

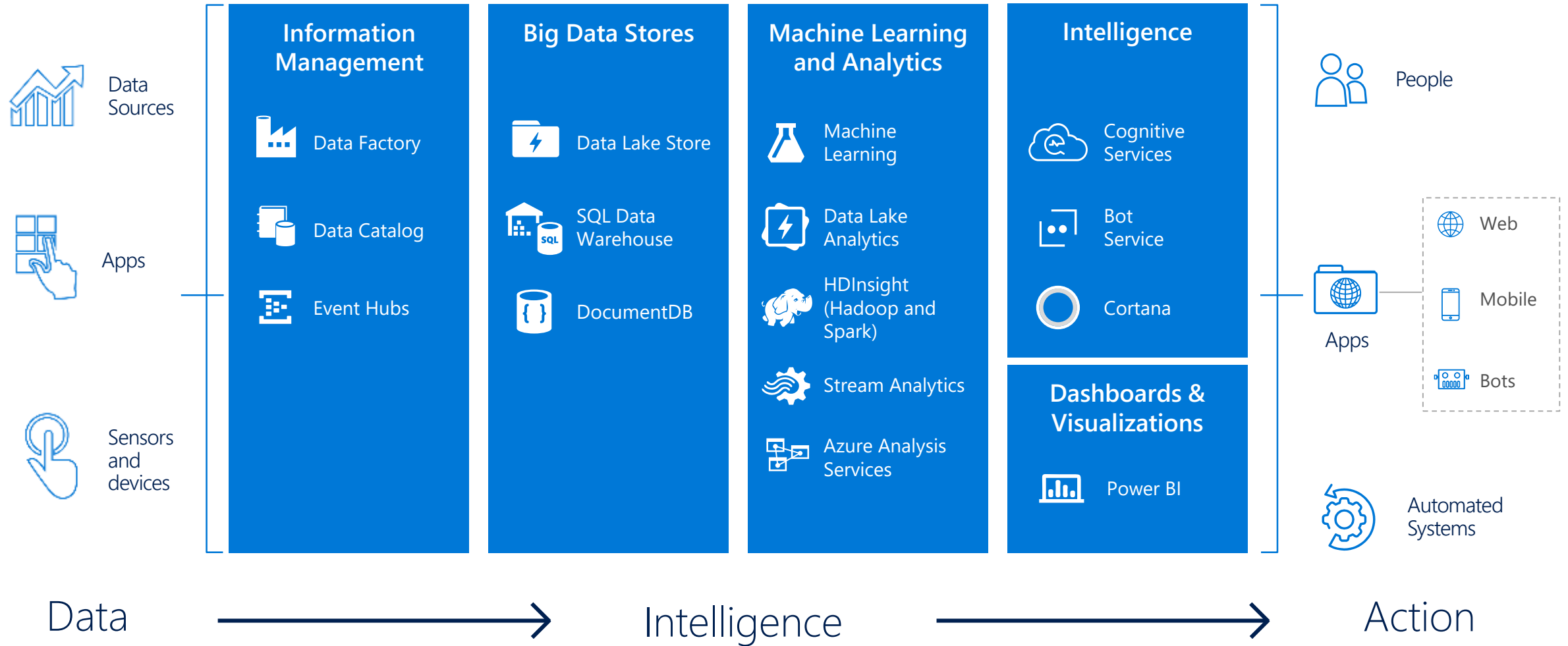
Einführung in Azure Machine Learning mit R Integration

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Agenda

- Overview Azure Machine Learning
- Demo: Using R Scripts in Azure Machine Learning Studio
- Demo: Operationalising R with Azure Machine Learning Studio

Easily turn data into intelligent action



*“ I need our systems to think.
I need them to learn and
I need them to present issues
and problems and anomalies
to the employees, to the managers.”*

Adam Coffey

President and CEO
WASH Laundry Systems

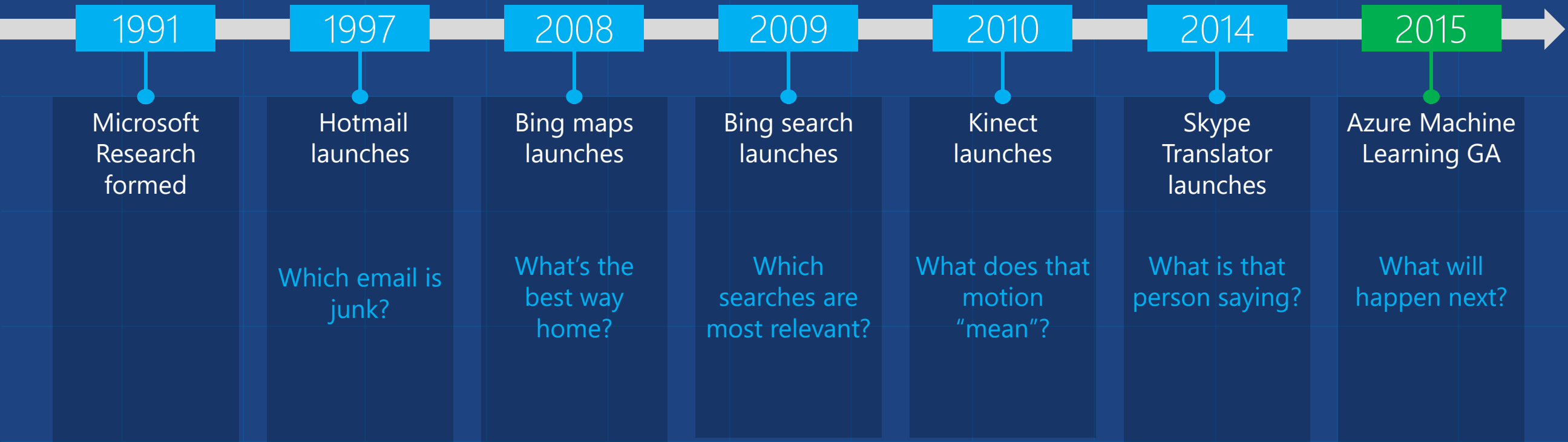
What is Machine Learning?

Computing systems
that become smarter
with experience

“Experience” =
past data + human input

Microsoft & Machine Learning

Answering questions with experience



Machine learning is pervasive throughout Microsoft products.

“The main benefit we have experienced is that everything is in one place. Data is stored in the same place that hosts computations on the data.”

Corey Coscioni
West Monroe

How Are We Different?

Enable custom predictive analytics solutions at the speed of the market

The old Machine Learning landscape

No improvement in generations

Expensive

Huge set-up costs of tools, expertise, and compute/storage capacity

Siloed data

Siloed and cumbersome data management restricts access to data

Disconnected tools

Complex and fragmented tools limit participation in exploring data and building models

Deployment complexity

Many models never achieve business value due to difficulties with deploying to production

Differentiation



Accessibility

Model Your Way

[Data Scientist]

All Skill Levels
Business-tested Algorithms
R & Python

Deploy in Minutes

[Data Scientist, IT & Developers]

One Click Deployment
Manage via Cloud Portal
Model accessed as a Web Service

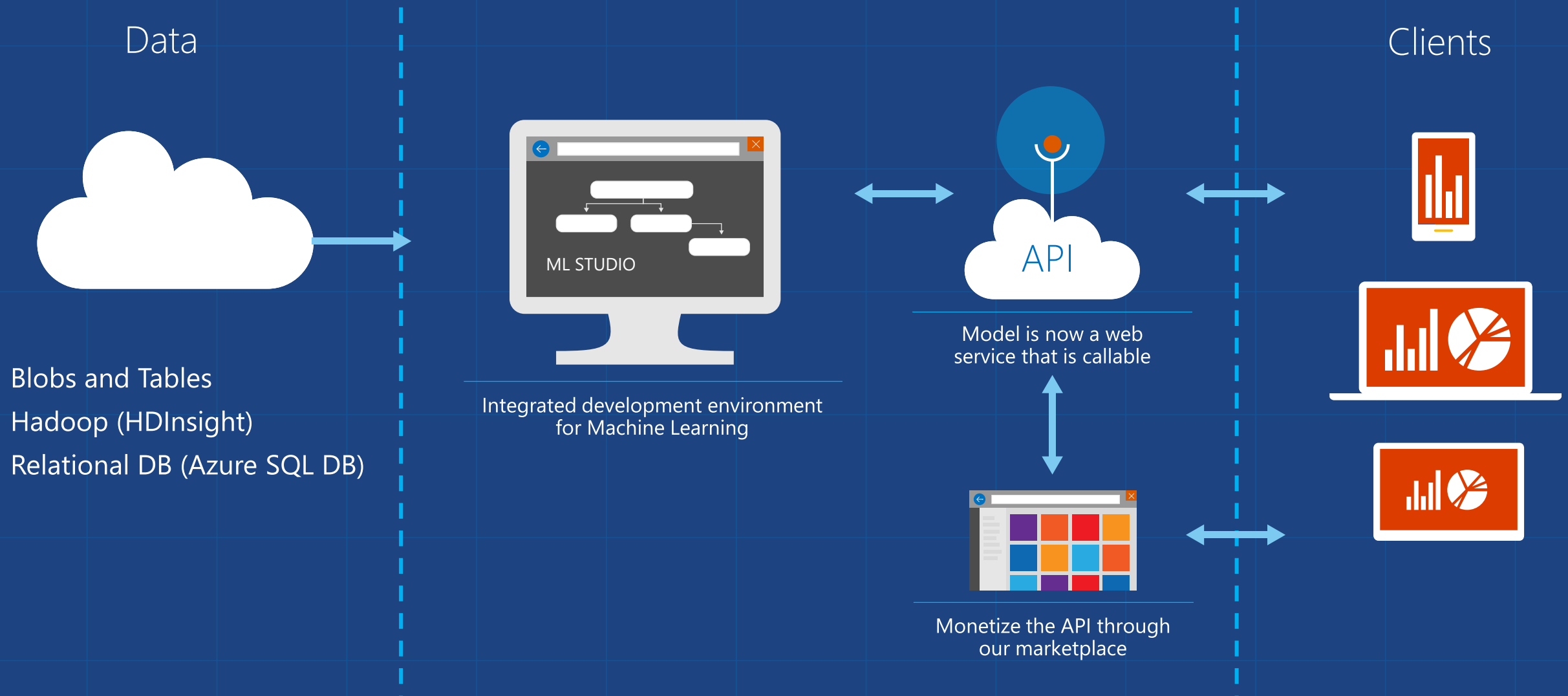
Expand your Reach

[Ecosystem & Developers]

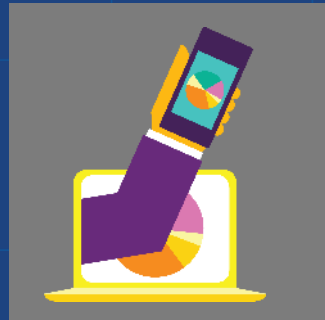
Product Gallery
Azure Marketplace
The Data Science "Inside"

Azure Machine Learning Service

Data -> Predictive model -> Operational web API in minutes



What can Azure ML do for you...?



Telemetry data analysis



Buyer propensity models



Social network analysis



Predictive maintenance



Web app optimization



Churn analysis



Natural resource exploration



Weather forecasting



Healthcare outcomes



Fraud detection



Life sciences research



Targeted advertising



Network intrusion detection



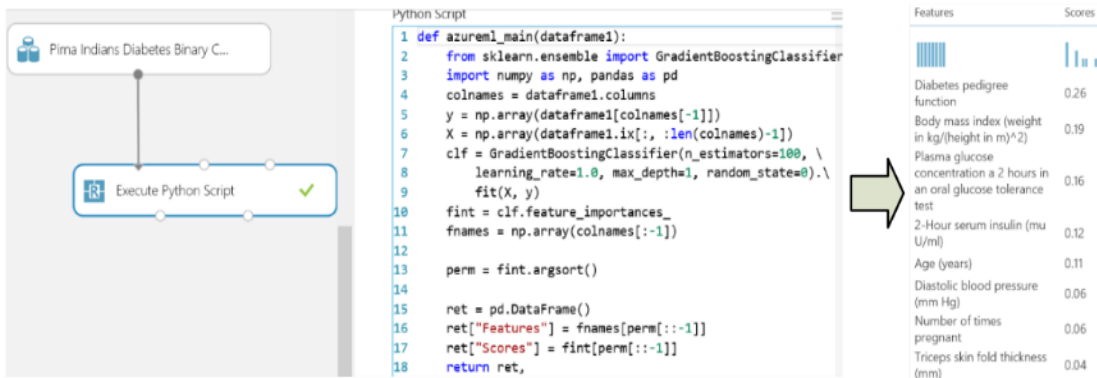
Smart meter monitoring



Model Your Way: Open source/our source

Script with R, SQLite or Python

CPython 2.7 support from inside AML Studio
numpy/scipy/panda/scikit-learn/etc.
Anaconda distro pre-installed



The screenshot shows the AML Studio interface. On the left, a workflow diagram includes a 'Pima Indians Diabetes Binary C...' node and an 'Execute Python Script' node with a green checkmark. The main area displays a Python script:

```
1 def azureml_main(dataframe1):
2     from sklearn.ensemble import GradientBoostingClassifier
3     import numpy as np, pandas as pd
4     colnames = dataframe1.columns
5     y = np.array(dataframe1[colnames[-1]])
6     X = np.array(dataframe1.ix[:, :len(colnames)-1])
7     clf = GradientBoostingClassifier(n_estimators=100, \
8         learning_rate=1.0, max_depth=1, random_state=0).\
9         fit(X, y)
10    fint = clf.feature_importances_
11    fnames = np.array(colnames[:-1])
12
13    perm = fint.argsort()
14
15    ret = pd.DataFrame()
16    ret["Features"] = fnames[perm[::-1]]
17    ret["Scores"] = fint[perm[::-1]]
18    return ret,
```

On the right, a 'Features' table shows the output of the script:

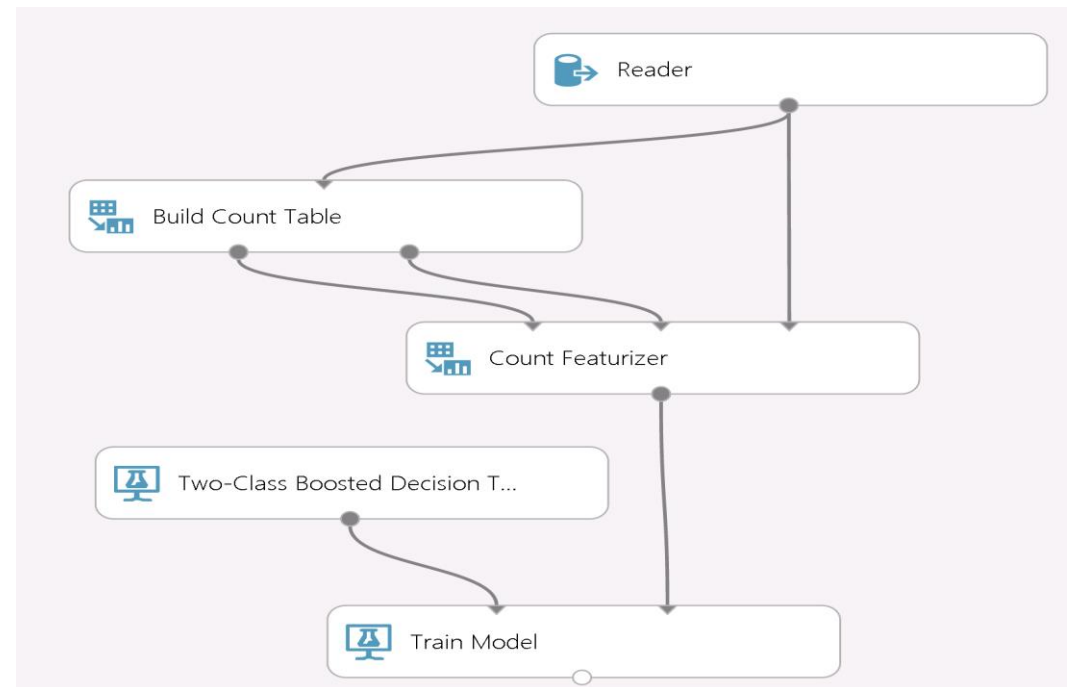
Features	Scores
Diabetes pedigree function	0.26
Body mass index (weight in kg/height in m) ²	0.19
Plasma glucose concentration a 2 hours in an oral glucose tolerance test	0.16
2-Hour serum insulin (mu U/ml)	0.12
Age (years)	0.11
Diastolic blood pressure (mm Hg)	0.06
Number of times pregnant	0.06
Triceps skin fold thickness (mm)	0.04

Python client library

Analyze data using Python and its libraries
Use IPython, PTVS, Eclipse to edit/debug

Big learning with counts

TB scale datasets
Modular: tune/monitor/replace in isolation
Monitorable and debuggable



Deploy in Minutes

One click to production

Publish as a **Web Service** or to **Gallery**

Continuous updates to streamline process

Stay tuned to our blog for more

The screenshot displays the Azure Machine Learning Studio interface. At the top, there are navigation tabs for 'Home', 'Studio', and 'Gallery'. Below this, there are two tabs: 'Training experiment' and 'Scoring experiment'. The main workspace shows a workflow for a 'Binary Classification: Income Prediction [Scoring Exp.]' which is marked as 'Finished running'. The workflow consists of several steps: 'Web service input', 'Adult Census Income Binary C...', 'Clean Missing Data', and 'Project Columns'. At the bottom of the interface, there is a toolbar with various actions. The 'PUBLISH WEB SERVICE' and 'PUBLISH TO GALLERY' buttons are highlighted with a blue box.

Expand your Reach

New in-product Gallery

Discover what others have built

Learn by dropping these into your workspace

Share your work with others

The screenshot shows the Azure Machine Learning Gallery interface. At the top, there is a header with the text 'Discover. Learn. Share.' and a 'Learn more' button. Below this, there is a featured experiment titled 'Bicycle demand forecasting from O'Reilly Media webcast and report; Data Science in the Cloud wit...'. This experiment includes a video thumbnail of an owl and a description: 'This experiment is developed in full in the O'Reilly Media report and webcast Data Science in the Cloud with Azure Machine Learning and R. by Stephen Elston.' Below the featured experiment, there is a section for 'Trending experiments' which includes several cards for different experiments: 'Predict Wine Quality - Classification', 'Recession Prediction', 'Sample 1: Download dataset from UCI: Adult 2 class dataset', 'Predict the remaining useful life of an aircraft engine', and 'Seismic Activity Predictor'.

JJ Food Service

Getting the right products to the right places

Objectives

Build a platform that could anticipate customer orders, recommend additional products, and, above all, cut the time it takes customers to place orders.

Tactics

Used Azure Machine Learning to analyze real-time and historical customer data and create predictive shopping lists that provide product recommendations based on cart contents.

Results

- Accurate predictions of customers' needs
- IoT-enabled cab sensors
- Arrival of foods in peak condition
- Increase in basket value through upsell with decreased checkout times

“You have to keep asking yourself what is possible, what we can do next. With Azure Machine Learning, the wow factor is huge. Customers are amazed that we can predict so accurately what they need.”

Mushtaque Ahmed,
Chief Operating Officer



Arçelik A.Ş.

Creating a crystal ball for appliance manufacturing

Objectives

Replace an outdated forecasting system with a new solution to improve accuracy and ensure the right spare parts are available anytime and anywhere they're needed.

Tactics

Used Azure Machine Learning to test algorithms and identify the most accurate ones to forecast the needs for spare parts 12 months in advance.

Results

- Forecasting accuracy increased up to 80%
- Inventory turnover expected to climb by 10%
- Increased forecasts from 100,000 to all 350,000 spare parts SKUs

“With more spare parts in our warehouse, we needed a way to respond to customer needs quickly. We reached that goal by using Azure Machine Learning to increase forecast accuracy.”

Burcu Aksoy,
Spare Part Team Leader, Customer Care





Check out finished APIs and solutions or put your own on the Machine Learning marketplace at datamarket.azure.com



Find videos, tutorials on [Documentation off azure.com/ml](https://azure.com/ml)
Stay tuned to our blog <https://aka.ms/mlblog>

Get started for free with only a Microsoft Account ID
azure.com/ml

Azure verstehen = Azure nutzen können

- **ASI = Azure Skills Initiative**
- **Selbstlernen via engl. MOOC Video Learning**
- **Österreich als Pilotprojekt in Europa**
 - www.theLLPA.com/azure/at
- **ETC Learning Innovation**
 - Invest von 0,- Euro bis 979,- Euro möglich
 - ASI + dt. Q&A Services + dt. (v)ILT Exam-Prep Workshop
 - Modular buchbar – ganz nach Ihrem Geschmack
- **Voranmeldung / Beratung: www.etc.at/Azure-Skills-Initiative**



