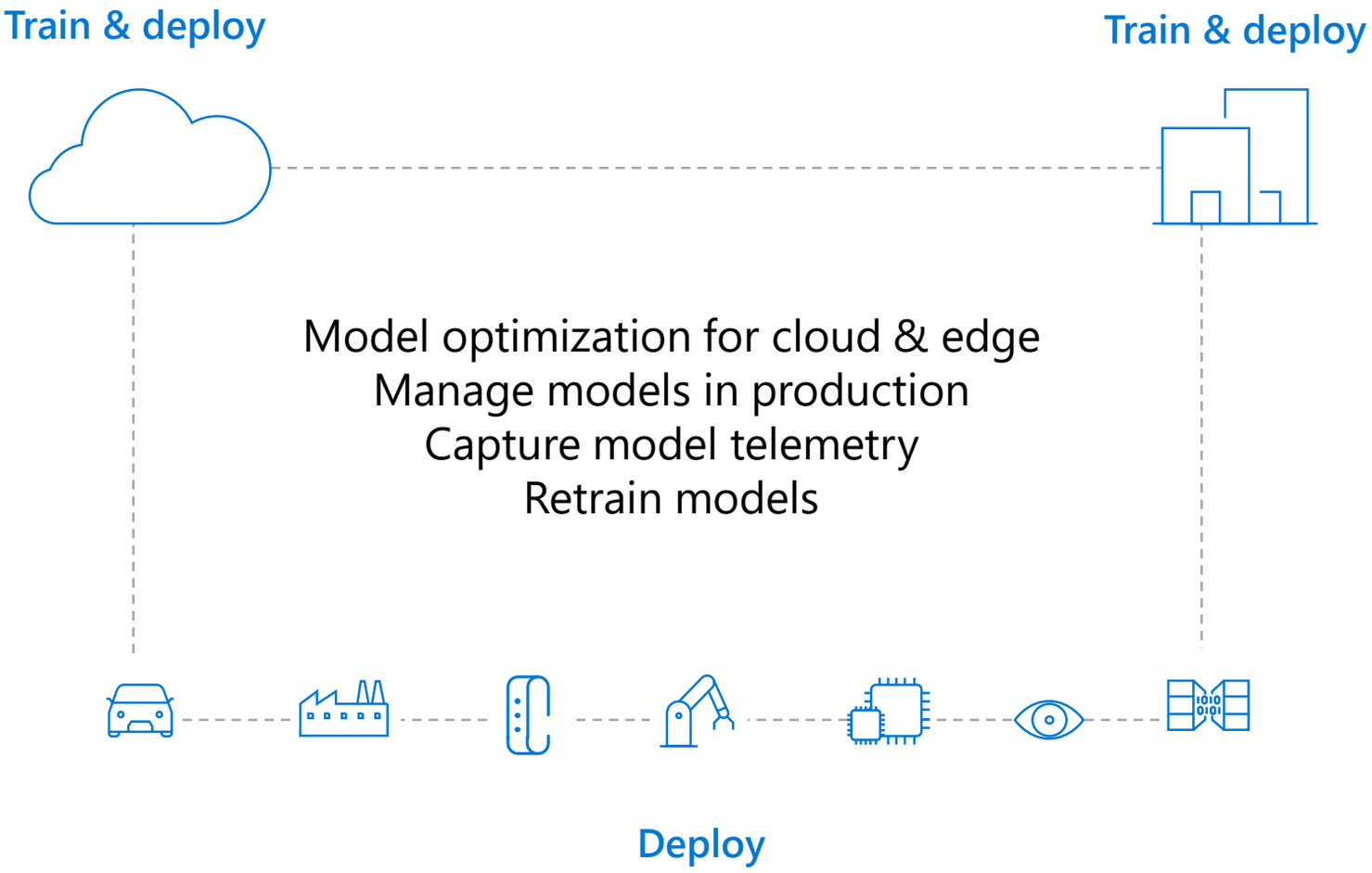
Mixed and diverse compute

Use multiple pipelines that are reliably coordinated across heterogeneous and scalable computes and storages

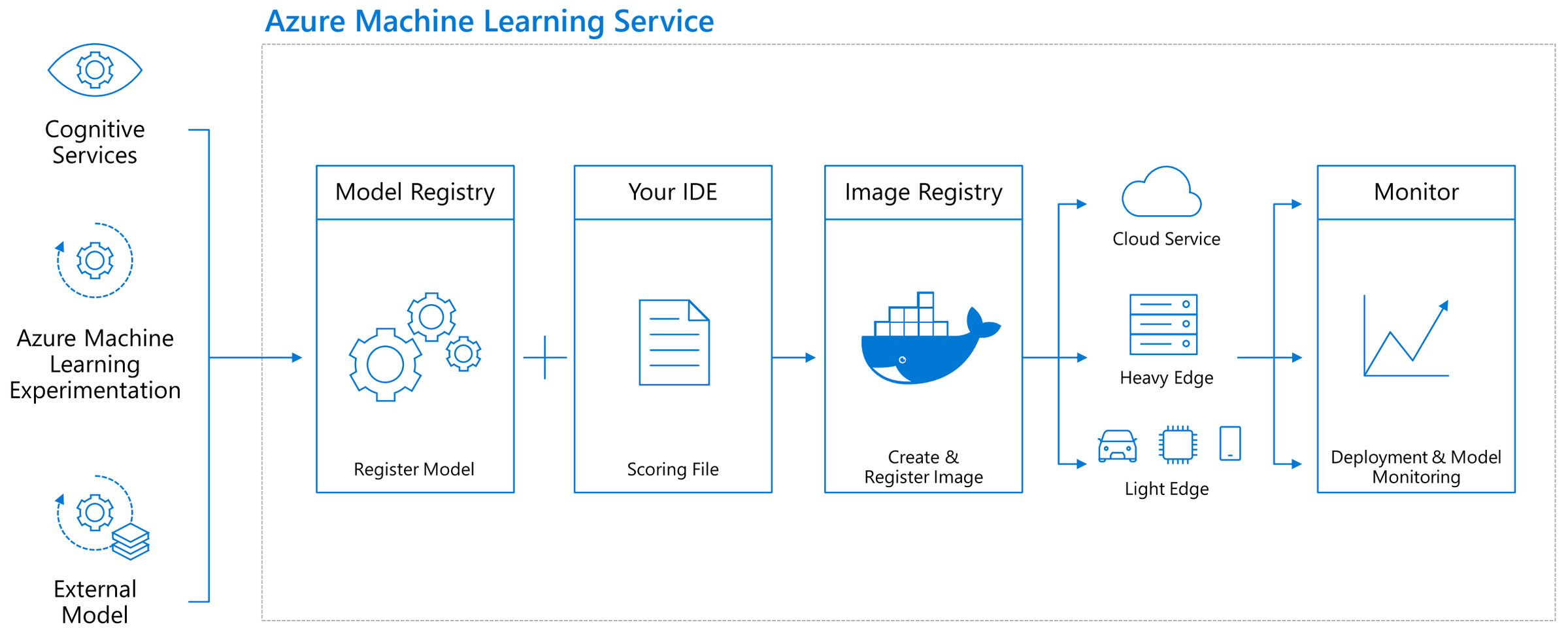
Simple deployment

Flexible deployment

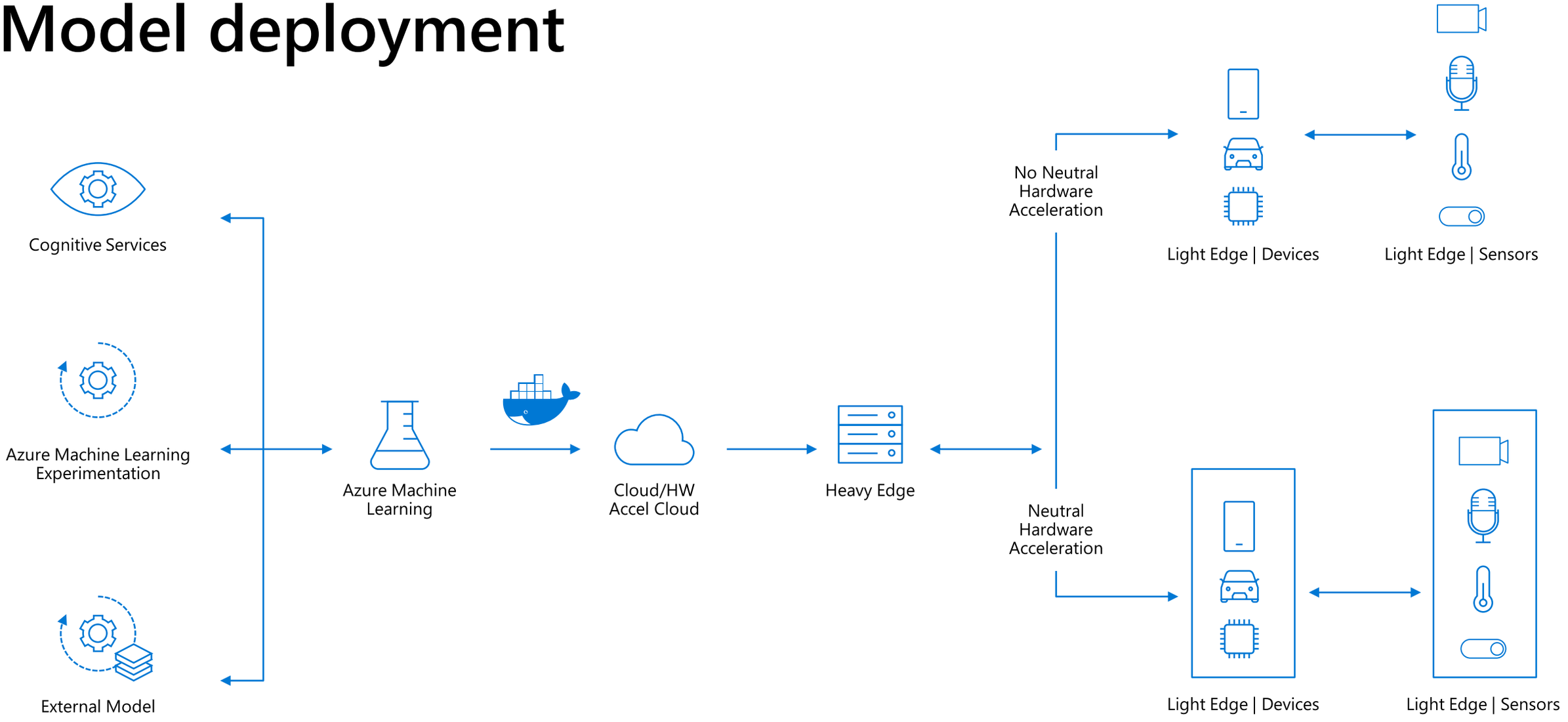
Deploy and manage models on intelligent cloud and edge



Deploy Azure ML models at scale



Model deployment



Support for open source frameworks

Popular frameworks

Use your favorite deep learning frameworks

TensorFlow

PyTorch

Scikit-Learn

MXNet

Chainer

Keras

without getting locked into one framework

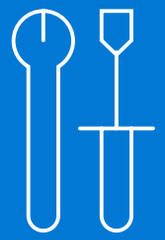
ONNX

Community project created by Facebook and Microsoft

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

NVIDIA QUALCOMM Windows vespa SOPHON

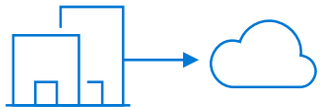
intel skymizer MathWorks NETRON Visual DL



Tool agnostic Python SDK

Tool Agnostic Python SDK

Use your favorite IDEs, editors, notebooks, and frameworks



Flexibility of your local environment or curated cloud environment

Integrate with other services like Azure Databricks

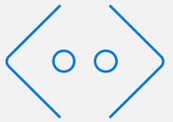
Get started quickly without any complex pre-requisites

Azure ML service also includes DataPrep SDK

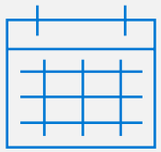
Customer challenges and pain points

- Understanding the semantics of data is difficult and time-consuming
- Merging data from different sources is a manual process
- Detecting, troubleshooting and fixing errors is a high tax
- Custom code is always required
- Operationalization is challenging

Examples of manual, non-scalable work



Data formatting

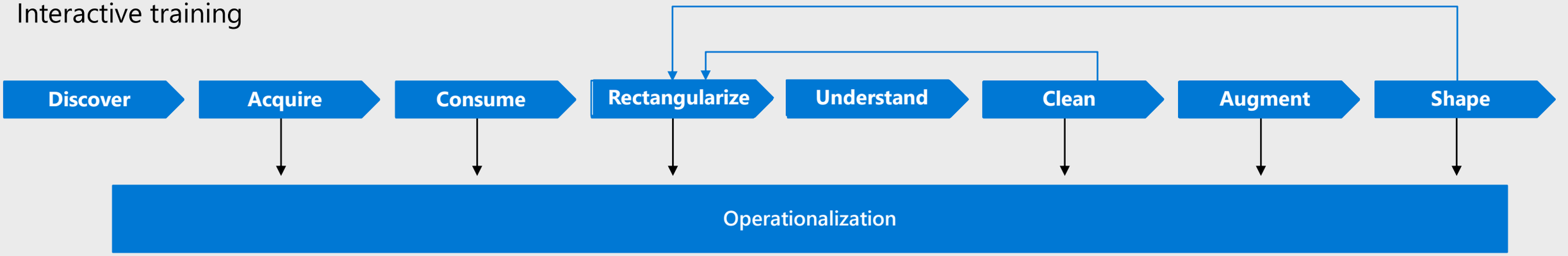


Dealing with dates

'Rectangualizing' data

Data lifecycle

Interactive training



Retraining/scoring

Data Prep SDK

Core Engine

Scale through Streaming

Multiple Runtimes (Scale Up/Scale Out) Single Artifact (Code or GUI)

Intelligent Transforms (By Example, AutoSplit, AutoJoin, Fuzzy Grouping, …)

Smart File Reading

GUI

Exploratory Data Analysis Experience

“Sheet Centric” intuitive UI

Share pipelines to and from Code

SDK

Familiar pattern for complex Transforms

Responsive, Lazy Evaluated

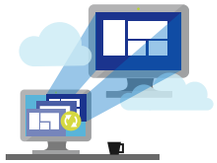
Smart File Reading

Share pipelines to and from GUI

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

Seamlessly integrated with the Azure Portfolio

Machine Learning on Azure

Domain specific pretrained models
To reduce time to market


Vision


Speech


Language


Search

Familiar Data Science tools
To simplify model development


PyCharm


Jupyter


Visual Studio Code


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


Customer story

Drone-based electric grid inspector powered by deep learning

Challenge

Traditional power line inspection services are costly

Demand for low cost image scoring and support for multiple concurrent customers

Needed powerful AI to execute on a drone solution

Solution

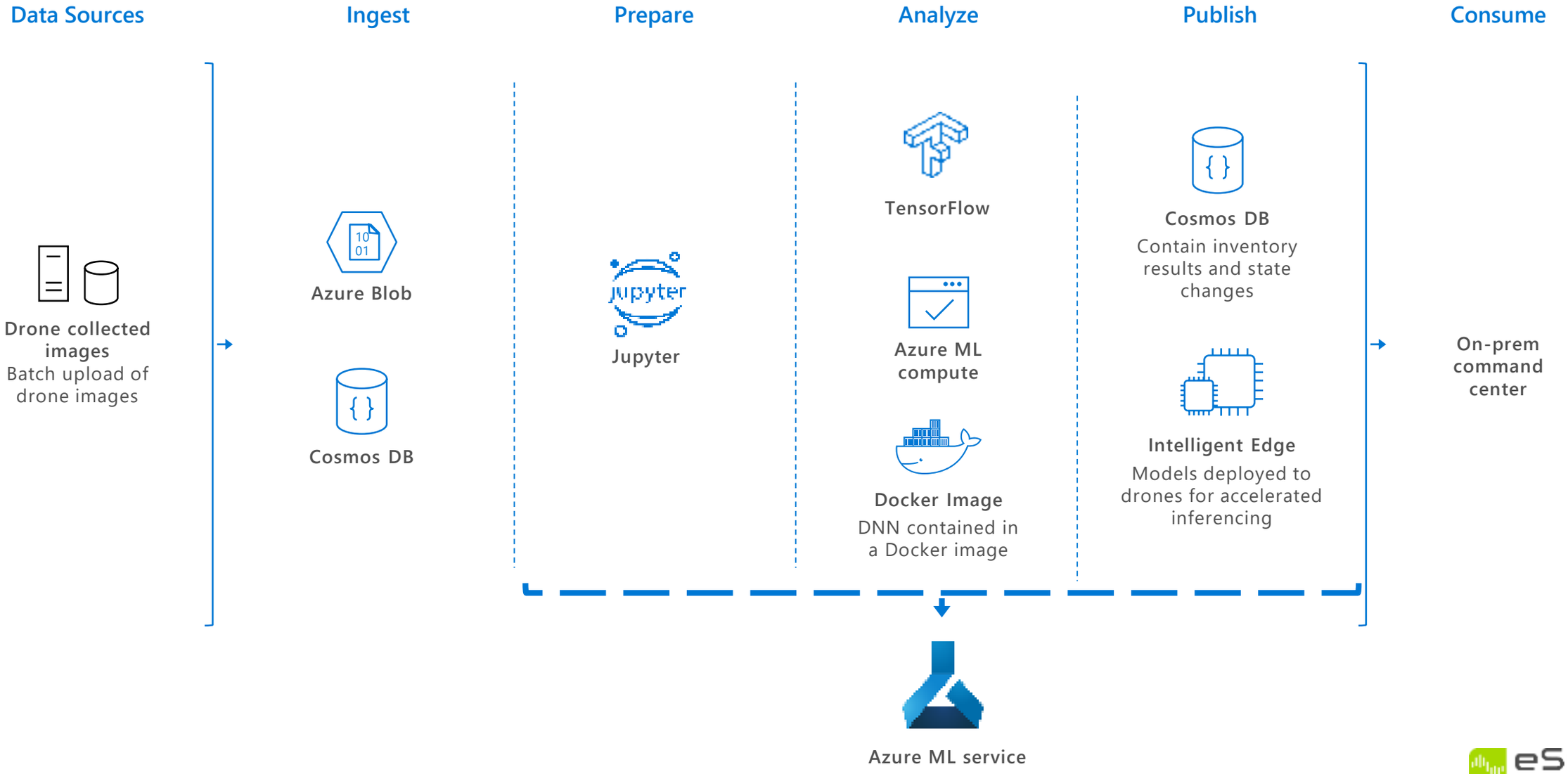
Deep learning to analyze multiple streaming data feeds

Azure GPUs support Single Shot multibox detectors

Reliable, consistent, and highly elastic scalability with Azure Batch Shipyards

eSmart SYSTEMS

eSmart architecture



Try it for free

http://aka.ms/amlfree

Learn more: http://aka.ms/azureml-docs
Visit the Getting started guide

Microsoft