Microsoft

Serverless AI on Azure

Sven Wildermann
Technical Solutions Professional for Data & AI

@svenwildermann
linkedin.com/in/svenwildermann/

SERVERLESS

What media should I use to keep backup?

What is the right **size** of **servers** for my business needs?

How do I **deploy** new **code** to my **server**?

What happens in case of **server hardware** failure?

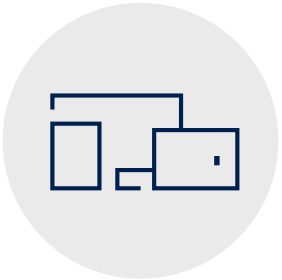
What size of **servers** should I **buy**?

Which packages should be on my **server**?

Who **monitors** my **App**?

How often should I backup my **server**?

How can I **scale** my app?



How can I increase **server** utilization?

Do I need secondary network connection?

Who **monitors** my **Servers**?

Who has **physical** access to my **servers**?

Do I need a UPS?

Which OS should I use?

Are my **servers** in a secure location?

What happens if the power goes out?

What storage I need to use?

How many **servers** do I need?

It takes how long to **provision** a new **server**?

How often should I **patch** my **servers**?

How can I dynamically configure my app?

On-Premises

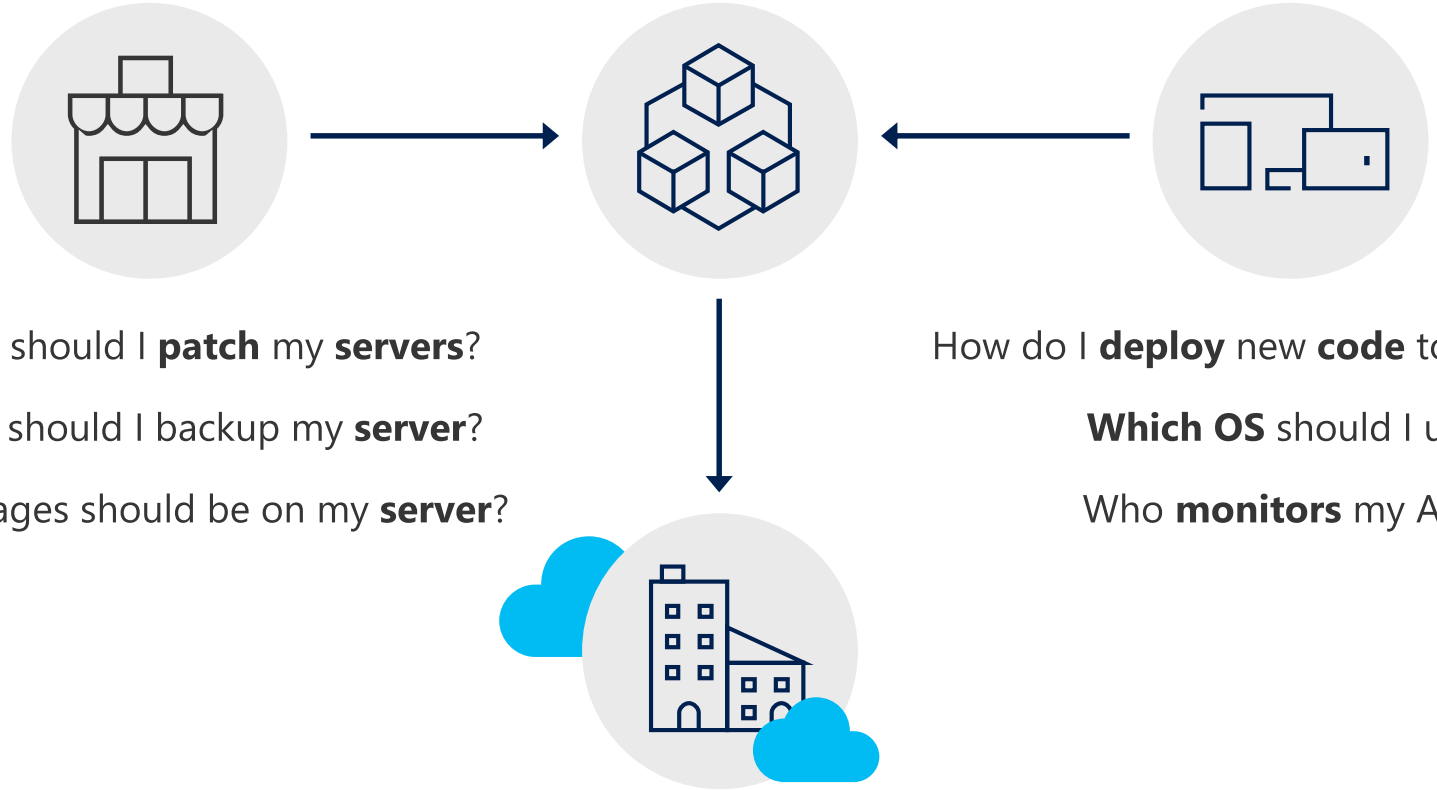
The “evolution” of application platforms

What is the right **size** of **servers** for my business needs?

How can I increase **server** utilization?

How many **servers** do I need?

How can I **scale** my app?



How often should I **patch** my **servers**?

How often should I backup my **server**?

Which packages should be on my **server**?

How do I **deploy** new **code** to my **server**?

Which OS should I use?

Who **monitors** my App?

On-Premises

IaaS

The “evolution” of application platforms

What is the right **size** of **“servers”** for my business needs?

How can I increase **“server”** utilization?

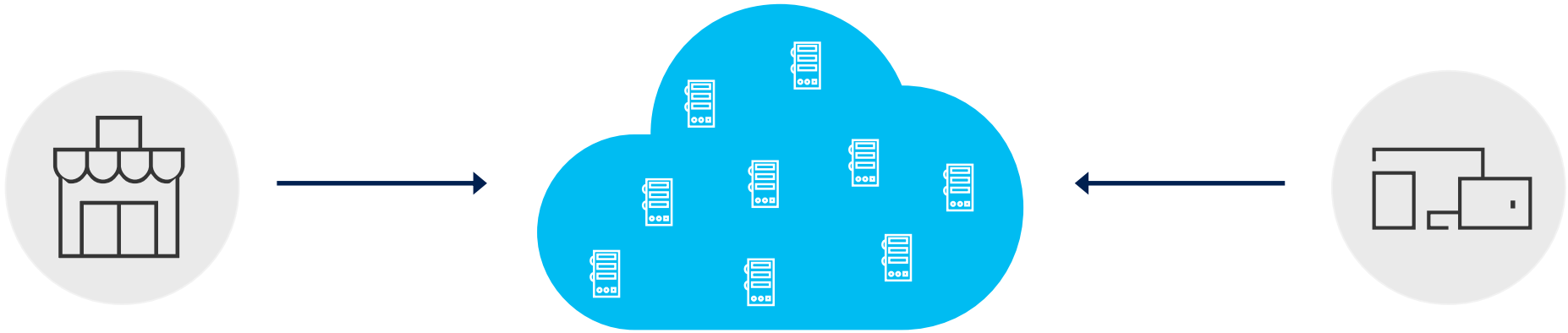
How many **“servers”** do I need?

How can I **scale** my app?

On-Premises — IaaS — PaaS

The “evolution” of application platforms

How do I **architect** my app?



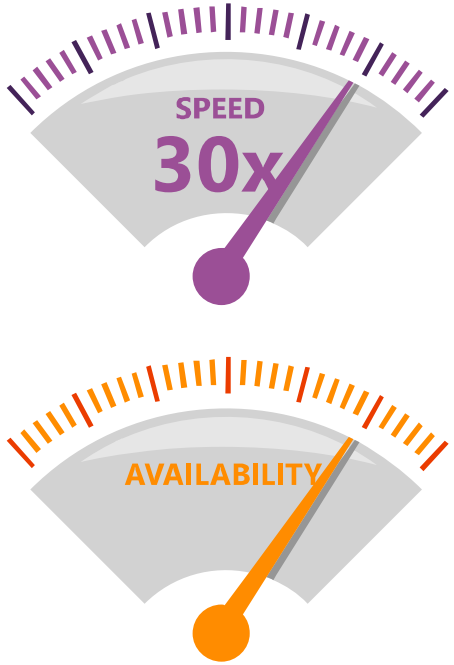
Serverless, the platform for next gen apps

On-Premises — IaaS — PaaS — **Serverless**

The “evolution” of application platforms

WHAT IS "SERVERLESS"

Abstraction of servers



Event-driven scale

Sub-second billing

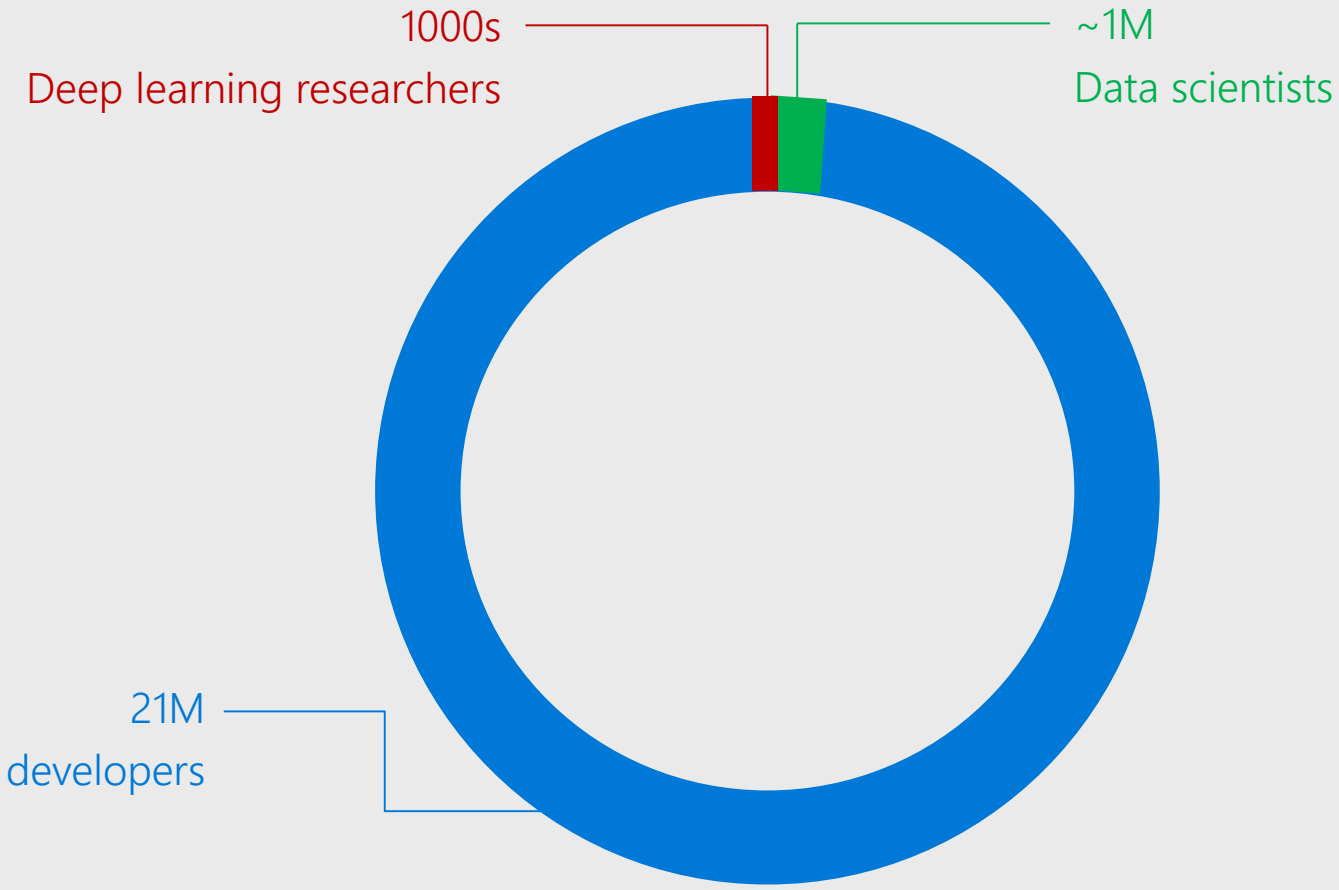
ARTIFICIAL INTELLIGENCE


KNIGHT RIDER

Who can actually use AI today?

Very few user can create a custom ML model today

We need to make our AI services accessible to more people.



Microsoft Business Analytics & AI Platform

Azure AI Services

PRE-BUILT AI

Cognitive Services

CONVERSATIONAL AI

Bot Se

CUSTOM AI

Azure Machine Learning

Azure Infrastructure

AI ON DATA

Cosmos DB

SQL DB

SQL DW

Data Lake

AI COMPUTE

ark

DSVM

Batch AI

ACS

IoT Edge

CPU, FPGA, GPU

Tools

CODING & MANAGEMENT TOOLS

VS Tools for AI

Azure ML Studio

Azure ML Workbench

Others (PyChar lotebooks...)

DEEP LEARNING FRAMEWORKS

3rd Party

Cognitive Toolkit

TensorFlow

Caffe

Others (Scikit-learn, MXNet, Keras, Chainer, Gluon...)

Cognitive Services

Vision

From faces to feelings, allow your apps to understand images and video

Language

Hear and speak to your users by filtering noise, identifying speakers, and understanding intent

Speech

Process text and learn how to recognize what users want

Search

Map complex information and data in order to solve specific tasks

Knowledge

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

Cognitive Services

- Video Indexer
- Computer Vision
- Face
- Emotion
- Content Moderator
- Custom Vision

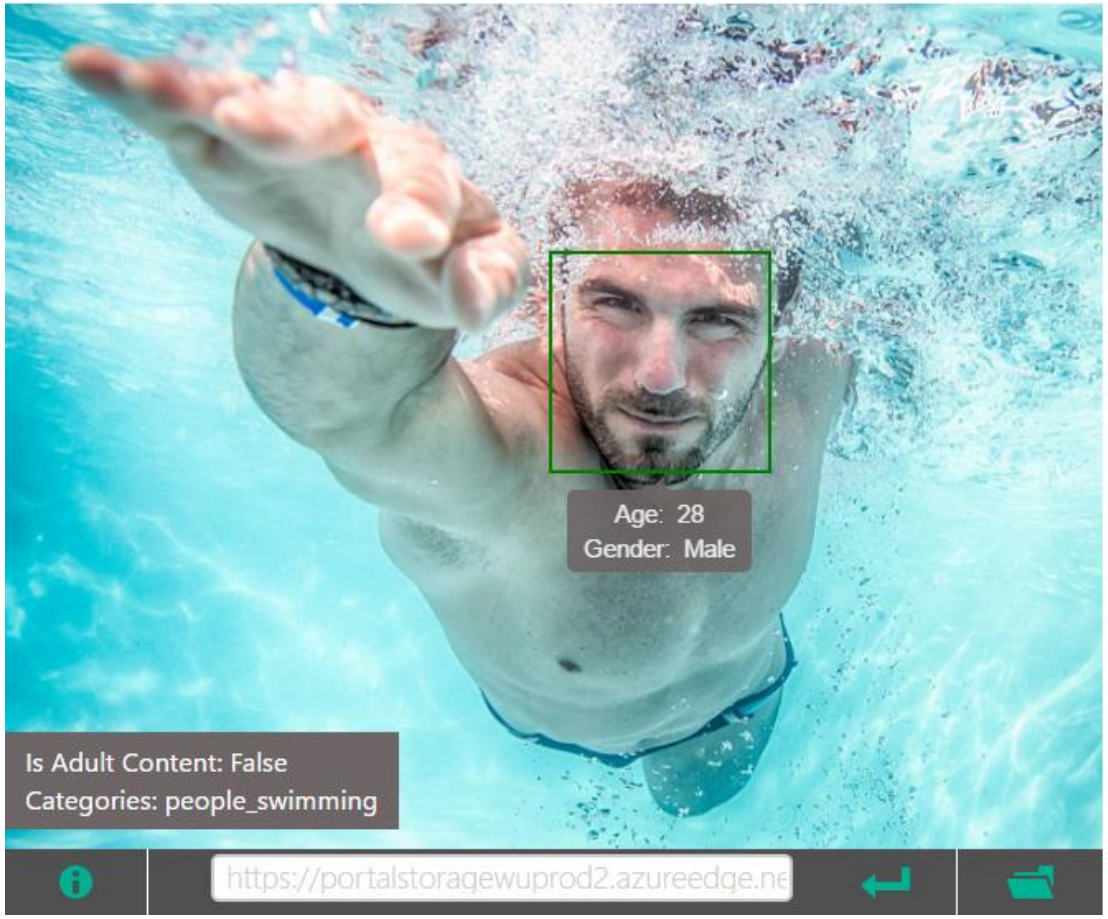
- Speaker Recognition
- Bing Speech
- Custom Speech
- Translator Speech
- Unified Speech
  - Speech to Text
    w. Custom Speech
  - Text to Speech
    w. Custom Voice
  - Speech Translation
    w. Custom Translator

- Text Analytics
- Bing Spell Check
- Translator Text
- Language Understanding (LUIS)

- QnA Maker
- Custom Decision

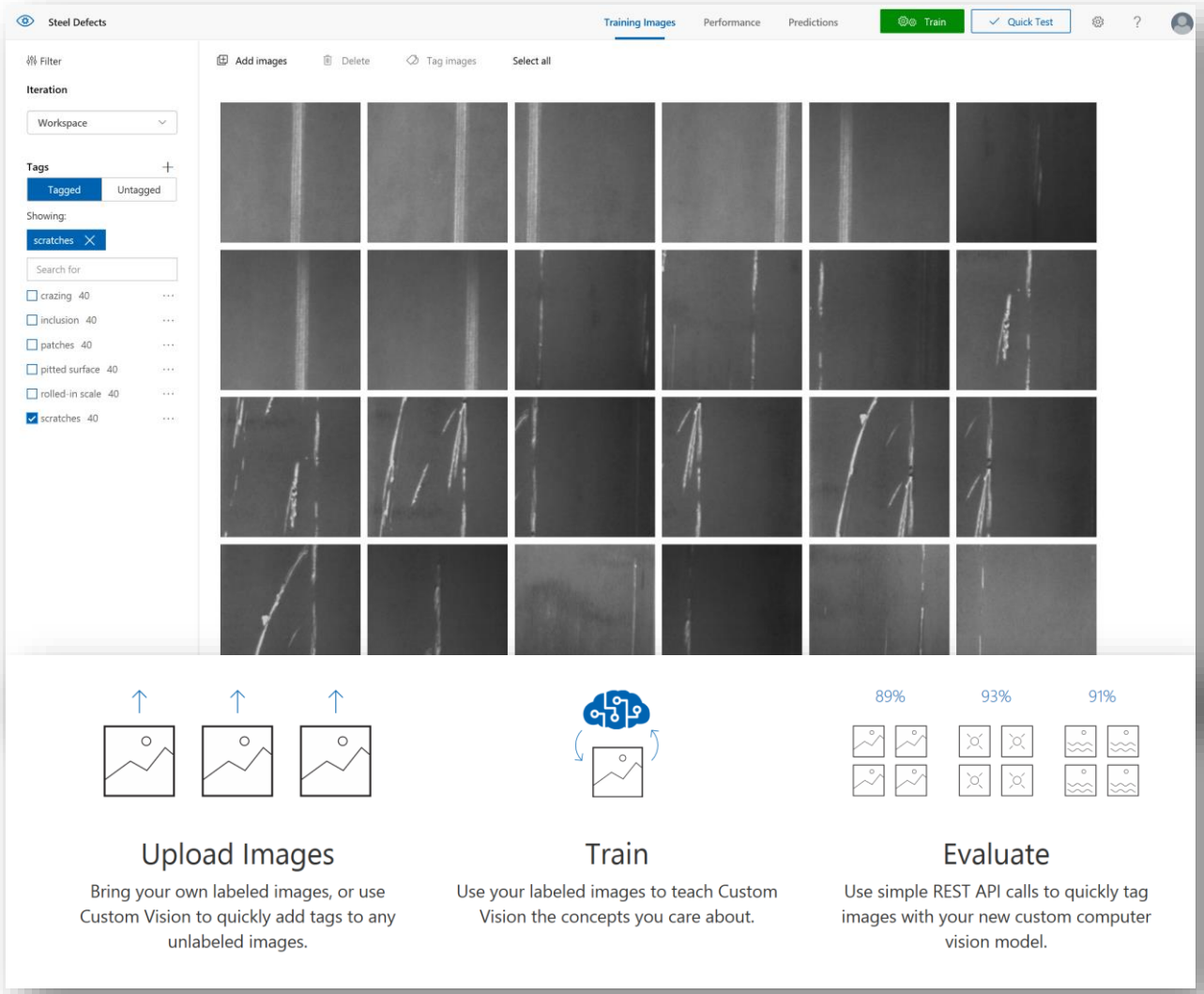
- Bing Entity Search
- Bing Autosuggest
- Bing Search
  - Web Search
  - Image Search
  - News Search
  - Video Search
- Bing Statistics add-in
- Bing Visual Search
- Bing Custom Search

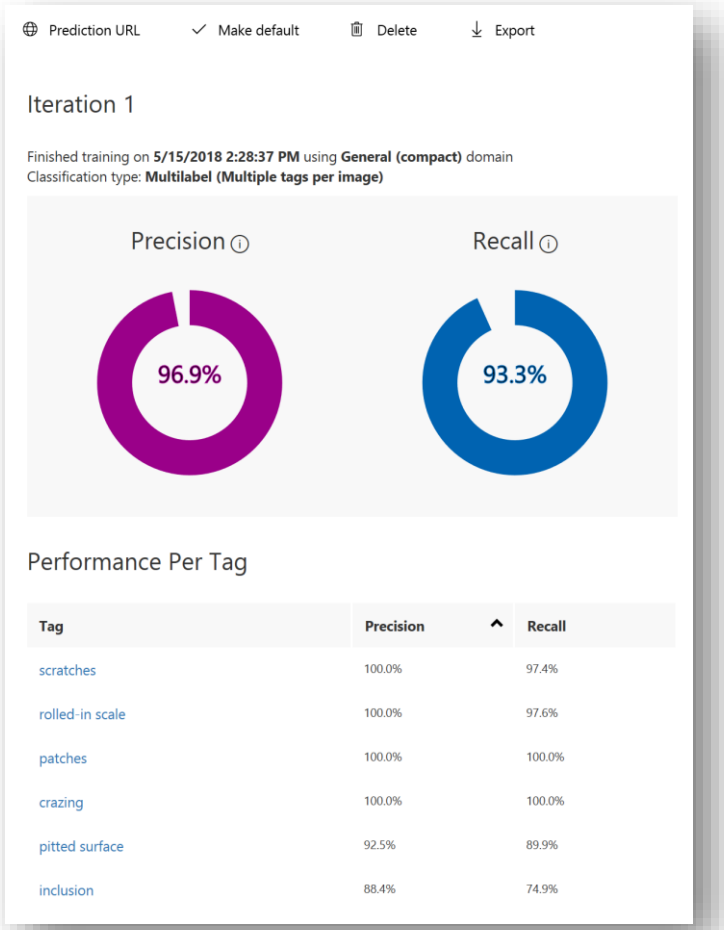
Microsoft Cognitive Services: Developer API

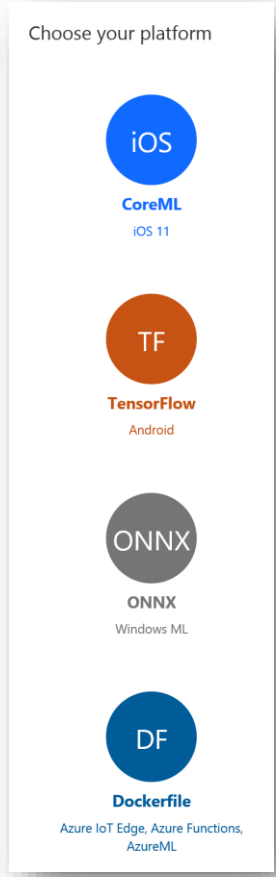


Feature Name	Value
Description	{ "type": 0, "captions": [{ "text": "a man swimming in a pool of water", "confidence": 0.7850108693093019 }] }
Tags	[{ "name": "water", "confidence": 0.9996442794799805 }, { "name": "sport", "confidence": 0.9504992365837097 }, { "name": "swimming", "confidence": 0.9062818288803101, "hint": "sport" }, { "name": "pool", "confidence": 0.8787588477134705 }, { "name": "water sport", "confidence": 0.631849467754364, "hint": "sport" }]
Image Format	jpeg
Image Dimensions	1500 x 1155
Clip Art Type	0 Non-clipart
Line Drawing Type	0 Non-LineDrawing
Black & White Image	False
Is Adult Content	False
Adult Score	0.14916780591011047

Transfer Learning with Custom Vision







www.customvision.ai

DEMO

INTELLIGENT KIOSK & CUSTOM VISION

Azure AI

AI apps & agents

Azure Bot Service
Azure Cognitive Services

Machine learning

Azure Databricks
Azure Machine Learning

Automated ML

AzureML in
Azure Notebooks and Databricks

Machine learning on Azure

NEW UPDATES

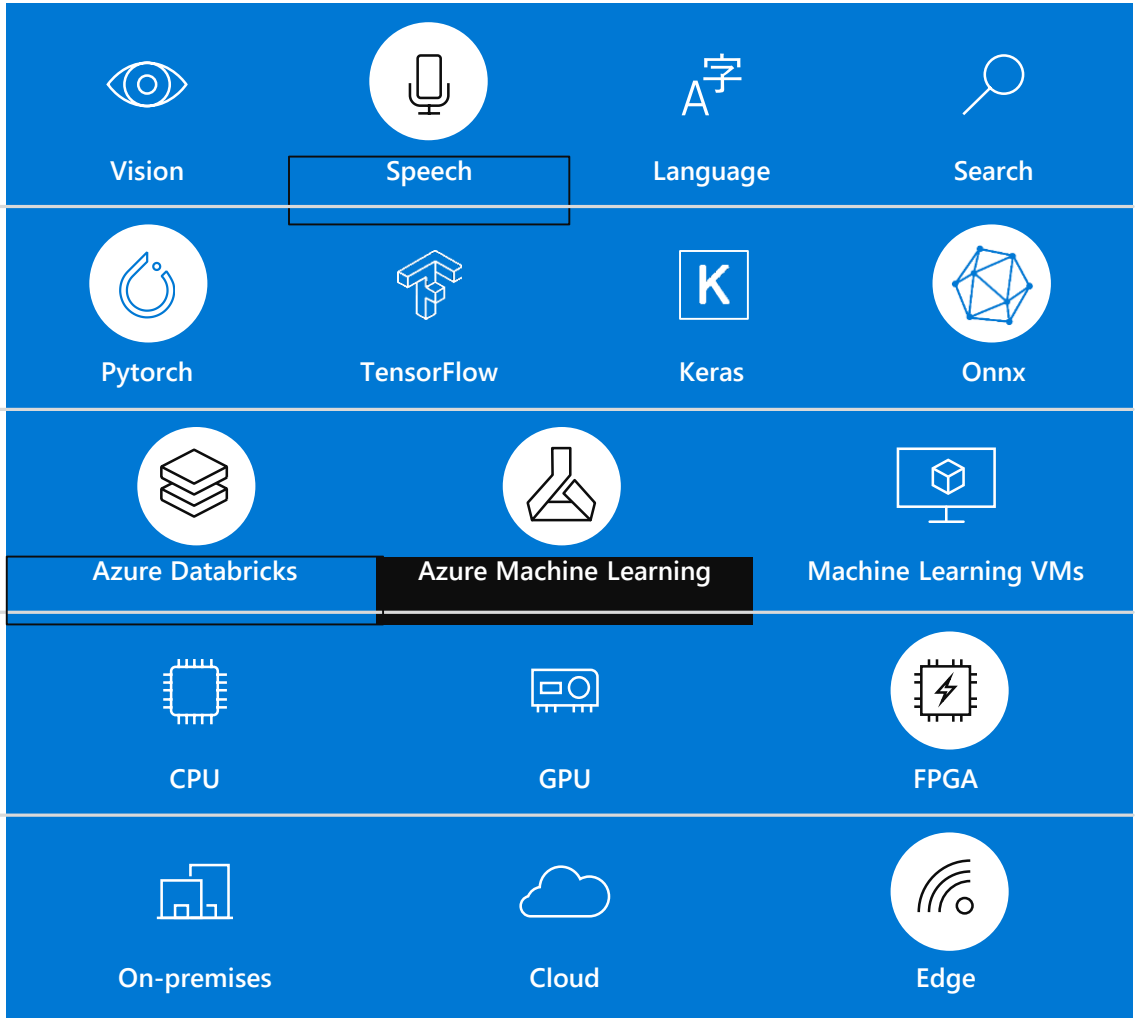
Sophisticated pretrained models
To simplify solution development

Popular frameworks
To build advanced deep learning solutions

Productive services
To empower data science and development teams

Powerful infrastructure
To accelerate deep learning

Flexible deployment
To deploy, manage models on intelligent cloud & edge



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

Open AI Platform

Use any framework or library

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

Git based checkpointing and version control

Service side capture of run metrics, output logs and models

Use your favorite IDE, and any framework

USE ANY FRAMEWORK OR LIBRARY

USE ANY TOOL

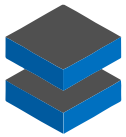
USE THE MOST POPULAR INNOVATIONS

Machine Learning Service and Databricks

Integrated data science & data engineering teams

Desktop solutions not adequate

Need a unified big data & ML solution



Azure Databricks

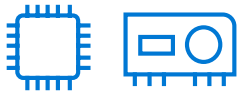
\+

Azure Machine Learning

Individual data scientist

Develop models on local machine or cloud VM

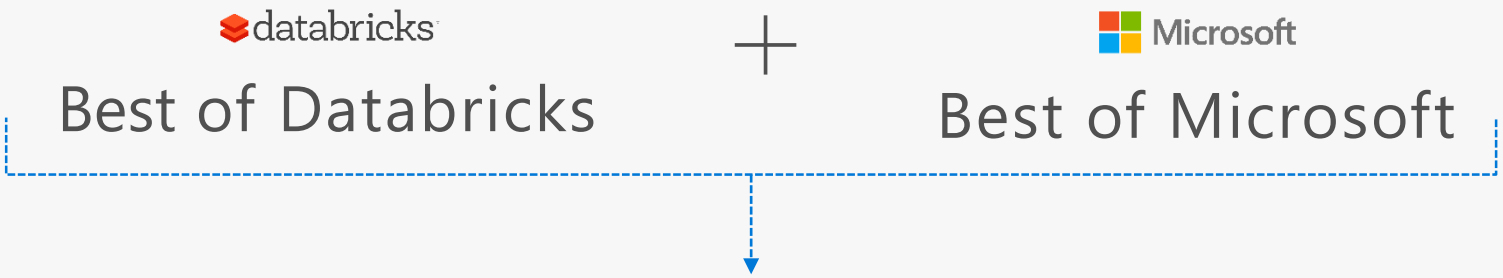
Need cloud for scale-out compute needs



Machine Learning VM

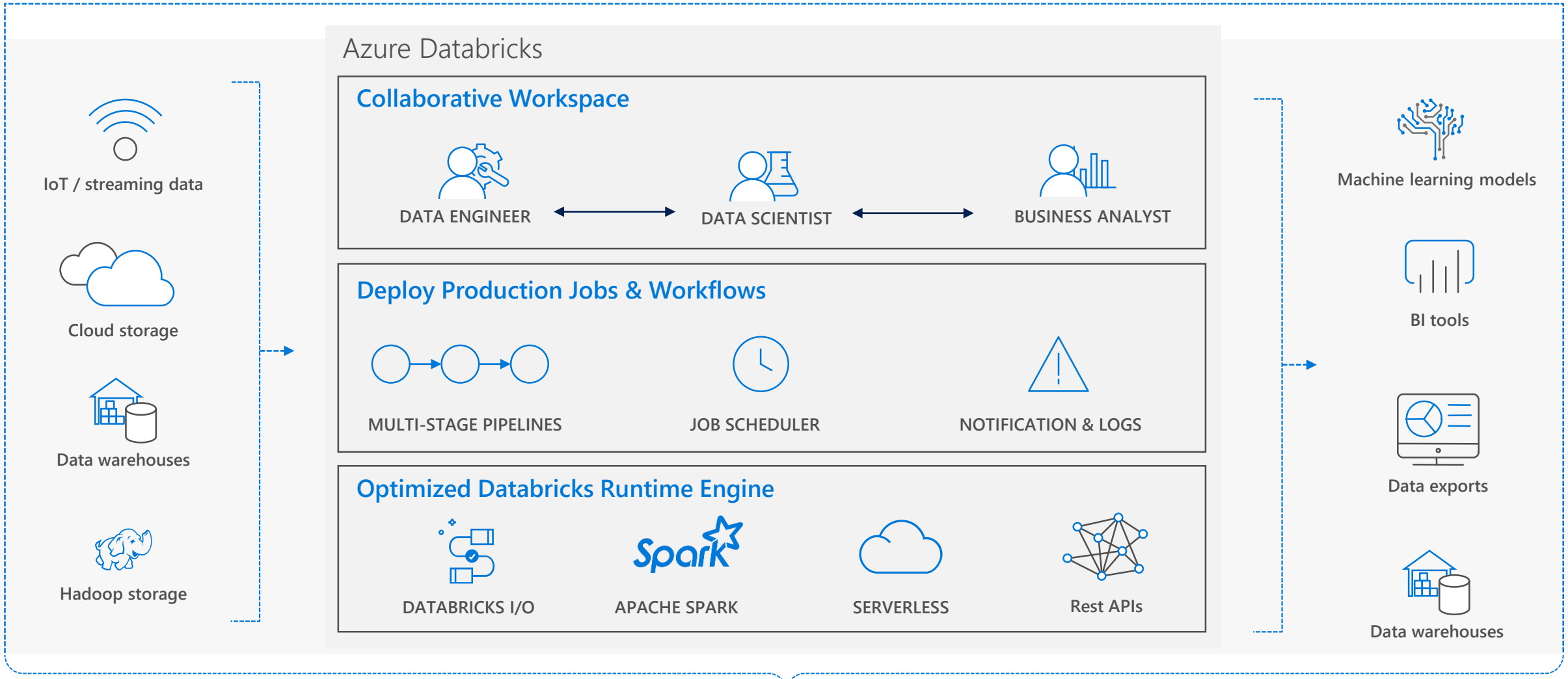
Azure Databricks

A fast, easy and collaborative Apache® Spark™ based analytics platform optimized for Azure



- Designed in collaboration with the founders of Apache Spark
- One-click set up; streamlined workflows
- Interactive workspace that enables collaboration between data scientists, data engineers, and business analysts.
- Native integration with Azure services (Power BI, SQL DW, Cosmos DB, Blob Storage)
- Enterprise-grade Azure security (Active Directory integration, compliance, enterprise-grade SLAs)

Azure Databricks



Enhance Productivity

Build on secure & trusted cloud

Scale without limits

Collaborative Workspace

GET STARTED IN SECONDS

Single click to launch your new Spark environment

INTERACTIVE EXPLORATION

Explore data using interactive notebooks with support for multiple programming languages including R, Python, Scala, and SQL

COLLABORATION

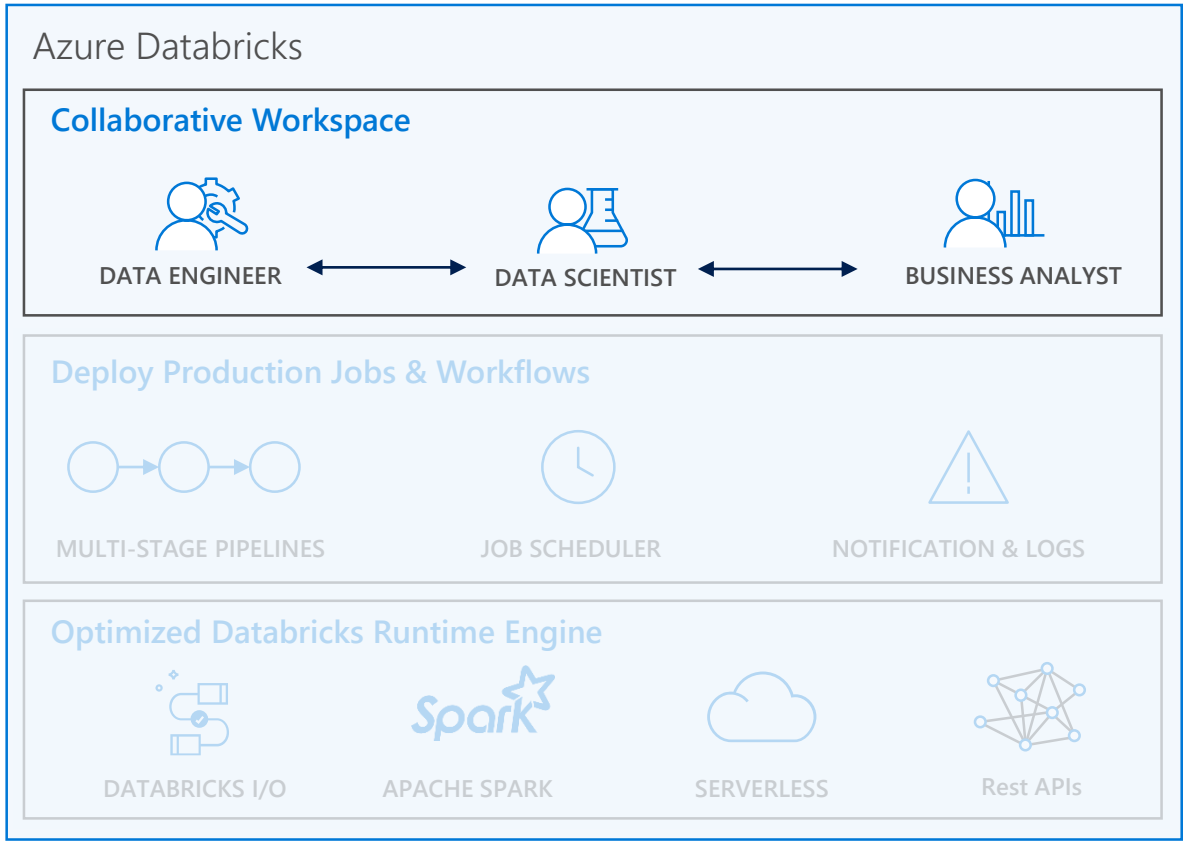
Work on the same notebook in real-time while tracking changes with detailed revision history, GitHub, or Bitbucket

VISUALIZATIONS

Visualize insights through a wide assortment of point-and-click visualizations. Or use powerful scriptable options like matplotlib, ggplot, and D3

DASHBOARDS

Rich integration with PowerBI to discover and share your insights in powerful new ways



myworkspace - Experiments

Machine Learning service workspace

Search (Ctrl+/)

Overview
Activity log
Access control (IAM)
Tags
Diagnose and solve problems

Settings

Locks
Automation script
Properties

Application

Experiments
Pipelines
Compute
Models
Images
Deployments
Activities

Support + troubleshooting

Usage + quotas
New support request

Experiments Pipelines Compute Models Images Deployments Activities

Welcome to your new Workspace

1. Getting started

Create your first experiment in Azure Notebooks to be able to view and track metrics.

Open Azure Notebooks

View More Sample Notebooks

2. Done getting started?

Once you run the Azure Notebook, you will be able to view the data from the experiment in the Experiments page.

View Experiments

What's possible with AML?

Using Azure Machine Learning service, you can track your models as you build, train, deploy, and manage them at cloud scale.

Run & Monitor Experiments

Submit Experiments for training and automatically track their progress and view logs.

Register Models

Save scoring logic operations into models to create Docker Images and Deployments.

Build Images

Quickly create Docker images that encapsulate models, scripts, and any associated files.

Deploy Models

Send scoring requests to web services in Azure Container Instances, Azure Kubernetes Service, or field programmable gate arrays (FPGA).

Create Pipeline

Pipelines are used to build, optimize, and manage mach learning workflows.

Learn more about our features and capabilities here

Azure Machine Learning Studio Capabilities Overview

Machine Learning in ML Studio

Anomaly Detection
- One-class Support Vector Machine
- Principal Component Analysis-based Anomaly Detection
- Time Series Anomaly Detection*

Classification

Two-class Classification
- Averaged Perceptron
- Bayes Point Machine
- Boosted Decision Tree
- Decision Forest
- Decision Jungle
- Logistic Regression
- Neural Network
- Support Vector Machine

Multi-class Classification
- Decision Forest
- Decision Jungle
- Logistic Regression
- Neural Network
- One-vs-all

Clustering
- K-means Clustering

Recommendation
- Matchbox Recommender

Regression
- Bayesian Linear Regression
- Boosted Decision Tree
- Decision Forest
- Fast Forest Quantile Regression
- Linear Regression
- Neural Network Regression
- Ordinal Regression
- Poisson Regression

Statistical Functions
- Descriptive Statistics
- Hypothesis Testing T-Test
- Linear Correlation
- Probability Function Evaluation

Text Analytics
- Feature Hashing
- Named Entity Recognition
- Vowpal Wabbit

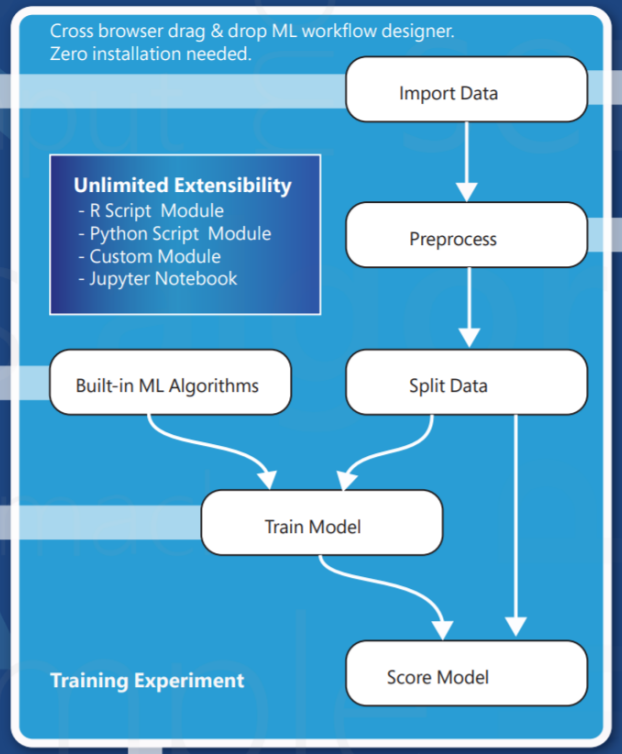
Computer Vision
- OpenCV Library

https://studio.azureml.net

Guest Access Workspace: Free trial access without logging in.
Free Workspace: Free persisted access, no Azure subscription needed.
Standard Workspace: Full access with SLA under an Azure subscription.

Data/Model Visualization
- Scatterplots
- Bar Charts
- Box plots
- Histogram
- R and Python Plotting Libraries
- REPL with Jupyter Notebook
- ROC, Precision/Recall, Lift
- Confusion Matrix
- Decision Tree*

Training
- Cross Validation
- Retraining
- Parameter Sweep



Data Source
- Azure Blob Storage
- Azure SQL DB
- Azure SQL DW*
- Azure Table
- Desktop Direct Upload
- Hadoop Hive Query
- Manual Data Entry
- OData Feed
- On-prem SQL Server*
- Web URL (HTTP)

Data Format
- ARFF
- CSV
- SVMLight
- TSV
- Excel
- ZIP

Data Preparation
- Clean Missing Data
- Clip Outliers
- Edit Metadata
- Feature Selection
- Filter
- Learning with Counts
- Normalize Data
- Partition and Sample
- Principal Component Analysis
- Quantize Data
- SQLite Transformation
- Synthetic Minority Oversampling Technique

Enterprise Grade Cloud Service
- SLA: 99.95% Guaranteed Up-time
- Azure AD Authentication
- Compute at Large Scale
- Multi-geo Availability
- Regulatory Compliance*

One-click Operationalization

Predictive Experiment

Make Prediction with Elastic APIs
- Request-Response Service (RRS)
- Batch Execution Service (BES)
- Retraining API

Community
- Gallery (http://gallery.azureml.net)
- Samples & Templates
- Workspace Sharing and Collaboration
- Live Chat & MSDN Forum Support

* Feature Coming Soon

Created by the Azure Machine Learning Team
Email: AzurePoster@microsoft.com
Download this poster: http://aka.ms/MLStudioOverview

Microsoft

DEMO

ML STUDIO