



Azure

Cloud의 혁신, Azure의 진화 3rd Wave

All About Azure

극강의 클라우드 플랫폼을 만나다!

2018년 6월 1일(금) 09:30~17:10

포시즌스호텔 서울 6F 누리볼룸

CustomVision.ai를 활용한 Machine Learning 이미지 처리 구현

김대우 부장 / Microsoft

<https://github.com/CloudBreadPaPa/all-about-azure-ml>

<https://www.linkedin.com/in/dae-woo-kim-ba721b52/>

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개발자,
왜 AI와 ML이 중요한가?

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일부 기존 알고리즘이나 절차적 프로그램으로 해결하기 어려운 문제
해결

고객의 재방문 분류

이미지나 비디오의
물체 인식

개별 절차의 문제점
탐색

**개발자,
더 쉽고 빠른 ML 모델 생성**



Custom Vision

www.customvision.ai

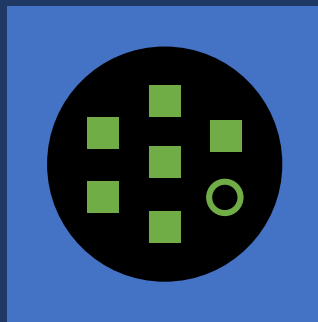
Visual Intelligence 개발 및 배포

Custom Vision Service is an easy-to-use tool for prototyping, improving, and deploying a custom image classifier to a cloud service, without any background in computer vision or deep learning required.

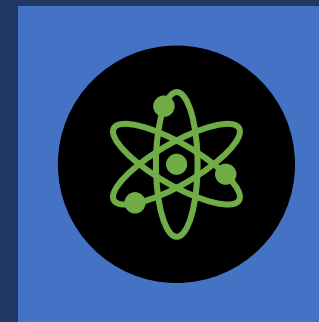
Custom Vision의 장점



빠르고 쉬움



Active Learning,
쉬운 배포



새로운 혁신

Custom Vision에서 이미지 분류(Classification)

Custom Vision은 Computer Vision 작업 경험 여부와 상관 없이 직관적인 사용을 목표로 개발

- 태그별로 약 30개의 이미지로 프로토타입 생성 가능
- 몇분 이내에 분류 모델 트레이닝 완성
- 모델을 생성하면 HTTP endpoint로 배포되어 어플리케이션에서 사용 가능

Custom Vision Demo

장점과 제약

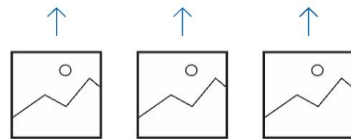
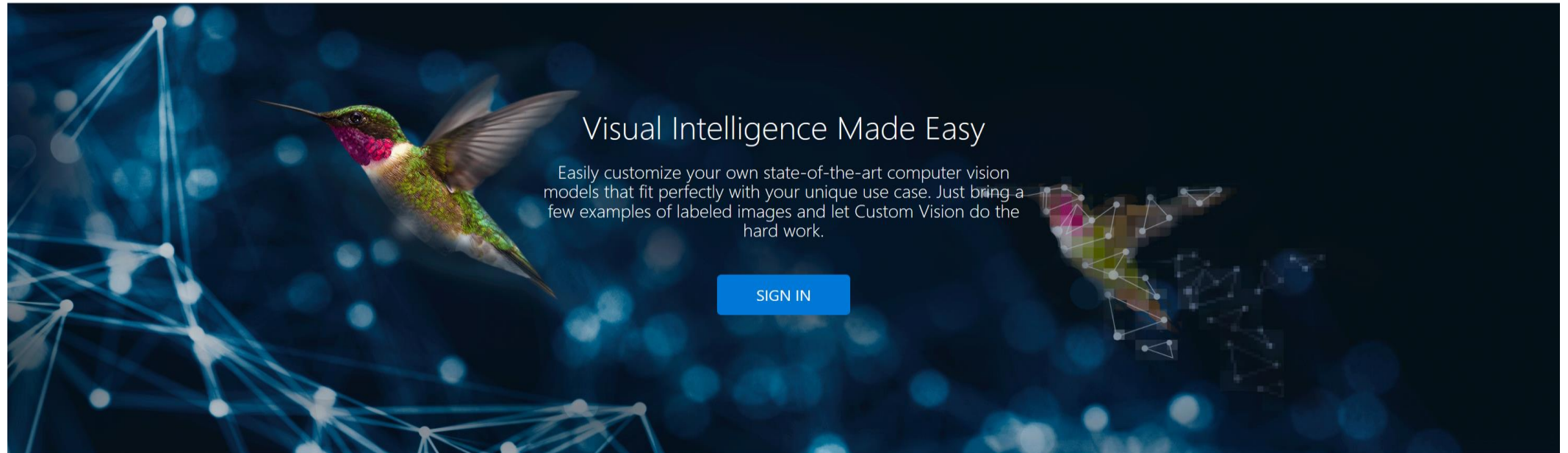
- Custom Vision은 식별하려는 이미지의 분류에 적용 가능
- Custom Vision 은 적은 양의 데이터로 빠르게 프로토타입 개발 및 프로젝트 적용이 가능
- 제공되는 domain들로 분류 precision과 recall 정확도를 조절 가능
- 정확한 결과를 위해 다양한 이미지를 이용해 트레이닝 할 것을 권장. 예를 들어, 다양한 백그라운드 또는 각도에서 촬영한 사진
- 사용하는 분류의 정확도는 이미지와 패턴에 따라 상이

Customvision.ai



Cognitive Services

Custom Vision



Upload Images

Bring your own labeled images, or use Custom Vision to quickly add tags to any unlabeled images.



Train

Use your labeled images to teach Custom Vision the concepts you care about.



Evaluate

Use simple REST API calls to quickly tag images with your new custom computer vision model.

**개발자,
Machine Learning
Model Inference**

Model을 Export해서 어플리케이션에서 사용

Choose your platform



CoreML
iOS 11



TensorFlow
Android



ONNX
Windows ML



DockerFile
Azure IoT Edge, Azure Functions,
AzureML

새로운 두가지 포맷 지원

- ONNX(Open Neural Network Exchange Format)
- Docker Container

Azure ML Package for Computer Vision

Sample code (less than 20 lines of code)

```
# create a dataset from a directory with folders representing different classes
dataset = Dataset.create_from_dir(dataset_name, dataset_location)

# split the full dataset into a train and test set
train_set_orig, test_set = Splitter(dataset).split(train_size=.8, stratify='label')

# Image augmentation
rotate_and_flip = augmenters.Sequential([augmenters.Affine(rotate=(-45, 45)), augmenters.Fliplr(.5)])
crop = augmenters.Sequential([augmenters.Crop(percent=(0, .1))])
train_set = augment_dataset(train_set_orig, [rotate_and_flip, crop])

# create the model
model = TransferLearningModel(num_classes = num_classes, base_model_name = 'ResNet18_ImageNet_CNTK')

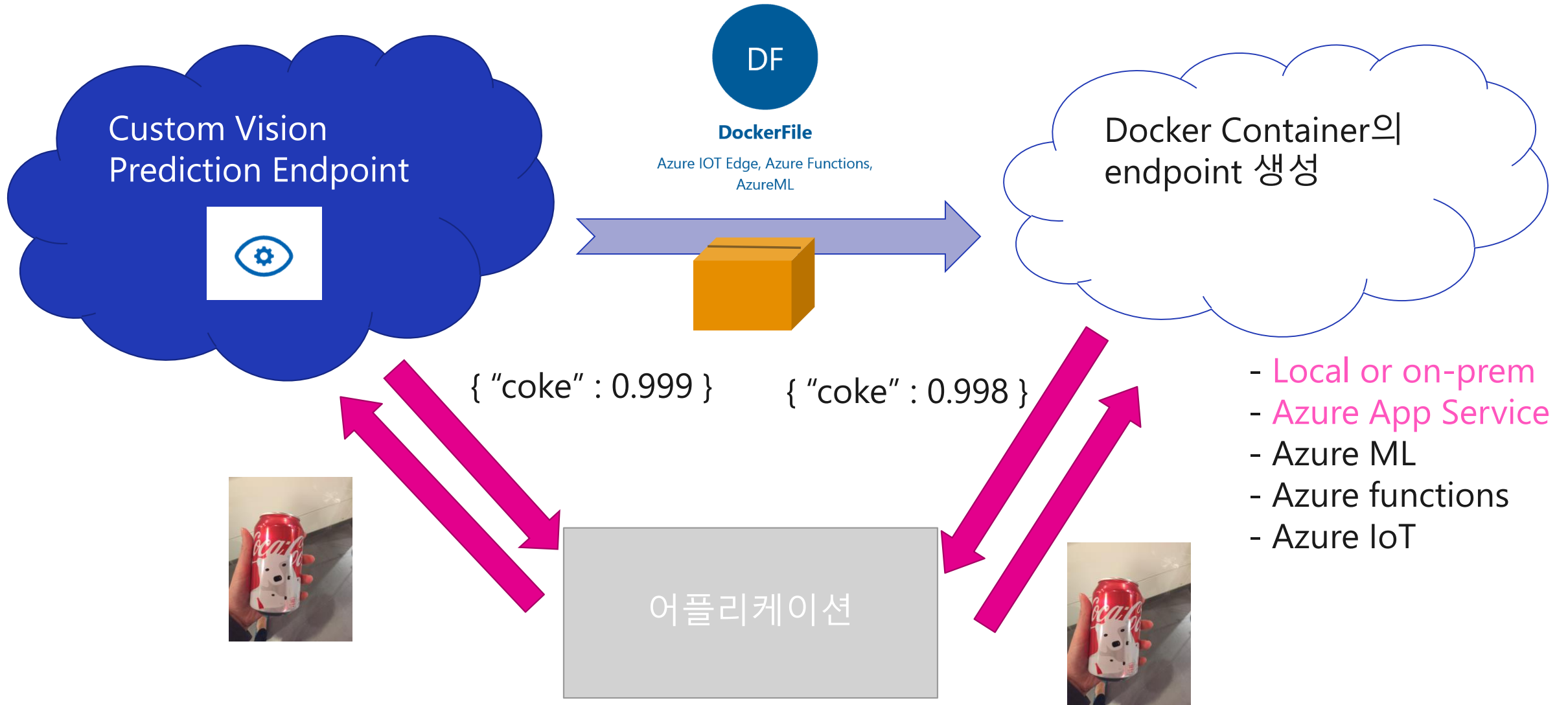
# train the model using cntk
num_epochs = 45
mb_size = 32
t = Trainer(model, train_set, num_epochs=num_epochs, mb_size=mb_size)
t.start_training()

# return the accuracy
ce = ClassificationEvaluation(model, test_set, minibatch_size=16)
acc = ce.compute_accuracy()

# Deployment
deploy_obj = AzureMLDeployment(deployment_name=deployment_name, associated_DNNModel=model, replicas=5)
deploy_obj.deploy()
```

Docker container 사용

Docker container 사용



SDK 호환성

단순 예측 call을 Custom Vision Service SDK를 이용해 적용

```
# Call the cloud service using the Python SDK
from azure.cognitiveservices.vision.customvision.prediction import prediction_endpoint

predictor = prediction_endpoint.PredictionEndpoint(prediction_key)
results = predictor.predict_image_url(project.id, iteration.id, url=test_img_url)
```

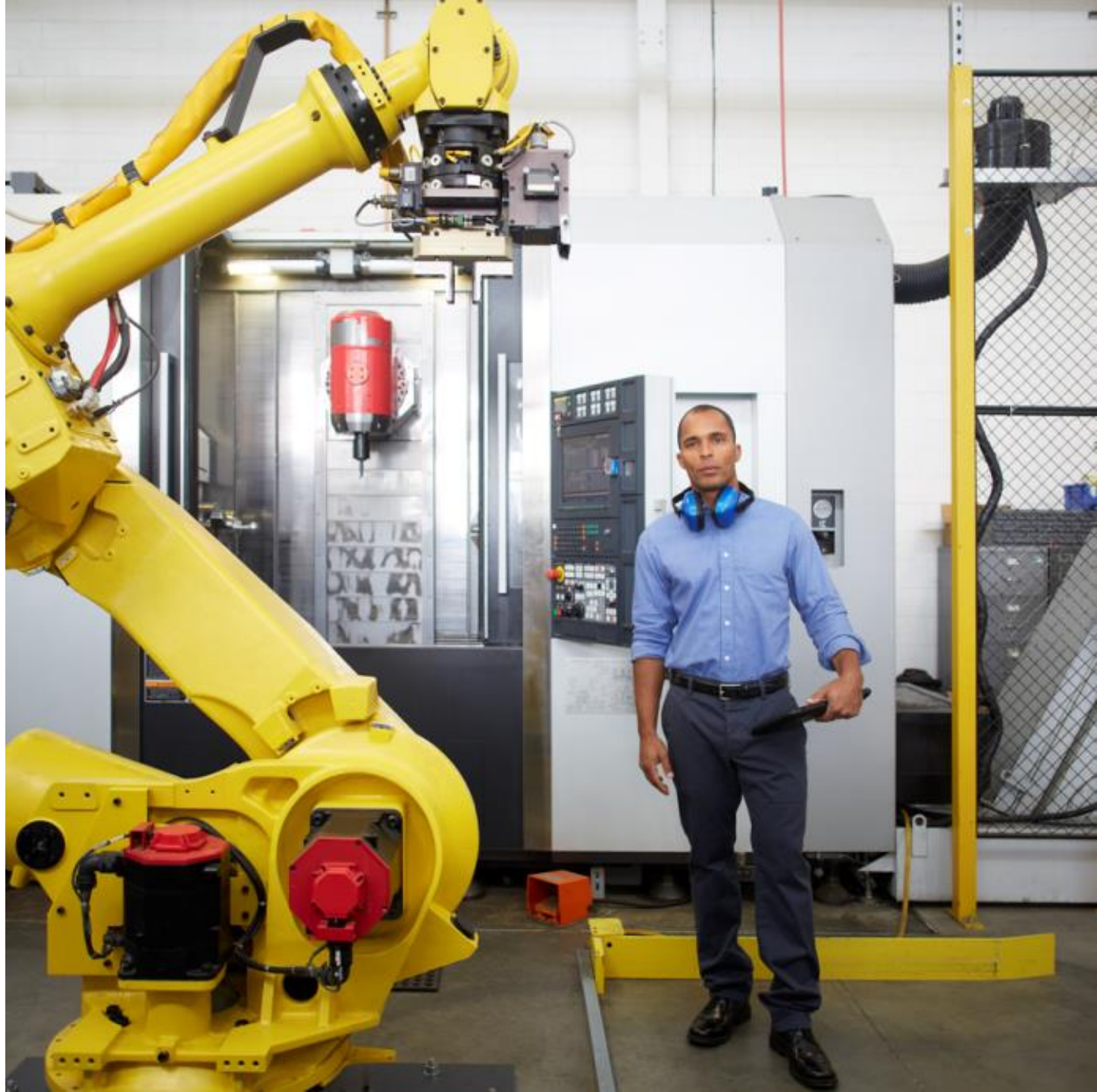
기존 SDK 어플리케이션도 같은 구성, Docker Container 주소만 추가 구성

```
# Call the local docker container using the Python SDK
from azure.cognitiveservices.vision.customvision.prediction import prediction_endpoint

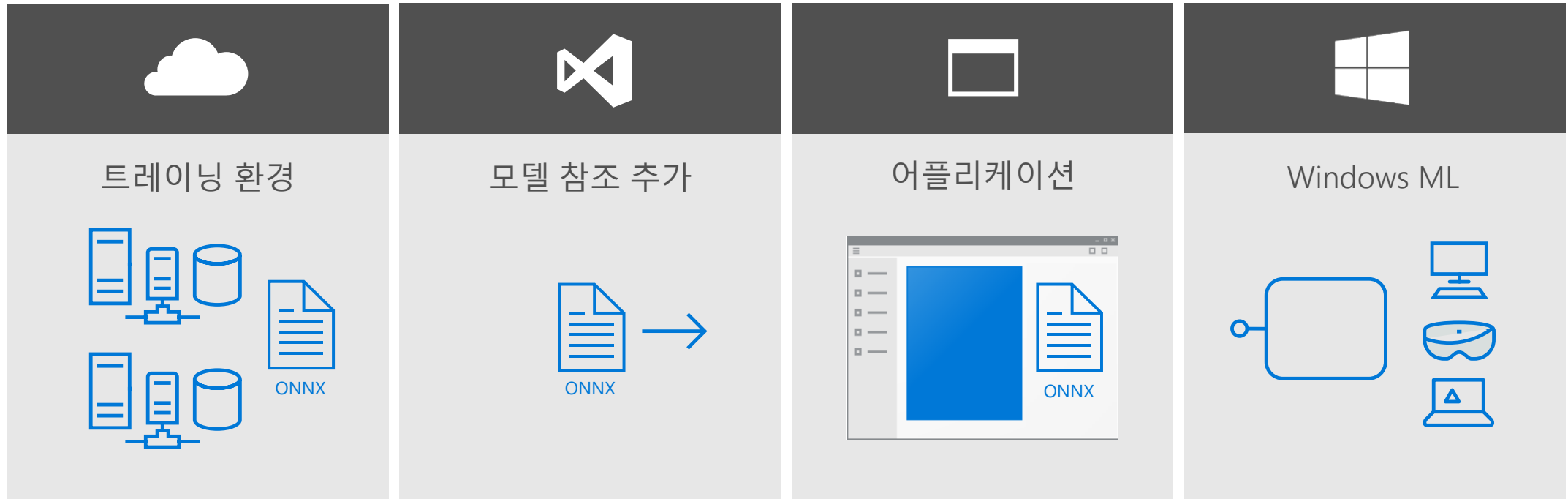
predictor = prediction_endpoint.PredictionEndpoint(prediction_key, base_url="http://localhost:80")
results = predictor.predict_image_url(project.id, iteration.id, url=test_img_url)
```

개발자, 쓸만한 ML Inference 방안

When the solution is
difficult to describe,
describe the data instead.

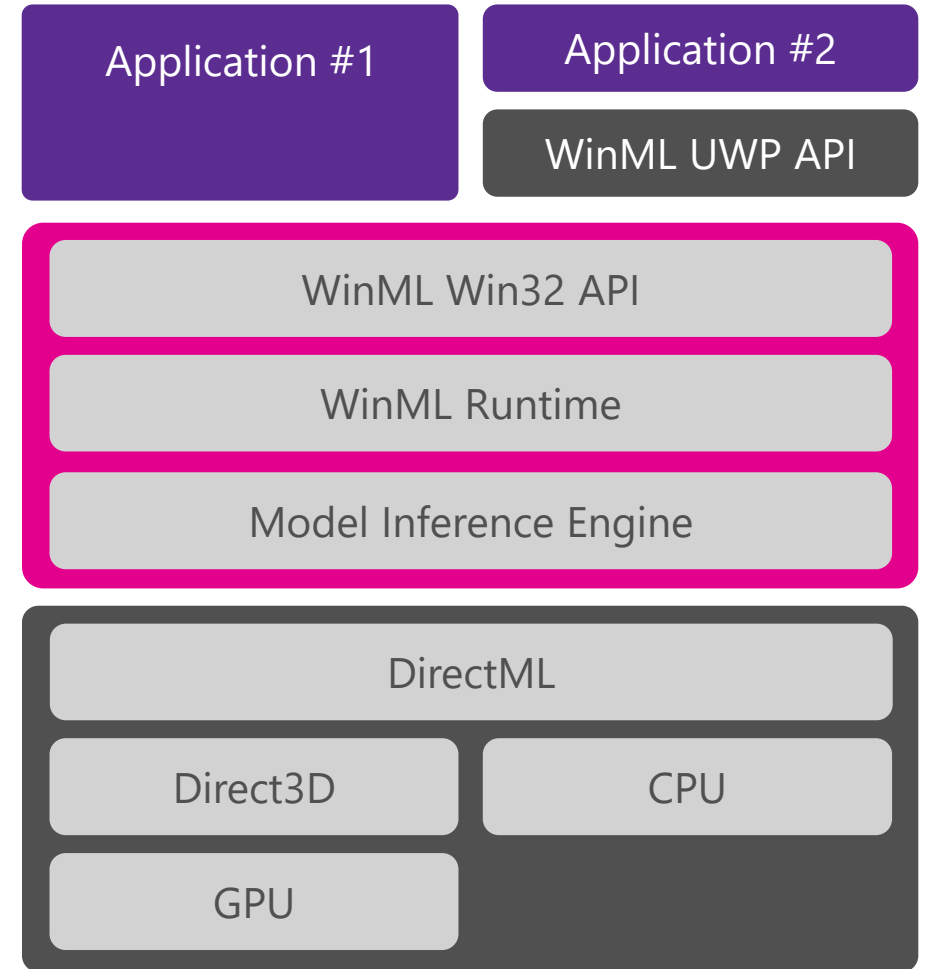


From idea to Inference



Windows ML 으로 다음 문제 해결

1. 개발자는 Windows ML로 ML 모델 evaluate가 가능해 자신의 데이터와 시나리오에 집중 가능
2. 트레이닝된 ML 모델들을 다양한 툴킷에서 적용 가능
3. 다양한 Windows 플랫폼에서, 하드웨어 가속 기능으로 빠르게 ML 모델 evaluation 가능

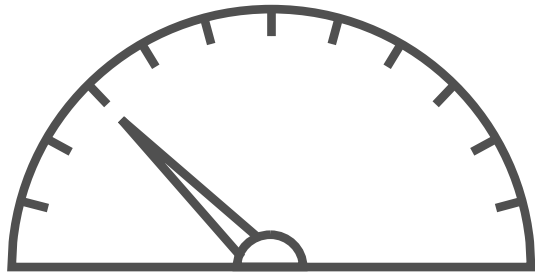


Windows ML 호출 패턴

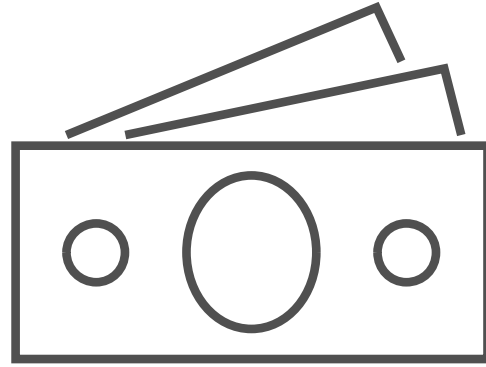
1. 메모리에 ML 모델 로드
2. 모델 input으로 어플리케이션 데이터 입력
3. 모델 evaluation을 수행하고 출력
4. 모델의 출력 결과를 어플리케이션에 맞게 적용

**개발자,
AI & ML을 적용하는 새로운 패턴**

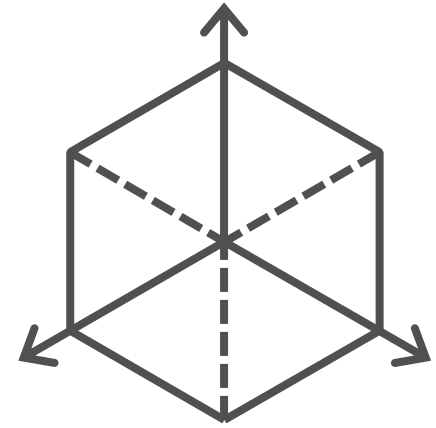
AI on the edge



Low latency



Scalability

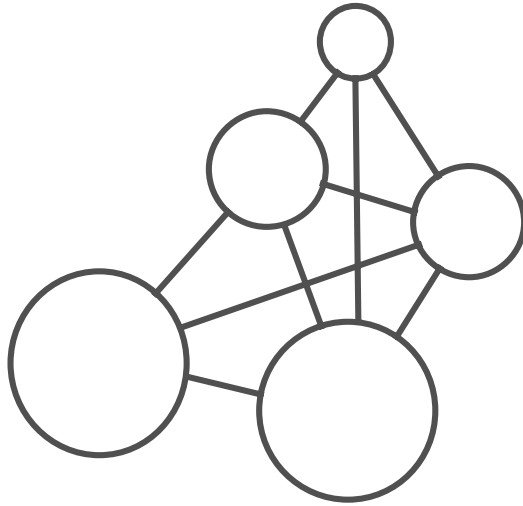


Flexibility

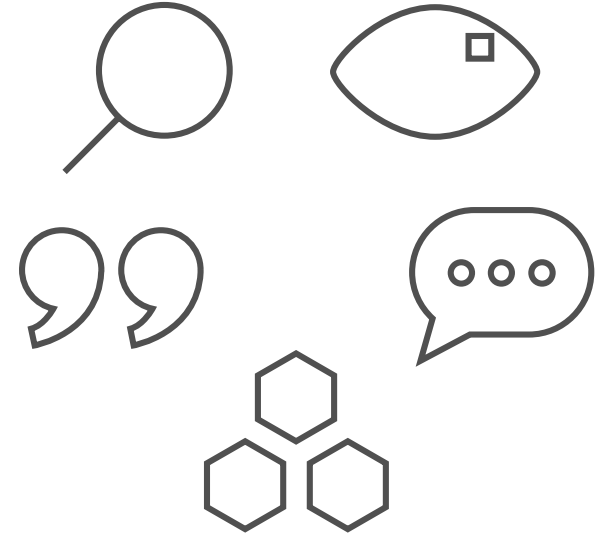
Windows AI 플랫폼



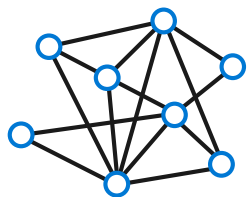
AI platform for
Windows developers



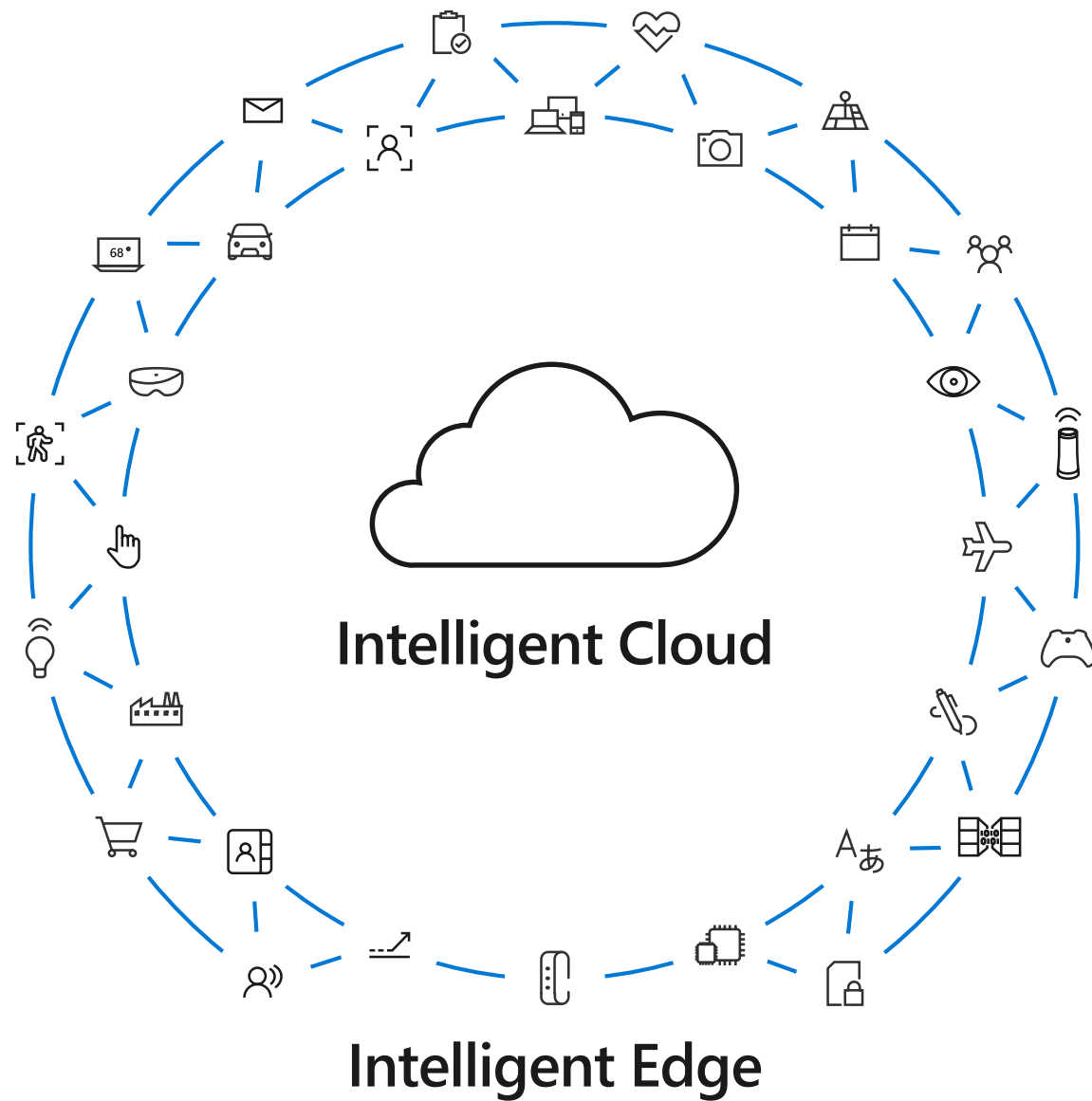
Windows as an
AI-first product



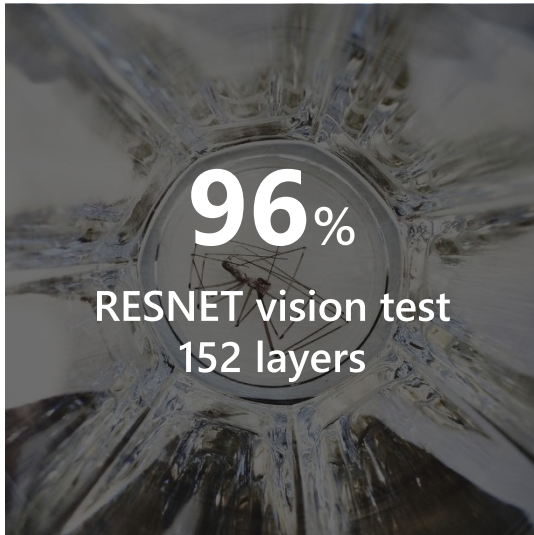
Complete workflow
with Microsoft AI



Artificial Intelligence

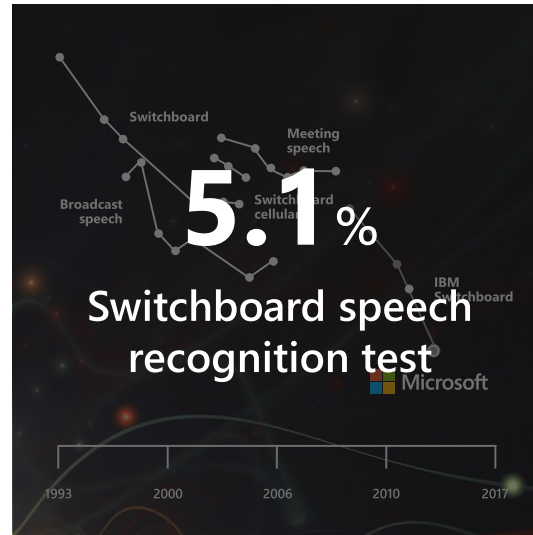


Microsoft AI breakthroughs



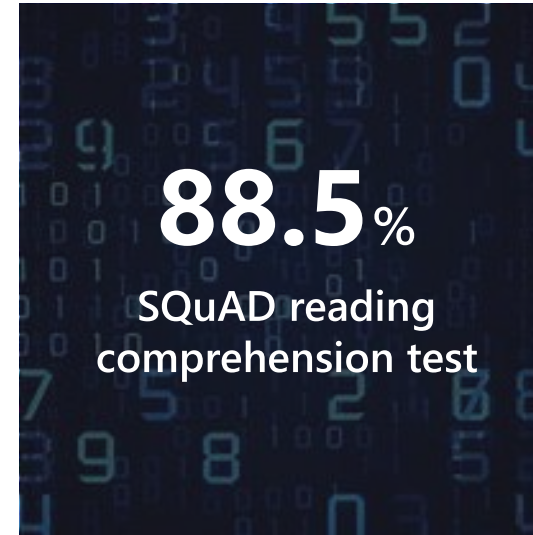
2016

Object recognition
Human parity



2017

Speech recognition
Human parity



January 2018

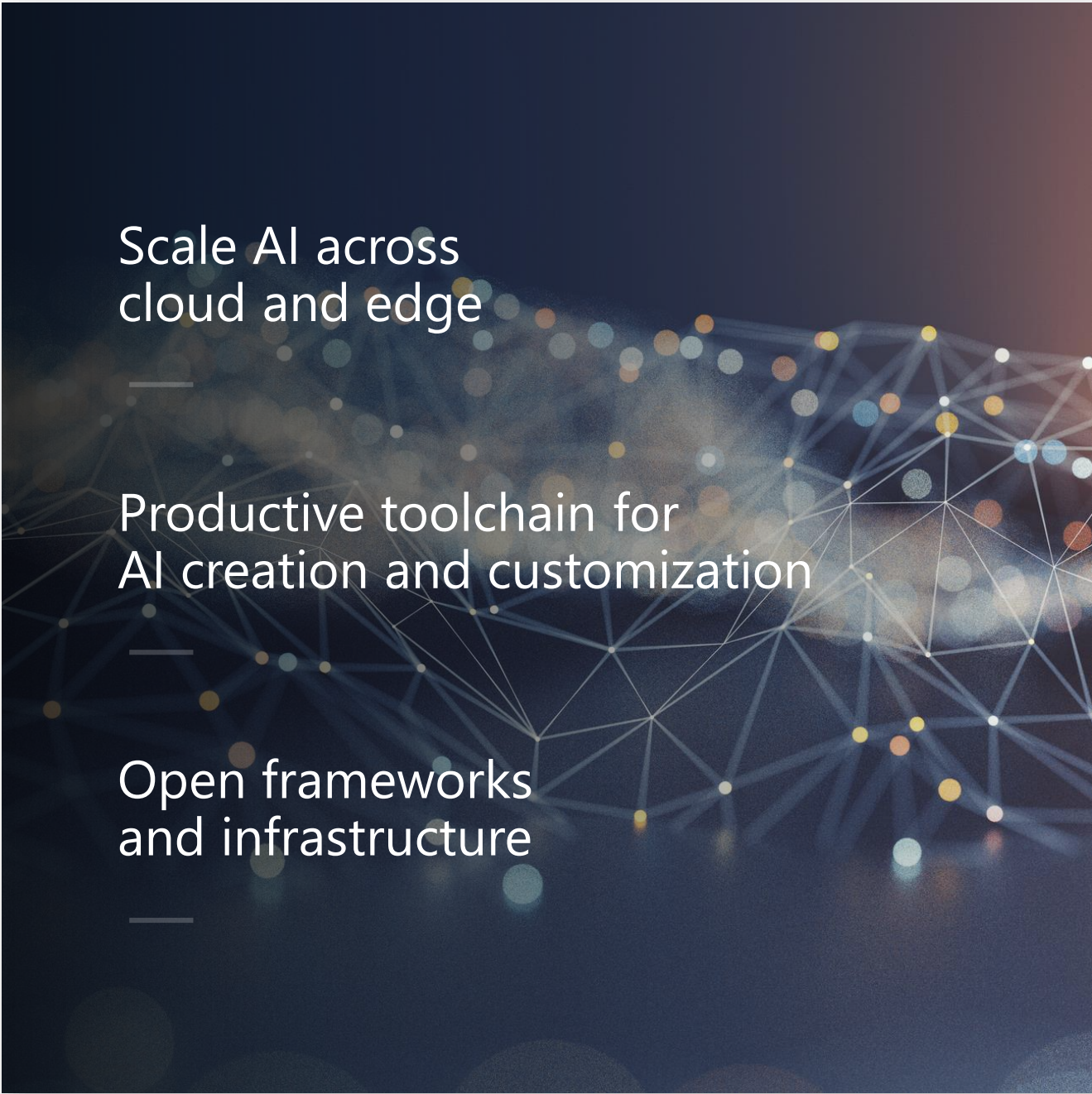
Machine reading comprehension
Human parity



March 2018

Machine translation
Human parity

Azure AI for every developer and every organization



Scale AI across
cloud and edge

Productive toolchain for
AI creation and customization

Open frameworks
and infrastructure

Azure AI

Vision

Speech

Language

Customized language understanding
Text-to-speech
Content moderation
Spell check

Speech translation

Custom image classification

Speaker recognition
Entity linking

Sentiment analysis, & augmentation

key phrase extraction
Image tagging

Custom voice
Object detection
Text translation
Intent analysis

OCR handwriting recognition

Emotion detection
Video insights
Custom translation

Face identification
Custom speech
Assisted text moderation

Speech transcription

Azure AI

Custom Vision

Custom Speech

Custom Language



Microsoft will invest \$5 billion in IoT. Here's why.

Apr 4, 2018 | Julia White, CVP Microsoft Azure



Azure AI-enabled edge devices

Azure AI-enabled edge devices



Azure AI-enabled edge devices

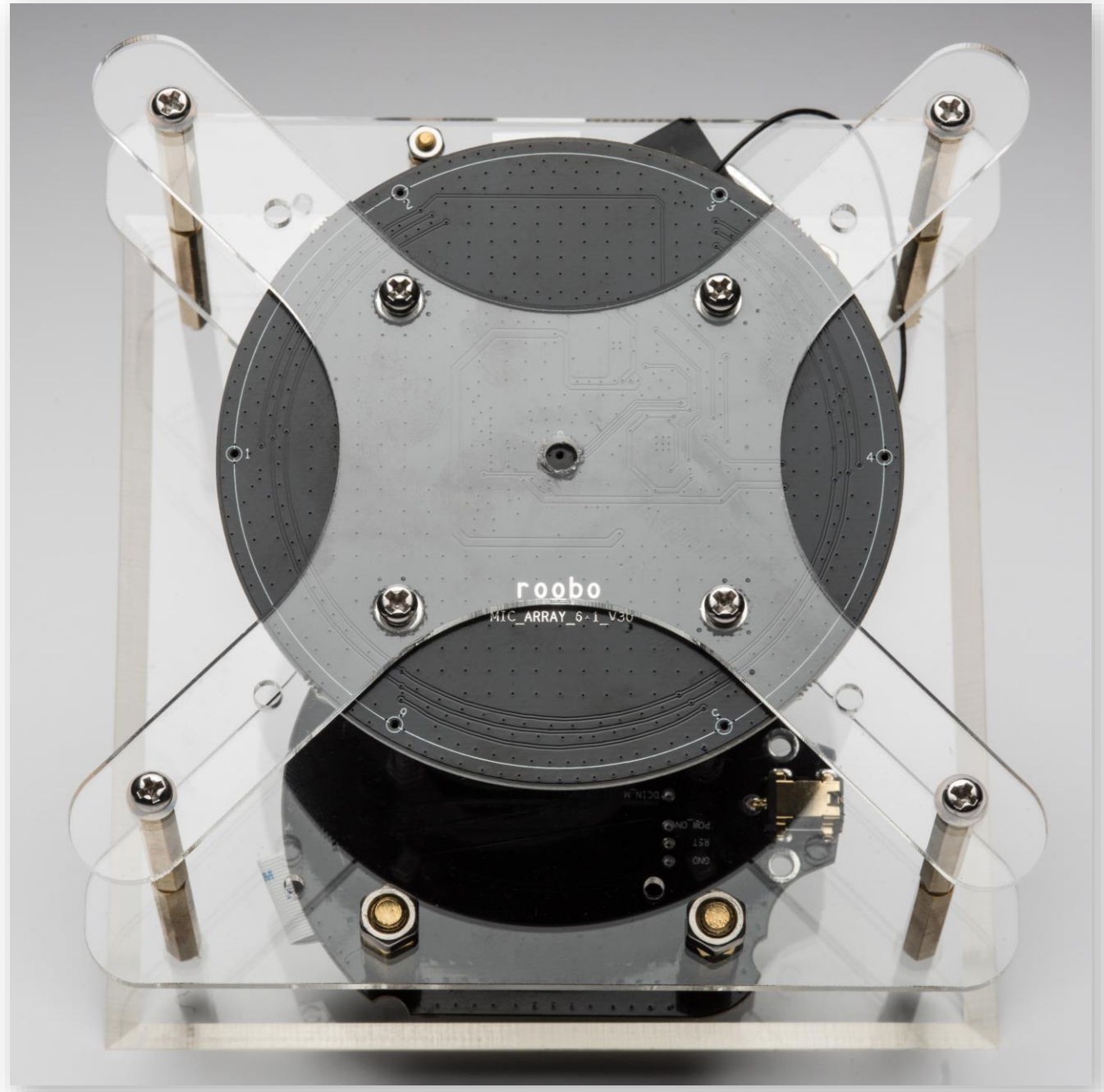
SamJoy

Powered by Xiaomi



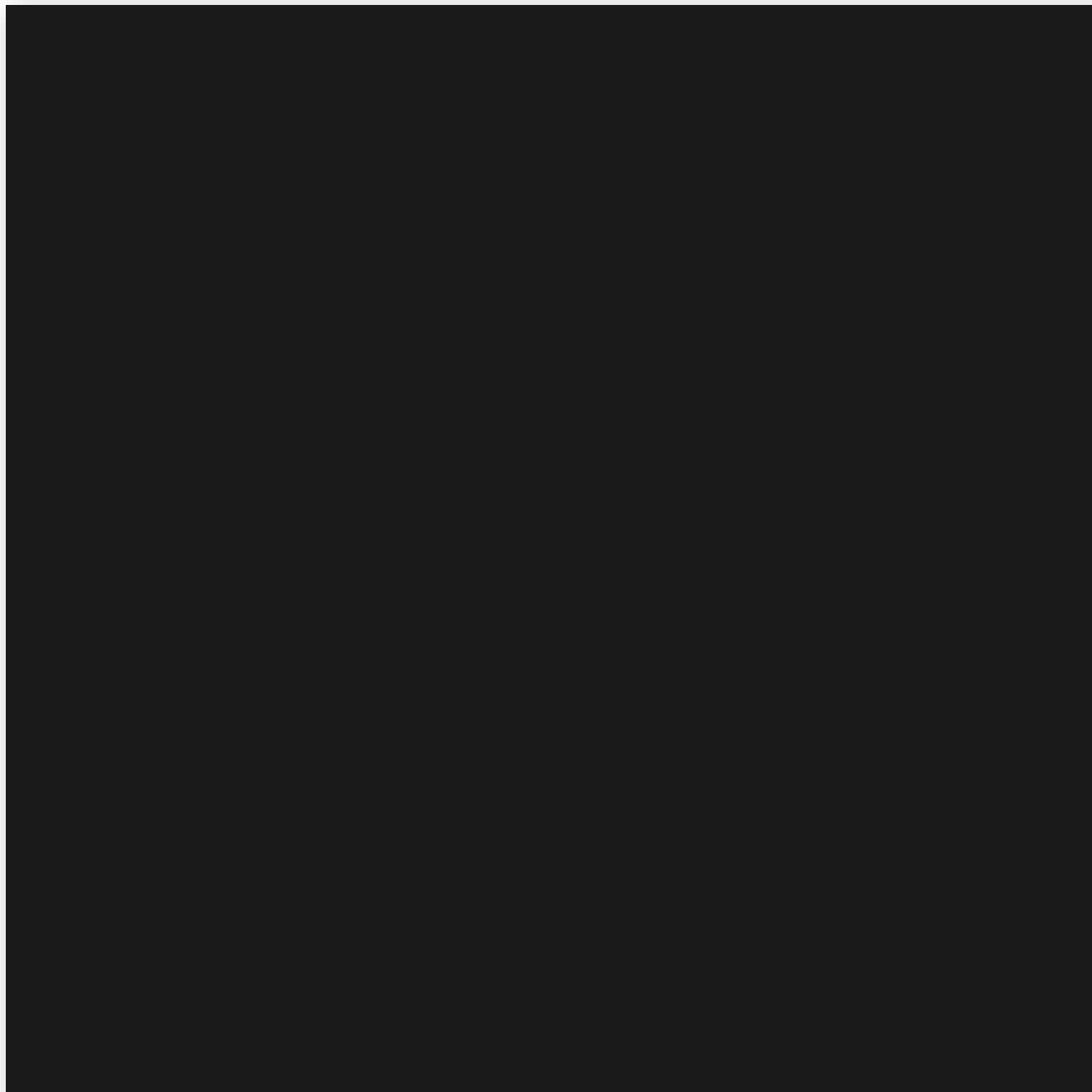
Azure AI-enabled edge devices

Announcing
Speech Devices SDK
& Reference Kits



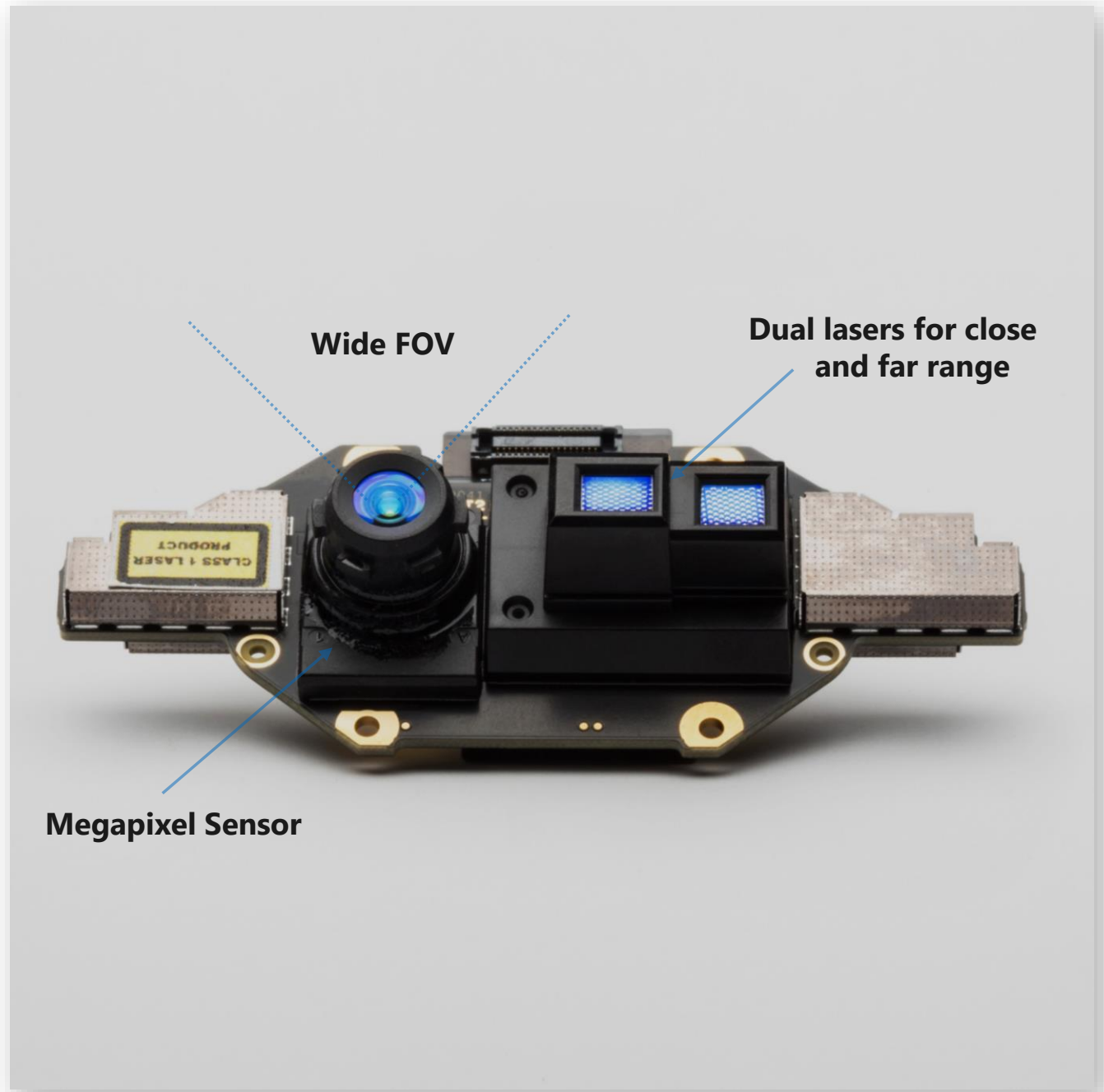
Azure AI-enabled edge devices

Kinect

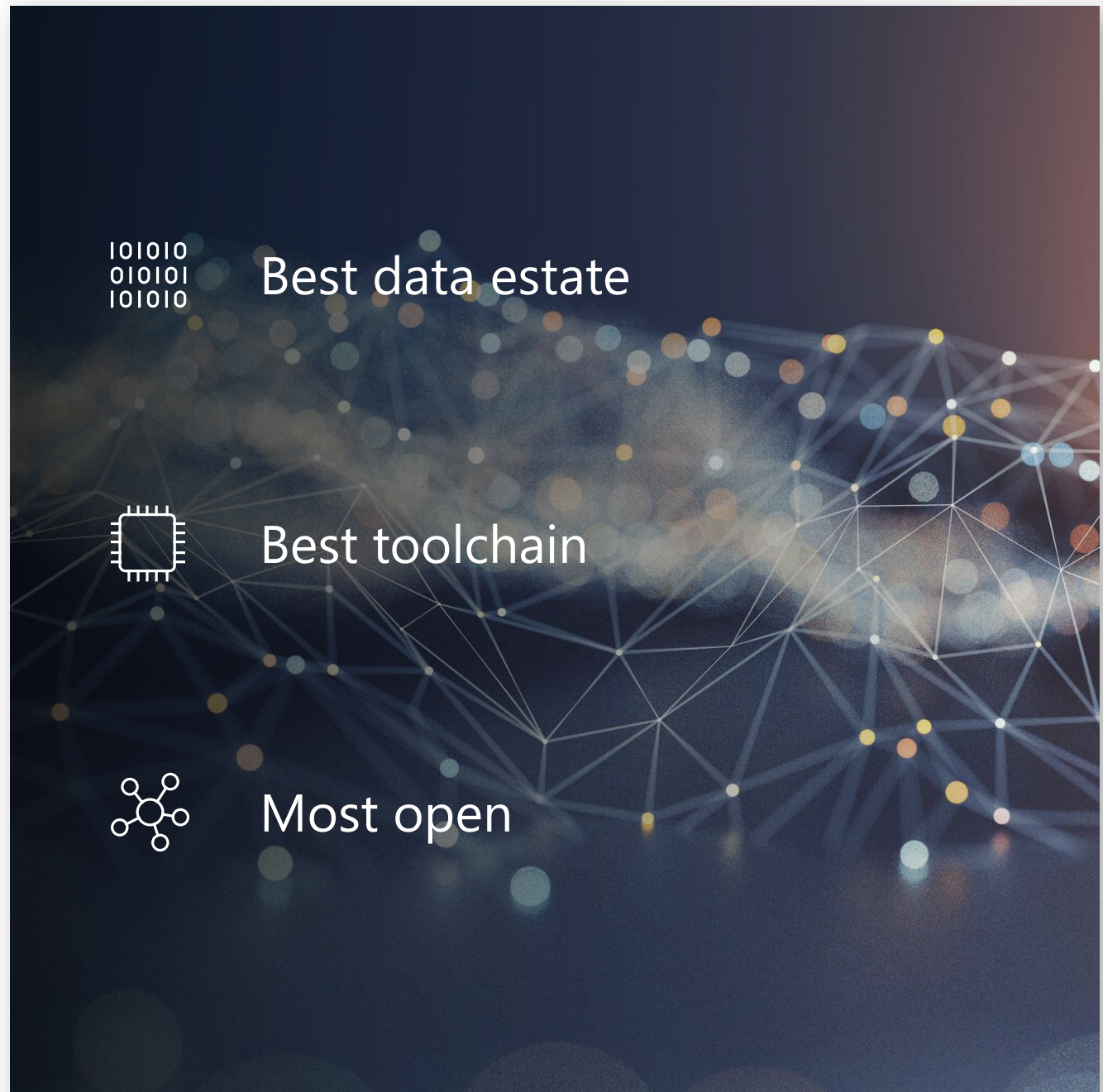


Azure AI-enabled edge devices

Announcing
Project Kinect for Azure



Azure AI Framework and Tools



Azure AI Infrastructure

Announcing
Project Brainwave
Real-time AI

Intelligent Cloud



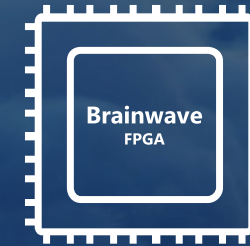
5X lower hardware latency
than TPU for real-time AI

Azure AI Infrastructure

Announcing Project Brainwave

Real-time AI
on cloud and edge

Intelligent Cloud



5x lower hardware latency
than TPU for real-time AI

Intelligent Edge



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