Microsoft

IoT in Action

#IoTinActionMS

Microsoft

Architecting the Intelligent Edge

Carl Coken
GM, Global Solutions Architect, Microsoft

Sarah Maston
Cloud Solution Architect, Microsoft

IoT in Action

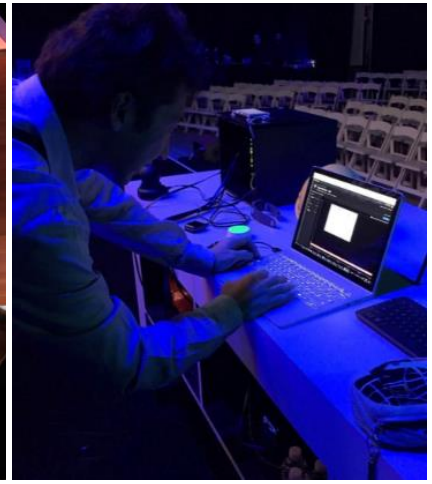
The Evolution of IoT in Action

ncd.io

Year 1 2017

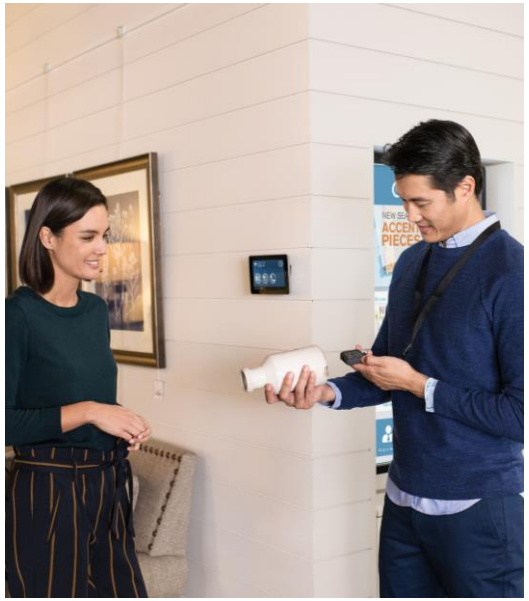
The Evolution of IoT in Action

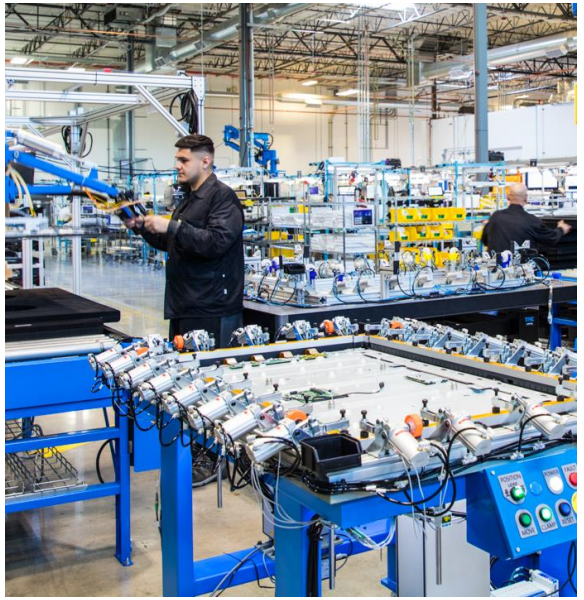
Insight



Year 2 2018

The Evolution of IoT in Action





Year 3 2019

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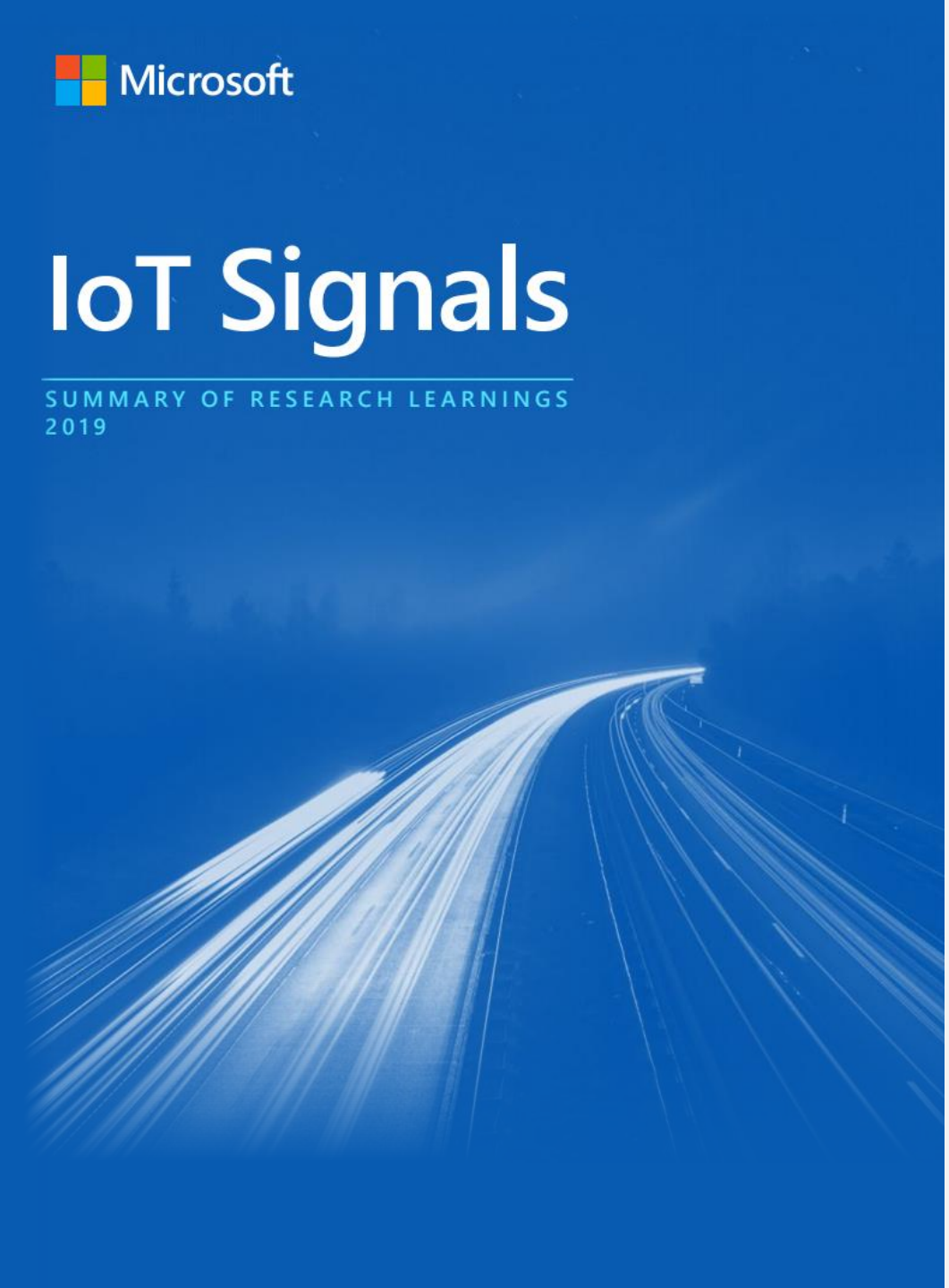
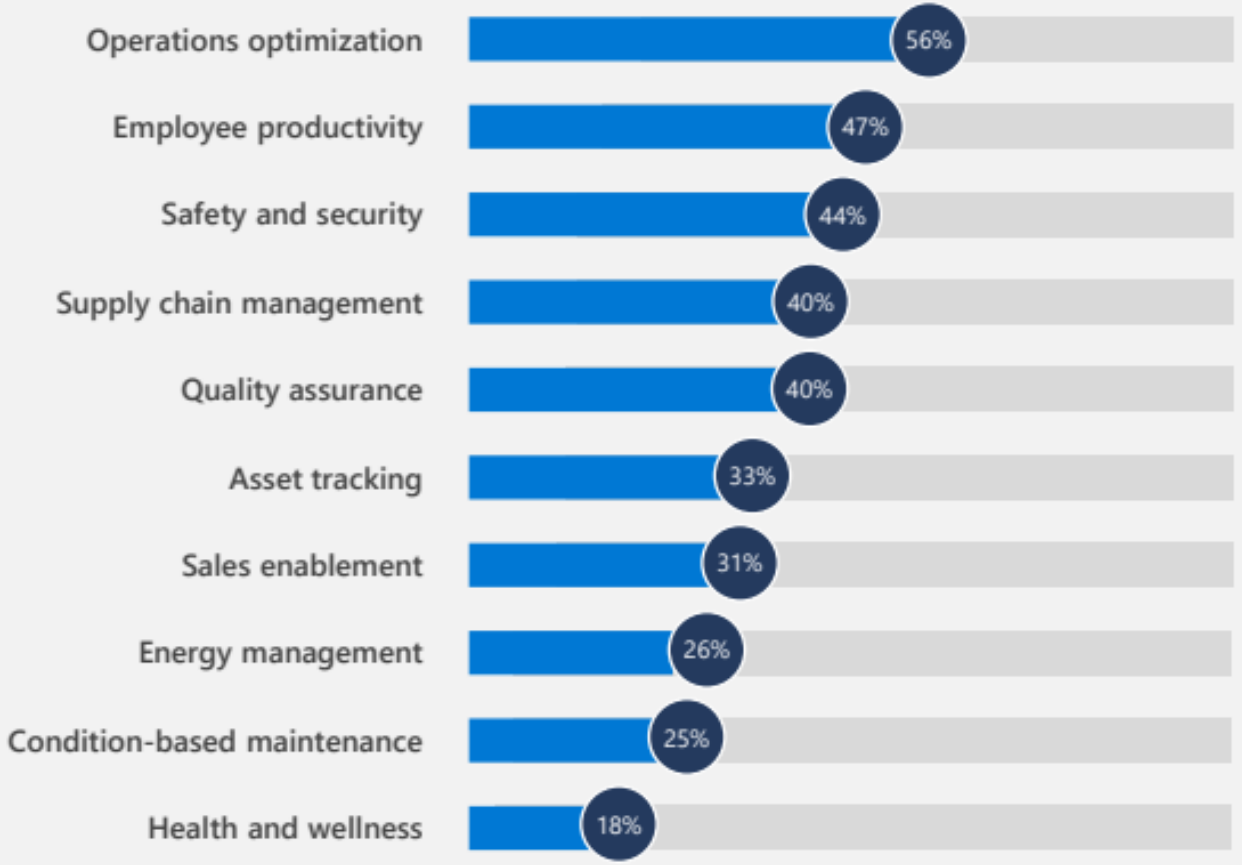
IoT Signals

SUMMARY OF RESEARCH LEARNINGS
2019



Reasons for IoT adoption



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IoT Signals

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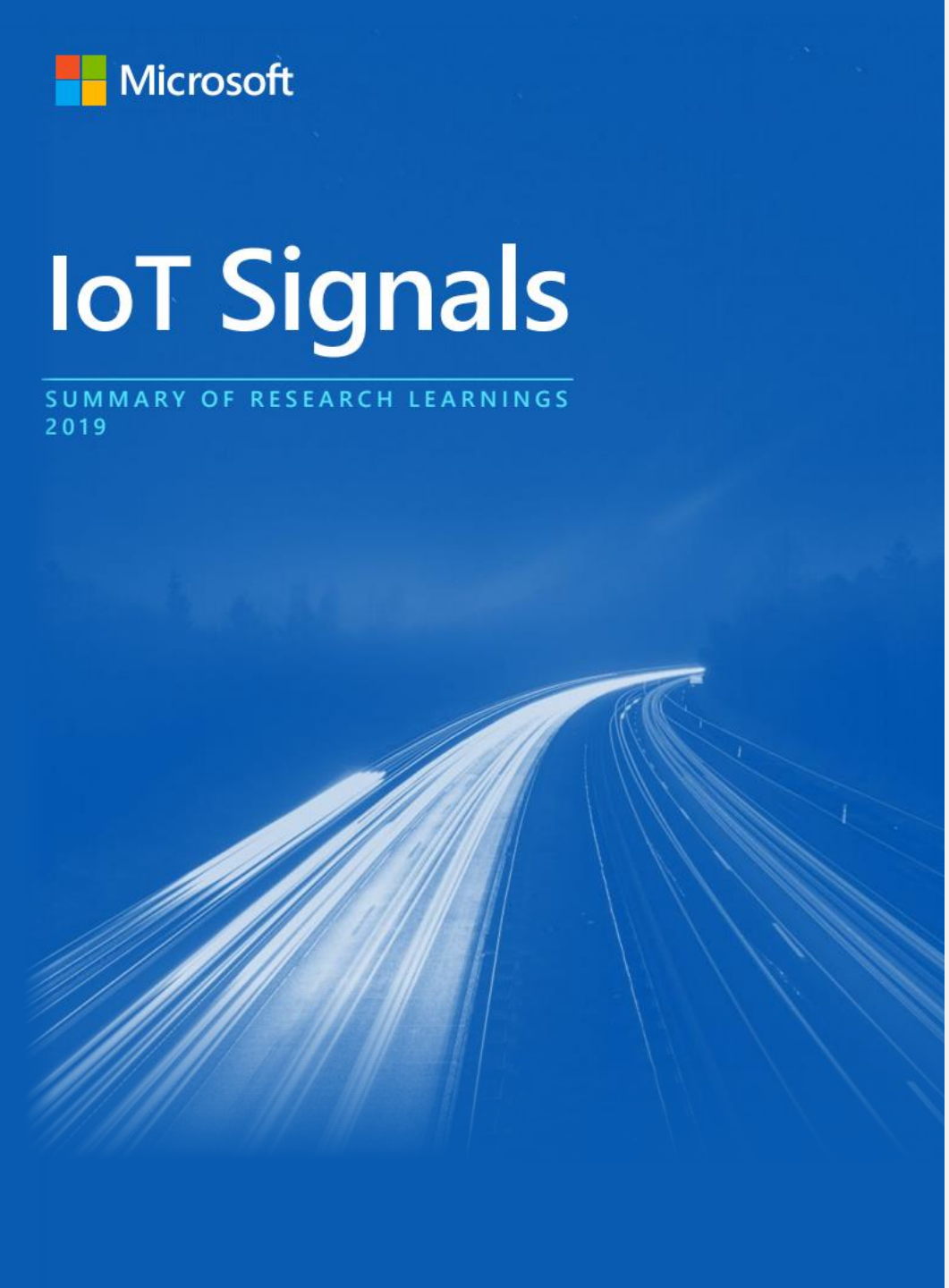
2019



Additional top use case by industry

RETAIL/ WHOLESALE

Supply chain optimization	64%
Inventory optimization	59%
Surveillance and security	48%
Loss prevention	44%
Energy optimization	40%

TRANSPORTATION

Fleet management	56%
Security, surveillance, and safety	51%
Manufacturing operations efficiency	40%
Vehicle telematics and infotainment	38%
Predictive maintenance	33%

GOVERNMENT

Public Safety	48%
Infrastructure and facilities management	40%
Regulations and compliance management	38%
Fleet and asset management	37%
Incident response	29%

HEALTHCARE

Tracking patient, staff, and inventory	66%
Remote device monitoring and service	57%
Remote health monitoring and assistance	55%
Safety, security, and compliance	53%
Facilities management	42%

Microsoft

IoT Signals

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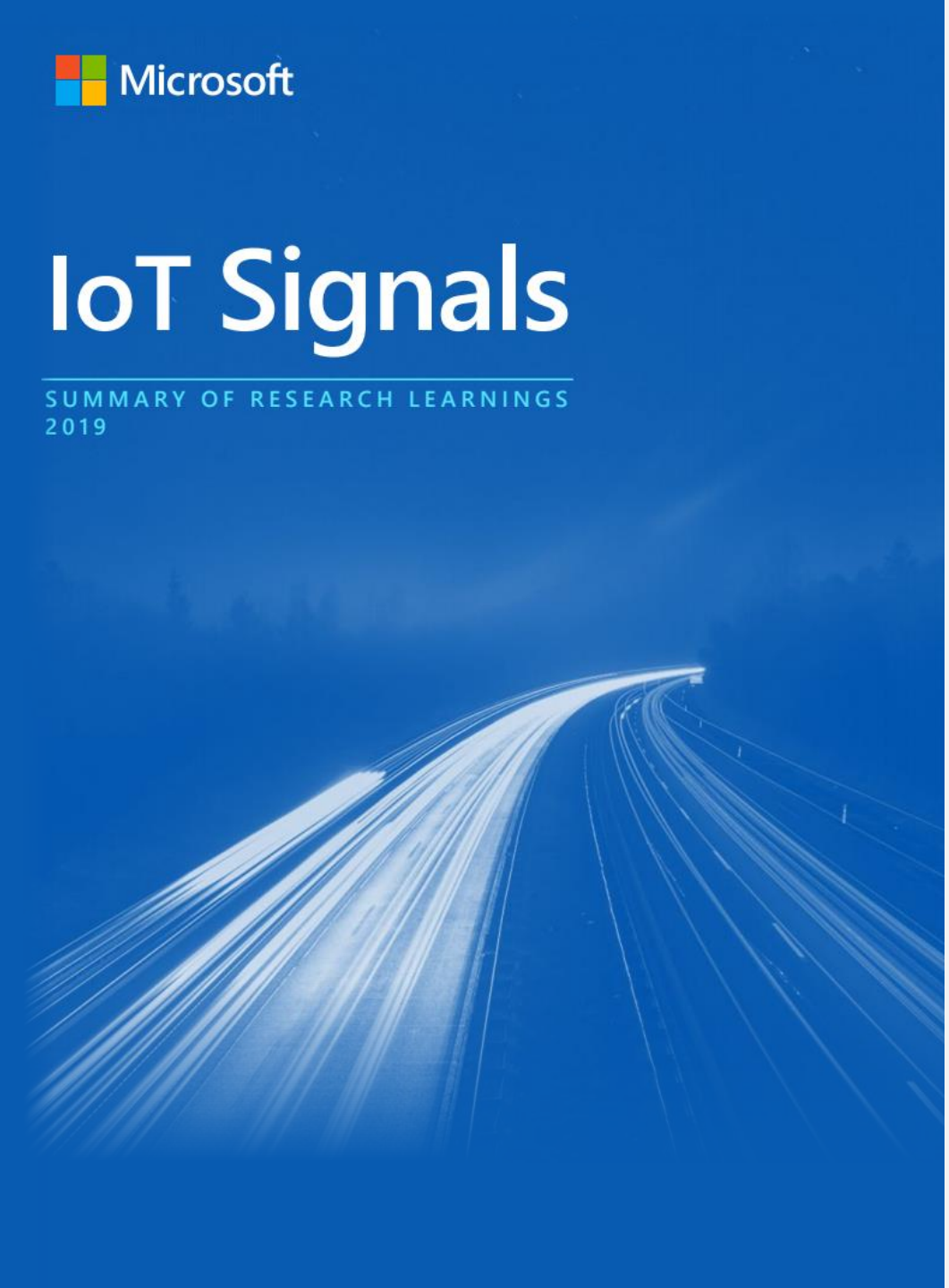
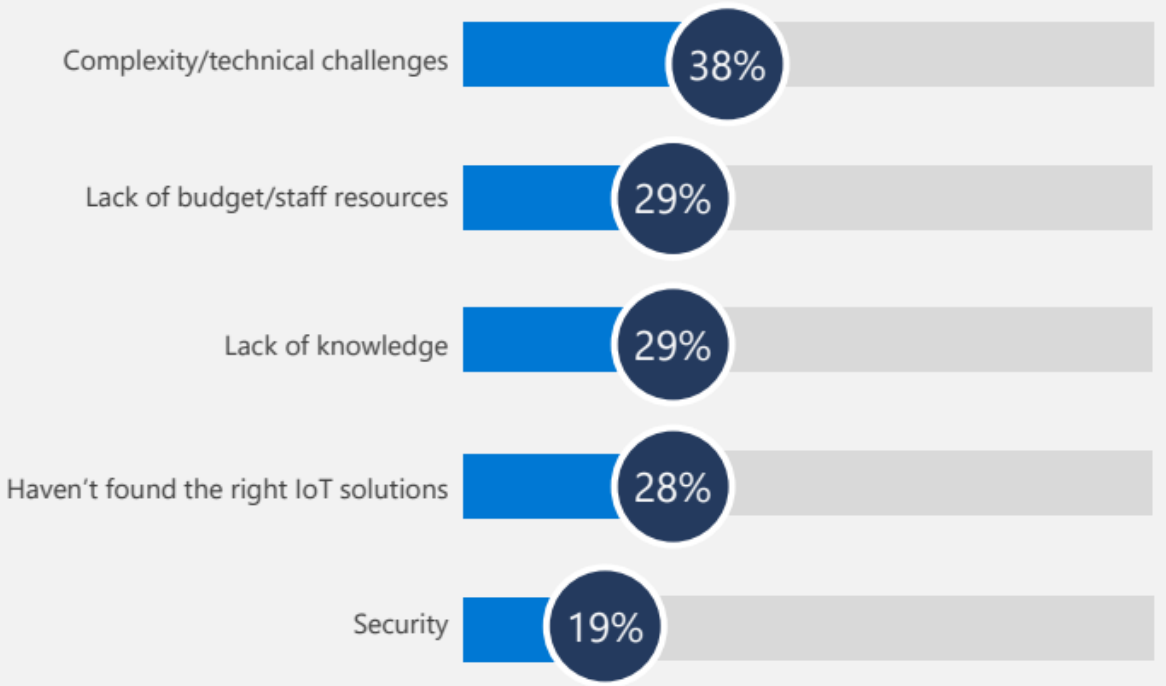
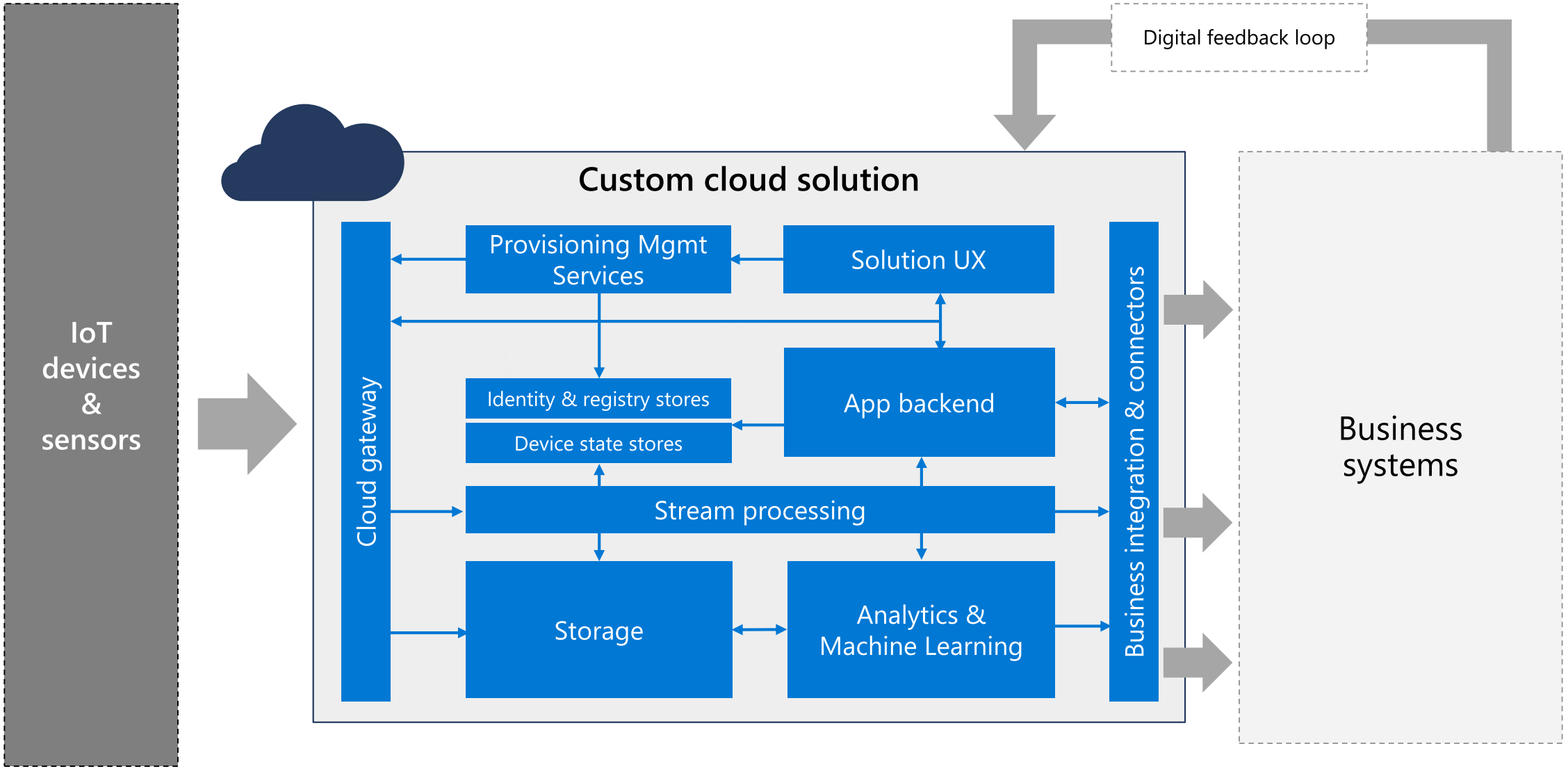


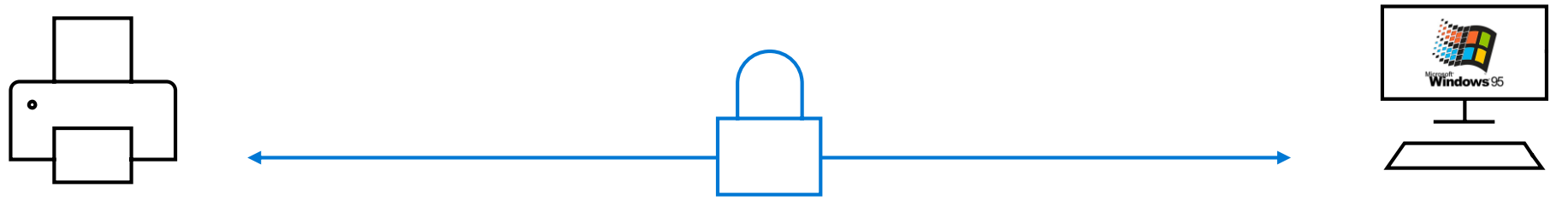
Top challenges



Solution architecture—DIY



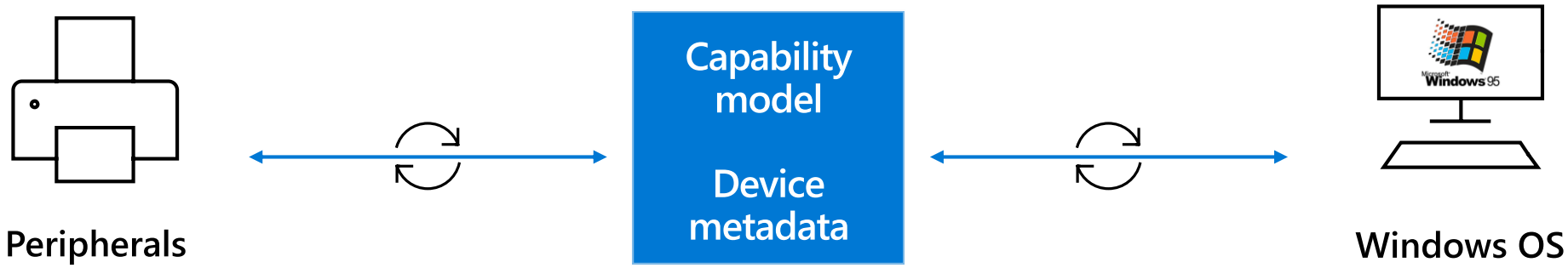
We had a similar challenge in the past…



Peripherals

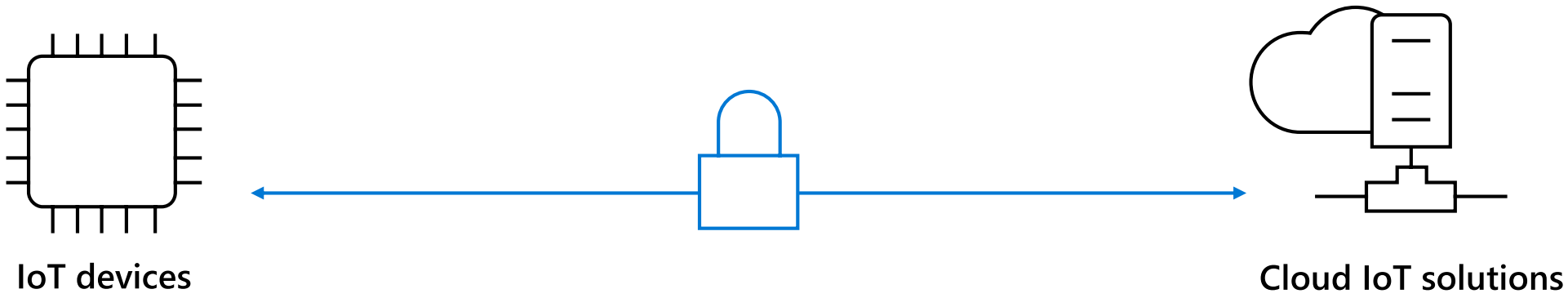
Windows OS

That was solved with Windows Plug and Play



Devices published their capability models and adhered to them
Windows used the capability model to know how to interact with them

IoT today



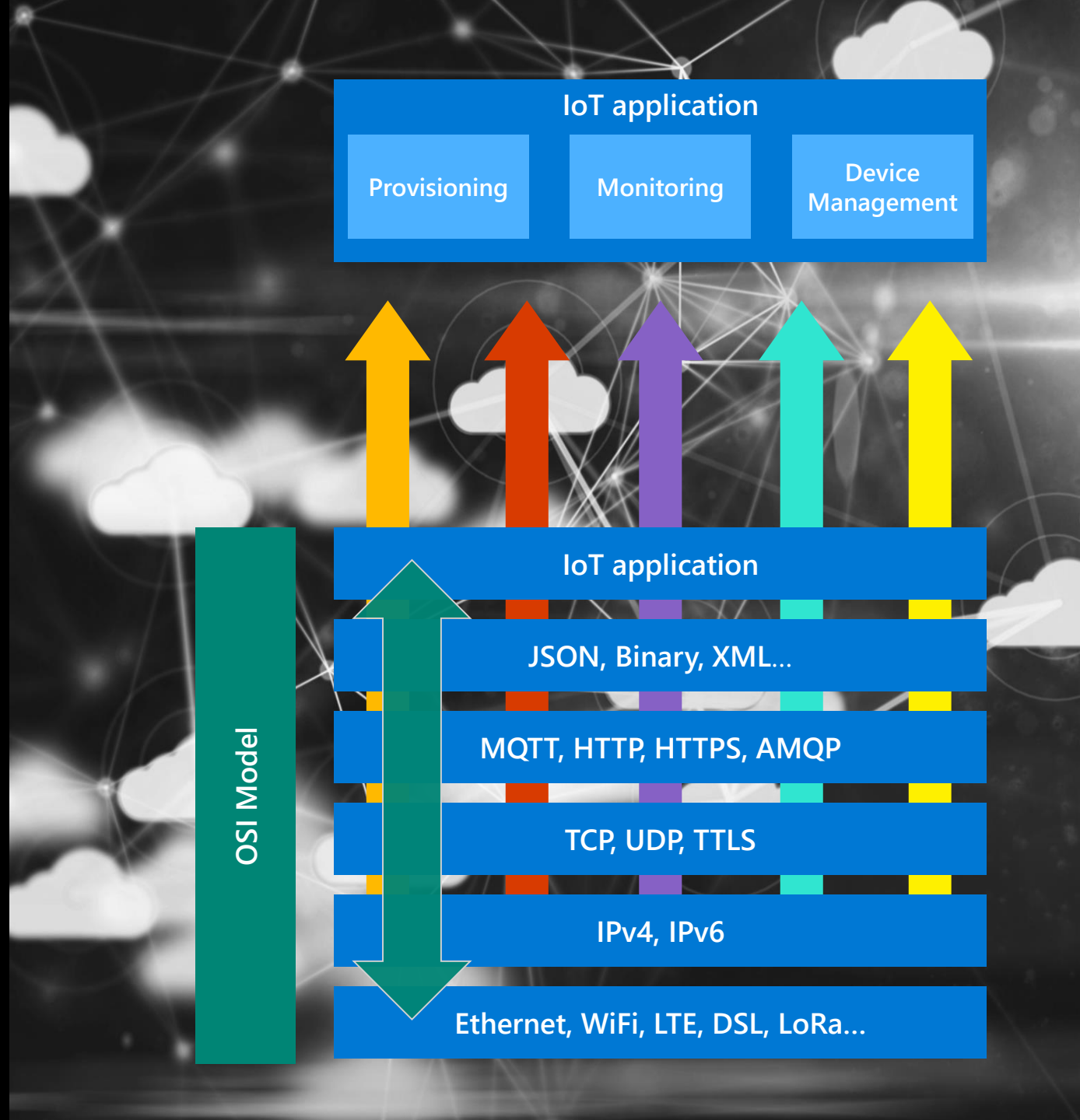
Tight coupling between software on device and IoT solution in the cloud

IoT Plug and Play + Azure IoT Central

with Daisuke Nakahara, Principal IoT Solution Architect, Microsoft

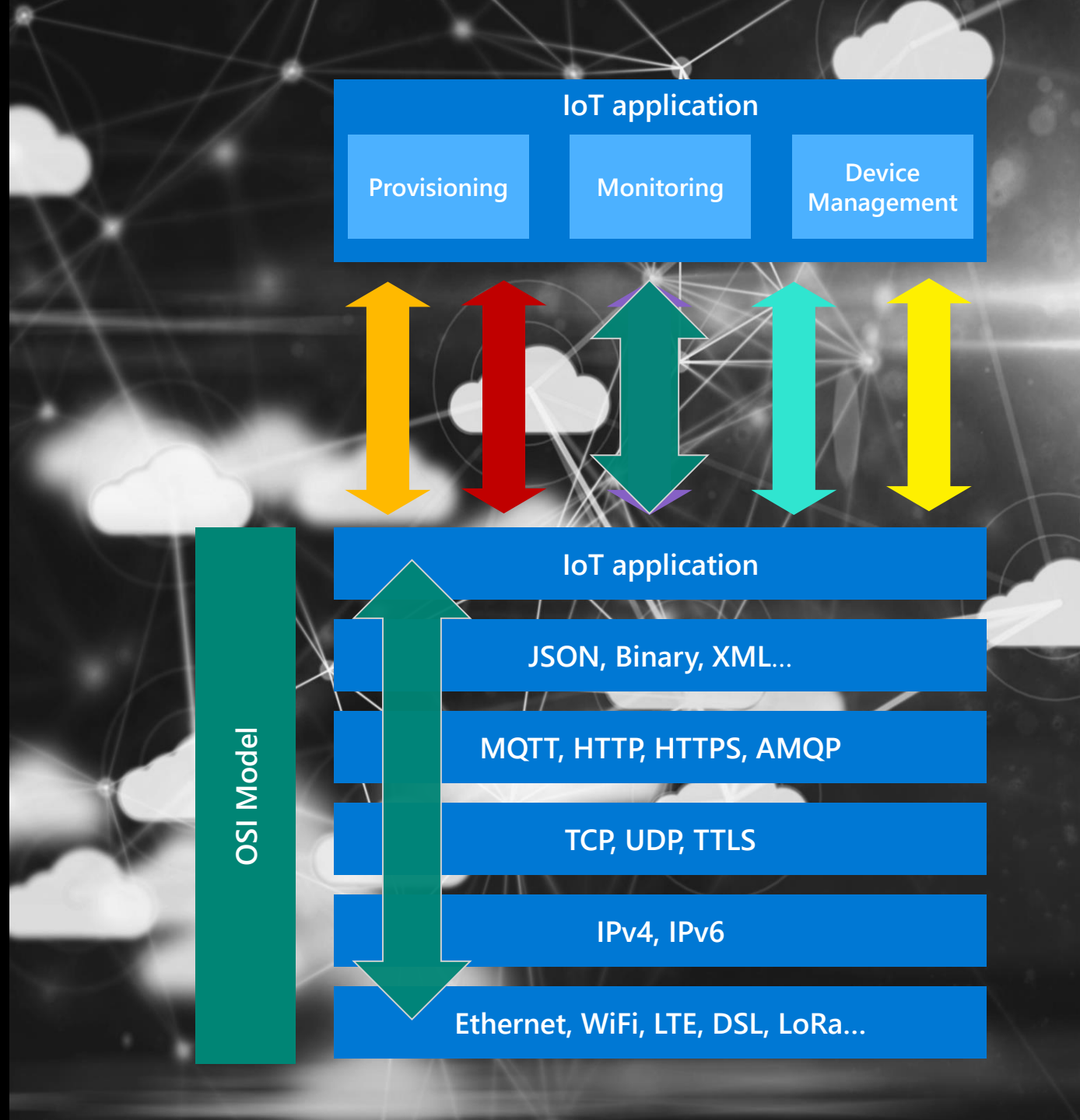
Connecting hardware is very "hard"

- Provisioning
- Configuration
- Device management
- Deployment
- Monitoring



IoT Plug and Play defines common language

- A platform feature to describe models and capabilities to Cloud
- Based on Digital Twin definition language
  - Open source based on open standards (JSON-LD, RDF)



Benefits

Solution developers

Dramatically reduces the effort needed to build software on devices

Customers and partners

Large ecosystem of devices that just work with Azure IoT solutions, without any development required

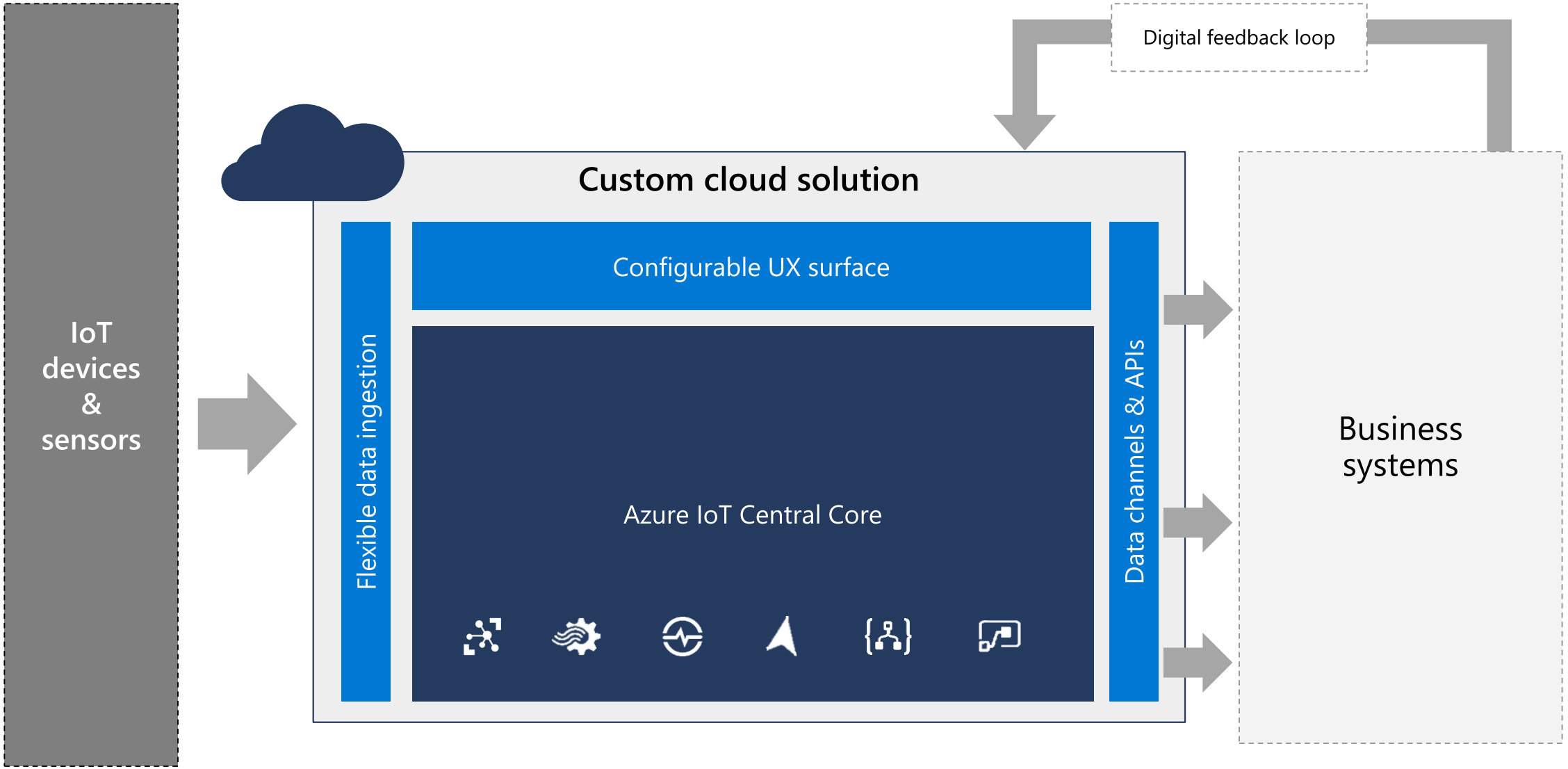
Device builders

Certify your device for IoT Plug and Play and it can be used with thousands of Azure IoT solutions

In public preview

http://aka.ms/IoTPlugandPlay

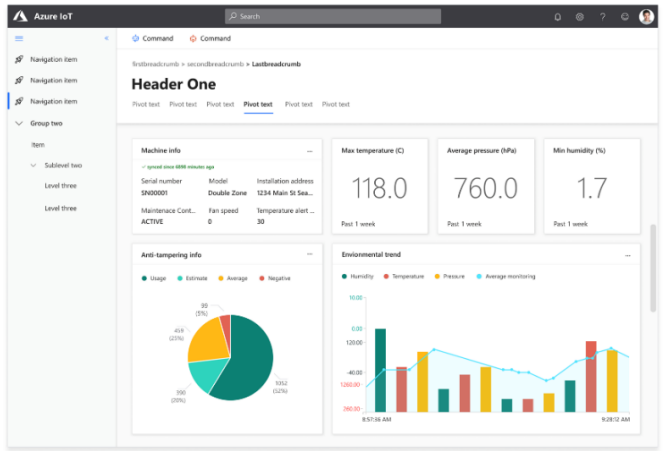
Solution architecture—IoT Central



Azure IoT central

IoT app platform with security, global scale, high availability, disaster recovery built in

- Device connectivity and management
- Telemetry ingestion and command and control
- Monitoring rules and triggered actions
- User roles and permissions
- Dashboards, visualization and insights
- Fully hosted and managed by Microsoft



- Maps, location telemetry and geofencing
- Device Bridge
  Ingest data from other clouds
- Continuous Data Export
  Bring data into downstream business applications

- White labeling
  Your SaaS—your brand
- IoT Plug and Play
  Public preview

Challenge #1

Getting connected

Challenge #2

Making it easier to combine services to “do something”

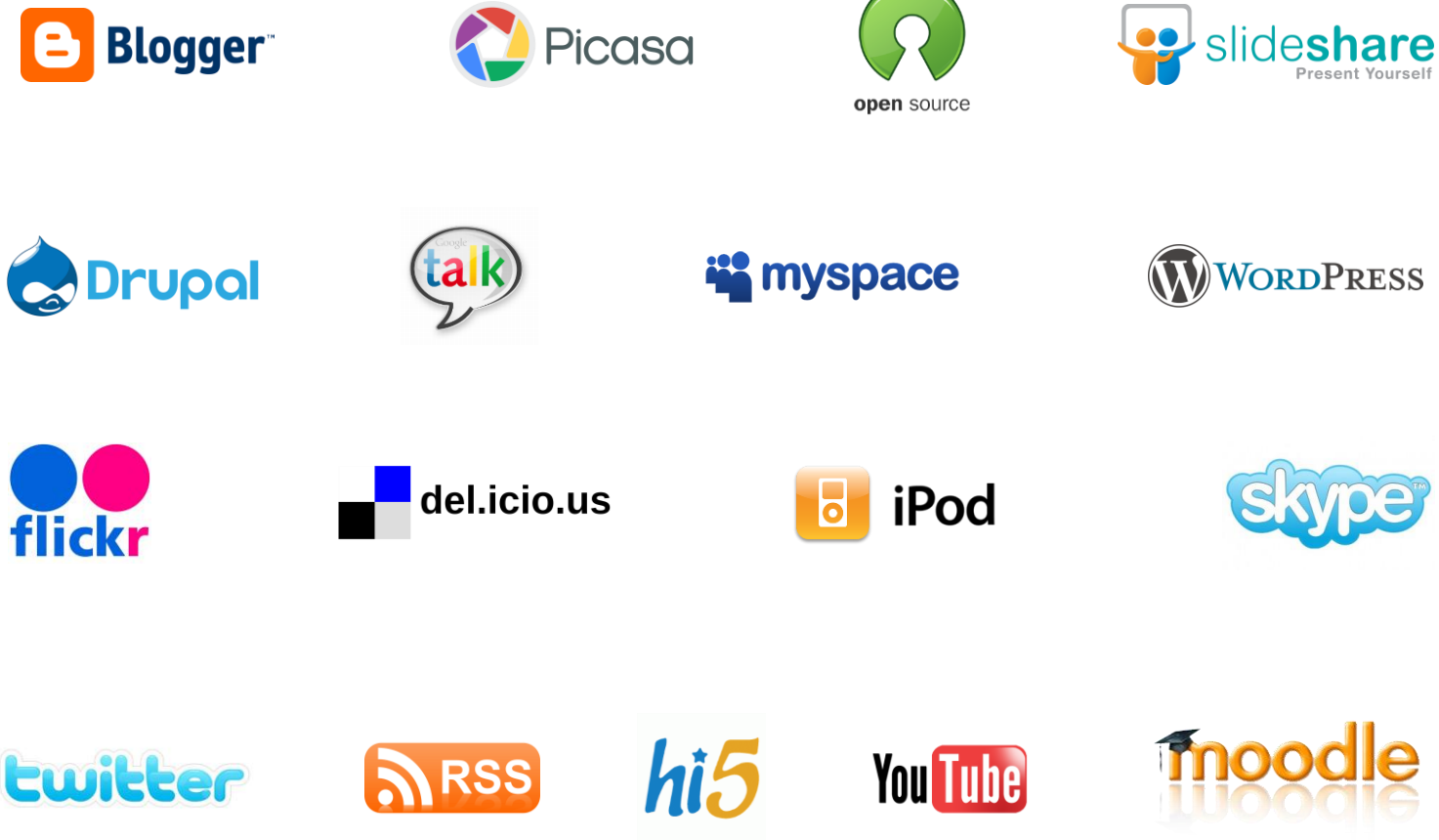
Challenge #3

Making it easier to use the data; it’s massive

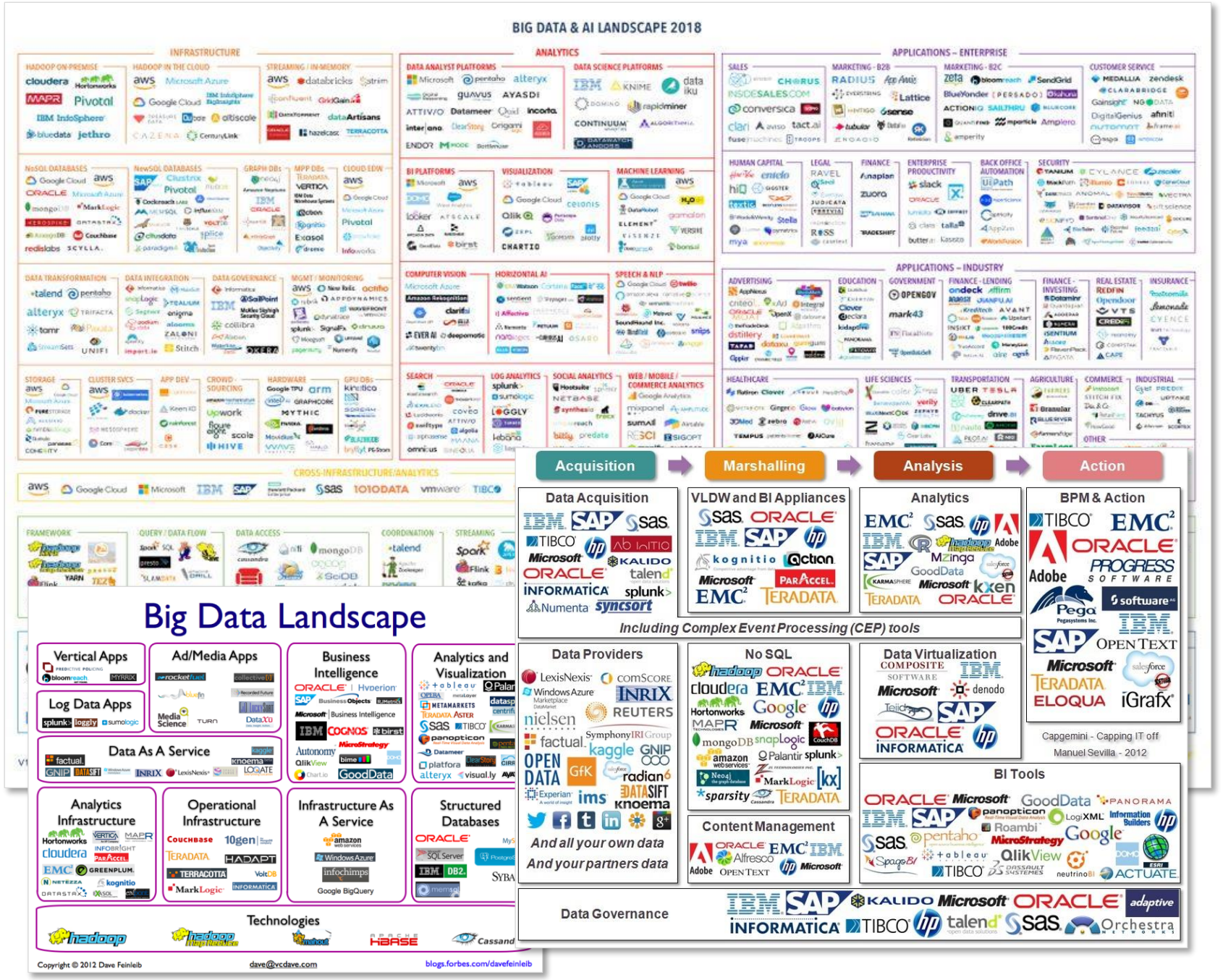
“We’ve been here before”

“Big Data” started with Web 2.0

Web 2.0 technologies

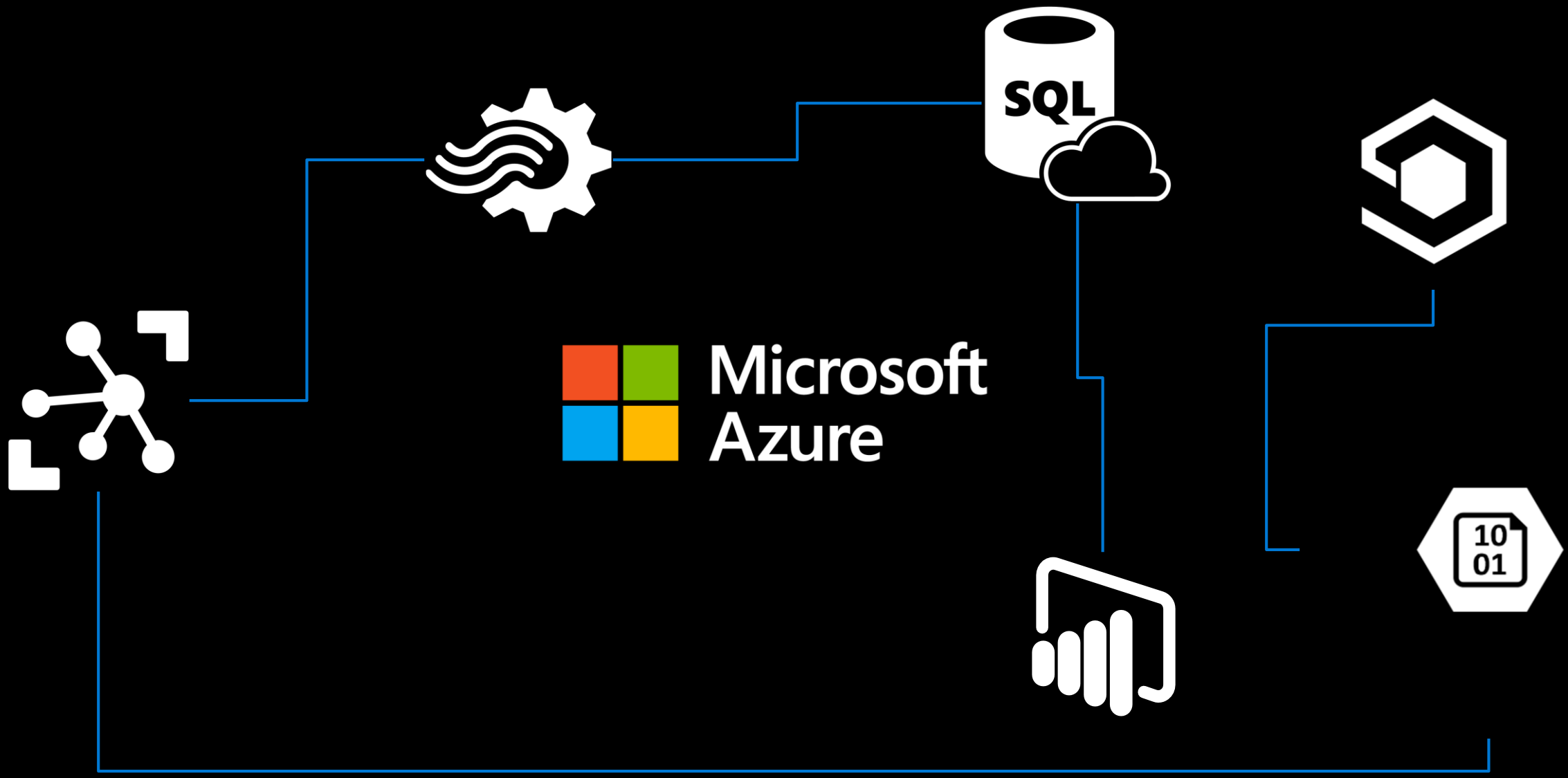


Remember these?



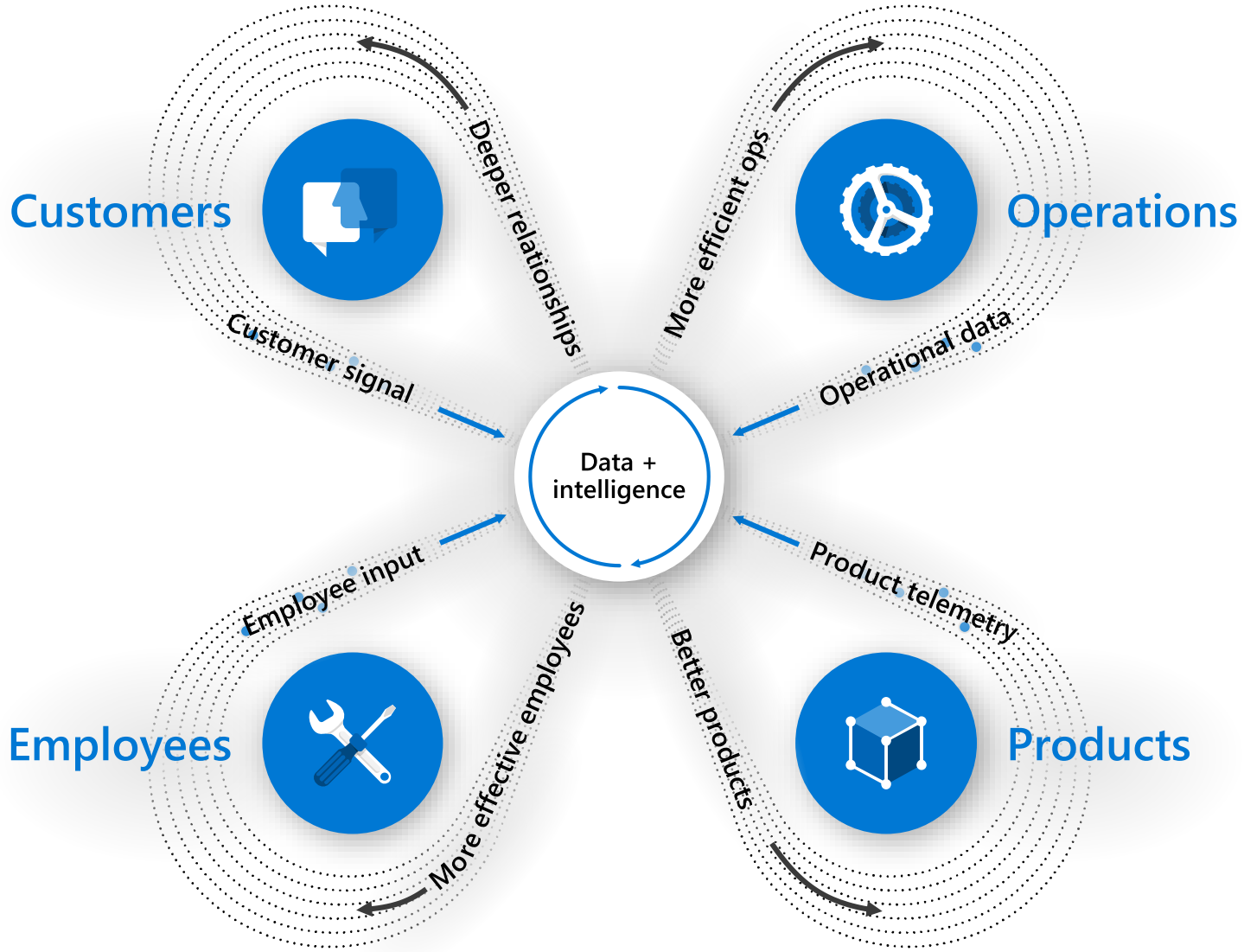
“Big Data” challenge 2.0


Microsoft
Azure


SQL
Microsoft
Azure
10
01

The digital feedback loop

1. Data: Capture digital signal across business
2. Insight: Connect and synthesize data
3. Action: Improve business outcomes



What is confidential computing?

The ability to store, transport, **and act** on compute workloads without compromising privacy of data and intellectual property

Why confidential computing in IoT

Intelligent edge computing creates the need to protect code and data in use in addition to protection in storage and transit

Code and data confidentiality

Proprietary code and algorithms

Sensitive data like patient information and ML models

Actions from insights

Safe actions from insights out of intelligent edge processing

Trustworthy I/O for command and control of critical infrastructure

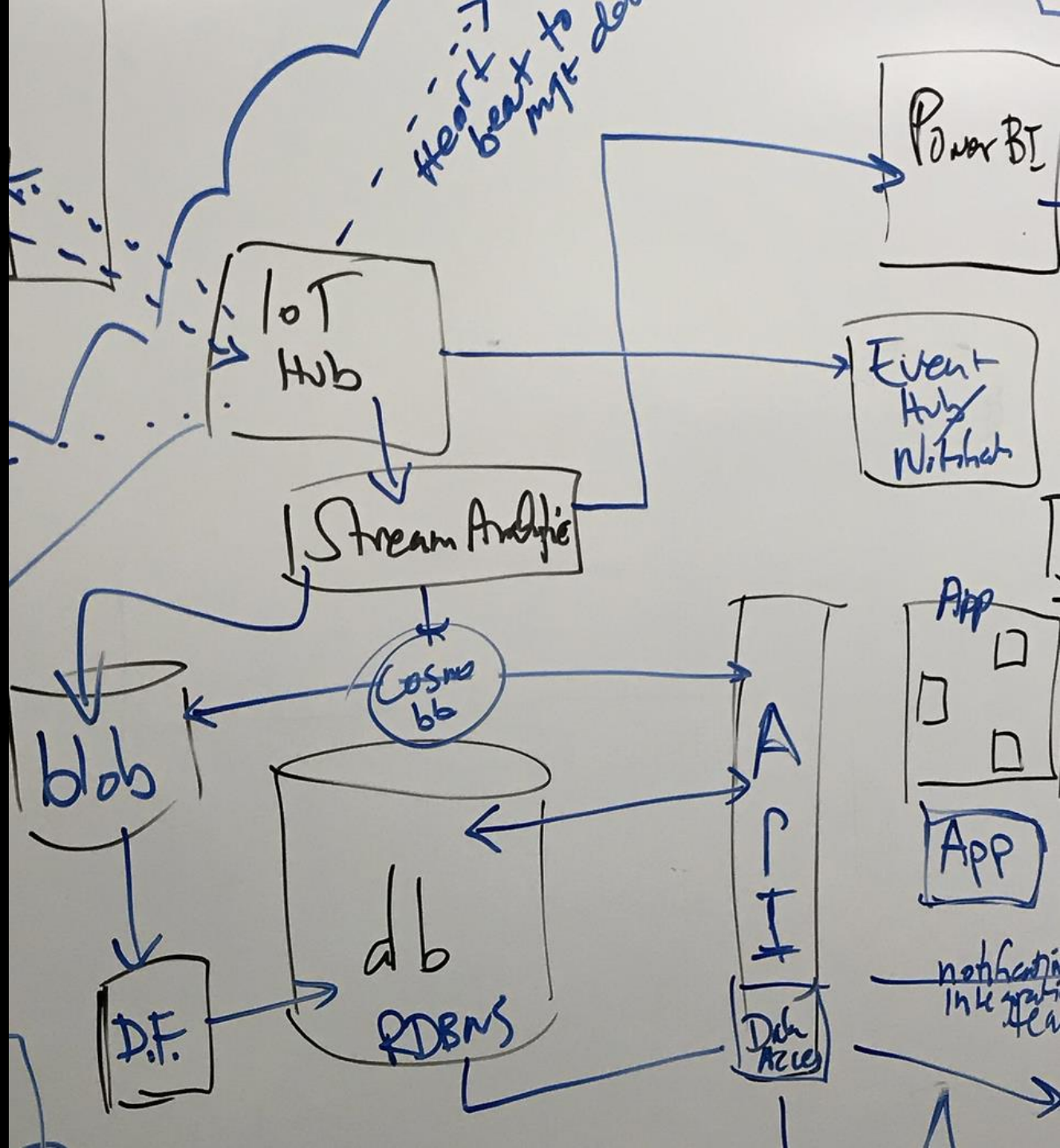
Valued transactions

Metering actions for billing

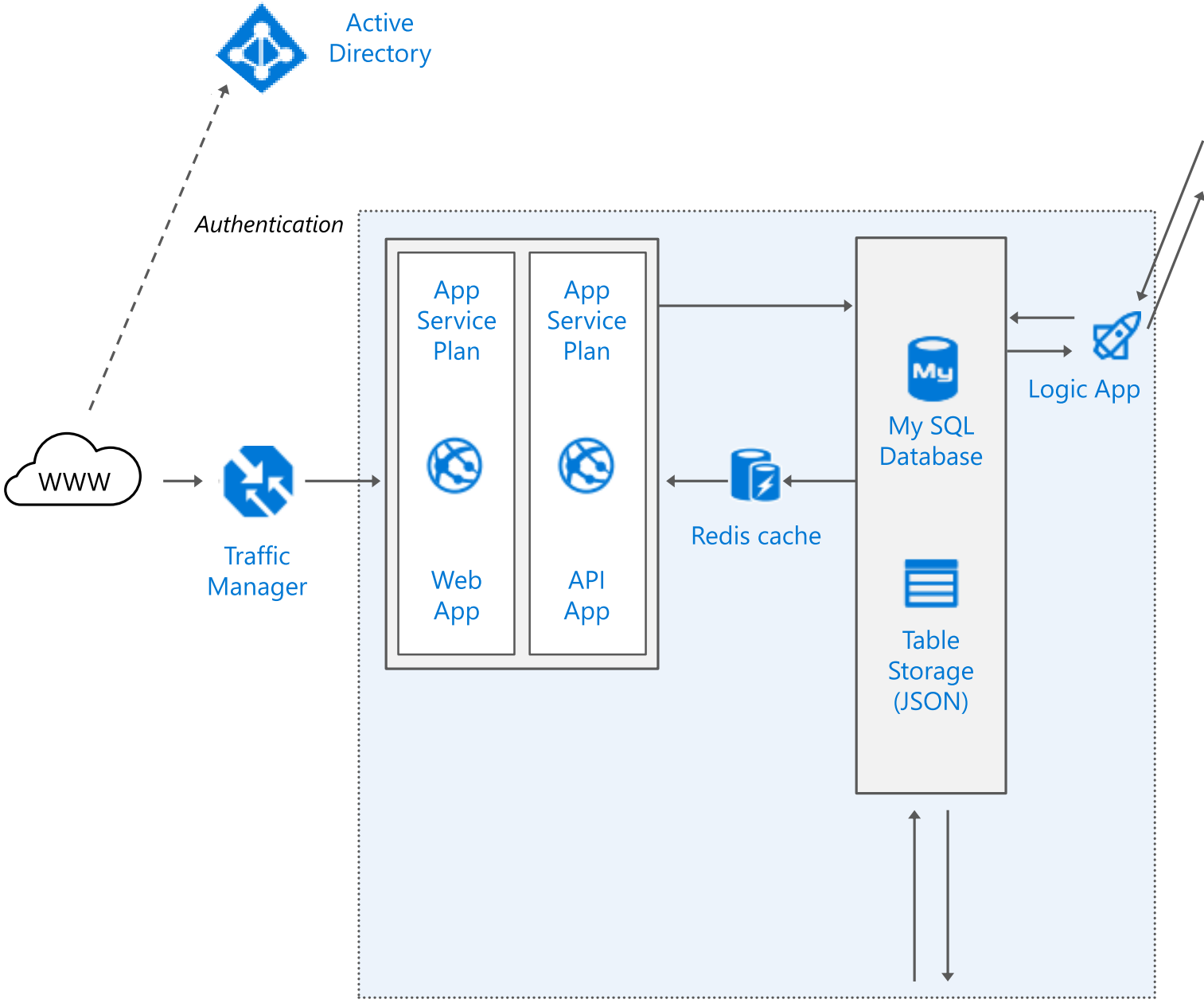
Events tracking e.g., violations for warranty management

Partners make more possible

The anatomy of the architectural design session



The output


Active Directory
Authentication
WWW
Traffic Manager
App Service Plan
Web App
App Service Plan
API App
Redis cache
My SQL Database
Table Storage (JSON)
Logic App

Tech Data

Ameer Jalal

Field Tech Consultant

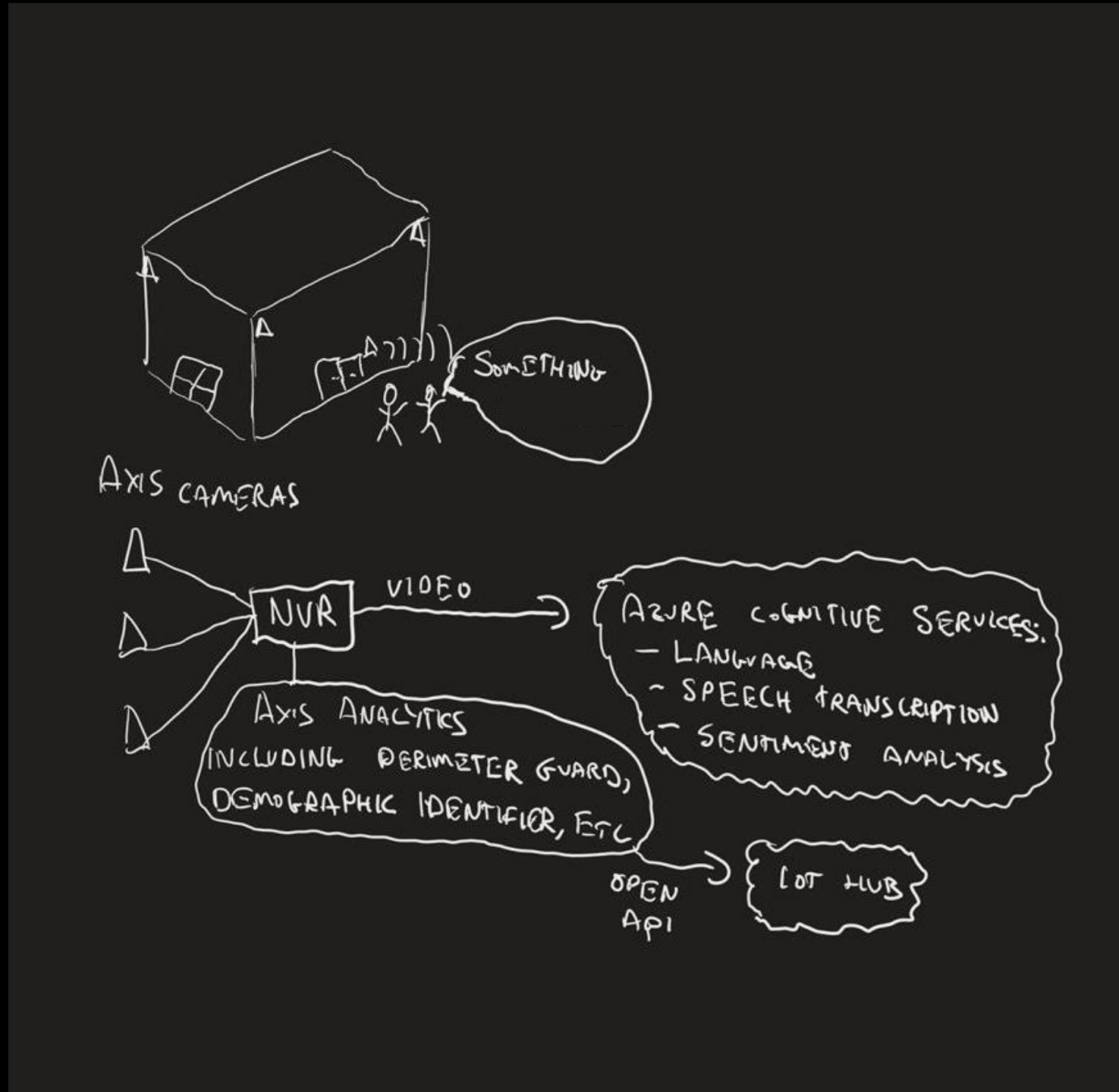
Tech Data®

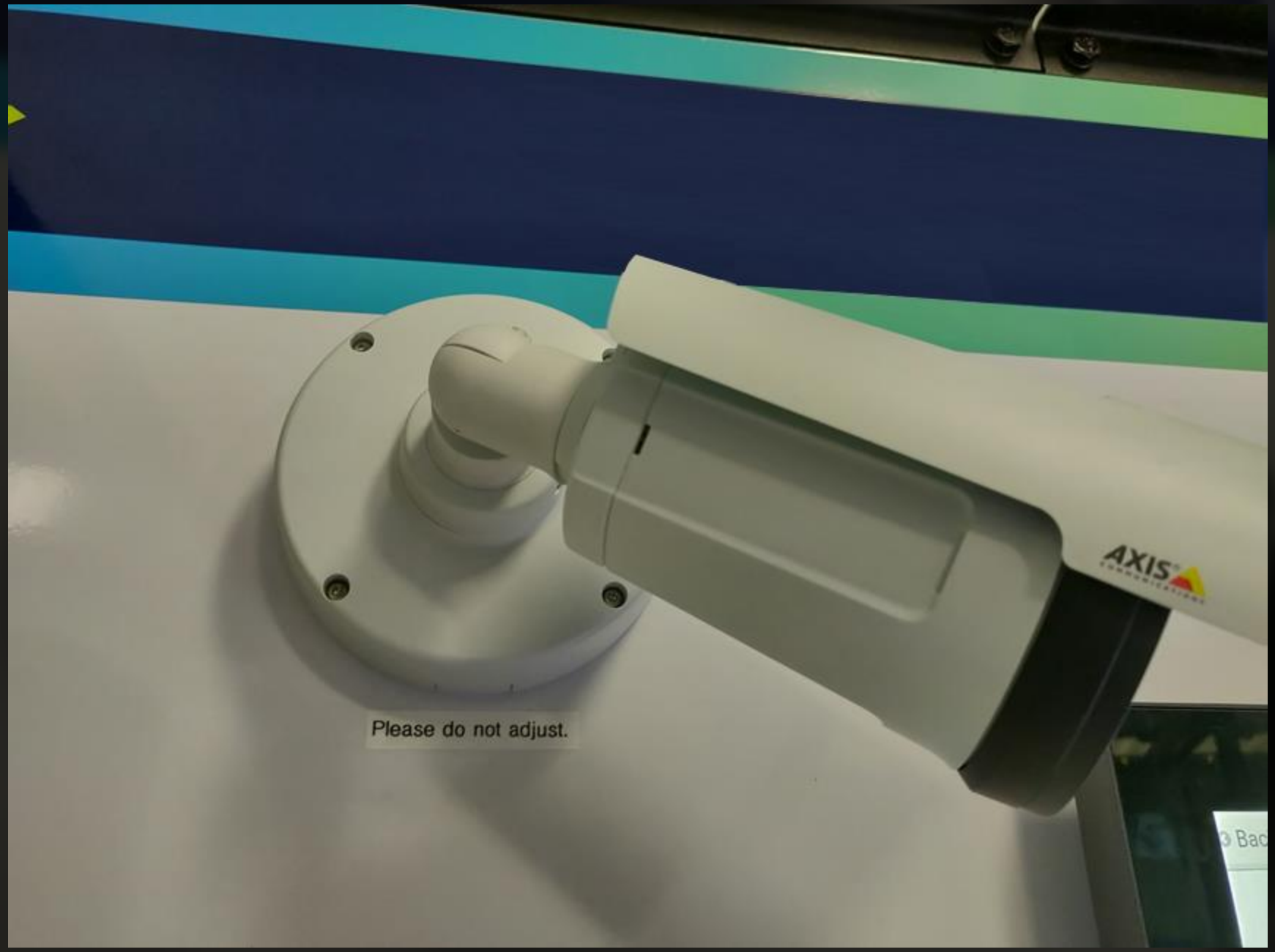
The problem we wanted to solve:

How do we find better methods to communicate?

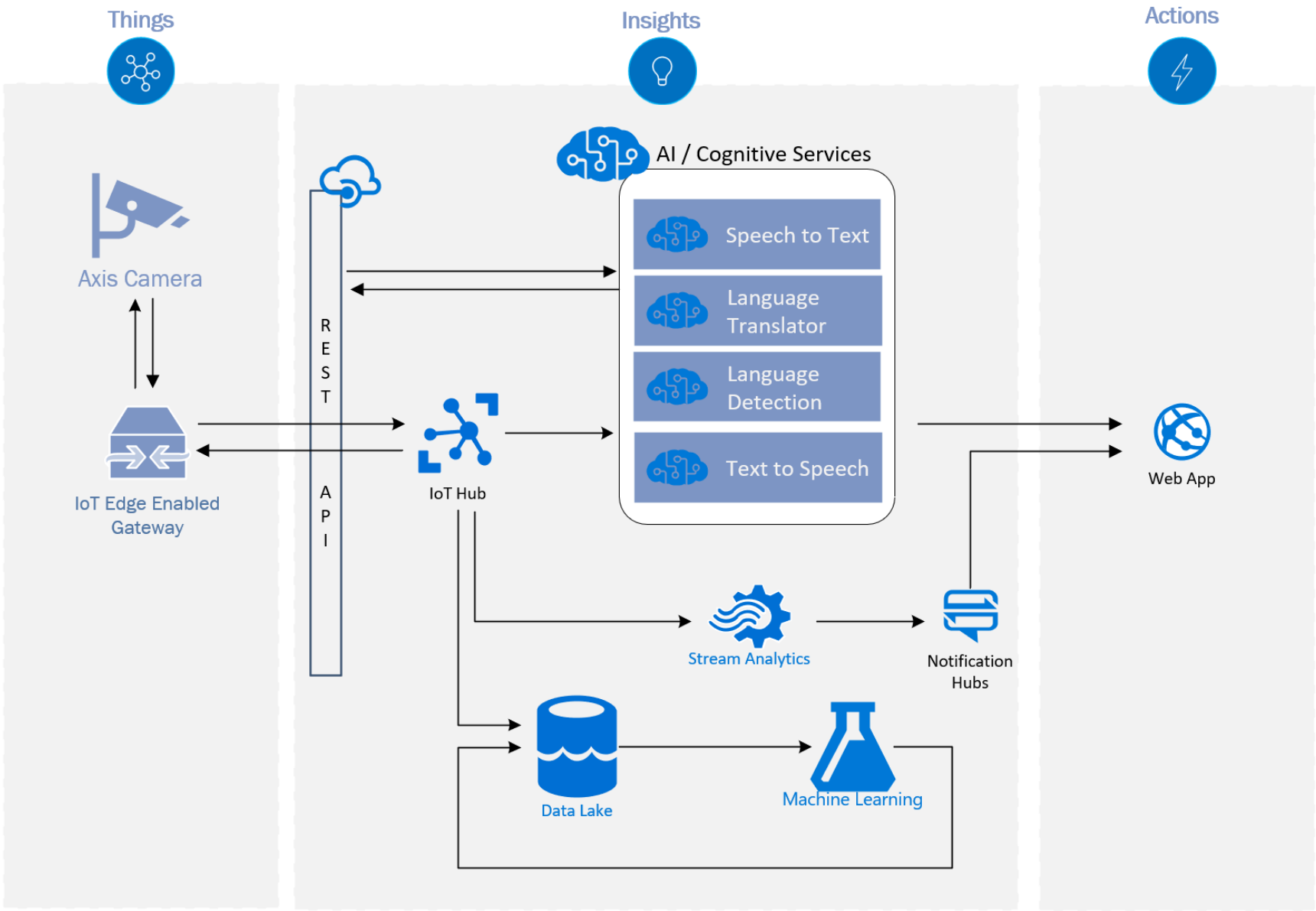
For example:

You are in a hospital and need translation services




AXIS
Please do not adjust.

Reference architecture



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

Ameer Jalal

Field Tech Consultant

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/ameerjalal

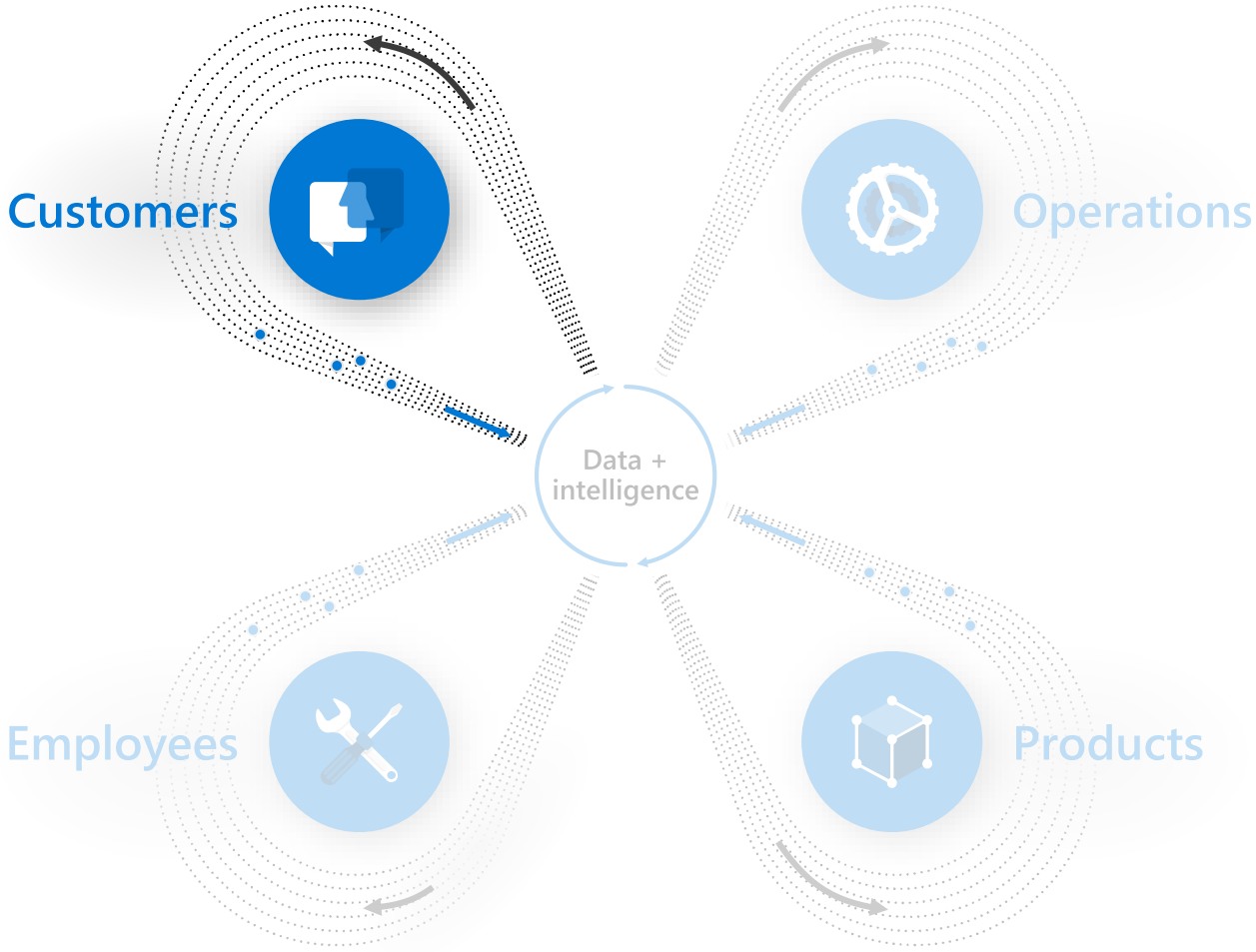
@????

"We partnered with Girl Scouts to host an event called STEMapalooza, where I hosted a workshop helping girl scouts build their first "PC" by putting together a Raspberry Pi kit. This is a picture from one of these events."

We iterate on it with our partners

This is what we mean by our greatest strength is our ecosystem

We can help create the better process this way together




Bryan S. Hamilton
Cloud Architect

Losses in the supply chain

22.8 billion

global shipments are damaged, delayed, or lost every year[2]

30%

of perishable goods spoil before they reach their destination[3]

$60 billion

in goods are stolen each year worldwide; $35 billion in the U.S. alone[5]


intel
Microsoft

Intel® Connected Logistics Platform

Automate shipment tracking and gain visibility into the logistics chain*

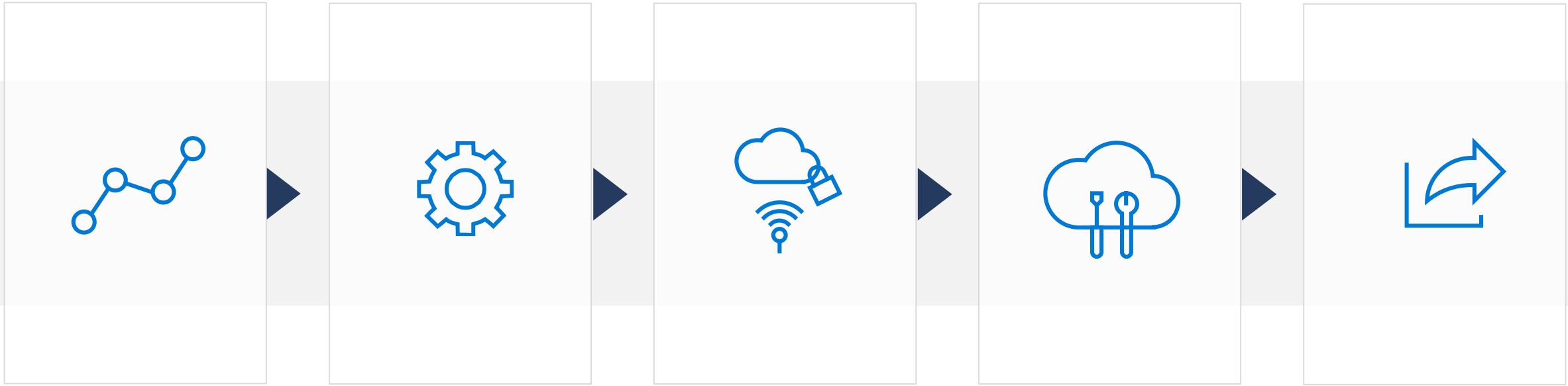
Edge connectivity
Multifunction IoT tags measure a variety of conditions

Continuous communication
A mesh sensor network helps ensure comprehensive asset visibility

Gateway interface
Gateways efficiently send aggregated data to the cloud via Wi-Fi or cellular connections

Powerful cloud
Microsoft Azure connects, monitors, authenticates and automates data transmission

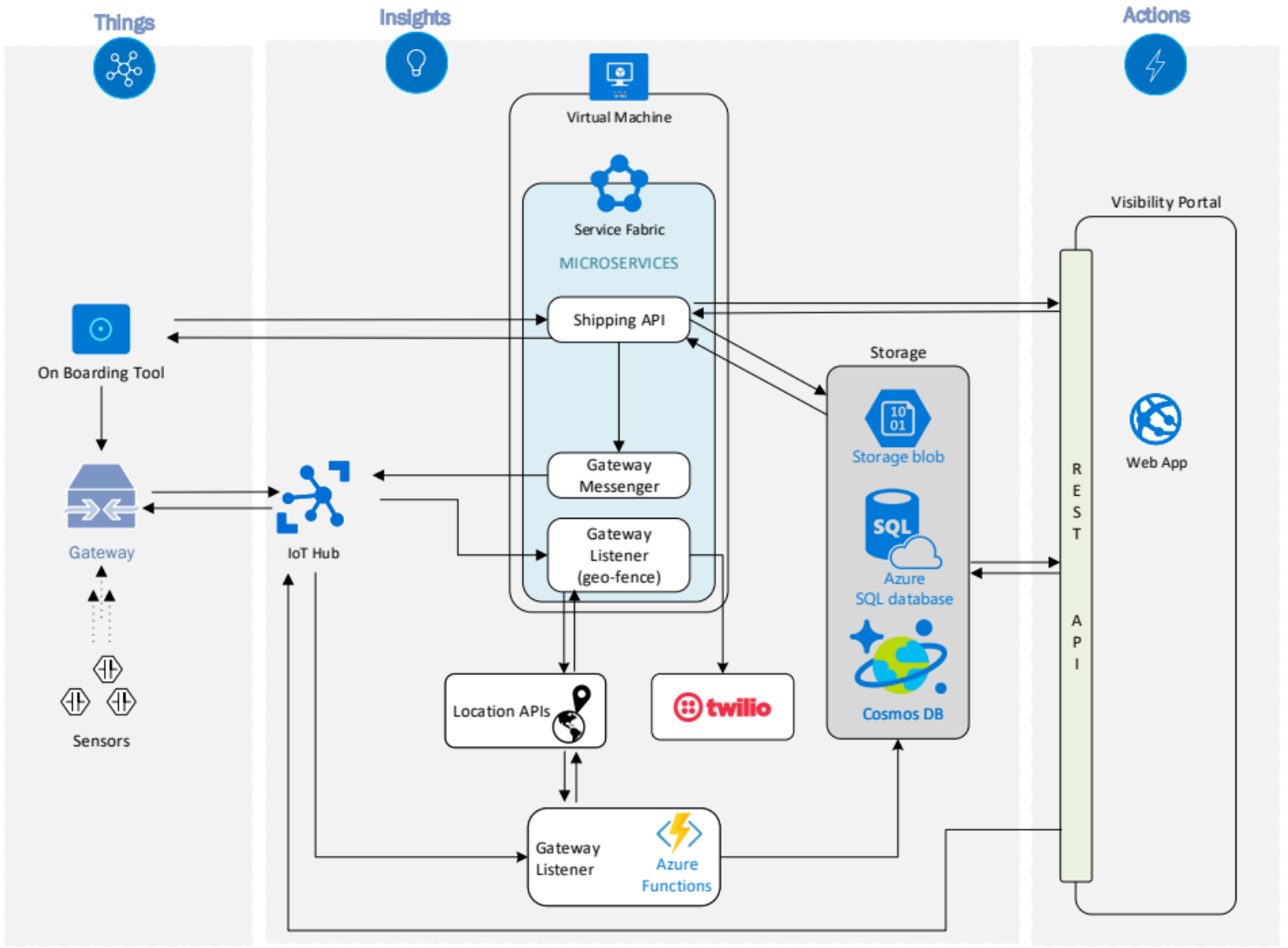
Meaningful insights
Insights are visualized and delivered through mobile apps or online dashboards



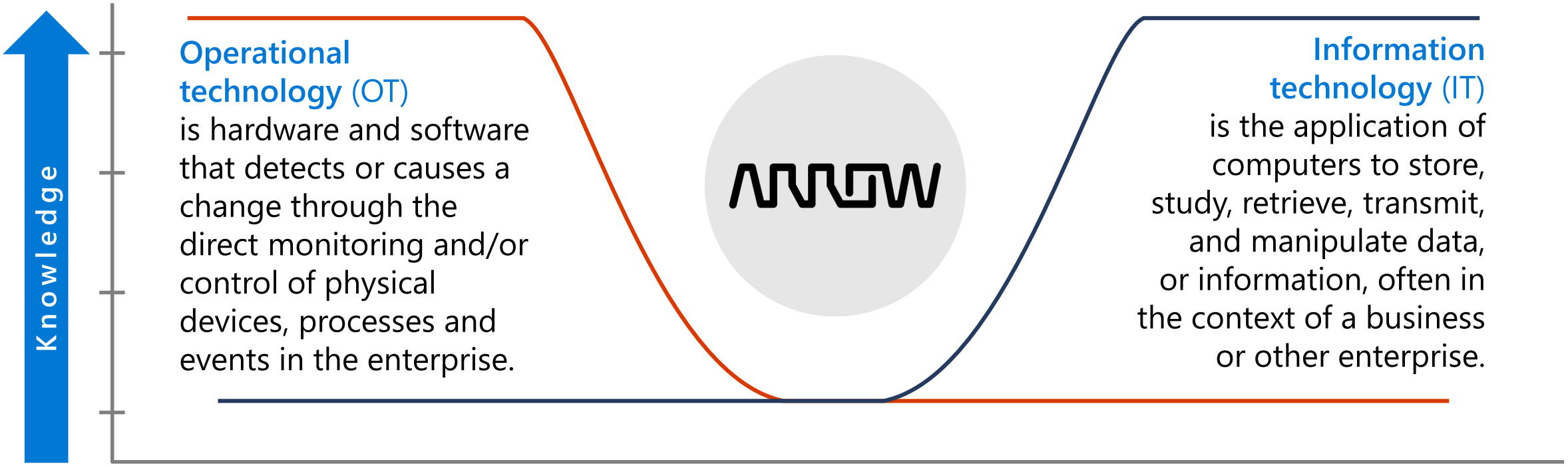
*The Intel® Connected Logistics Platform is fully implemented with the help of an experienced Microsoft Systems Integrator


Demo

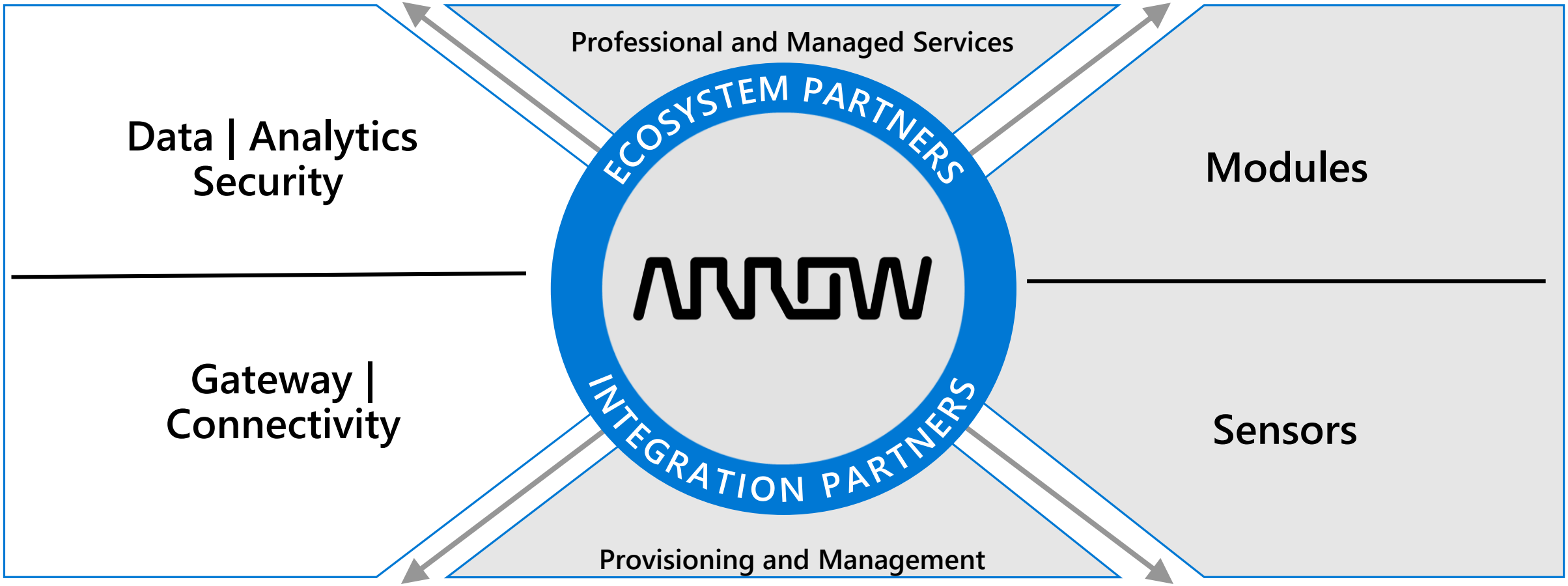
Reference architecture



Digital transformation requires partnerships



Our partnerships scale digital transformation projects



Next steps

- We'll connect you with the Arrow team to find out how easy it is to adopt the Intel Connected Logistics Platform: iot@arrow.com
- Learn more about the Intel Connected Logistics Platform at https://www.arrow.com/en/campaigns/iot-intel-connected-logistics-platform
- Learn more about Microsoft Azure at azure.microsoft.com

Bryan S. Hamilton

Cloud Architect

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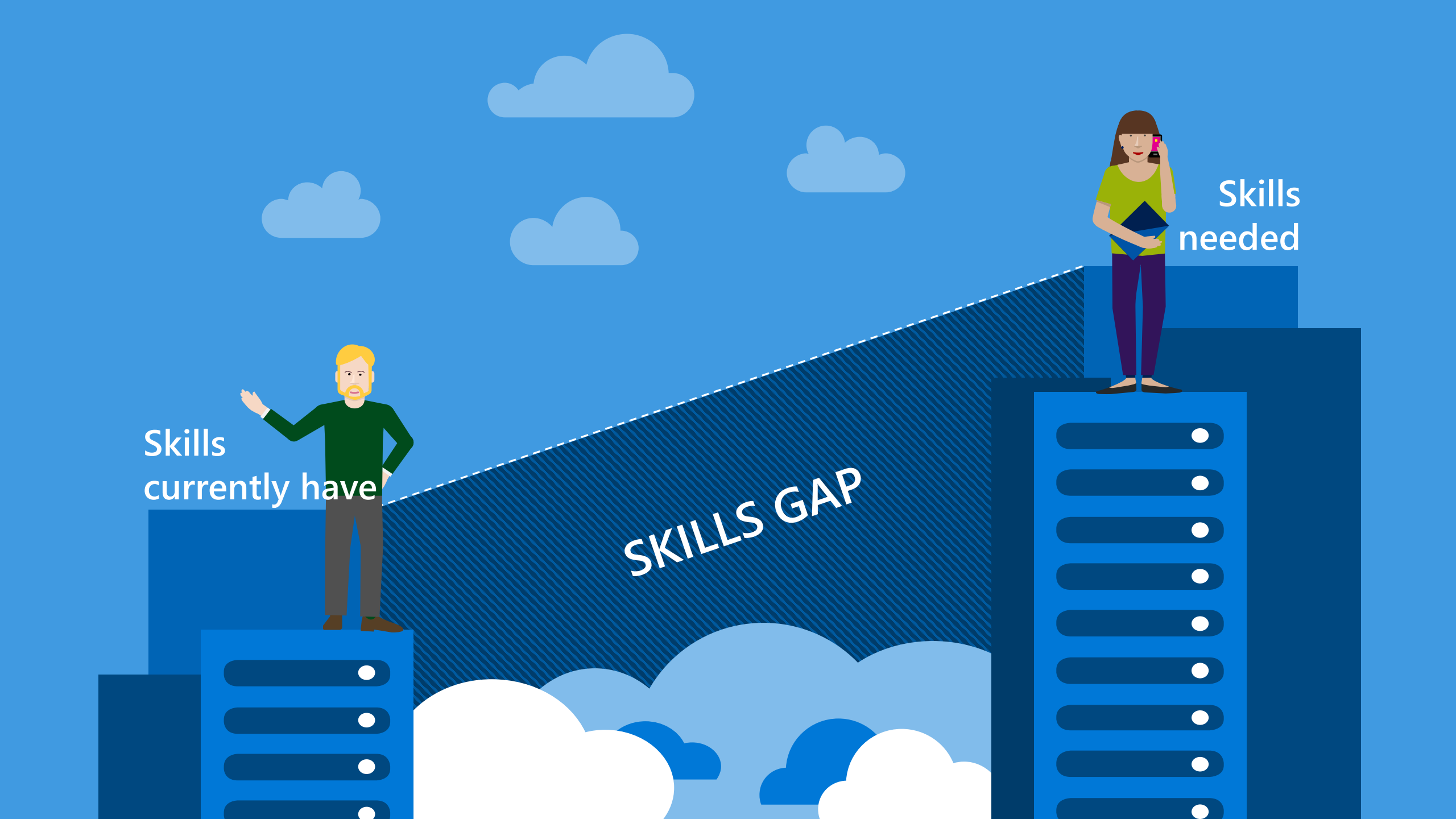
Skills needed
Skills currently have
SKILLS GAP

Welcome to Microsoft Learn

Microsoft.com/learn

Time investment expectation

Microsoft.com/learn

12300 XP

Azure fundamentals

8 hr 17 min remaining • Learning Path • 1 of 12 modules completed

Beginner | Developer | Solution Architect | Administrator | AI Engineer | Business Analyst | Business User | Data Engineer | Data Scientist | Azure | Azure Portal | Azure Resource Manager | Storage | Virtual Machines

Interested in the cloud, but aren't quite sure what it can do for you? This path is the place to start.

In this learning path, you will:

- Learn cloud concepts such as High Availability, Scalability, Elasticity, Agility, Fault Tolerance, and Disaster Recovery
- Understand the benefits of cloud computing in Azure and how it can save you time and money
- Compare and contrast basic strategies for transitioning to the Azure cloud
- Explore the breadth of services available in Azure including compute, network, storage and security

Once you complete this learning path, you will have the necessary knowledge to take the AZ900 Microsoft Azure Fundamentals Exam.

Prerequisites
None

Modules in this learning path

Cloud Concepts - Principles of cloud computing

1100 XP

1 hr 2 min • Module • 10 Units

★★★★★ 4.8 (23350)

Explore the core concepts of cloud computing and how it can help your business.

Overview

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Total XP= 12,300

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Overview

Module XP= 1,100

Leveling up your Azure skillz with Microsoft Learn

Microsoft

Top Challenges

Complexity
- IoT PnP, IoT Central

Knowledge
- MS Learn

Security
- Confidential Computing

Solution == Partners

IoT in Action


Microsoft