Microsoft

IoT in Action

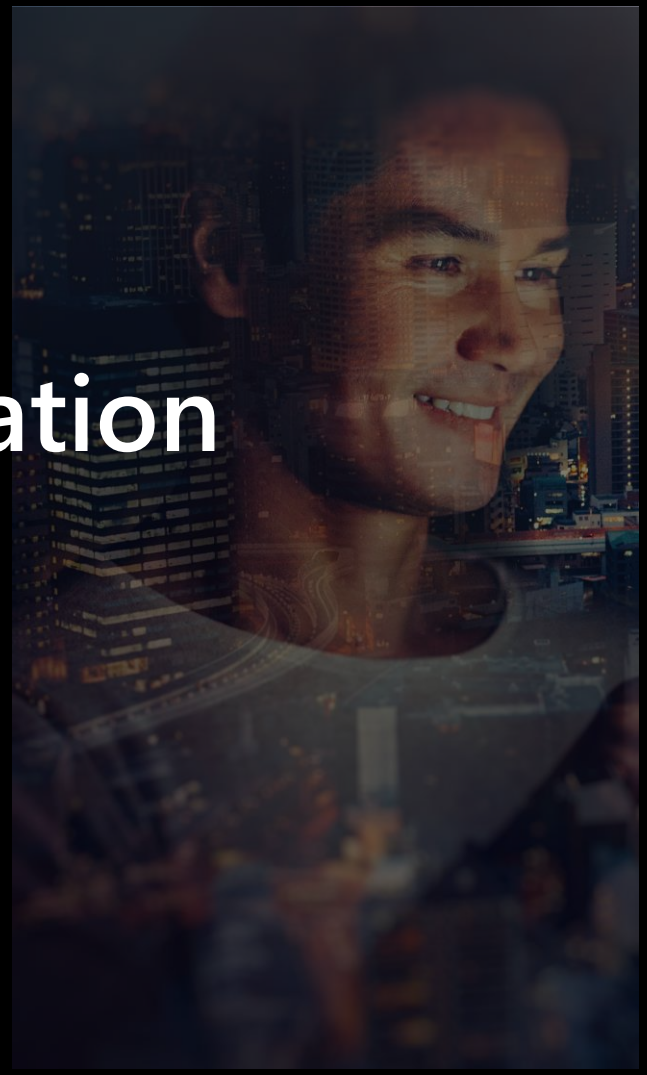
#IoTinActionMS

Microsoft

IoT Continuum:
Evolving Business

Michael Kuptz
GM America IoT & Mixed Reality Sales
Microsoft

IoT in Action



Digital transformation

$$\text{Tech intensity} = (\text{Tech adoption} \times \text{Tech capability})^{\text{Trust}}$$

70%

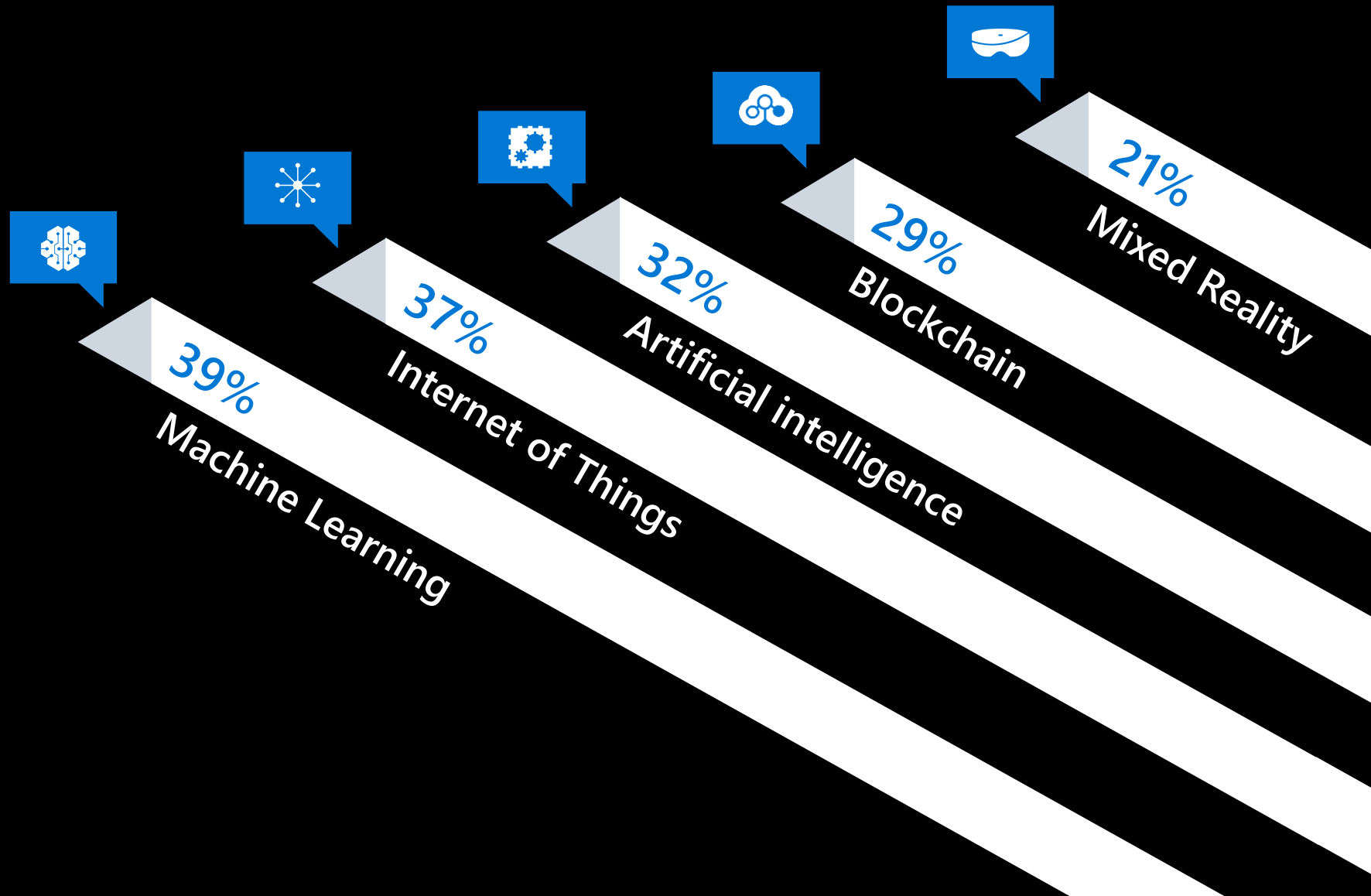
Digital transformation through tech intensity

37%

Leading with IoT engagements

23%

% of Global IoT Projects which are Smart City (#1 Vertical)



Going digital

1 million/hour
new devices coming online by 2020

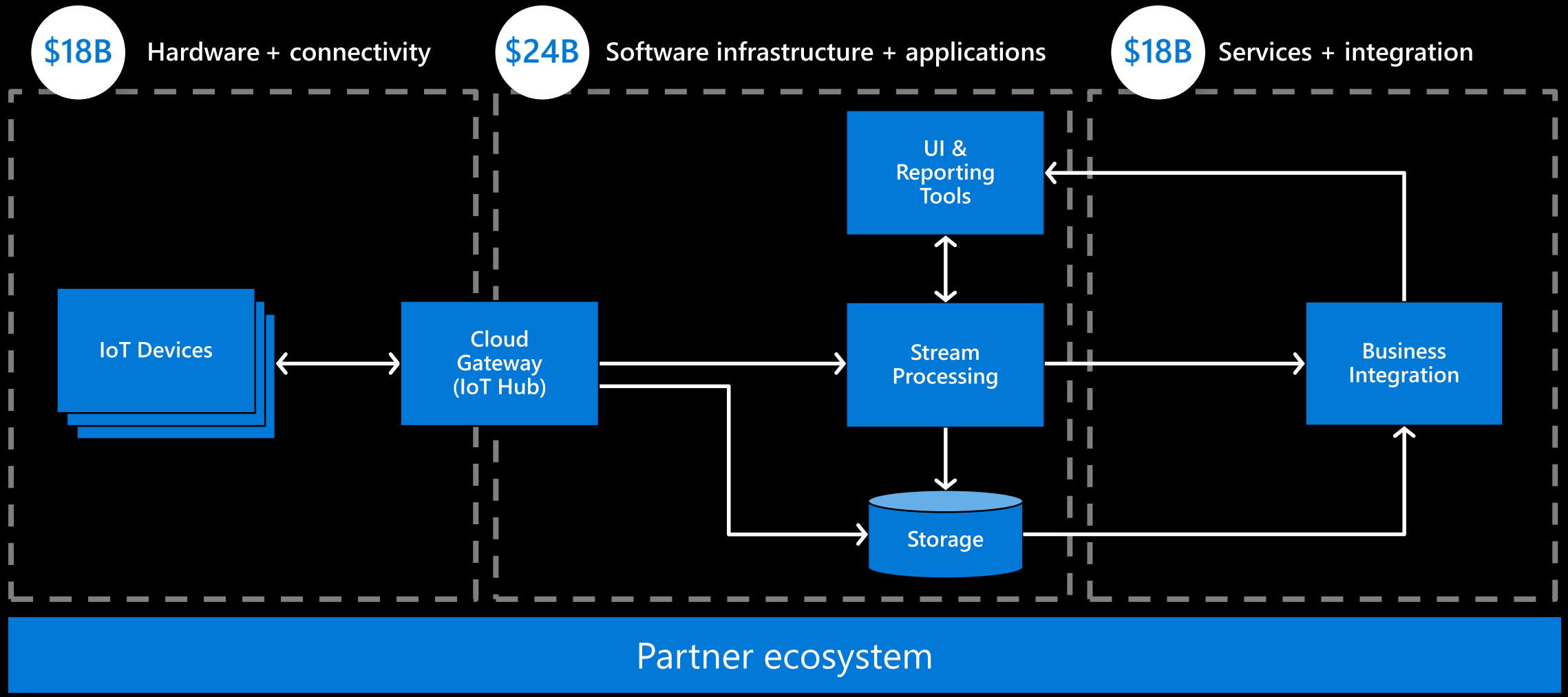
12 years
average age of S&P 500 corporations by 2020

81% businesses
operating in a hybrid environment by 2021

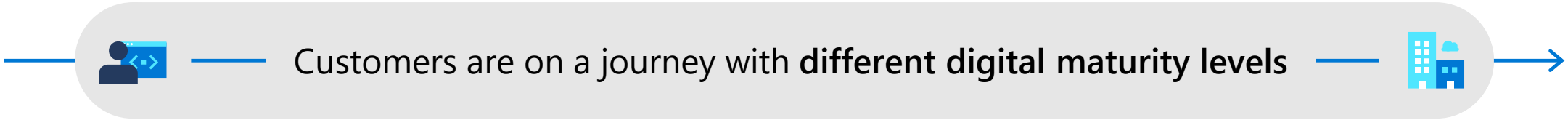
"How can any entity profit from their data and cloud platform?"

Blueprint to profitability

2020 **$60B** IoT market



Three emerging patterns of digital transformation



Build digital capabilities

Build digital businesses

Modernization

Foundation for Digital Transformation

Common initiatives:
- Digital workplaces
- Digital customer experiences
- Transforming the infrastructure
- Application modernization

Industry & Horizontal

Solution-centric opportunities

Industry Solution examples:
- Predictive Maintenance, Customer Insights, Citizen Services

Horizontal Solution examples:
- Digital Marketing, Employee Self-Service, Smart Buildings, Security & Surveillance

Transformational

Reimagine their businesses

CXO sponsorship

Digital Maturity Model assessment

Comprehensive **program of change**

Evolves into new **commercial business models**


EXXON
DOVER
FUELING SOLUTIONS
+
COUNTRY CORNER
FOOD MART
Self
EXXON
ATM
MURRAY'S

Blueprint to profitability

DOVER FUELING SOLUTIONS

Meet Anthem

iSense™

DFS
EDGE

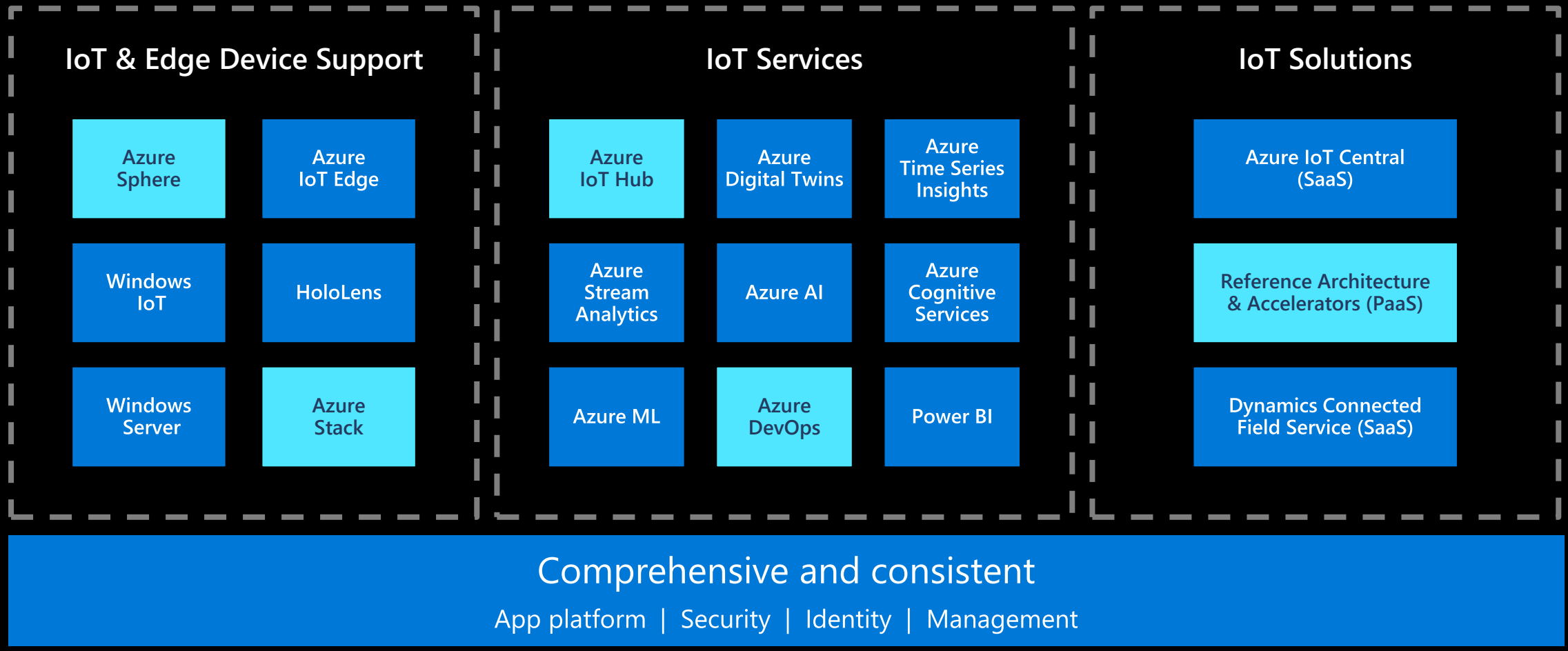
happiest minds

Infochips An Arrow Company

AZW

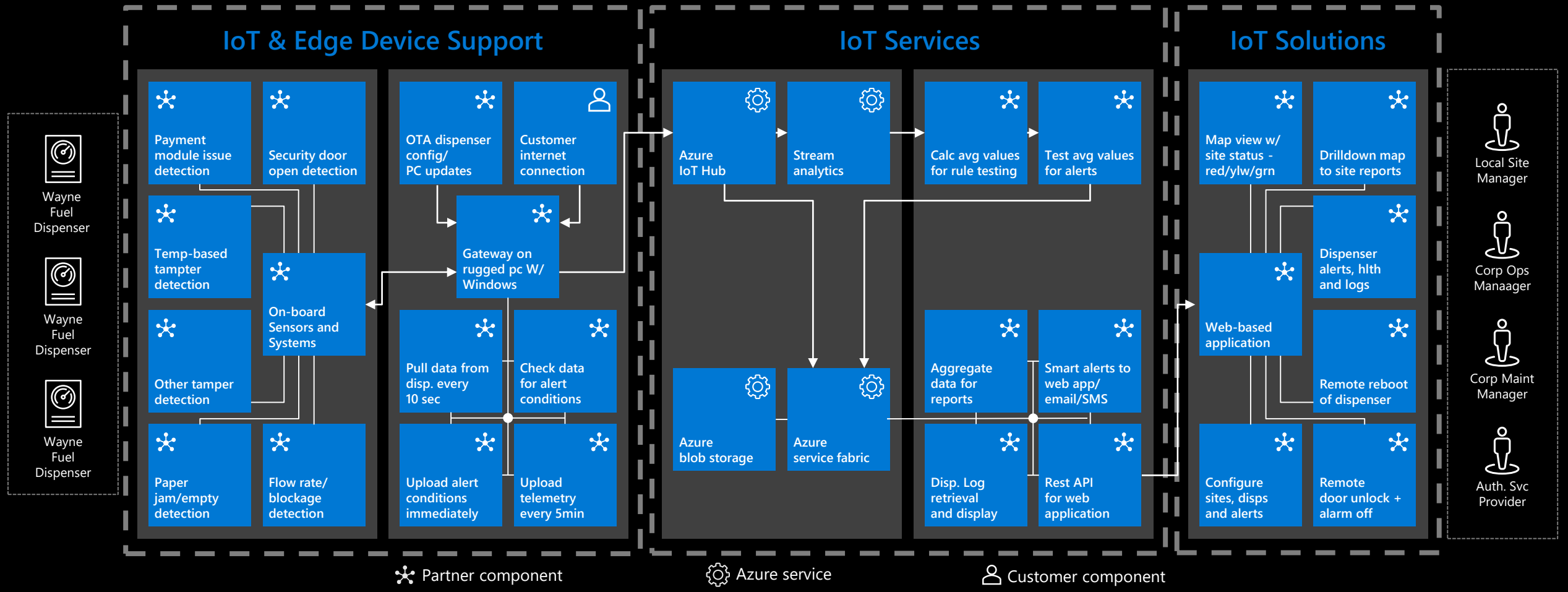
Partner ecosystem

Microsoft's IoT Platform

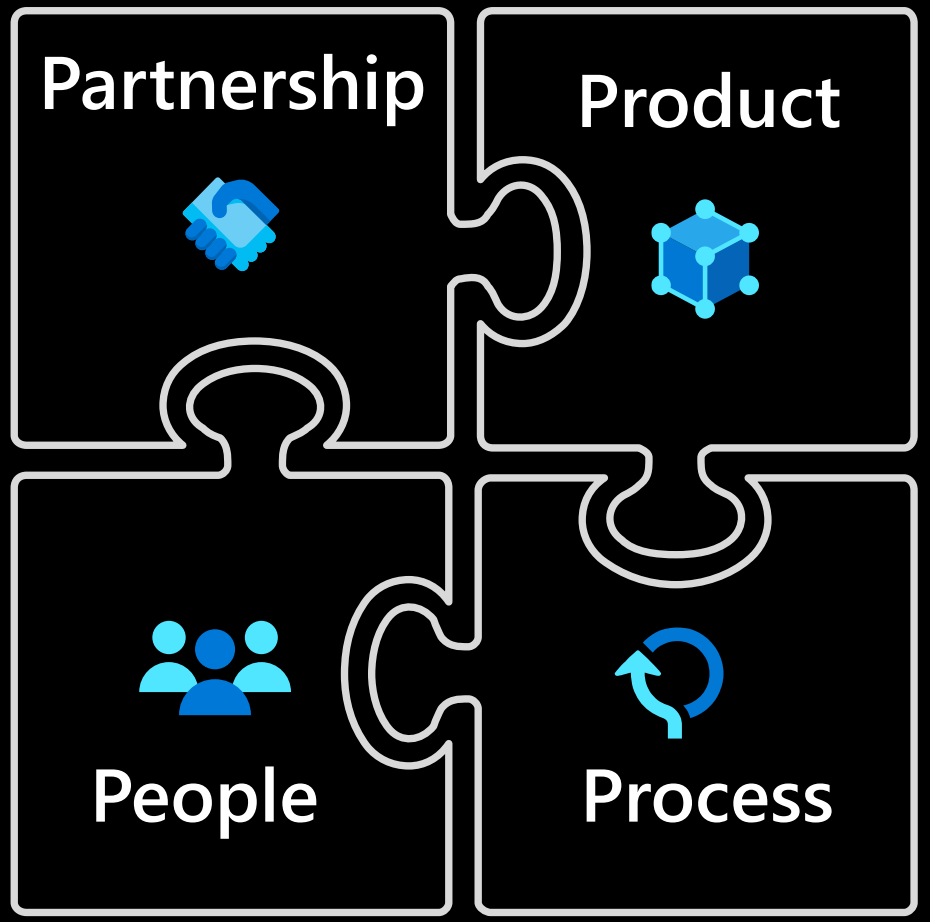


iSense™ architecture

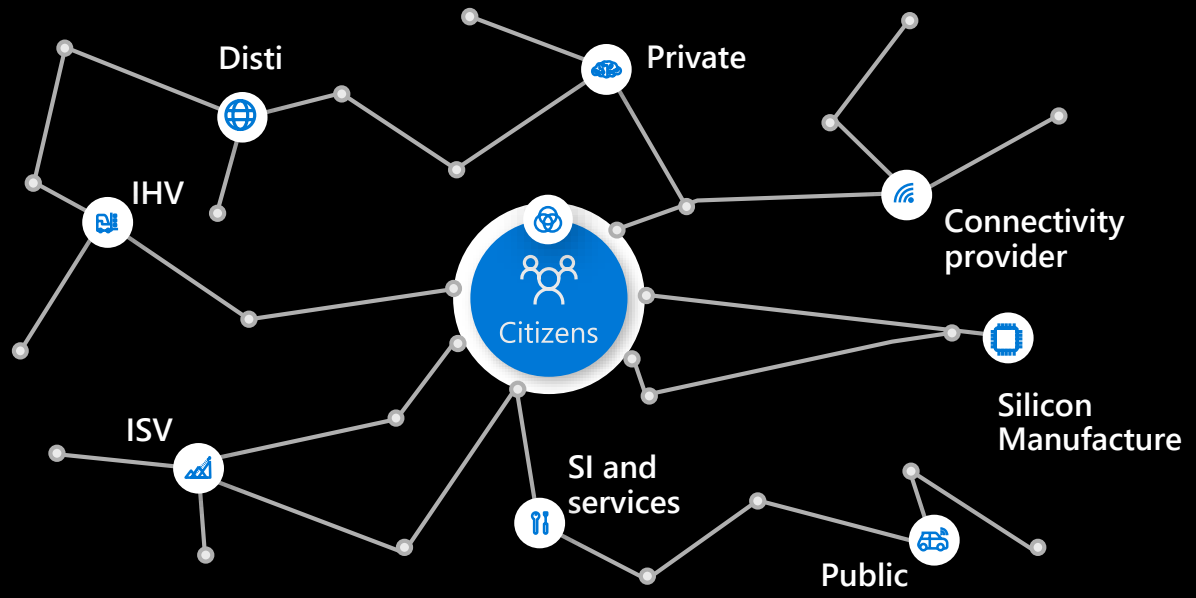
DOVER FUELING SOLUTIONS



Success in IoT



Ecosystem

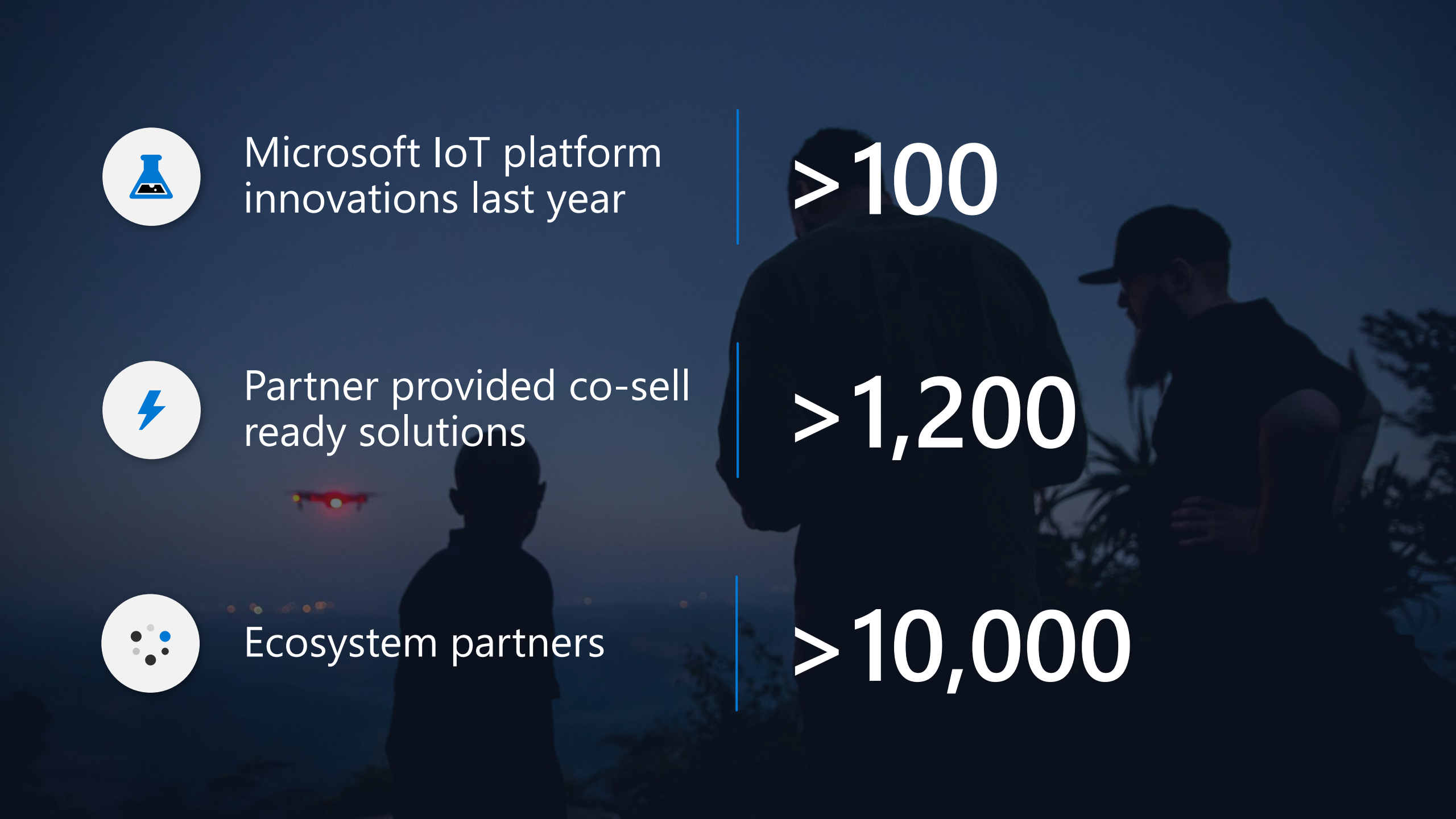


Customer

LOB

IT

Strategy for ecosystem
Build, buy, partner


Microsoft IoT platform innovations last year
>100
Partner provided co-sell ready solutions
>1,200
Ecosystem partners
>10,000

Partnership

"Within the ecosystem, **partners need to be committed** and have a passion for guiding innovators swiftly throughout the entire journey..."

AVNET®
Reach Further™

Product

"Microsoft Azure offers extraordinary power, performance and intelligence, and allows us to easily do things with **machine learning, edge computing,** and **artificial intelligence** that would be much more difficult otherwise."

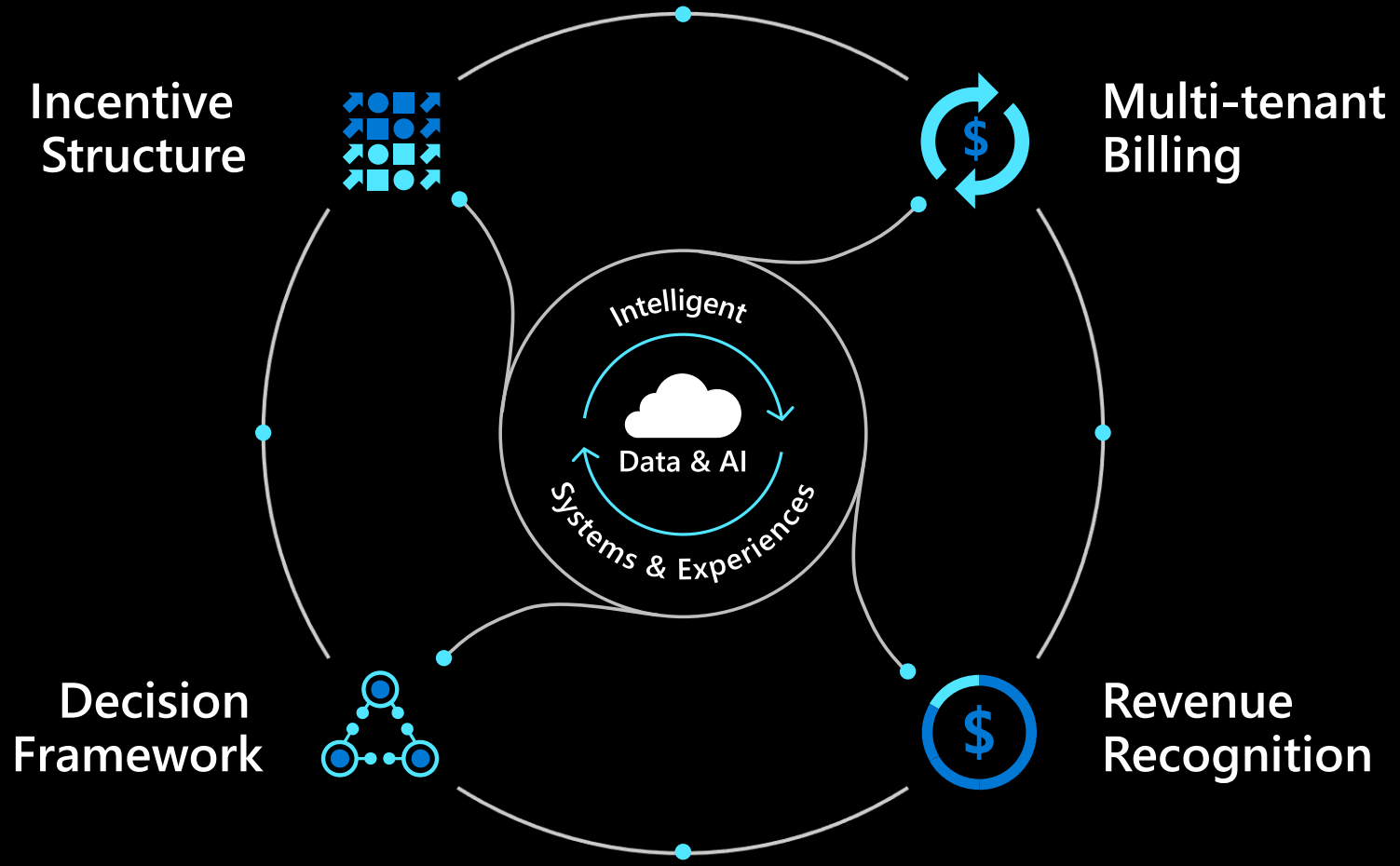
— Gary Slater,
Digital and Data Science Architect

Process

> We emphasize collaboration, using real-time data to make it easier for people to work together as a team and achieve better results in less time. And because we're using Microsoft Azure, we can offer global collaboration, so our customers can use it on **any site or in any country** and every user is on the same database.

— Sebastian Spindler
Key Account & Partner Manager

Process

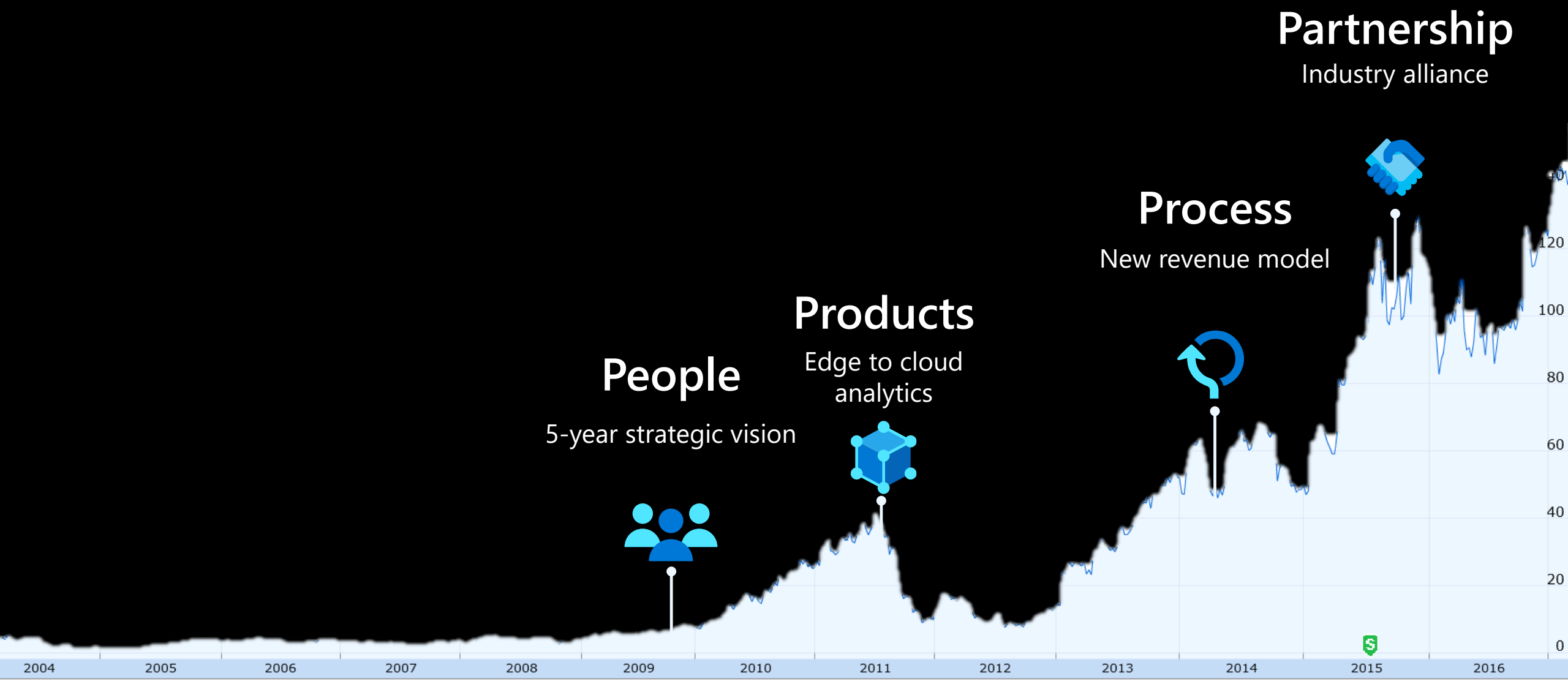

Incentive Structure
Multi-tenant Billing
Intelligent
Data & AI
Systems & Experiences
Decision Framework
Revenue Recognition

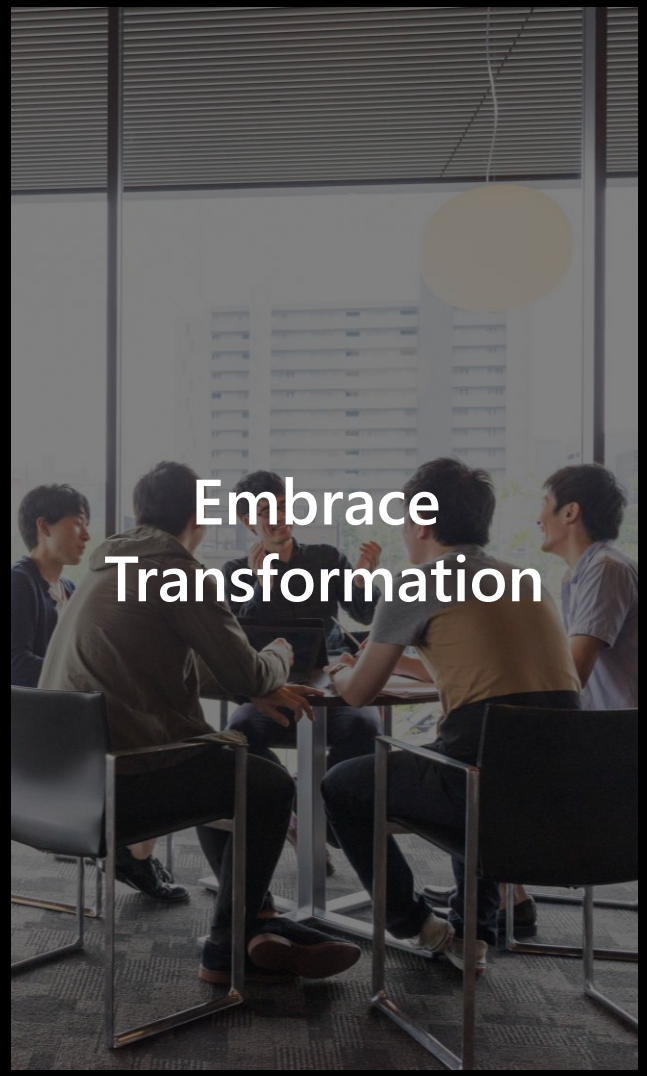
People

"Culture was the key for us. Our CEO had to ensure that **every single leader** was on the same page on what we were trying to accomplish"

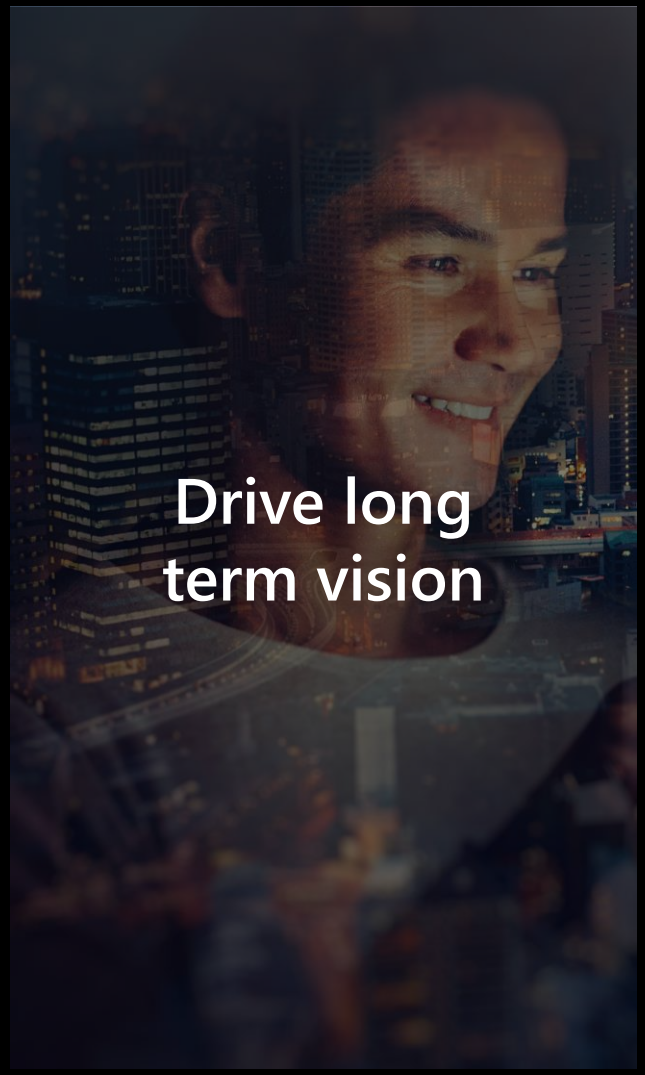
PCL

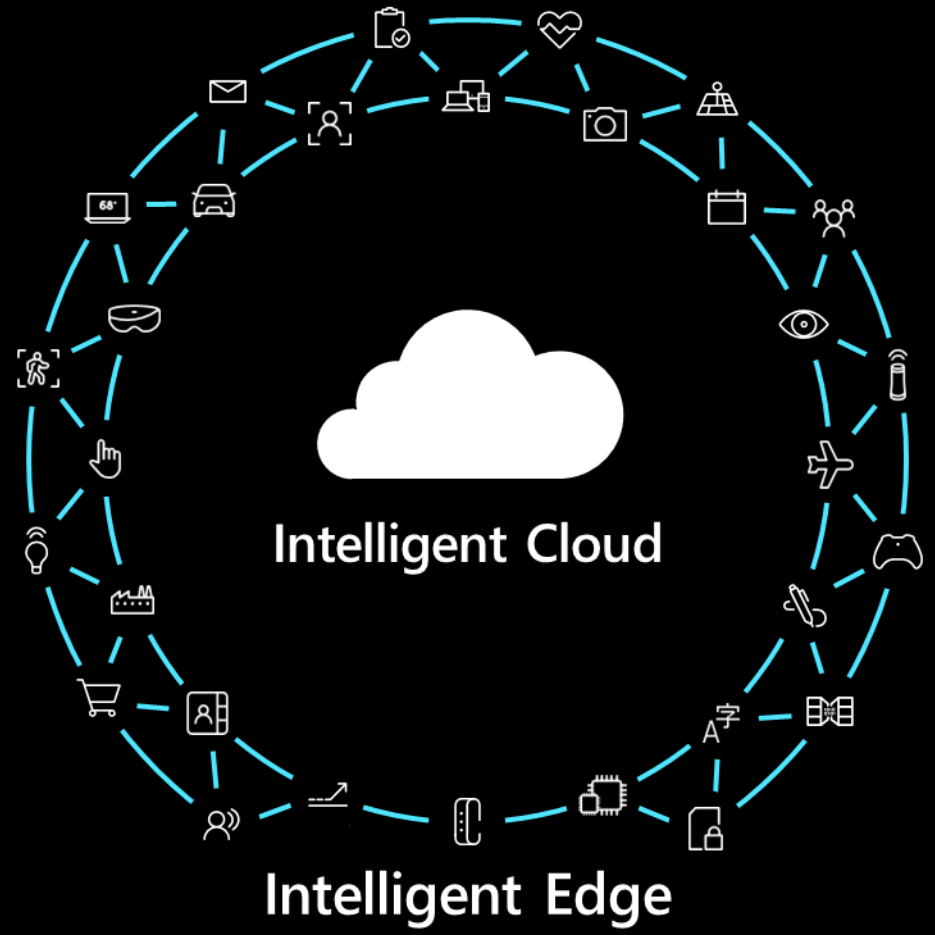
Sustained value



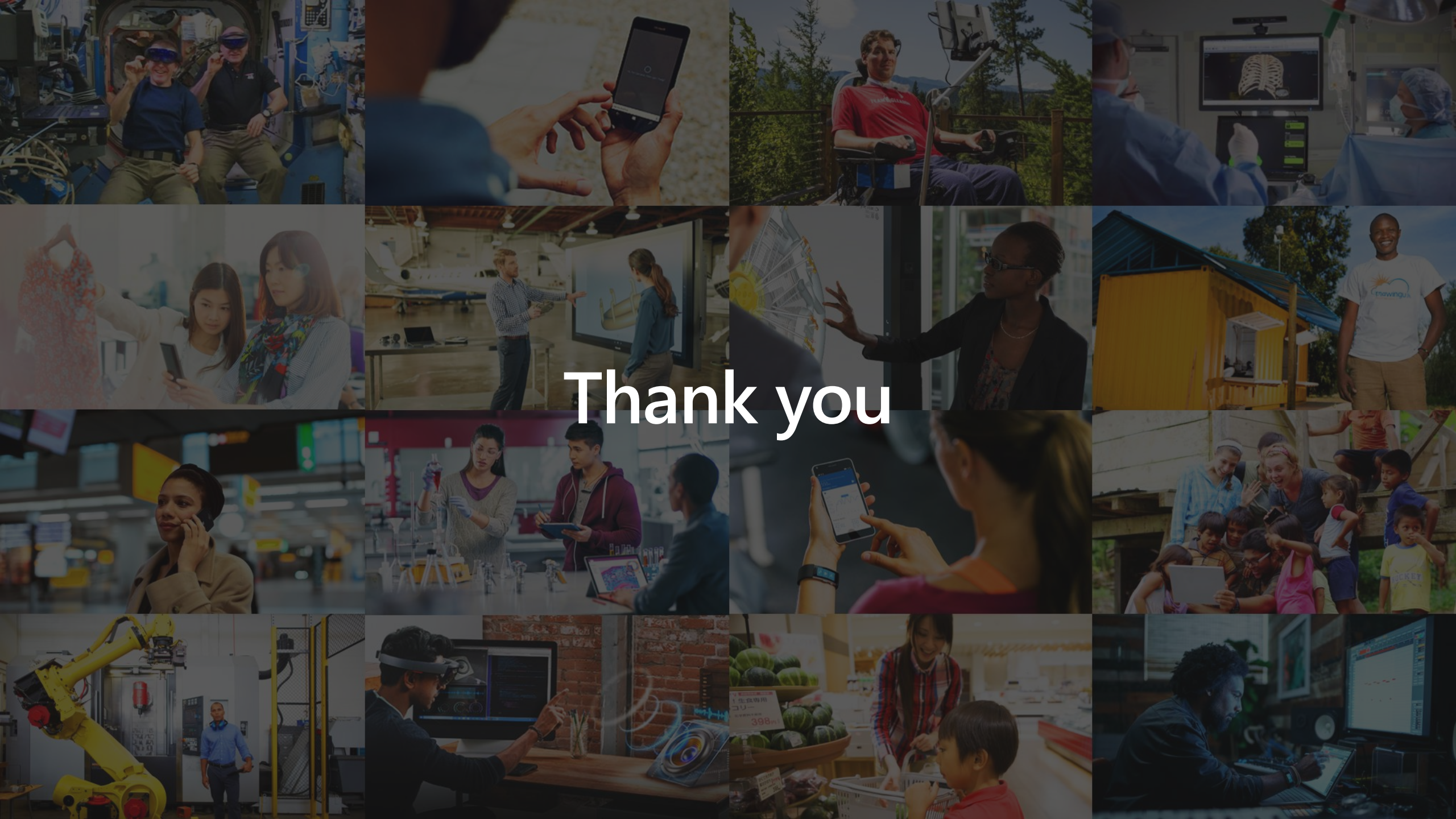

Embrace
Transformation


Lead with
growth mindset


Drive long
term vision



Empower every person and every organization on the planet to achieve more

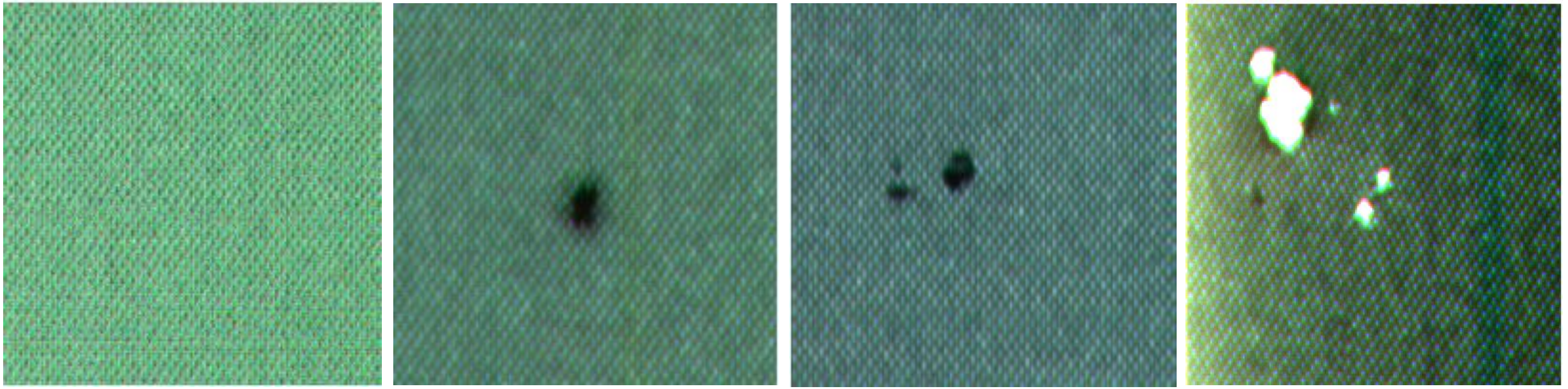

Thank you

Microsoft

Stephen Welch

VP of Data Science
Mariner

IoT in Action



IoT Found a Snag

SPYGLASS VISUAL INSPECTION

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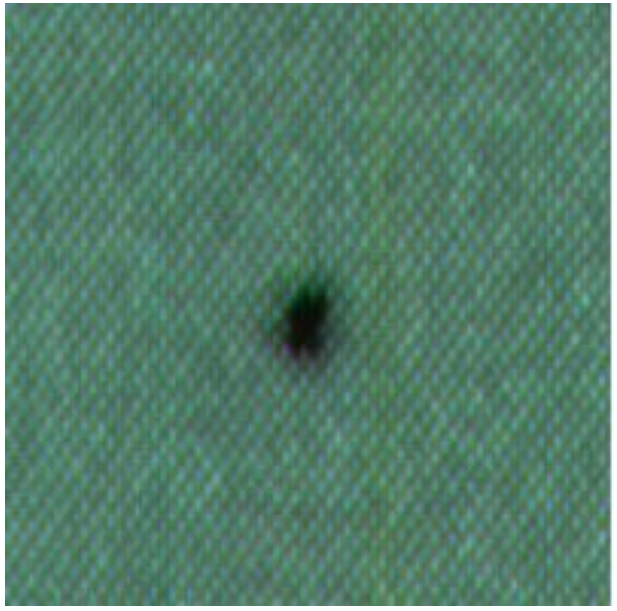
Insight to Achieve

Which Images Show Defects?

1



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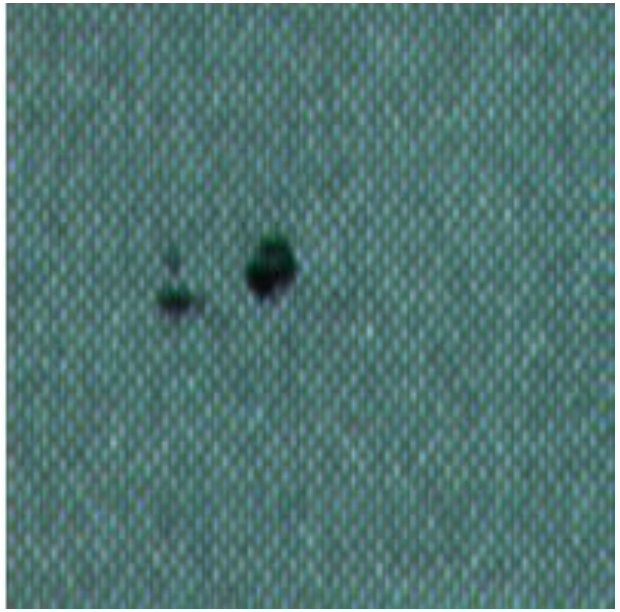

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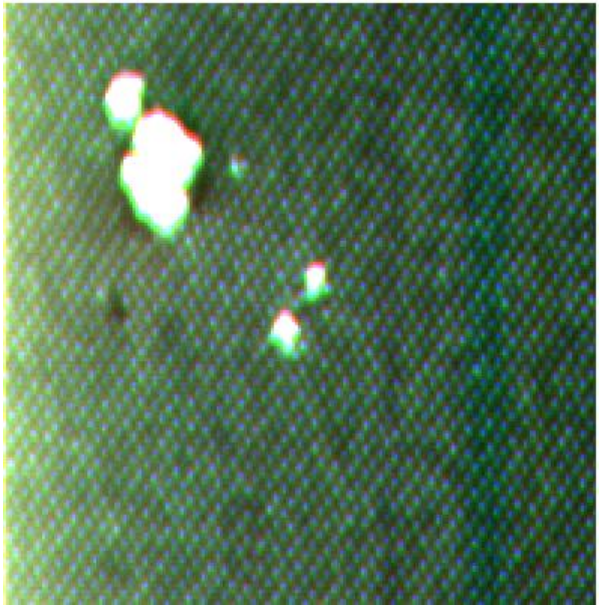
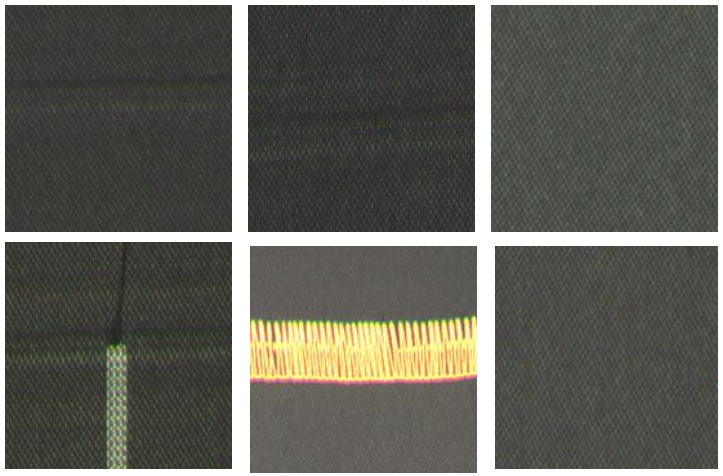


4

Our data comes from a tricky fabric manufacturing problem



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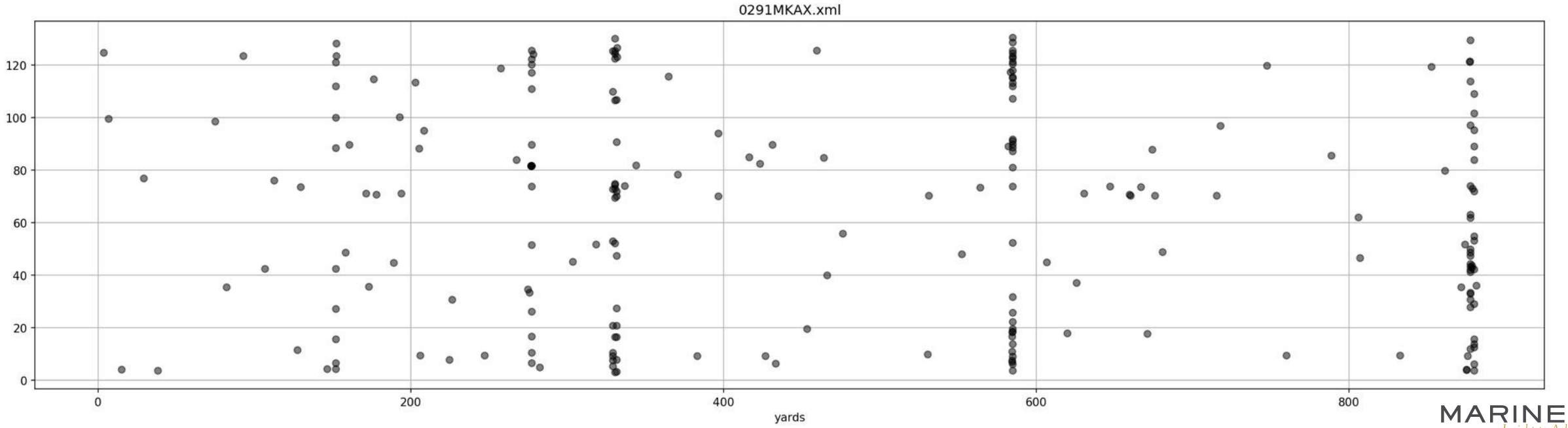

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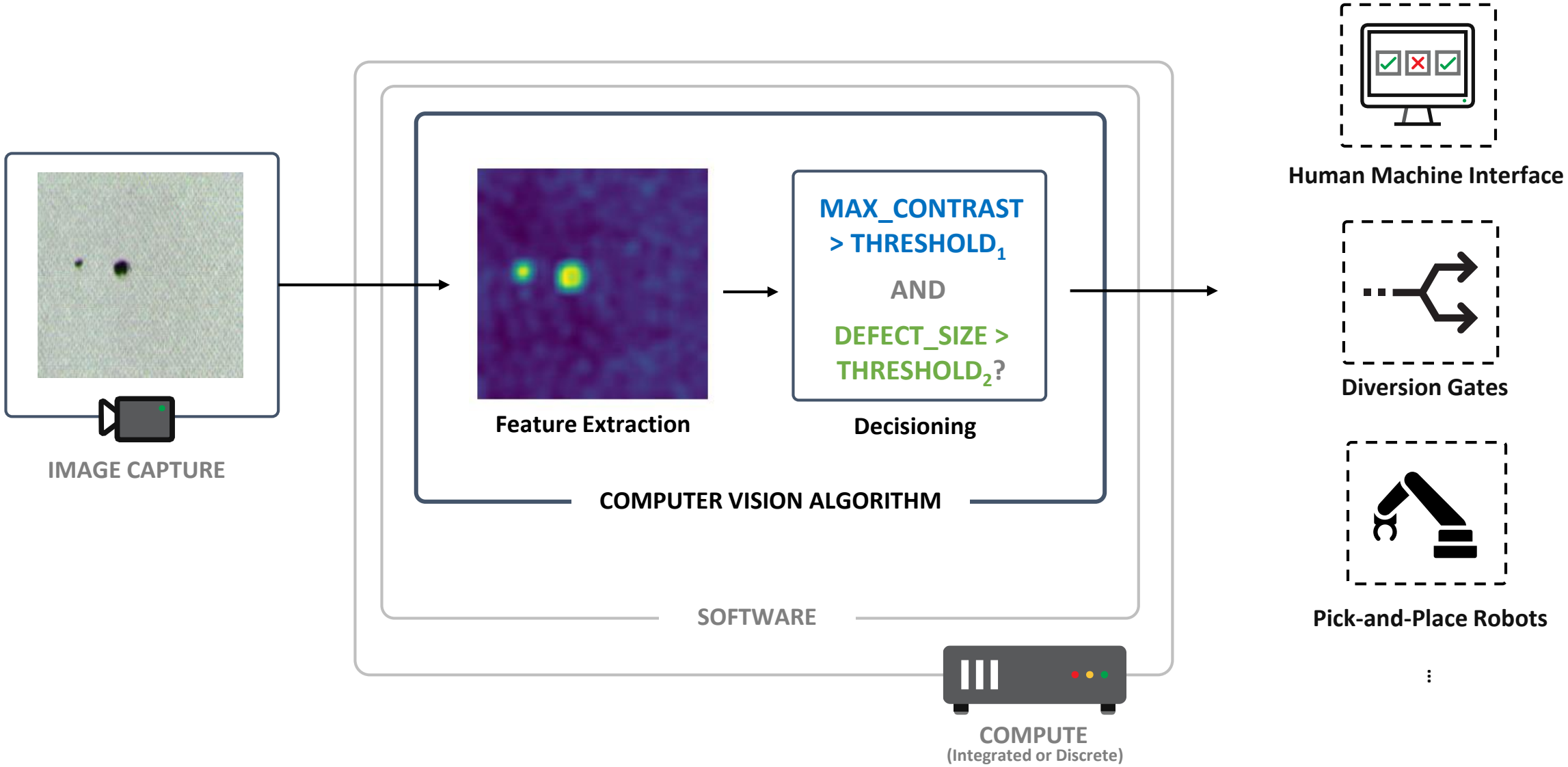
Traditional machine vision systems use a two step process to make decisions



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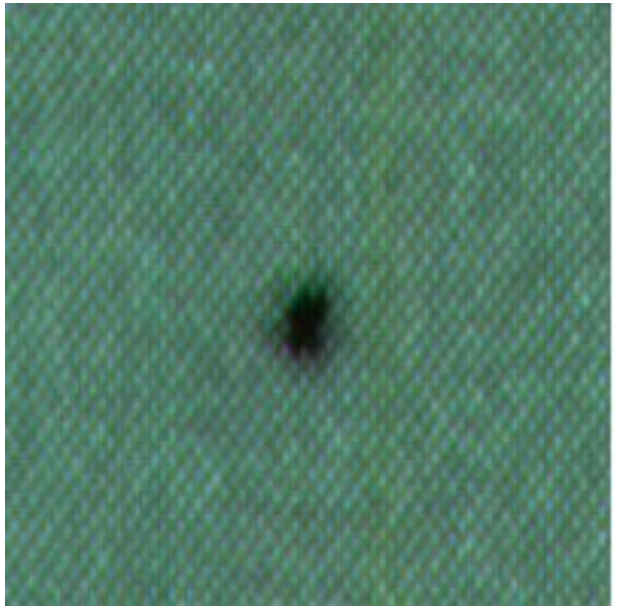
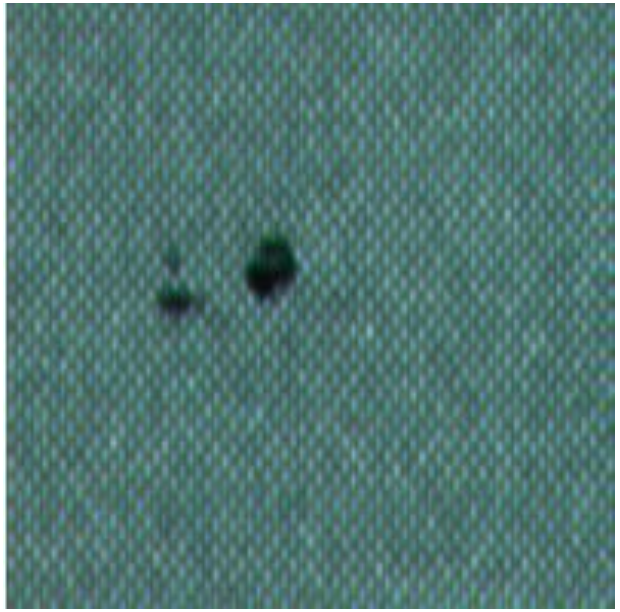
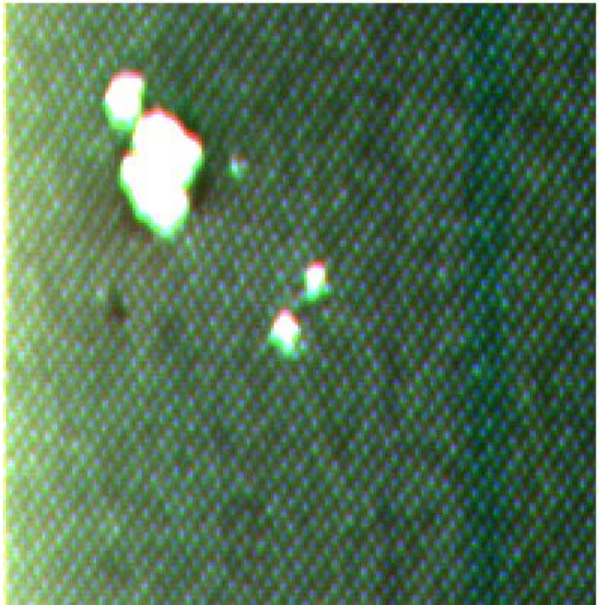


2



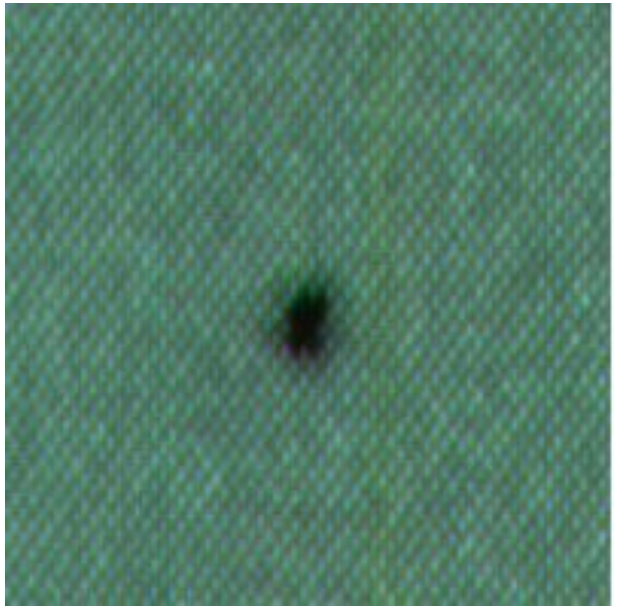
3



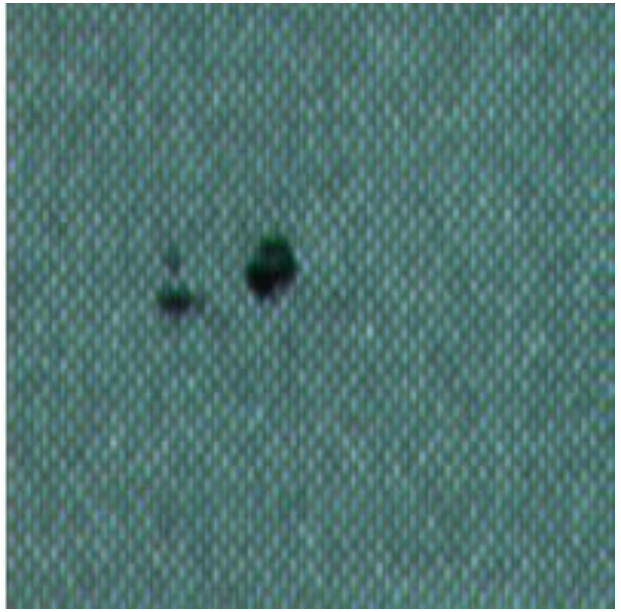
4

Which Images Show Defects?

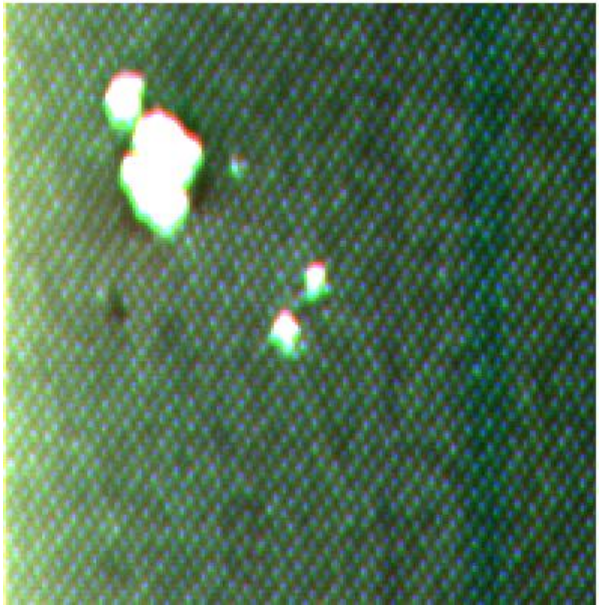
GOOD



DEFECTIVE



GOOD

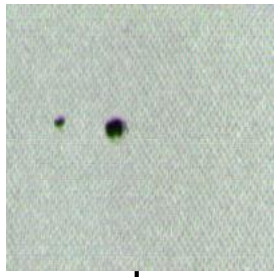


DEFECTIVE

TRADITIONAL MACHINE VISION

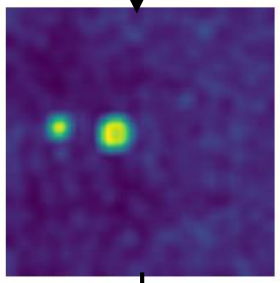
SPYGLASS VISUAL INSPECTION

IMAGE CAPTURE



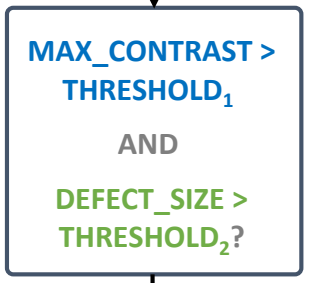
FEATURE EXTRACTION

These algorithms are typically designed once by vision system manufacturer, and “baked in” to production software.



DECISIONING

May consist of many tunable parameters, often difficult to find optimal configuration, even for experts.



PREDICTIONS/RESTULTS

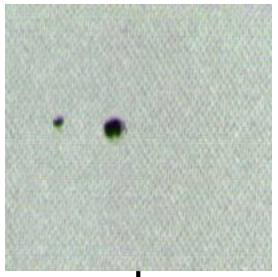
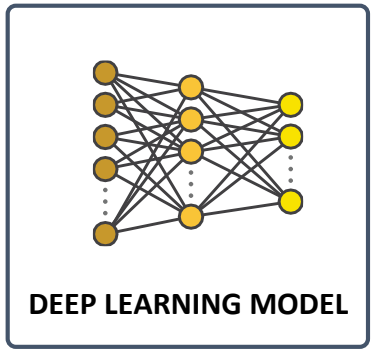


IMAGE CAPTURE



MODEL TRAINED ON YOUR DATA

Deep learning model trained using labeled examples from your experts, and updated as conditions change.

PREDICTIONS/RESULTS

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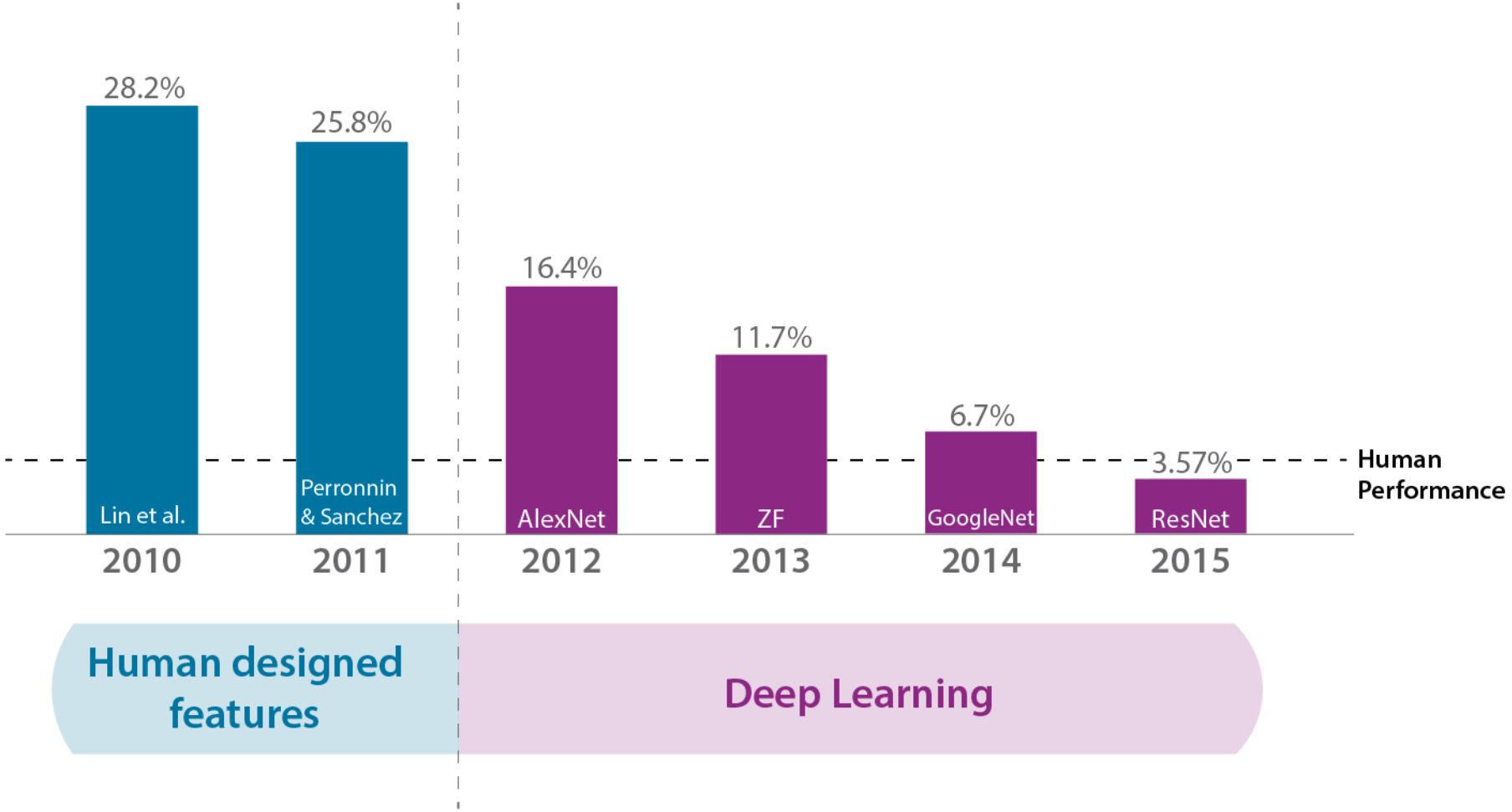
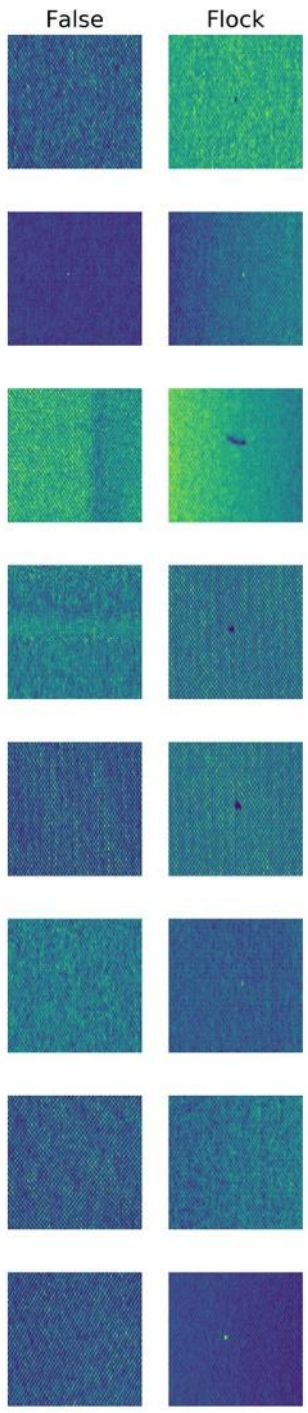
IMAGENET IMAGE CLASSIFICATION TOP-5 ERROR RATE

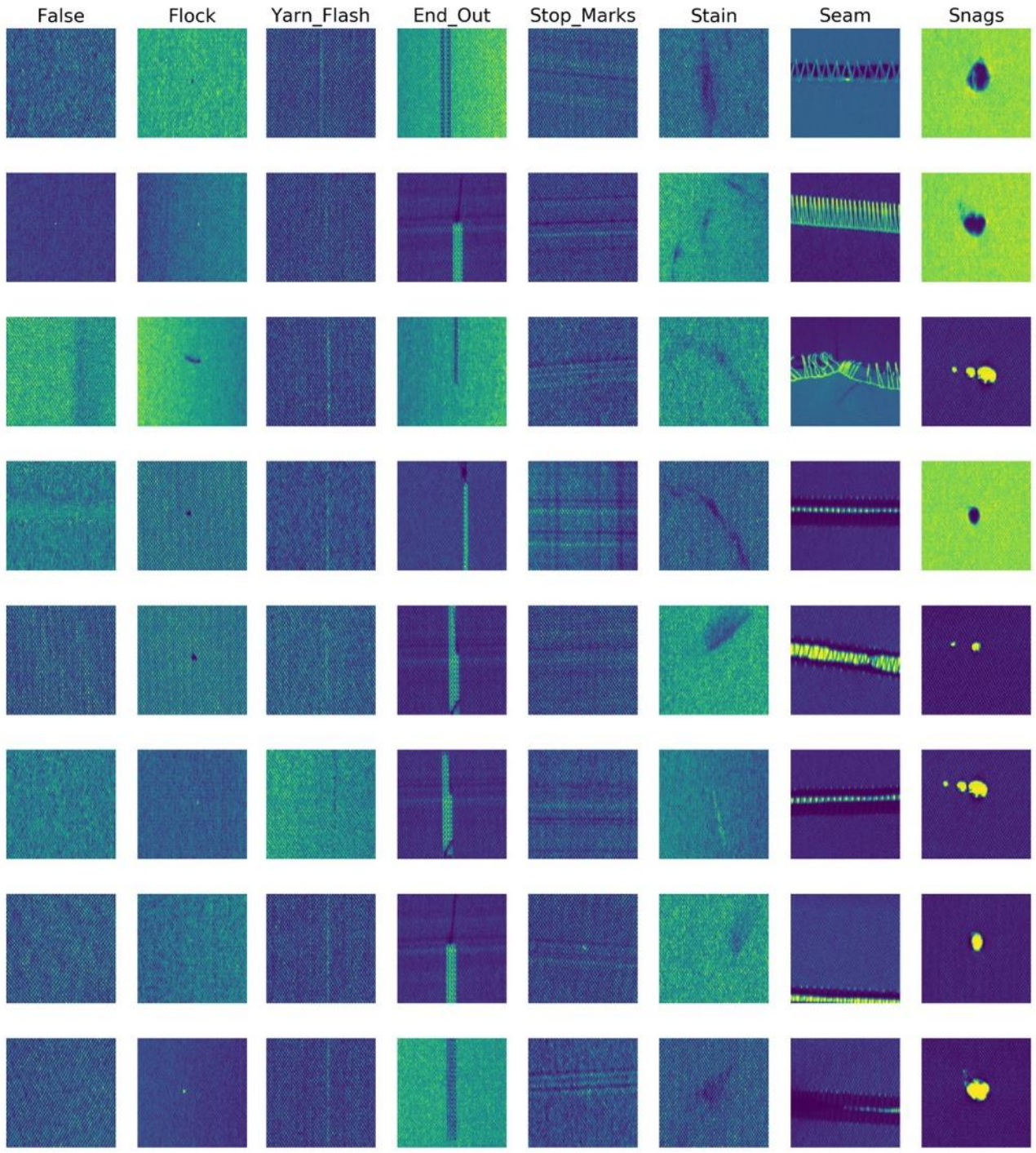
(ILSVRC, lower is better)



Alexnet Krizhevsky, Alex, Ilya Sutskever, and Geoffrey E. Hinton. "Imagenet classification with deep convolutional neural networks." *Advances in neural information processing systems*. 2012.
ResNet He, Kaiming, et al. "Deep residual learning for image recognition." *Proceedings of the IEEE conference on computer vision and pattern recognition*. 2016.



We begin by iteratively labeling a dataset with our customer.



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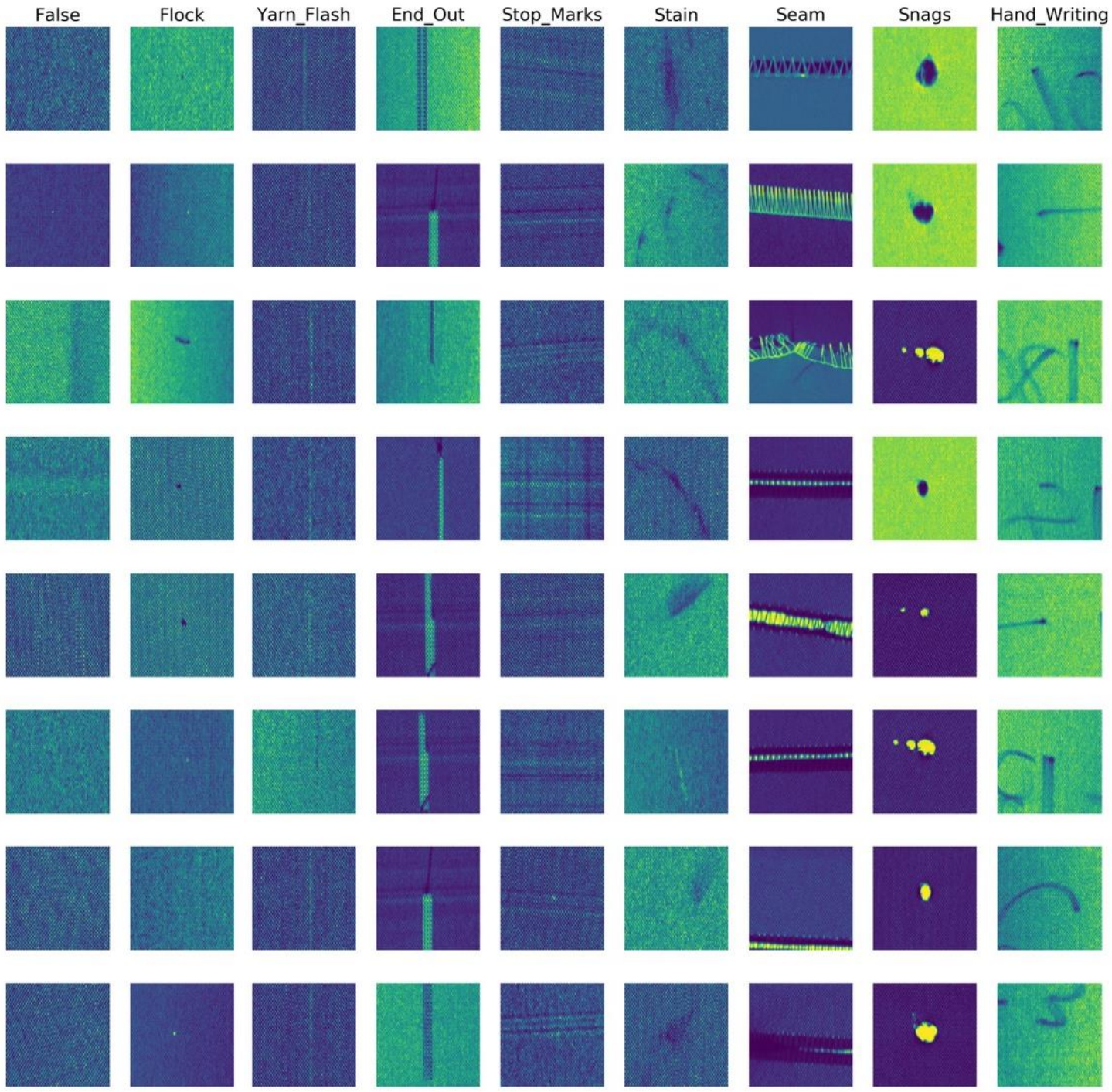

Containerizing and building on Azure IoT Edge lets us quickly make changes, add new classes, and deploy new models.

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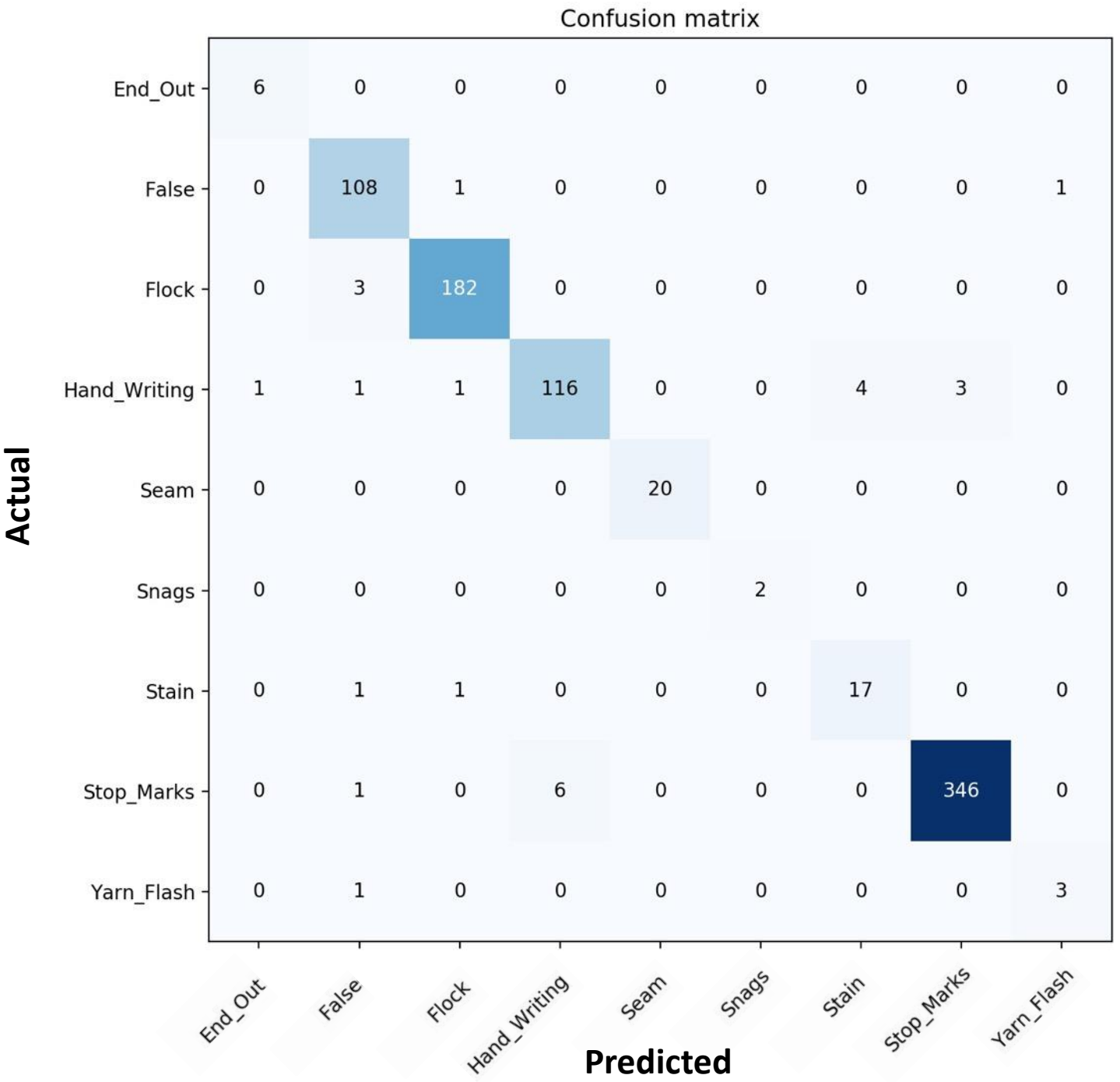

97.7%

ResNet Accuracy

Classification accuracy on held out test set

⬇ 30X

False Rejects Reduction

Reduced rate from 16.8 to 0.47 false rejects per 100 yds

⬆ 2-5X

Improvement Over Manual Inspection

Reduced False Reject Rate to 0.47 and False Negative Rate to <0.2, relative to manual inspection targets of 1/100yds

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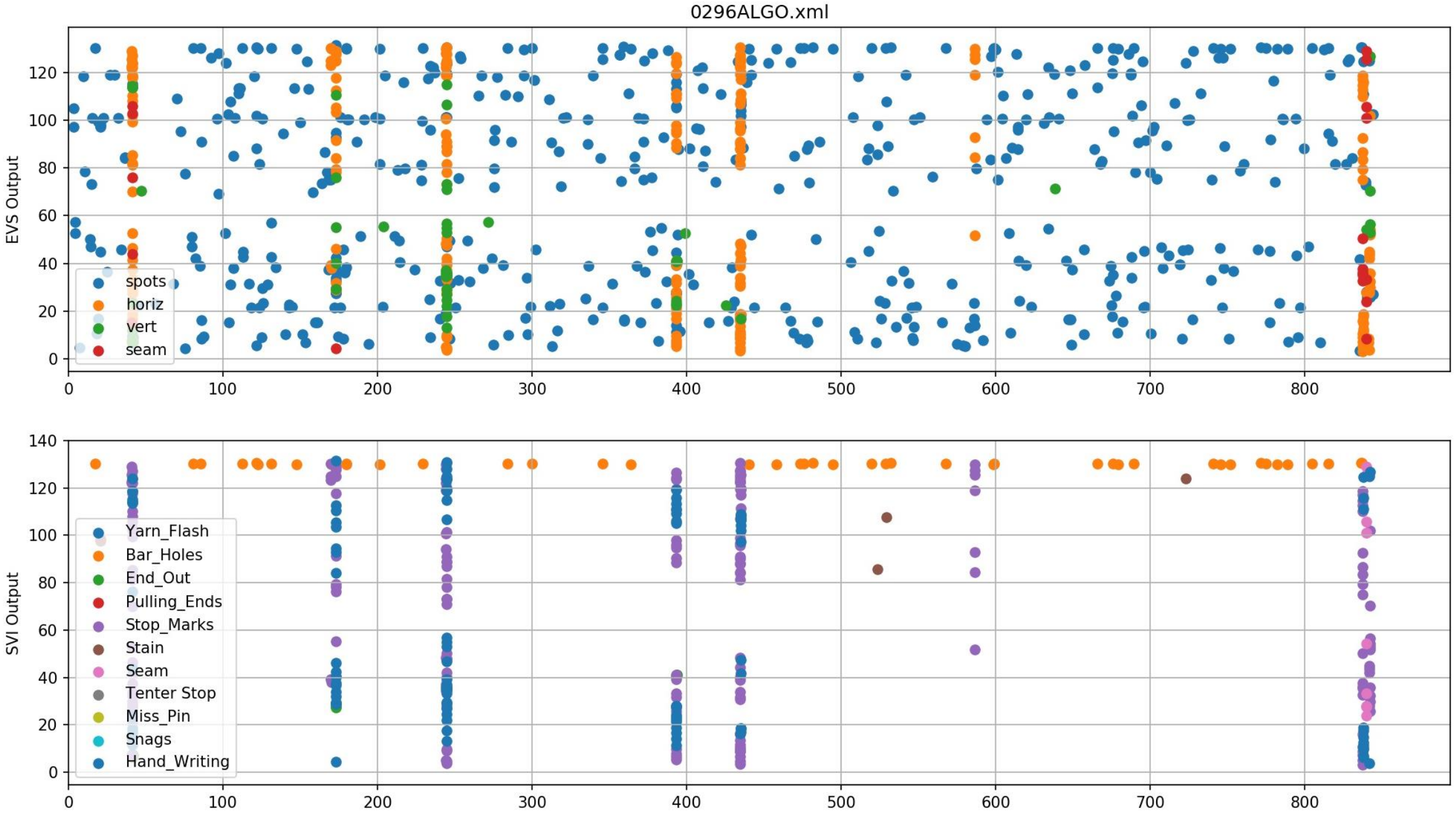
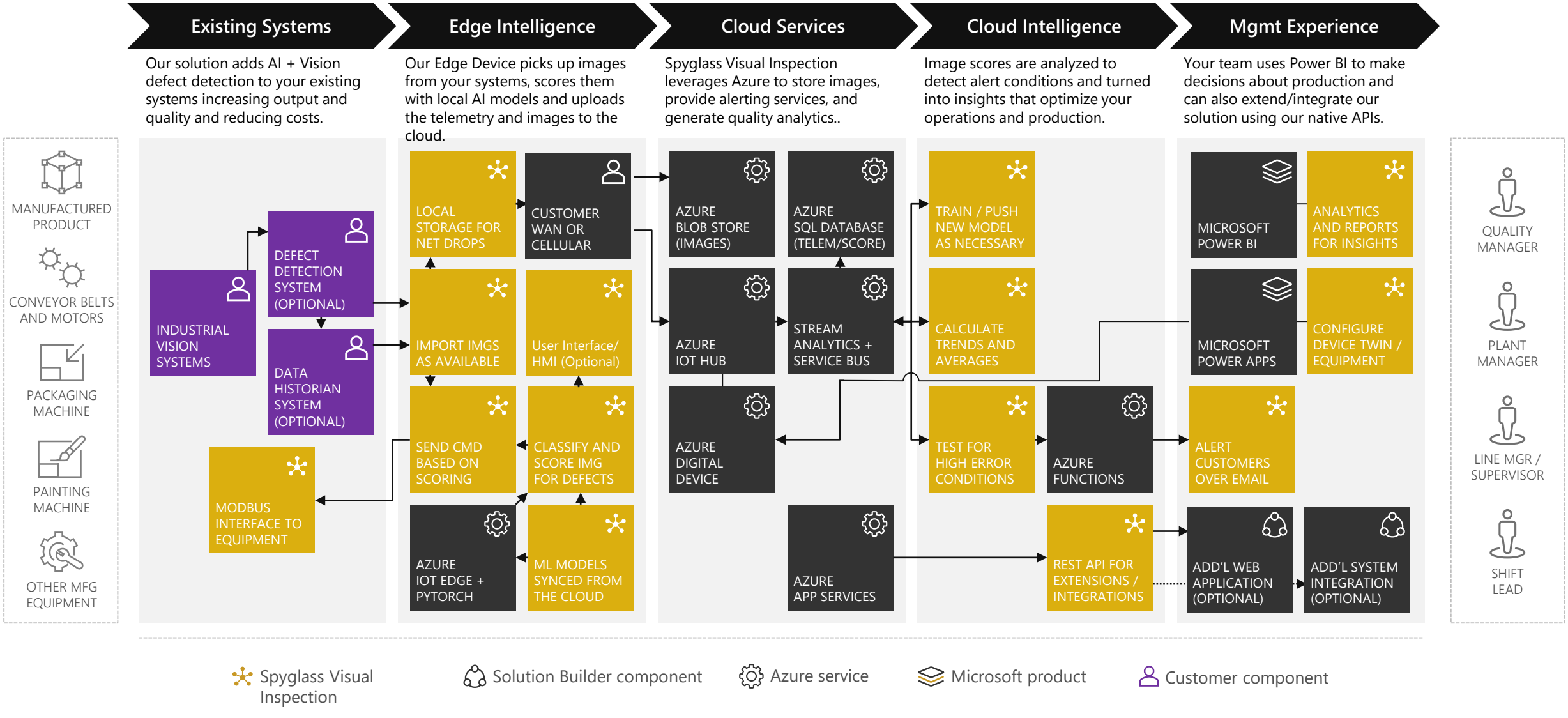
Insight to Achieve



Ok, great results! Now, how do we deploy and maintain?



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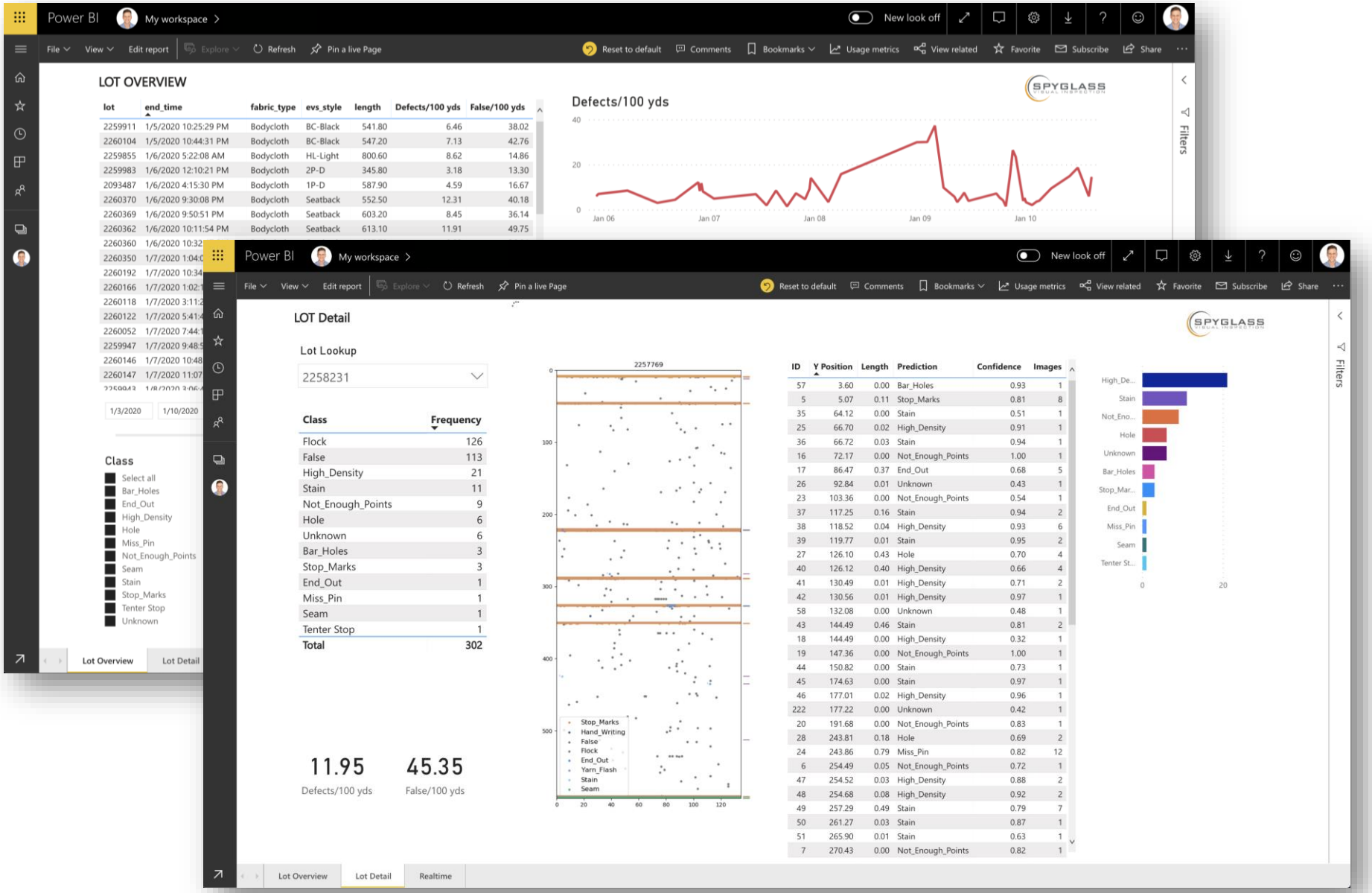
Spyglass delivers real-time monitoring and alerting through local HMIs and Power BI



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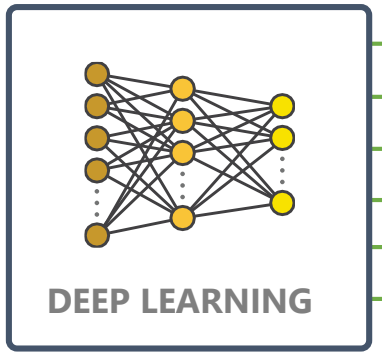
Deep Learning Drives Many Paths to Business Value



Precise, rapid, and adaptable visual inspection

Remove Defective Products Early in Production	⬇ 30X	False Rejects Reduction[1]
Improve Output Quality	⬇ 10X	Reduction in missed defects[2]
Reduce Required Inspection Resources	⬆ 2-5X	Improvement Over Manual Inspection[3]
Increase Production Speed	⬆ 20%	Increase in line speed
Monitoring + Alerting to Catch Quality Issues Early	<5	Minutes to detect quality problems[4]
Quality Issue Root Cause Analysis	20+	Varieties of defects detected

1. Reduced rate from 16.8 to 0.47 false rejects per 100 yds, relative to existing vision system
2. Relative to traditional machine vision system
3. Reduced False Reject Rate to 0.47 and False Negative Rate to <0.2, relative to manual inspection targets of 1/100yd
4. For Spyglass implementations built on Spyglass Connected Factory infrastructure

MARINER
Insight to Achieve

Mariner – Manufacturing Analytics

Analytics Teams-as-a-Service

Right-Sized, Agile AI/ML, IoT, Analytics, Data Science Teams

Project-based Services

BI/DW
Analytics
Reporting

IP Solutions

SPYGLASS CONNECTED FACTORY

SPYGLASS VISUAL INSPECTION

AI/MACHINE LEARNING DATA SCIENCE

MODERN DATA WAREHOUSE/ESTATE

DATA VISUALIZATION

CLOUD DATA PLATFORM

INFORMATION LIFE CYCLE MANAGEMENT & GOVERNANCE

IOT AND IOT EDGE

Deep Learning. **Delivered.**

Our Guaranteed Approach to Visual Inspection

1

Define Success

The Spyglass team works with you to define your unique vision accuracy requirements.

2

Supply Images

Provide sets of images of your products that represent acceptable quality as well as images of each class of defect.

3

Prove it Works

Using supplied images, the Spyglass team builds an AI model demonstrating the success criteria

MARINER


Thank you!

Microsoft

IoT in Action

#IoTinActionMS