Microsoft

Mettre en place des applications intelligentes

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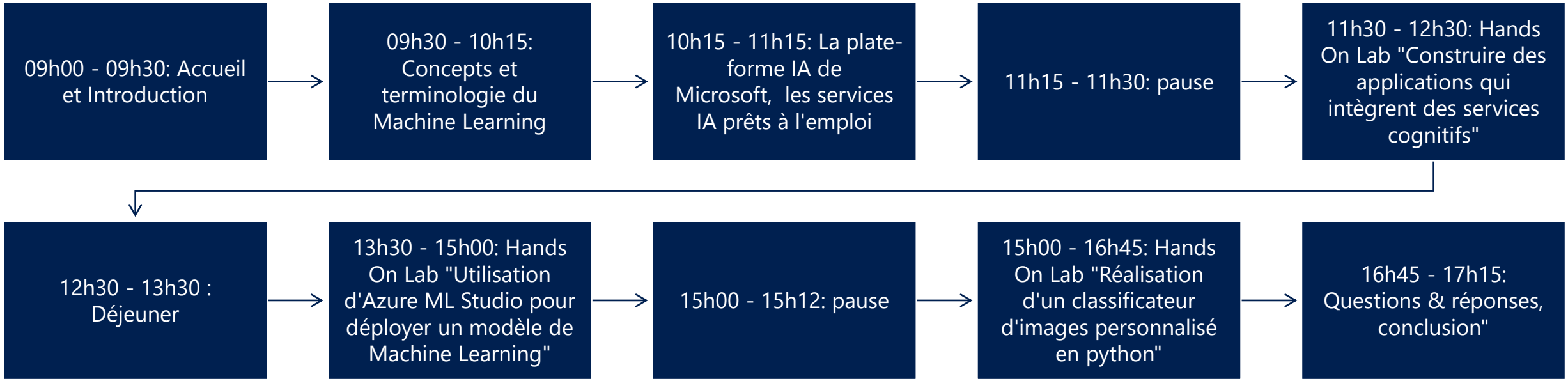
Agenda


09h00 - 09h30: Accueil et Introduction
09h30 - 10h15: Concepts et terminologie du Machine Learning
10h15 - 11h15: La plate-forme IA de Microsoft, les services IA prêts à l'emploi
11h15 - 11h30: pause
11h30 - 12h30: Hands On Lab "Construire des applications qui intègrent des services cognitifs"
12h30 - 13h30 : Déjeuner
13h30 - 15h00: Hands On Lab "Utilisation d'Azure ML Studio pour déployer un modèle de Machine Learning"
15h00 - 15h12: pause
15h00 - 16h45: Hands On Lab "Réalisation d'un classificateur d'images personnalisé en python"
16h45 - 17h15: Questions & réponses, conclusion"

Concepts et terminologie du Machine Learning

Machine Learning Concepts

what is a model?

- a model is an abstraction, or a simplification
- usually (but not always), a model is used to answer a question
- "all models are wrong, but some are useful"
- a useful model simplifies a complex concept or relationship without over-simplifying it
- a useless model is ethier too simplistic or too complex

Machine Learning Concepts

what is machine learning?

- field of study that gives computers the ability to learn models without being explicitly programmed, by using data (experience)
- the *problems* ML algorithms try to solve are usually
  - prediction (supervised learning) and
  - finding structure in data (unsupervised learning)

Machine Learning Concepts

machine learning (simplified)

- I have data, and I know that I can unearth relationships between the different data points
- I'm too lazy to do it, so I want to let an algorithm learn from the data and give me models
- I can then decide which model(s) are "useful", in other words
  - have **high accuracy** (can predict well)
  - are **easy to explain** (if we care about explainability)
  - are **actionable** (predictions come in a timely manner and can be acted on)

Machine Learning Concepts

Age	Income	Education	Gender	Housing
61	$65,000	Moderate	F	Own
42	$72,000	High	F	Rent
18	$25,000	Moderate	M	Other
22	$36,000	Low	M	Rent
31	$52,000	High	M	?

Training data

What we know

"features", "attributes"

Thing to predict

"class", "label"

Machine Learning Concepts

predictive modeling (supervised learning)

the choice of a model affects (and is affected by)

- whether the model meets the business goal
- how much pre-processing the model needs
- how accurate the model is
- how explainable the model is
- how fast the model is (in making predictions)
- how scalable the model is (building and predicting)

Machine Learning Concepts

the machine learning community calls it	statisticians call it
learning algorithm (or model)	model
trained model	fitted model
supervised learning	prediction problem
unsupervised learning	data-mining or pattern recognition
features or attributes	explanatory or independent variables
target or labels	response or dependent variables
training	fitting
scoring	predicting

Machine Learning Concepts

Build

Configure your model: units, layers, functions, trainers
Each usually has its own parameters

Train

Use your *training* dataset to build the model
Often >70% of available dataset

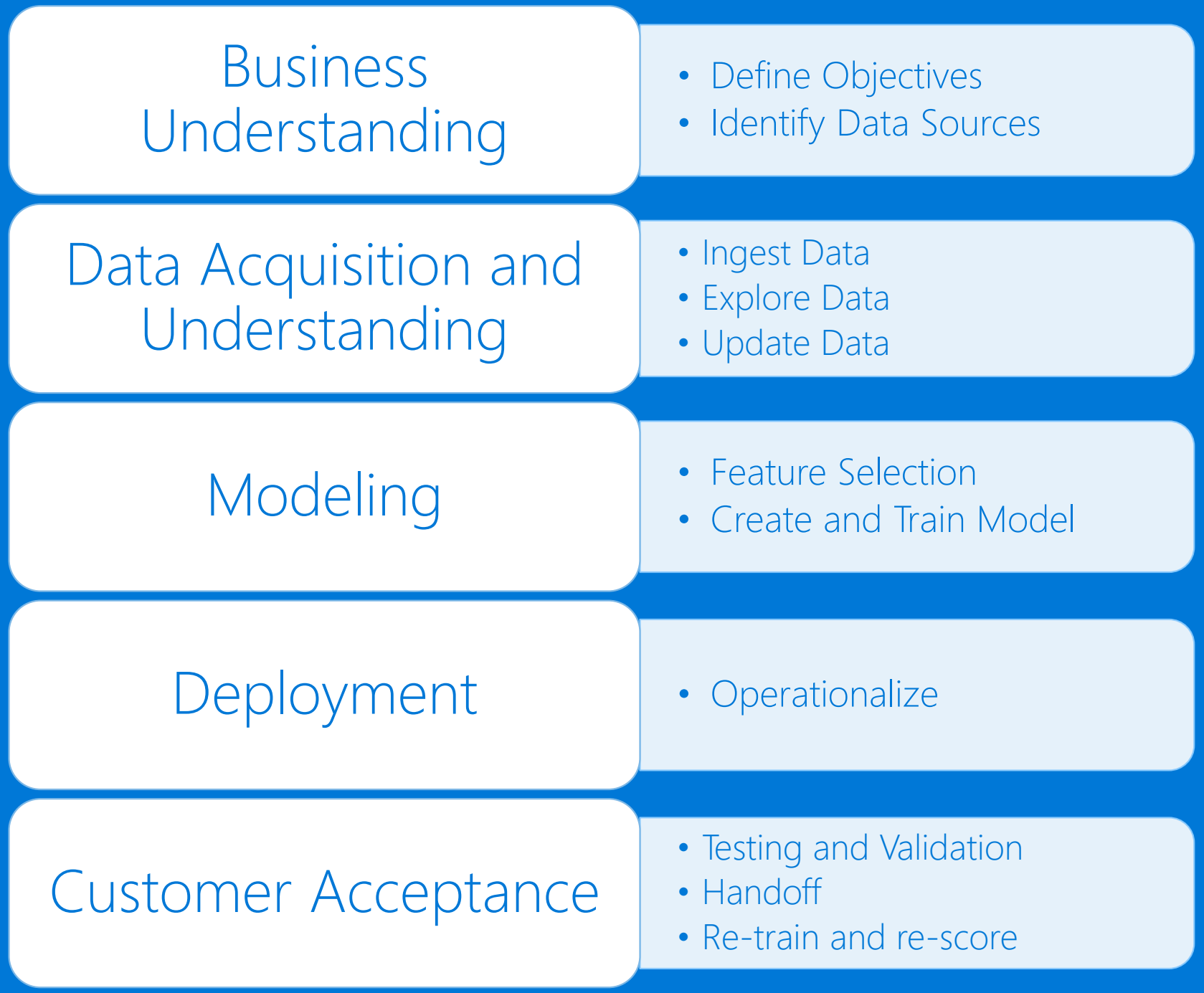
Test

Use your *test* dataset to validate the model
This dataset hasn't been seen by the model yet

Predict

If the model is good enough, use it in production
to make predictions on unseen data

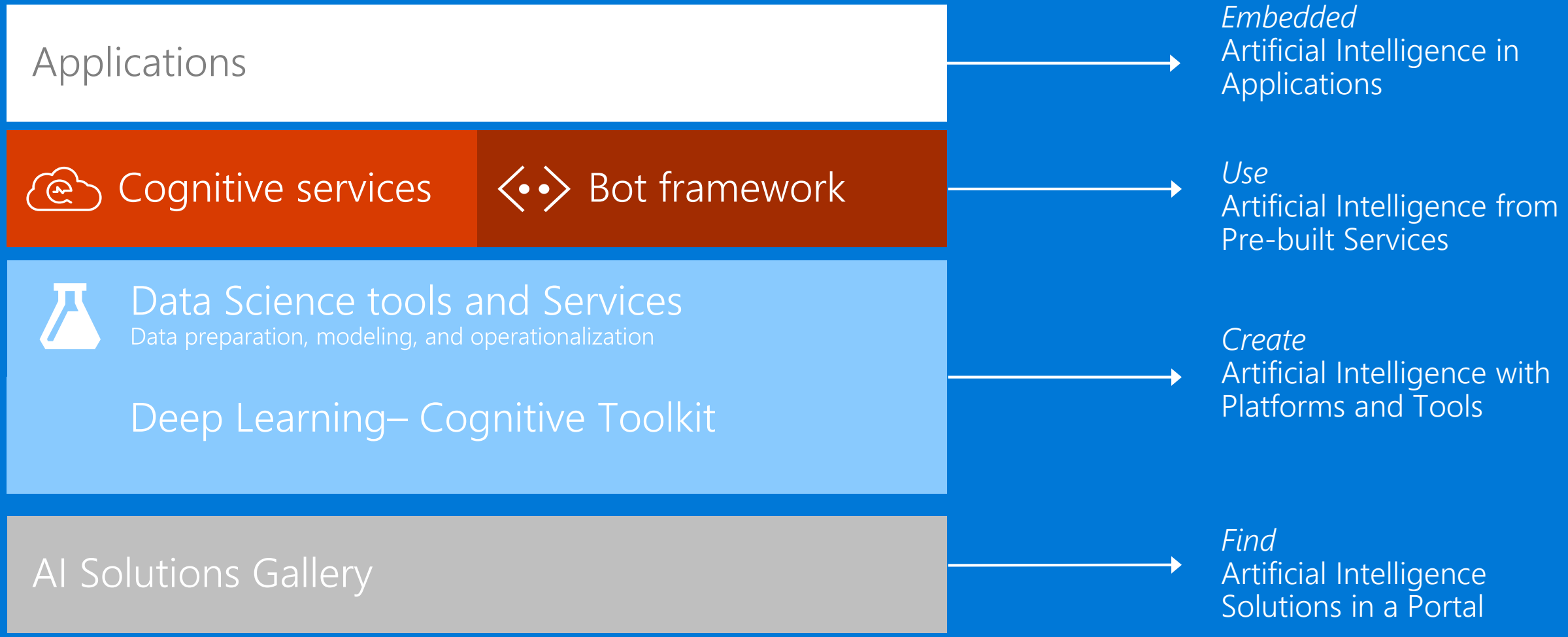
The Team Data Science Process



Microsoft AI Platform

Breakthroughs Enabling AI

The Microsoft AI Landscape



Microsoft 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...)

Tools

Visual Studio Tools for AI

Boost productivity with code-centric AI development and Azure integration.

Azure Machine Learning Workbench

Full lifecycle support for AI and data wrangling productivity.

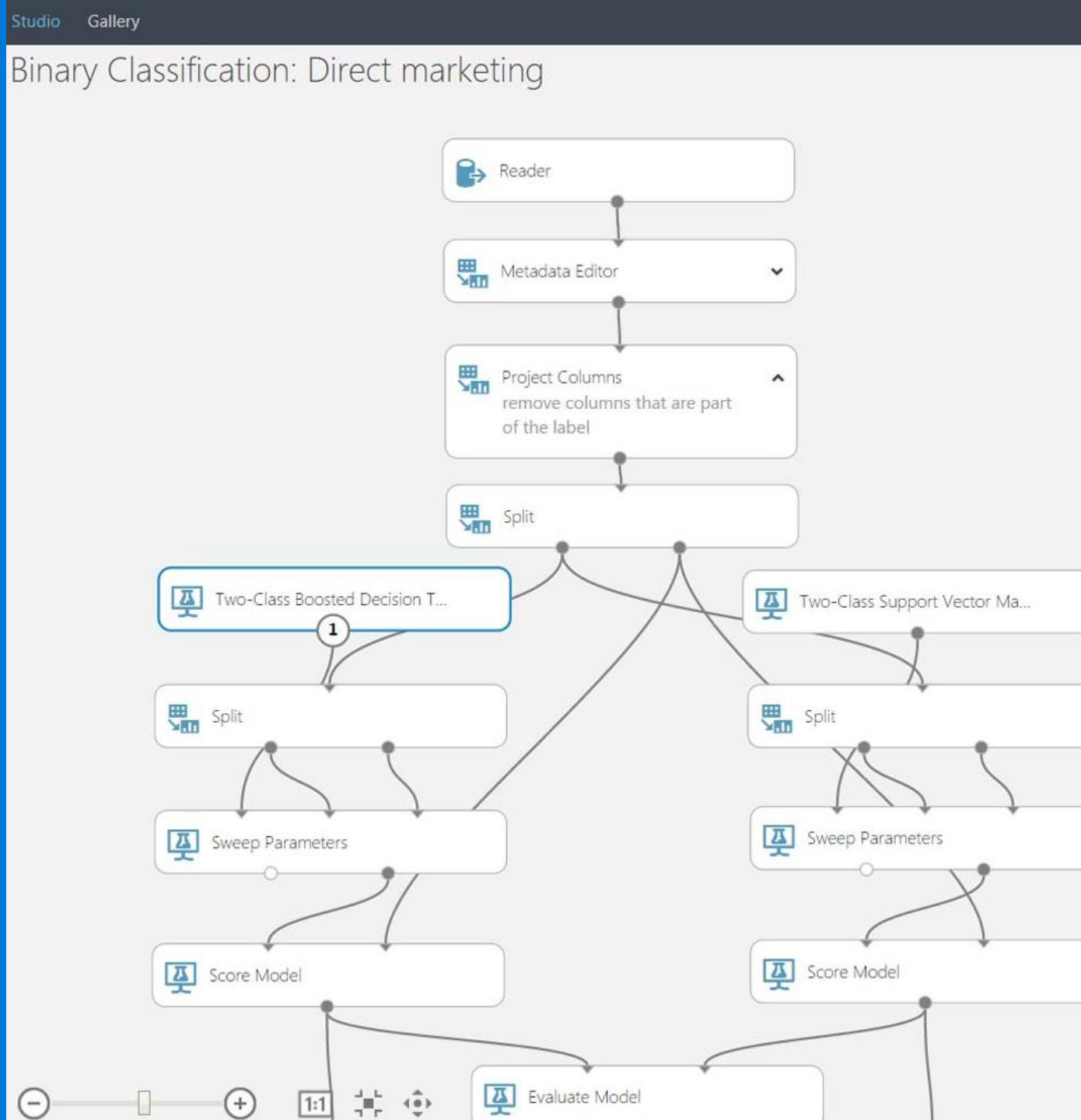
Azure Machine Learning Studio

Drag and drop machine learning development for any skillset.

Open deep learning framework support

Full support for Cognitive Toolkit, TensorFlow, Caffee and others.

Open standard for deep learning (ONNX).



Azure AI services

Bot Service

Accelerated development for conversational AI.

Cognitive Services

Vision, speech, language, knowledge and search pre-trained services customizable for any scenario.

Azure Machine Learning

Experimentation and management services for creating AI models with productivity.

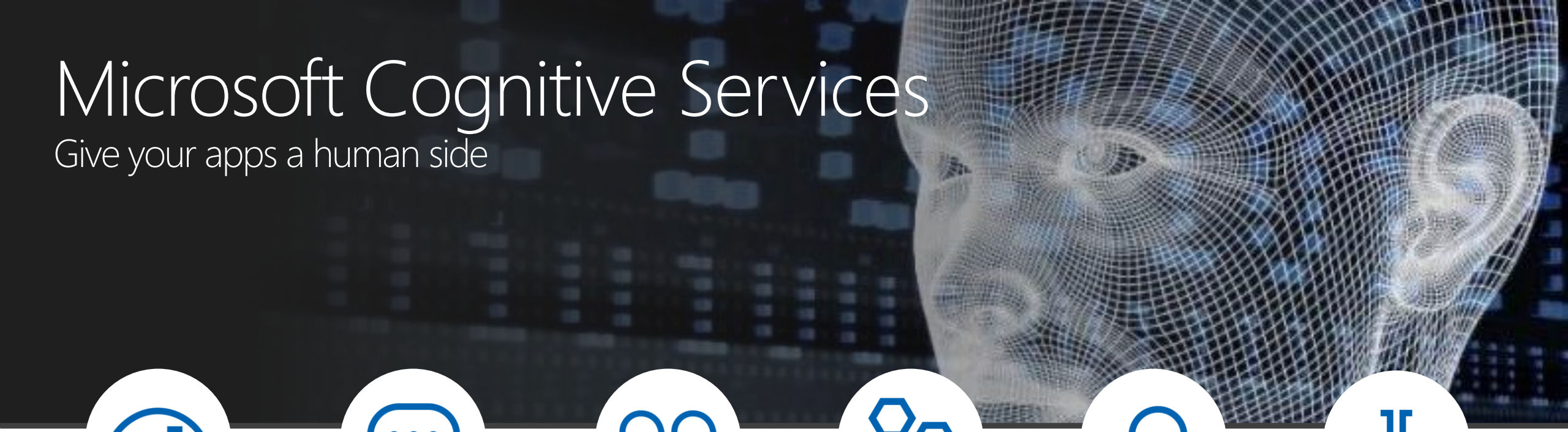
Microsoft

Microsoft Cognitive Services

Amplifying human ingenuity

Microsoft Cognitive Services

Give your apps a human side



Vision

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

Speech

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

Language

Process text and learn how to recognize what users want

Knowledge

Map complex information and data in order to solve specific tasks

Search

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

Labs

An early look at emerging Cognitive Services technologies: discover, try, and give feedback on new technologies before general availability

Microsoft Cognitive Services updates

Vision

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

Speech

- 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

Language

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

Knowledge

- QnA Maker
- Custom Decision

Search

- 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

Labs

- Project Gesture
- Project Local Insights
- Project Academic Knowledge
- Project Entity Linking
- Project Knowledge Exploration
- Project Event Tracking
- Project Answer Search
- Project URL Preview
- Project Anomaly Finder
- Project Conversation Learner
- Project Personality Chat

Cognitive Services capabilities

Infuse your apps, websites, and bots with human-like intelligence

Vision

Object, scene, and activity detection

Face recognition and identification

Celebrity and landmark recognition

Emotion recognition

Text and handwriting recognition (OCR)

Video metadata, audio, and keyframe extraction and analysis

Explicit or offensive content moderation

Custom image recognition

Speech

Speech transcription (Speech-to-text)

Speech Synthesis (Text-to-speech)

Real-time speech translation

Speaker identification and verification

Custom Speech models for transcription and translation

Custom voice

Language

Language detection

Text sentiment analysis

Key phrase extraction

Entity recognition

Spell checking

Explicit or offensive text content moderation, PII detection

Text translation

Customizable text translation

Contextual language understanding

Knowledge

Q&A extraction from unstructured text

Knowledge base creation from collections of Q&As

Semantic matching for knowledge bases

Customizable content personalization learning

Search

Ad-free web, news, image, and video search results

Trends for video, news

Image identification, classification and knowledge extraction

Identification of similar images and products

Named entity recognition and classification

Knowledge acquisition for named entities

Search query autosuggest

Ad-free custom search engine creation

A variety of real-world applications

Vision

What is in the image or video?

Intelligent Image insights

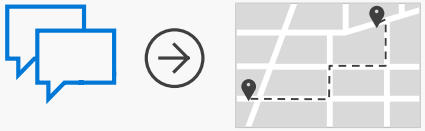
Category	People; 5 faces
Adult/Racy?	False/False
Dominant colors	■ ■ ■ ■
Accent color	

Computer Vision

Speech

Give me directions to the nearest local branch

Speech to text



- Convert spoken audio to text
- Convert text to spoken audio
- Extract intent of user

Speech Service

Language

Play today's customer call recording

Natural Language Processing

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

Now Playing

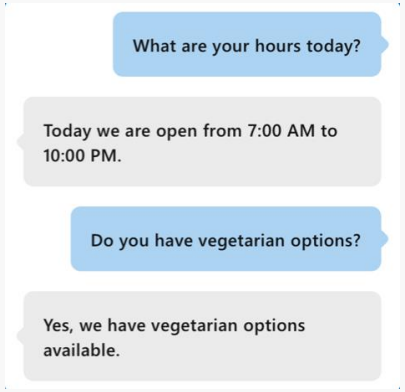
11/29/2016 Customer Call

Language Understanding

Knowledge

QnA Pair of this site?

Automatic extraction of questions and answers

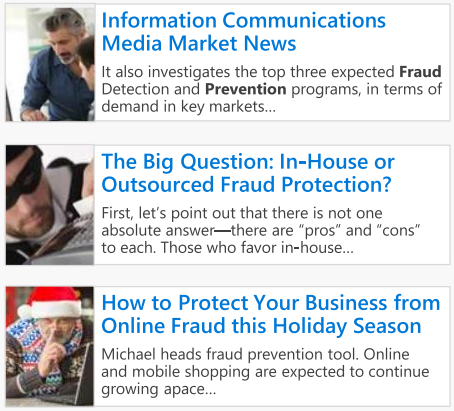


QnA Maker

Search

Search for 'fraud prevention'

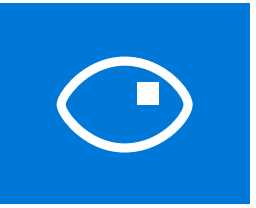
Intelligent web search



Bing News Search

Vision

Image-processing algorithms to smartly identify, caption, and moderate your pictures



Vision

Computer Vision

Distill actionable information from images

Video Indexer

Process and extract smart insights from videos

Face

Detect, identify, analyze, organize, tag faces in photos, and even recognize emotions

Content Moderator

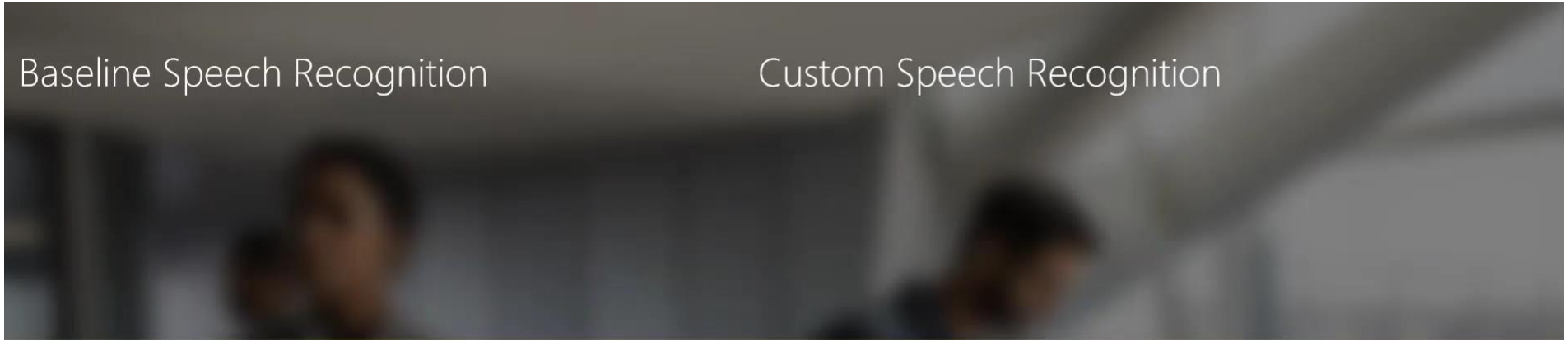
Machine-assisted moderation of text and images, augmented with human review tools

Custom Vision

Customizable web service that learns to recognize specific content in imagery

Speech

Convert spoken audio into text, use voice for verification, or add speaker recognition to your app



Speech

Speaker Recognition

Use speech to identify and verify individual speakers

Translator Speech

Easily conduct real-time speech translation with a simple REST API call

Custom Speech

Overcome speech recognition barriers like speaking style, background noise, and vocabulary

Unified Speech service

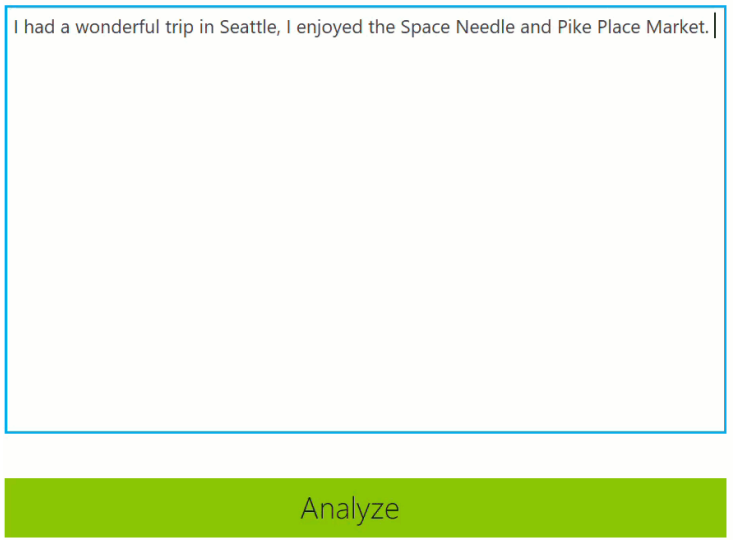
Unified speech service for **speech-to-text** (general and custom speech models), **text-to-speech** (general and custom voice models) and **speech translation** (general and custom translator)

Bing Speech

Convert speech to text and back again to understand user intent

Language

Allow your apps to process natural language with pre-built scripts, evaluate sentiment and learn how to recognize what users want



Language

Text Analytics

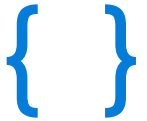
Detect sentiment, key phrases, language, and extract top entities from your text

Bing Spell Check

Detect and correct spelling mistakes within your app

Translator Text

Easily perform speech and text translation

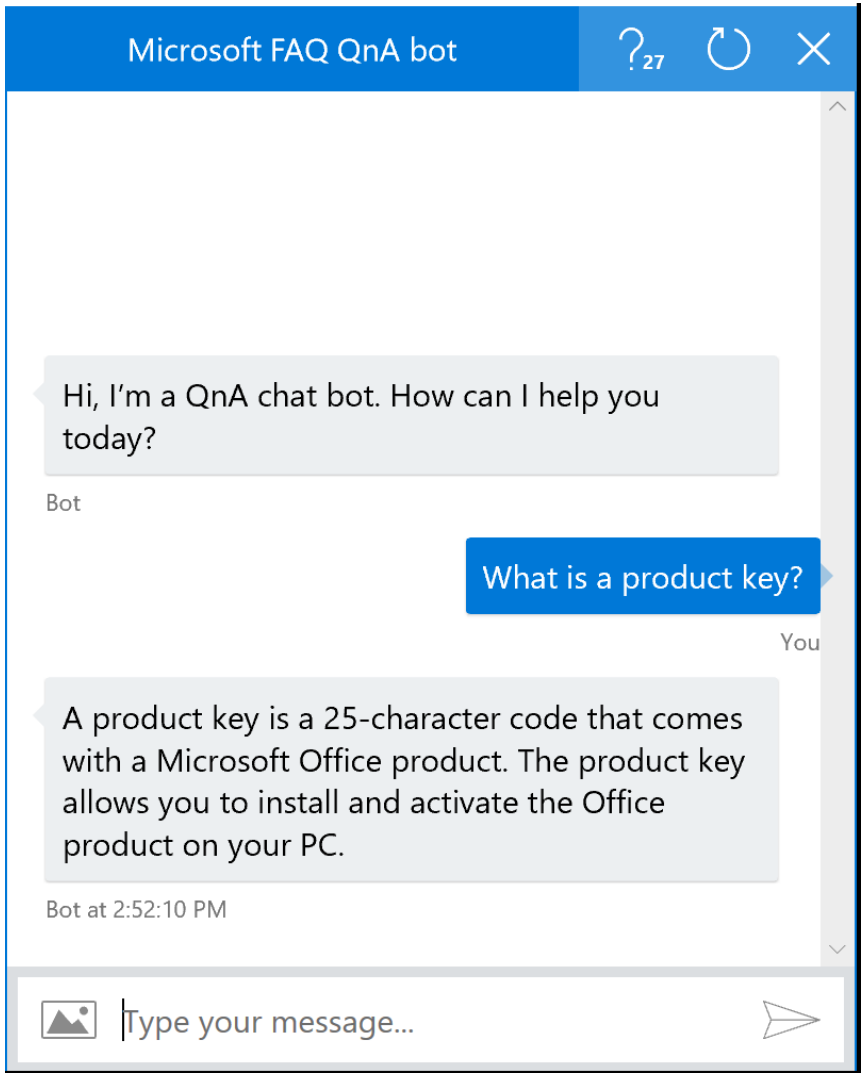


Language Understanding

Teach your apps to understand commands from your users

Knowledge

Map complex information and data in order to solve specific tasks



Knowledge

Custom Decision

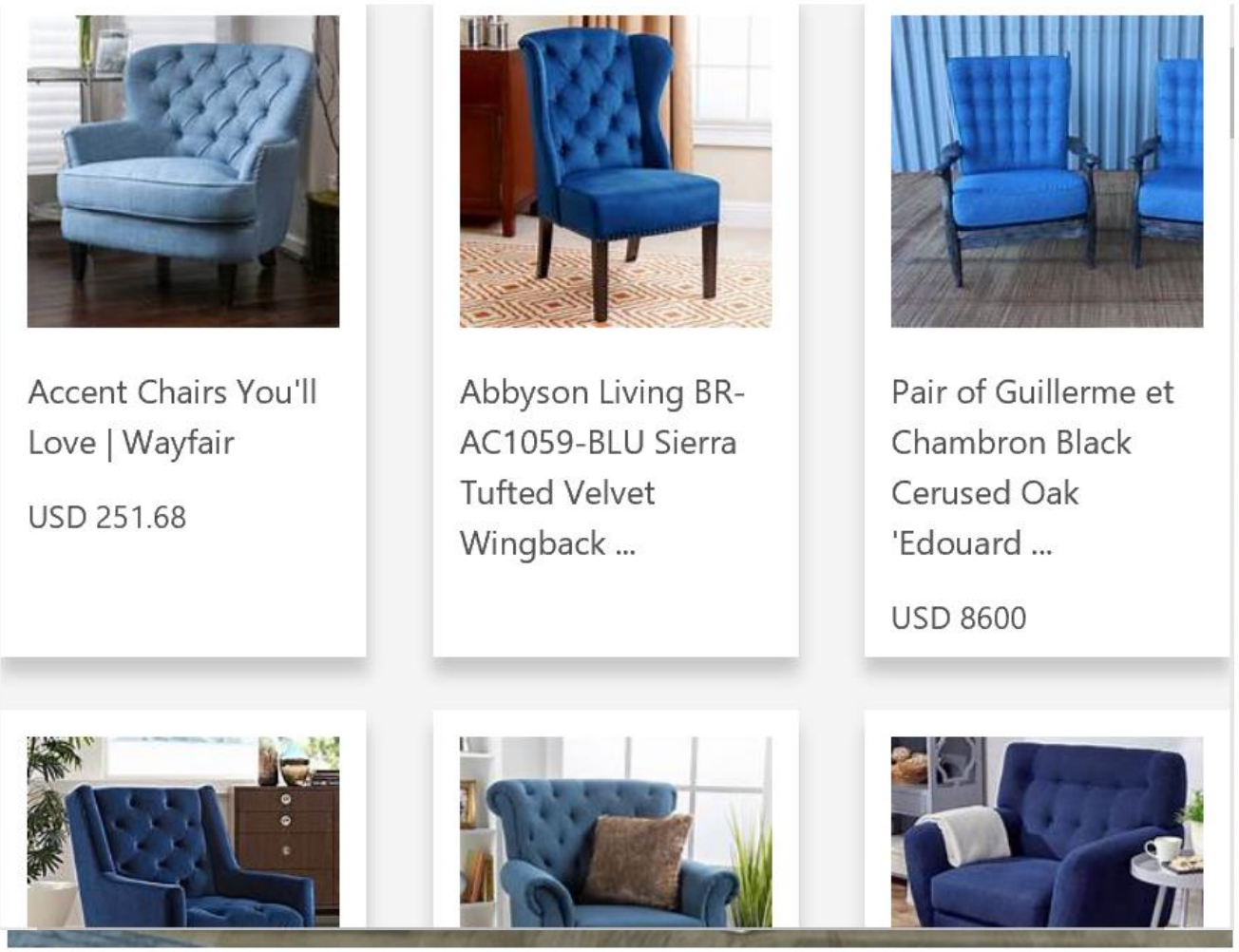
Create custom experiences with adaptive, contextual decision-making

QnA Maker

Distill information into conversational, easy-to-navigate answers

Search

Add Bing Search APIs to your apps and harness the ability to comb billions of webpages, images, videos, and news with a single API call



Search

Bing Search

Web Search
Image Search
News Search
Video Search

Bing Visual Search

Get rich insights to help build compelling image applications on the device of your choice

Bing Entity Search

Enrich user experiences with contextual entity search results

Bing Autosuggest

Give your app intelligent autosuggest options for searches

Bing Custom Search

Create a highly-customized web search experience

Bing Statistics add-in

Get powerful Bing API usage insights in an easy-to-use add-in

Microsoft Cognitive Services Labs

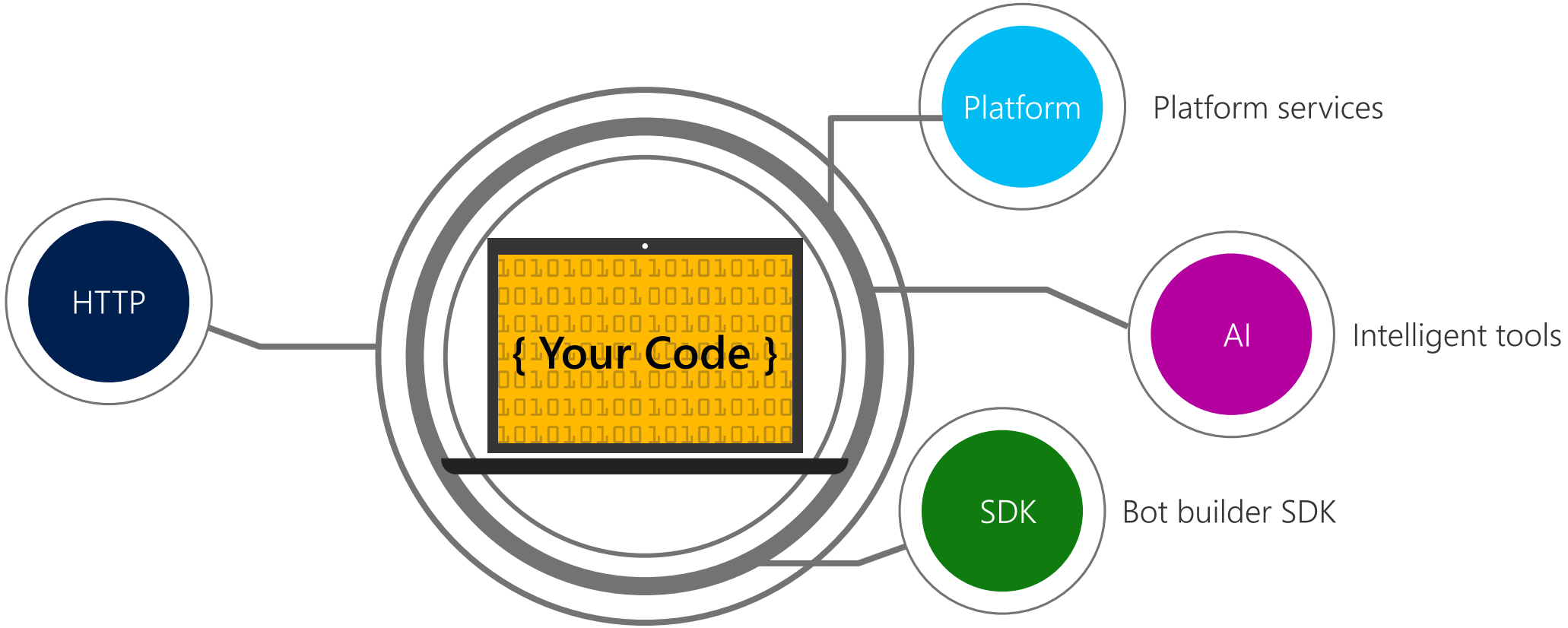
Labs provides developers with an early look at emerging Cognitive Services technologies

Early adopters who do not need market-ready technology can discover, try and provide feedback on new Cognitive Services technologies before they are generally available

Labs are not Azure services

Bot Service

What is a bot?



REST endpoint
Direct Line Protocol

Conversational and business logic

Canvas aware

Context sensitive

What is the bot framework?

What?

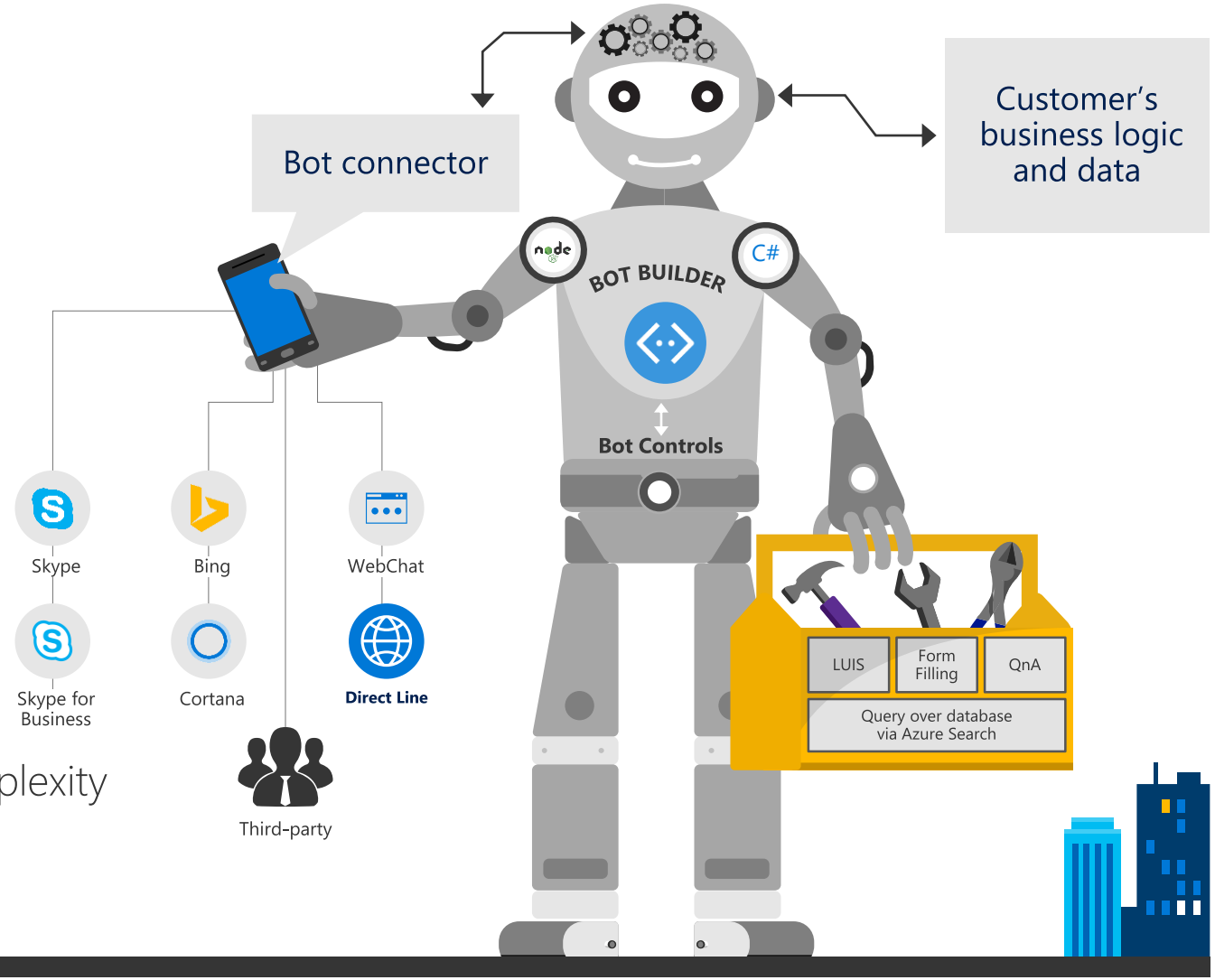
- Tools for building REST websites
- Services to enrich
- Mechanisms for receive events
- Data to debug and tools to analyze

Why?

- Implements standard protocols
- Modeling conversations is hard; tools help!
- UI across multiple canvases is hard; cards rock!
- Language understanding is hard
- Common and well understood patterns

Goals

- Start simple; add complexity; no dead-ends
- Bot adapts to the user, based on context
- Composable and intelligent controls to manage complexity



Bot SDK

- V3 Stable
- V4 Pre release
- GA this week

Bots Integration with Cognitive Services

Adding services to bots

- Examples
  - QnA Maker
  - LUIS
  - Azure Search
  - Computer Vision

Why Microsoft Cognitive Services?

Easy

Roll your own with REST APIs

Simple to add: just a few lines of code required

Get a key, Build

Flexible

Integrate into the language and platform of your choice

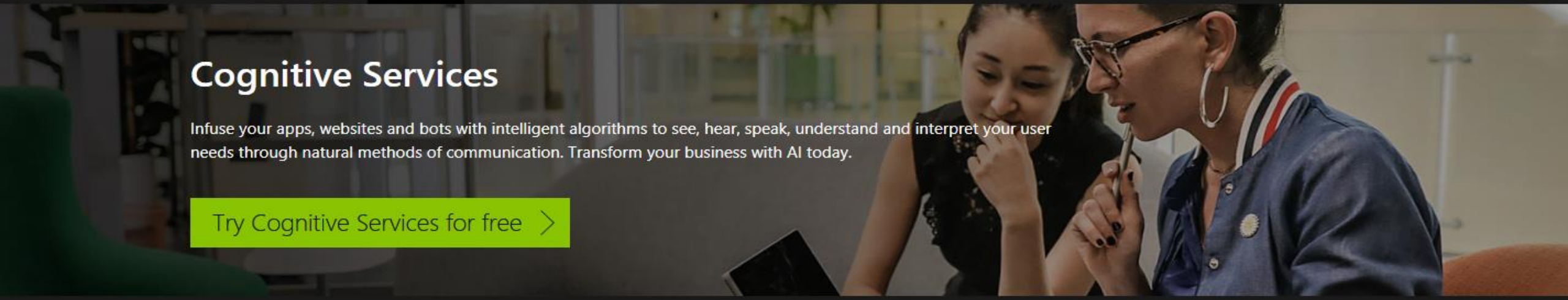
Breadth of offerings helps you find the right for your app

Bring your own data for your custom experience

Tested

Built by experts in their field from Microsoft Research, Bing, and Azure Machine Learning

Quality documentation, sample code, and community support



Cognitive Services

Infuse your apps, websites and bots with intelligent algorithms to see, hear, speak, understand and interpret your user needs through natural methods of communication. Transform your business with AI today.

Try Cognitive Services for free

Explore Cognitive Services: Directory Pricing Documentation

Use AI to solve business problems

Vision

Image-processing algorithms to smartly identify, caption and moderate your pictures.

Speech

Convert spoken audio into text, use voice for verification, or add speaker recognition to your app.

Knowledge

Map complex information and data in order to solve tasks such as intelligent recommendations and semantic search.

Search

Add Bing Search APIs to your apps and harness the ability to comb billions of webpages, images, videos, and news with a single API call.

Language

Allow your apps to process natural language with pre-built scripts, evaluate sentiment and learn how to recognize what users want.

Hands On Lab

Construire des applications qui intègrent des services cognitifs

Lab 01

Le but de ce lab est de découvrir les services cognitifs, et de voir comment ont peut les intégrer aux applications

Suivre les instructions du document Lab1-Cognitives Services Demo

Hands On Lab

Utilisation d'Azure ML Studio pour créer et déployer un modèle de Machine Learning

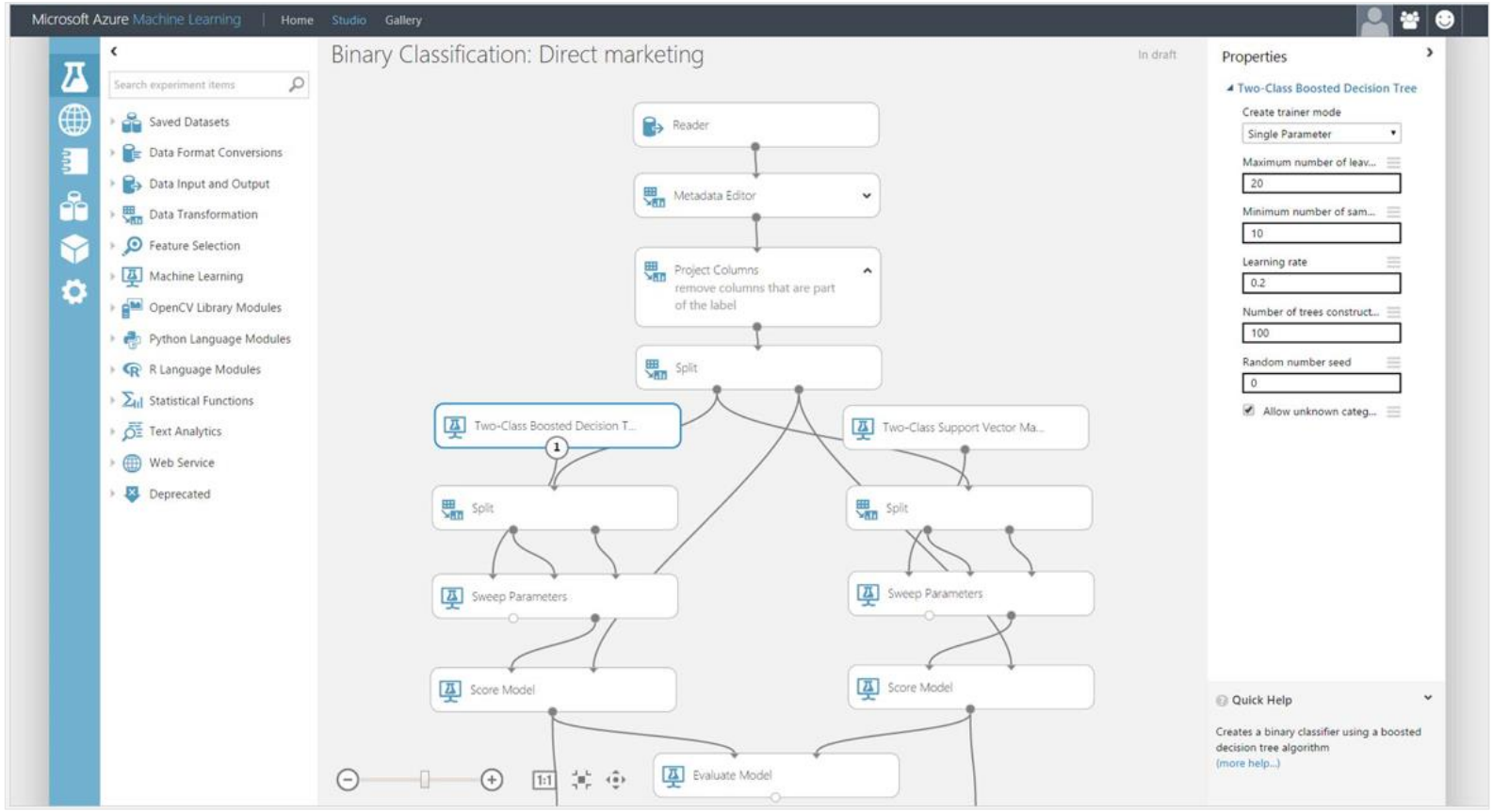
Azure Machine Learning Studio

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



Lab 02

Suivre les instructions des documents presents dans les repertoires Lab Azure ML credits et Lab Azure ML diabete

Hands On Lab

Réalisation d'un classificateur d'images personnalisé en python

Lab 03

Se connecter sur https://notebooks.azure.com avec le compte Microsoft

Naviguer vers

https://notebooks.azure.com/mdiallo/libraries/labcustomvision

1. *Click **Clone** in the toolbar at the top of this page to clone the library to your own Azure Notebooks account (**clear** the **Public Library** option so that your clone is a private library).*
2. *In your cloned library, open **Custom Vision.ipynb** and complete the tasks it contains.*

Questions & réponses

Merci