
Microsoft
IoT in Action
#IoTinActionMS

Microsoft

Architecting the Intelligent Edge

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IoT in Action

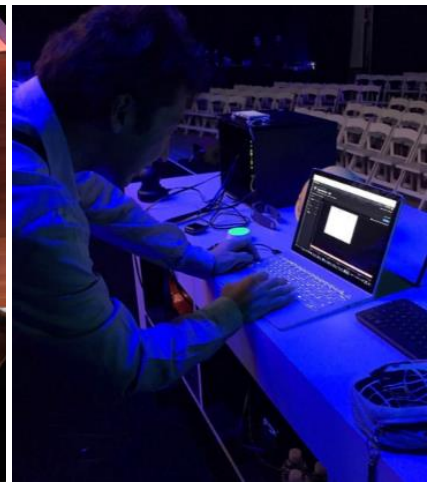
The evolution of IoT in Action

ncd.io

Year 1 2017

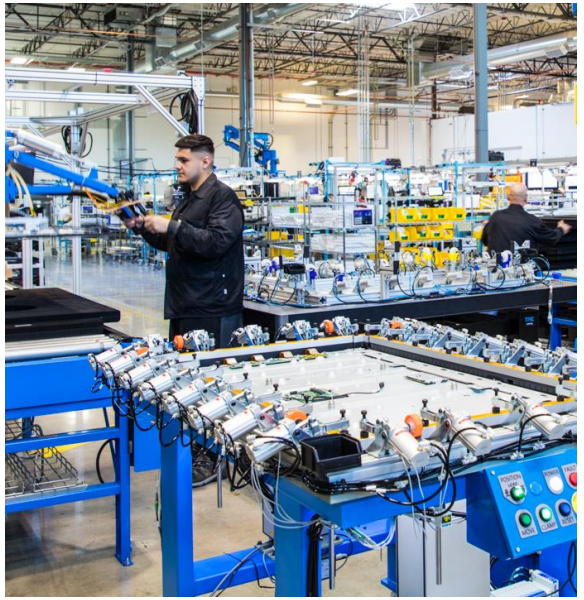
The evolution of IoT in Action

Insight



Year 2 2018

The Evolution of IoT in Action

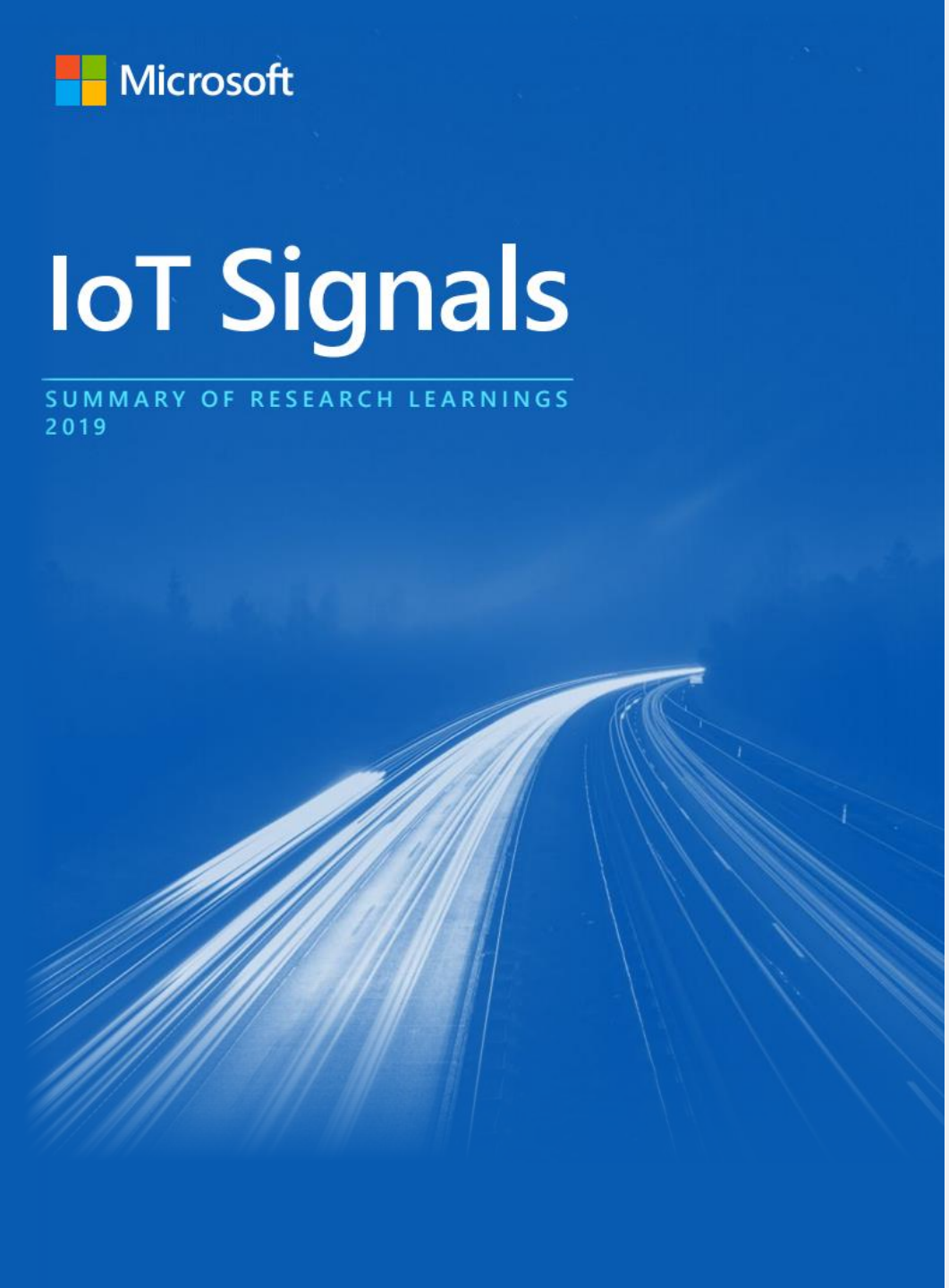


Year 3 2020

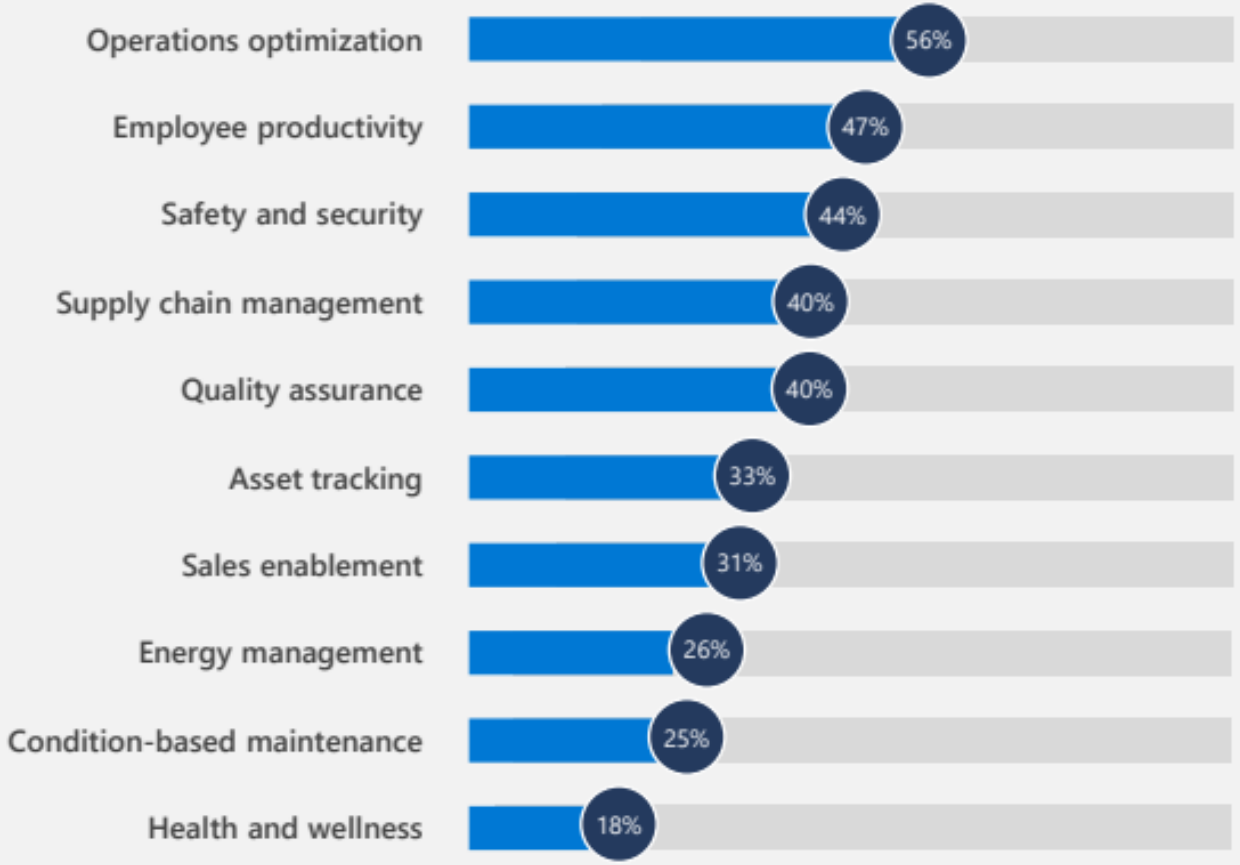
Microsoft

IoT Signals

SUMMARY OF RESEARCH LEARNINGS
2019



Reasons for IoT adoption



Microsoft

IoT Signals

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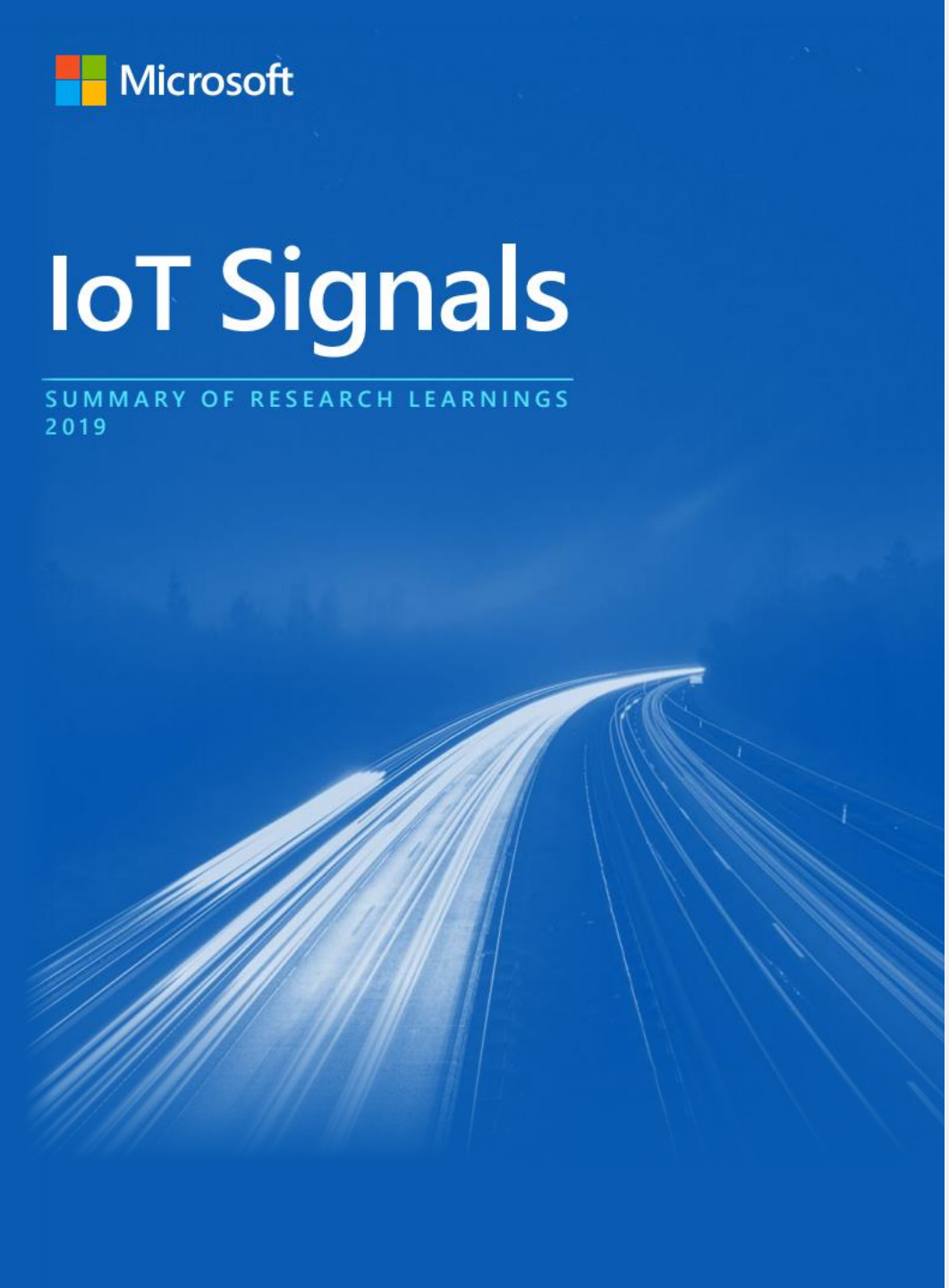
2019



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%

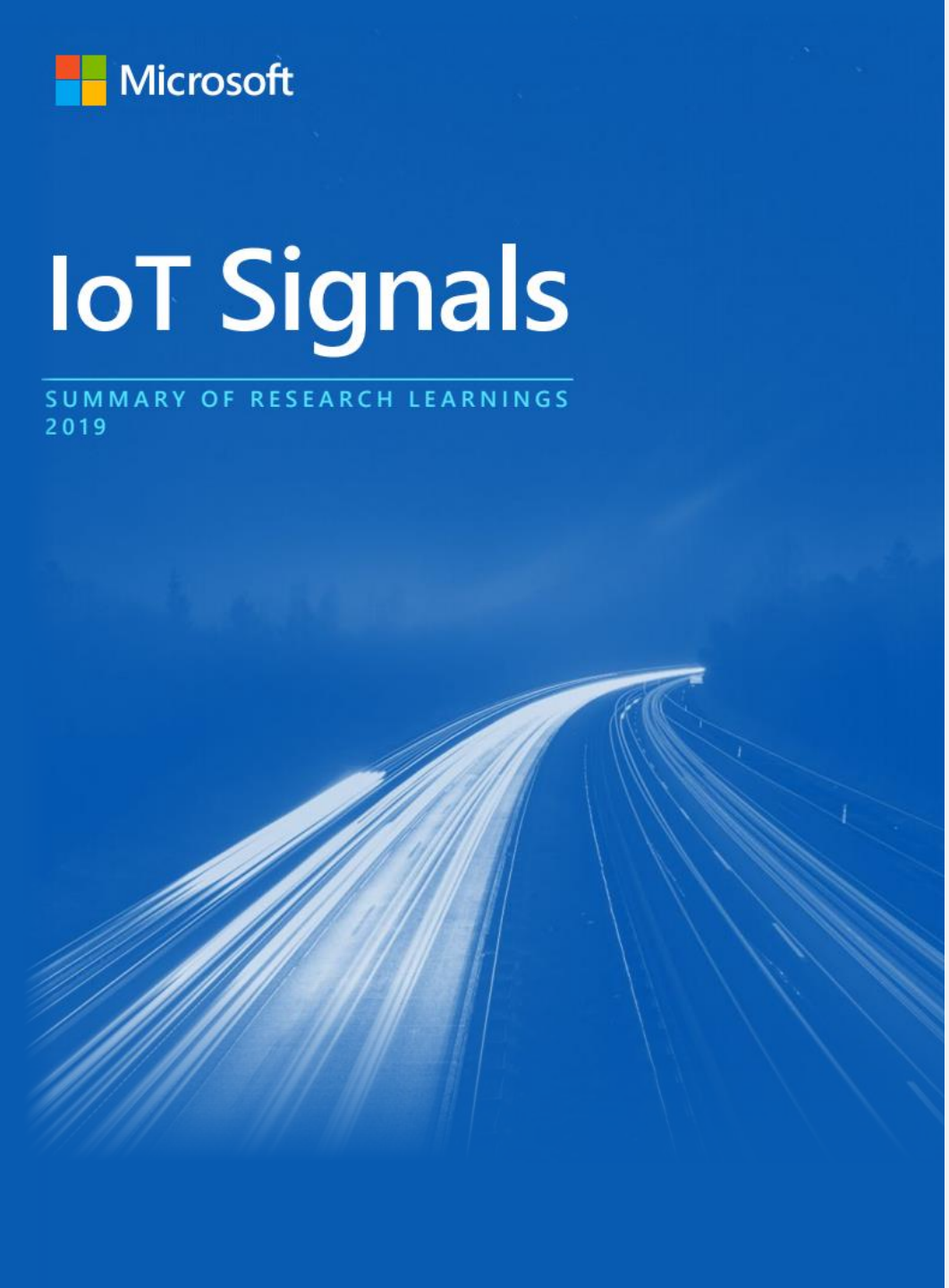
HEALTHCARE

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%

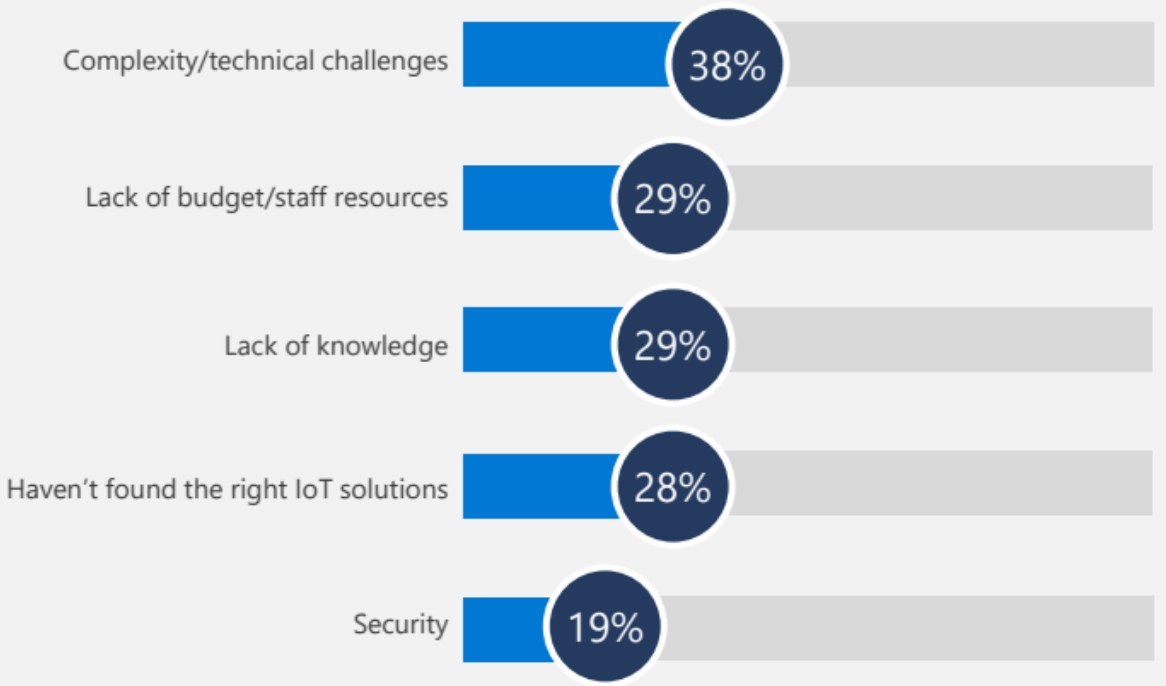
Microsoft

IoT Signals

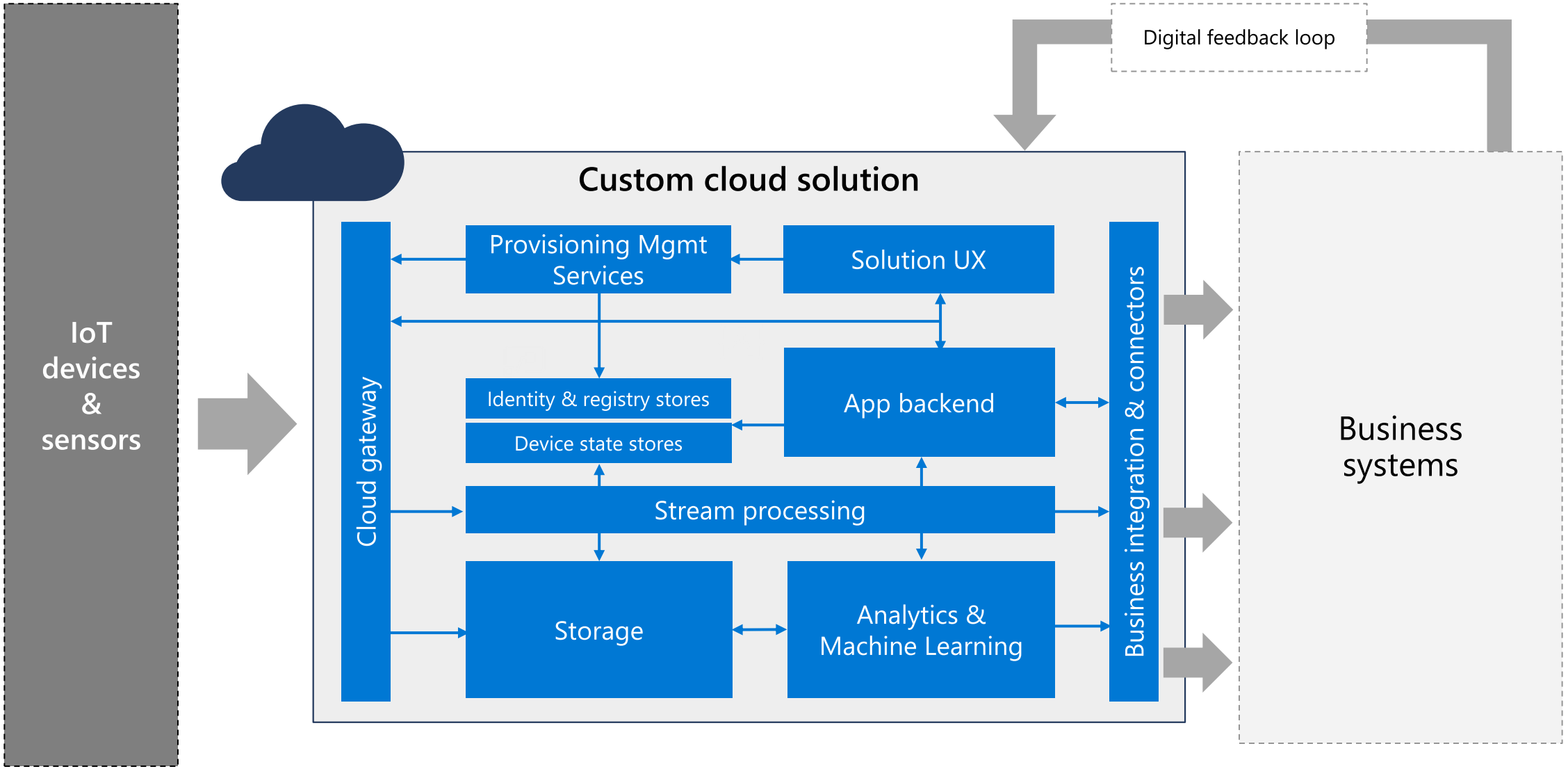
SUMMARY OF RESEARCH LEARNINGS
2019



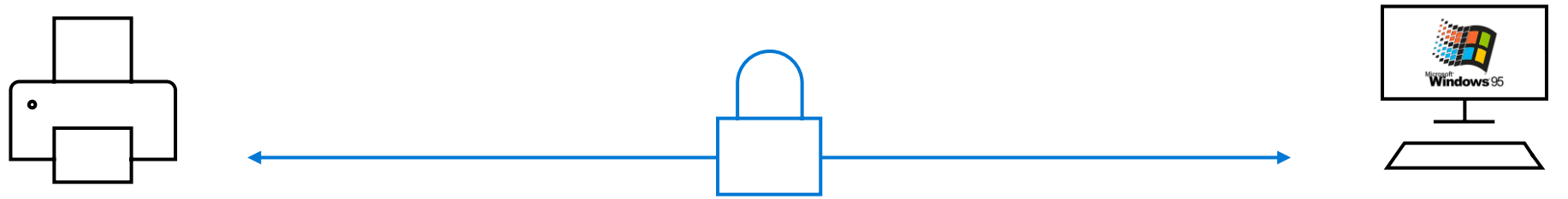
Top challenges



Solution architecture—DIY



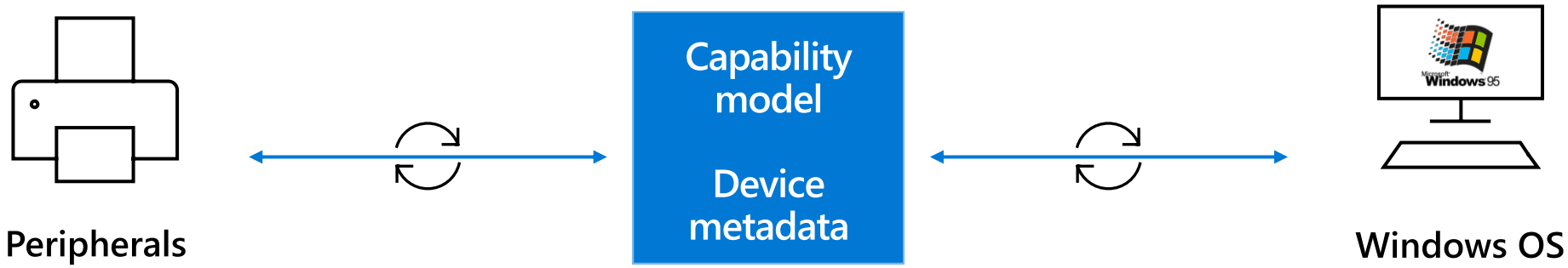
We had a similar challenge in the past…



Peripherals

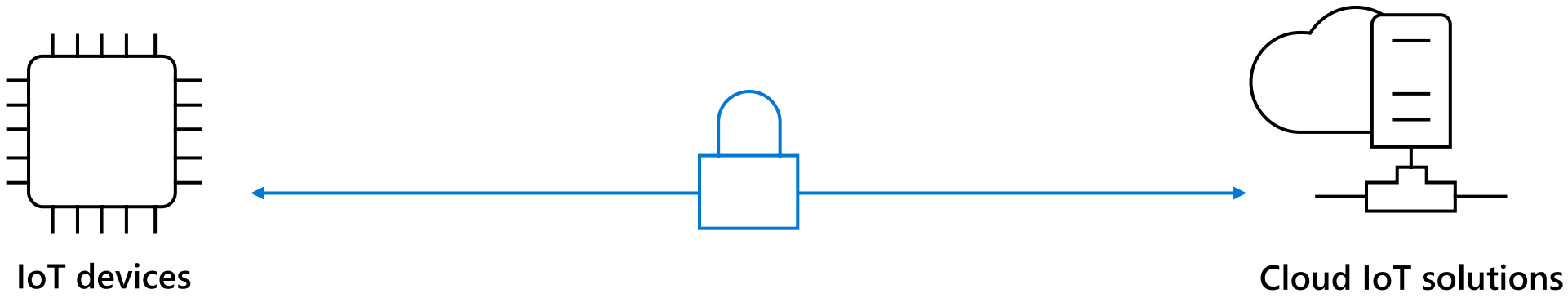
Windows OS

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

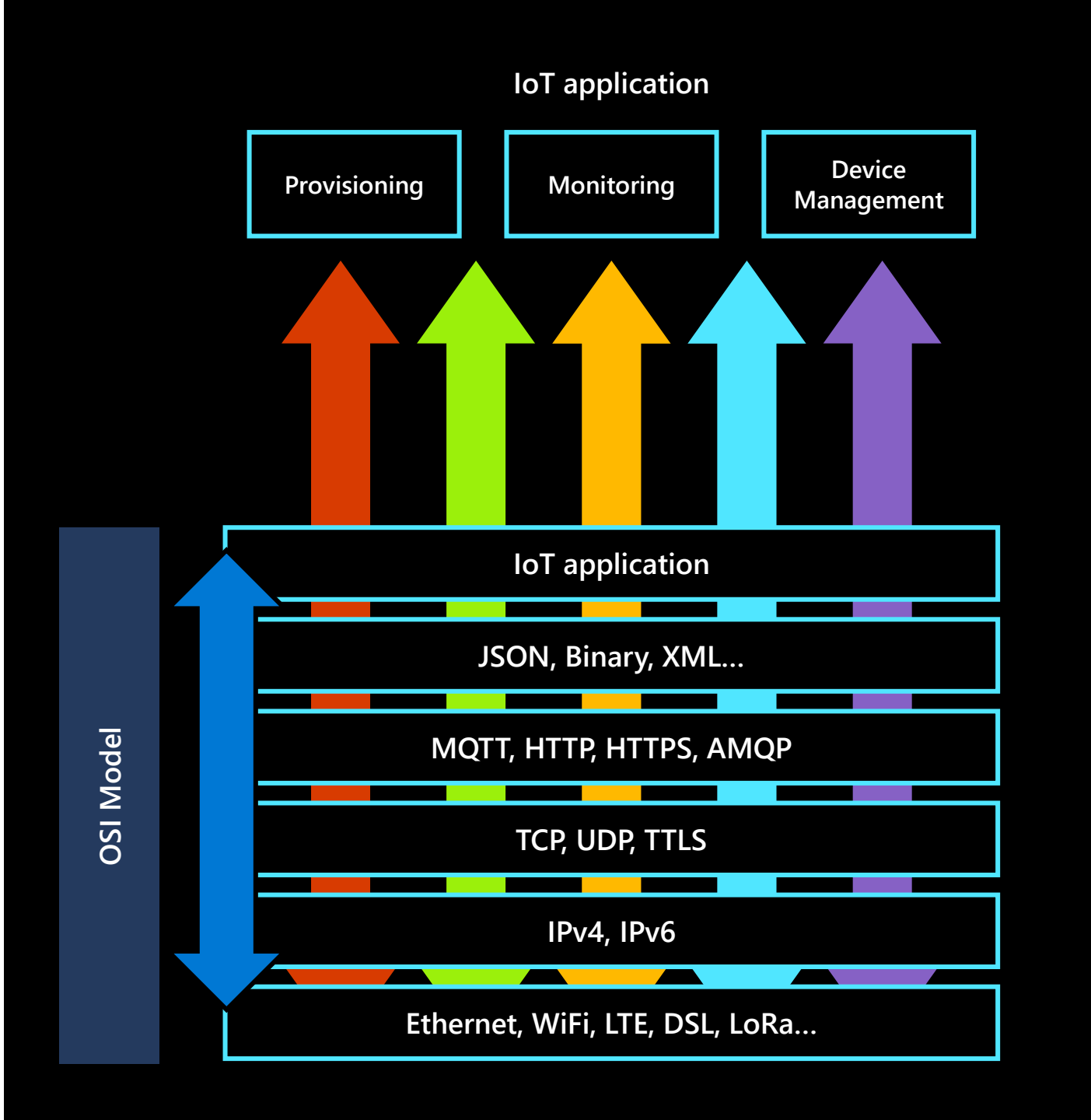
IoT today



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

Connecting hardware is very "hard"

Provisioning
Configuration
Device management
Deployment
Monitoring

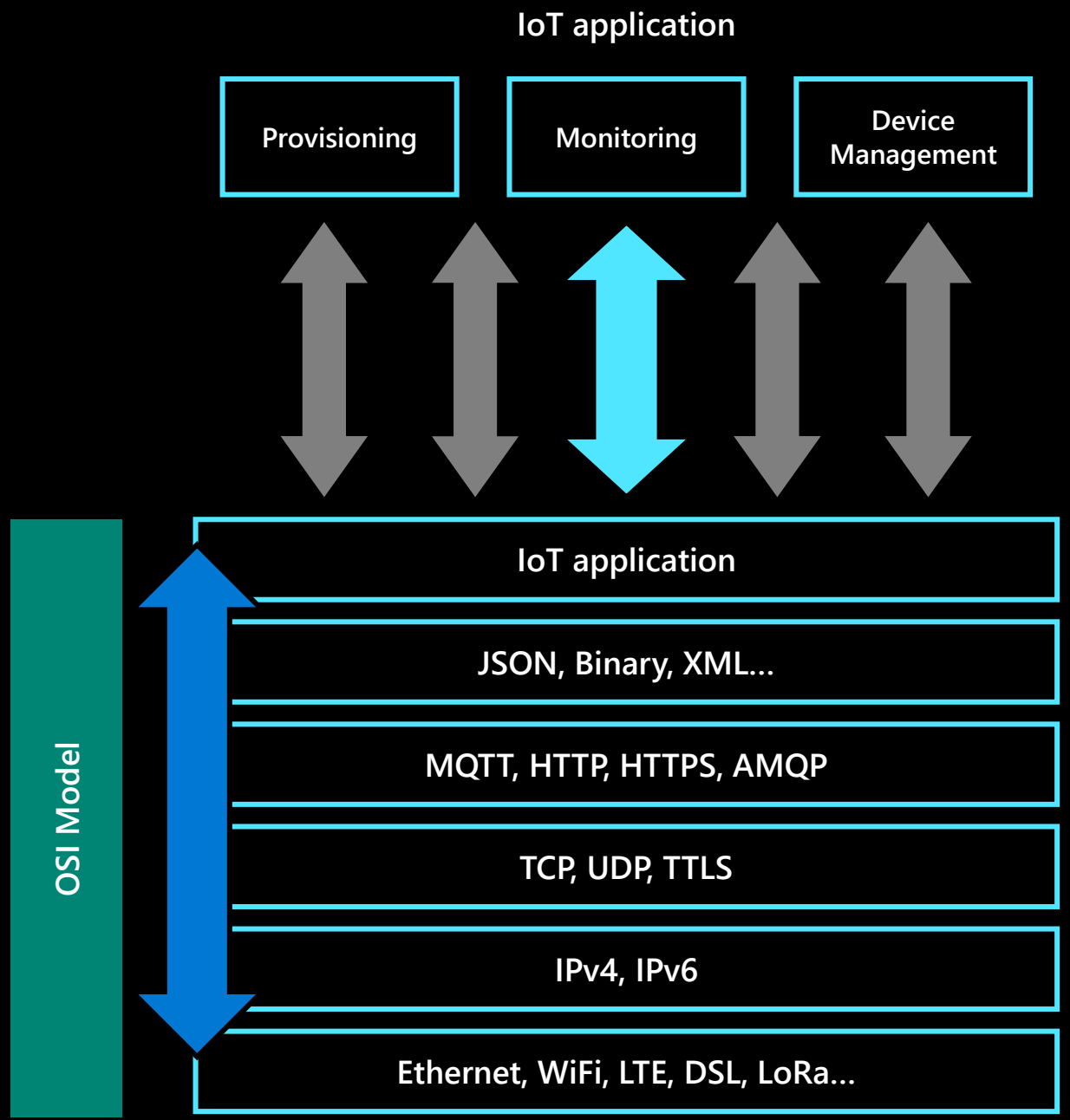


IoT Plug and Play defines common language

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

Contoso

Search

Device templates > Create new

- Dashboard
- Devices
- Device groups
- Rules
- Analytics
- Jobs

App settings

- Device templates
- Data export
- Administration

App manager

- Select template type
- Customize
- Review

Select template type

Templates define capabilities and determine how you view data about real devices.

Create a custom device template

IoT device

Start with a JSON file or build out your capabilities from scratch.

Select

Azure IoT Edge

Define template with Azure IoT Edge and gateway scenarios.

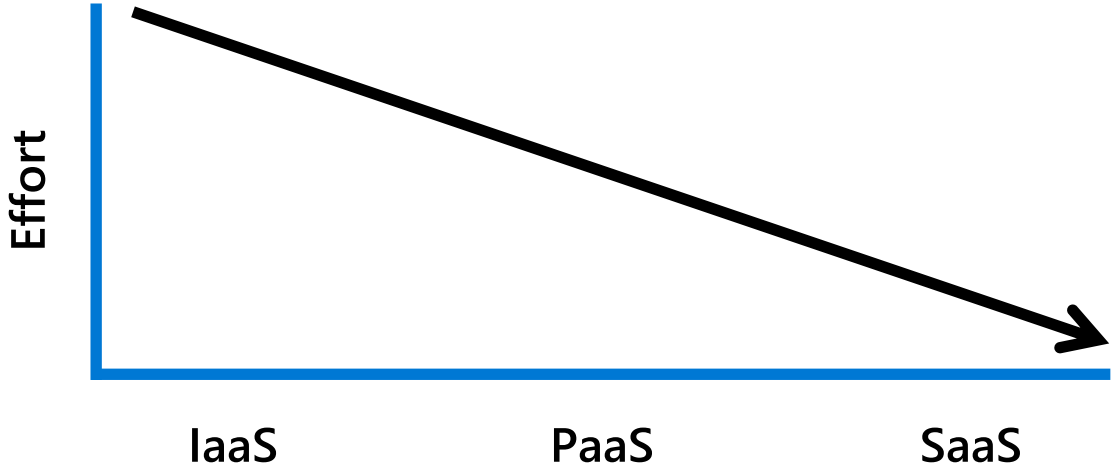
Select

Or choose a preconfigured device template

Next: Customize

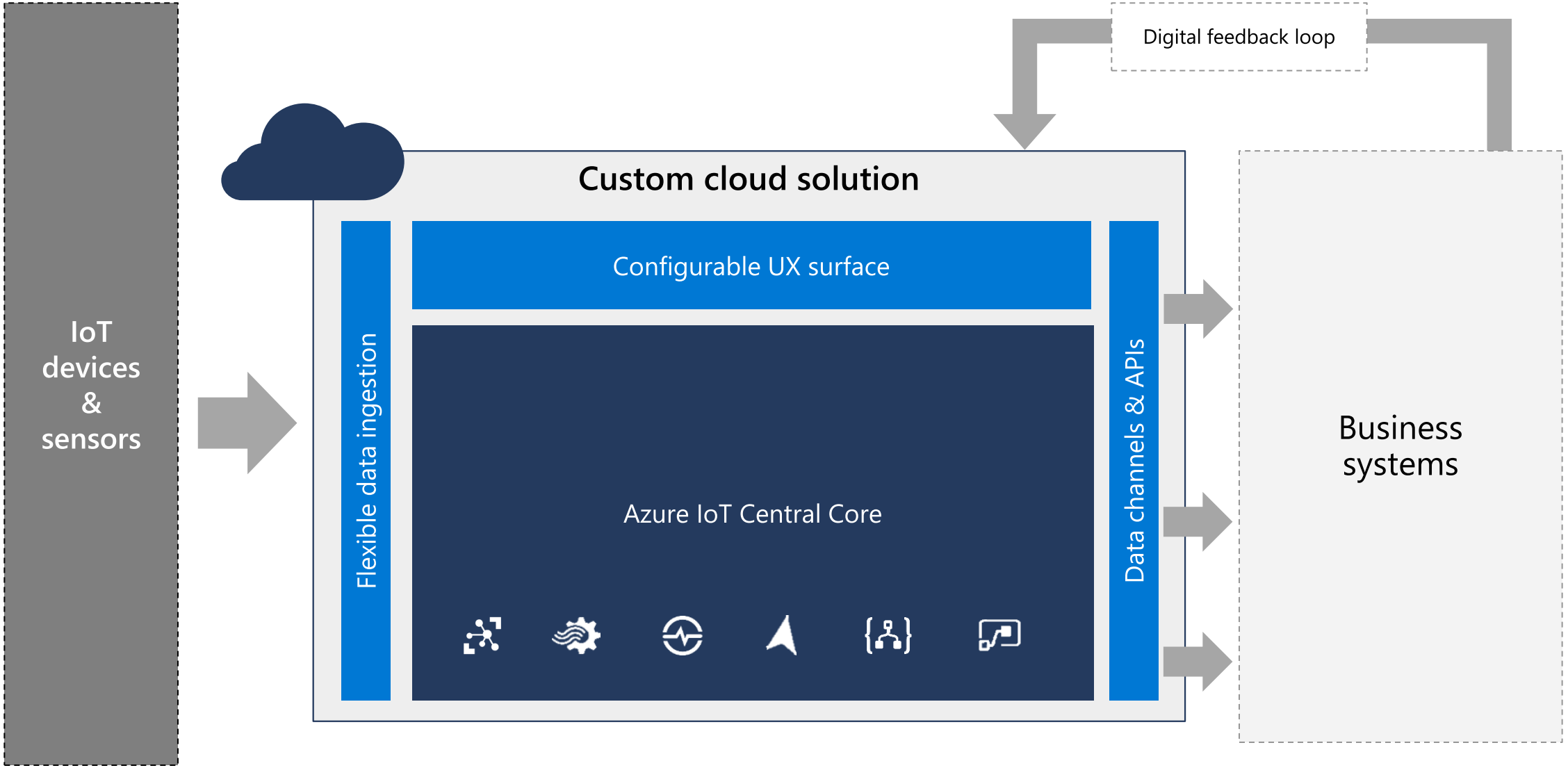
Cancel

Making IoT seamless



↓ The total effort to build and operate an IoT Solution is rapidly decreasing

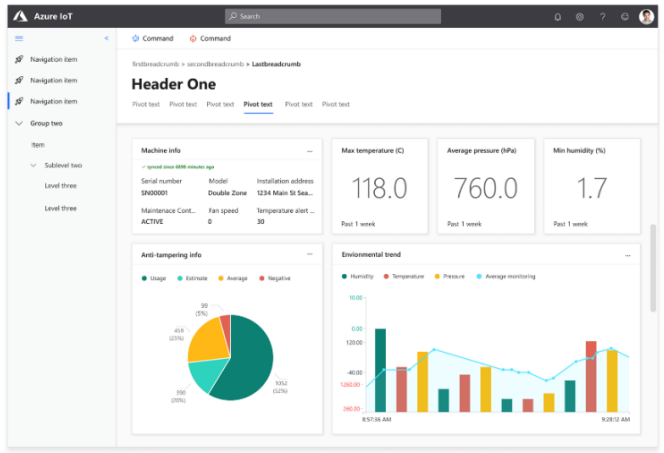
Solution architecture—IoT Central



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
- IoT Edge support
  Incl. Module Management
- Multi-tenancy & RBAC
- Extensibility
  APIs
- Solution Builder App Templates

IoT Central App Templates

App templates for Priority Industry Verticals

App Templates for Industries

Retail
Digital distribution center
In-store analytics
Checkout, Condition monitoring
Connected logistics
Smart inventory management

Healthcare
Continuous patient monitoring

Energy
Smart meter analytics
Solar power monitoring

Government
Water quality monitoring
Water consumption monitoring
Connected waste management

My apps | Azure IoT Central

https://apps.azureiotcentral.com/build/retail

Azure IoT Central

- Home
- Build
- My apps

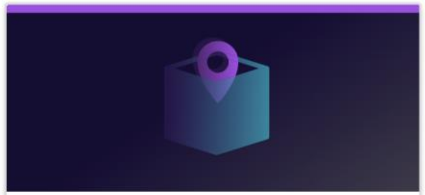
Build your IoT application

Test drive with a 7 day trial (limited to one per account), or build your own app that scales and grows with you.

Featured

Custom app

Retail | Energy | Government | Healthcare



Preview

Connected logistics

Track your shipment in real-time across air, water and land with location and condition monitoring.

Create app

Learn more

Preview

Digital distribution center

Improve warehouse output efficiency by digitalizing key assets and actions.

Create app

Learn more

Preview

In-store analytics – conditio...

Digitally connect and monitor your store environment to reduce operating costs and create experiences that customers love.

Create app

Learn more

Preview

In-store analytics – checkout

Monitor and manage the checkout flow inside your store to improve efficiency and reduce wait times.

Create app

Learn more

Challenge #1

Getting connected

Challenge #2

Making it easier to combine services to “do something”

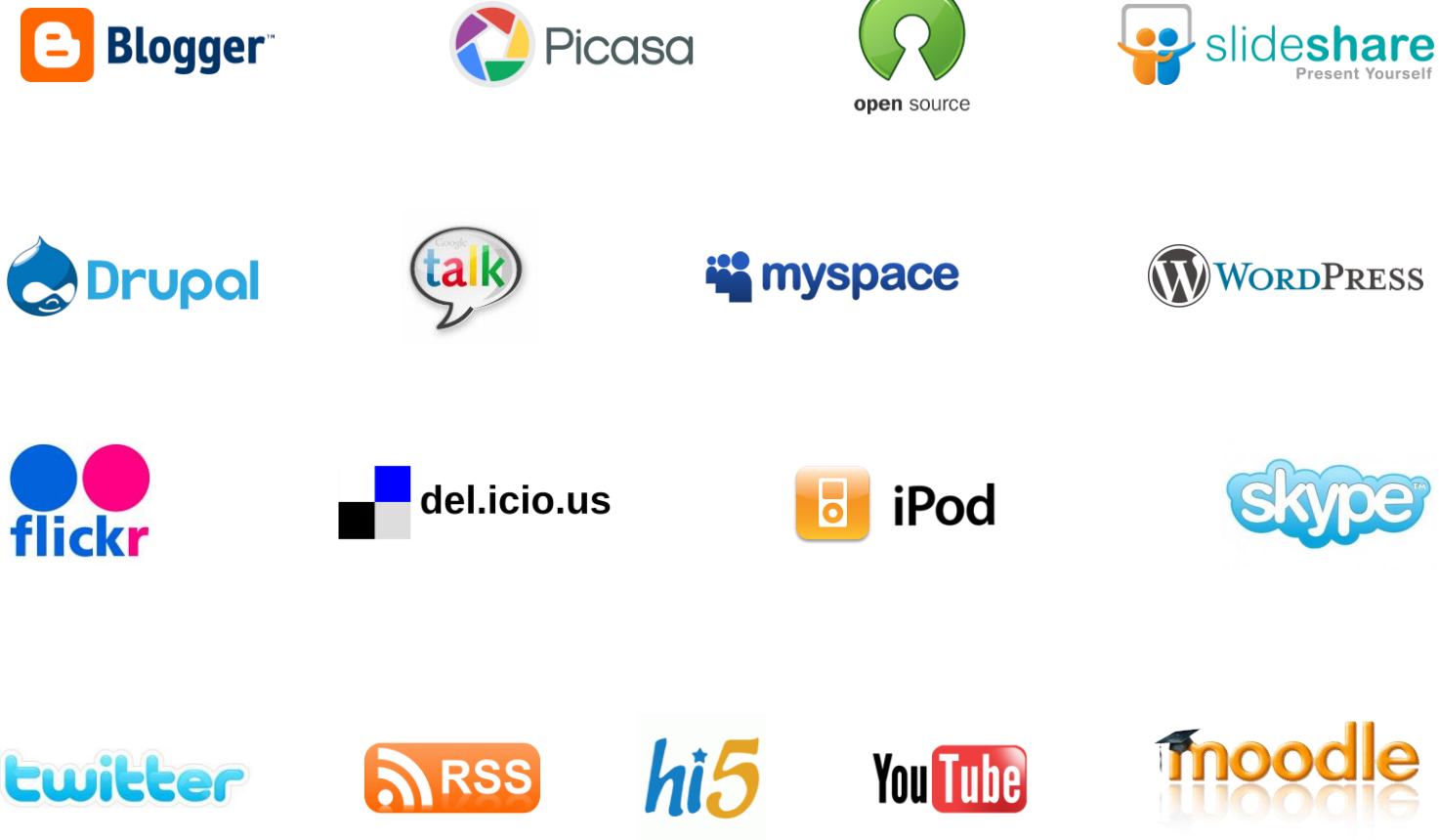
Challenge #3

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

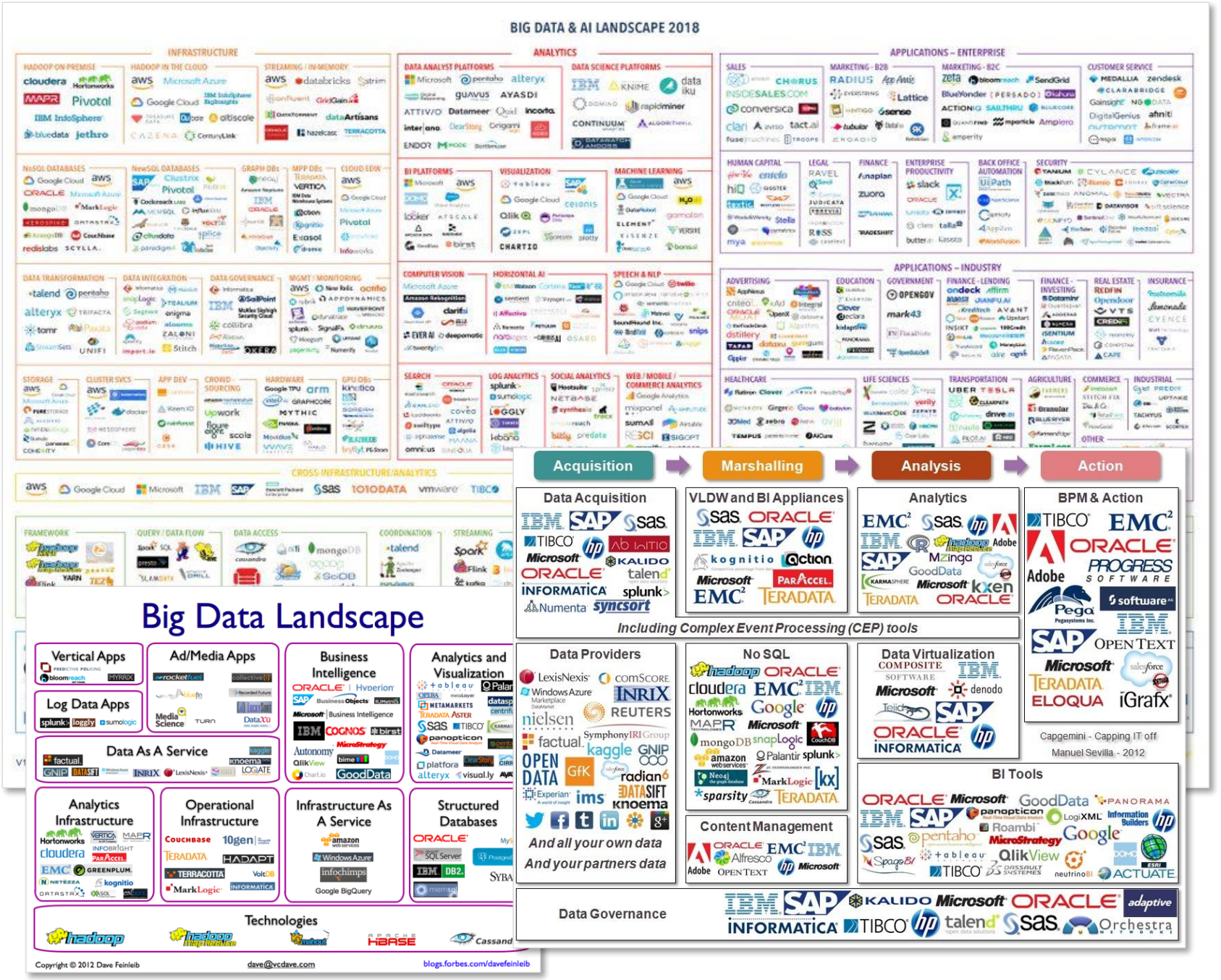
“We’ve been here before”

“Big Data” started with Web 2.0

Web 2.0 technologies

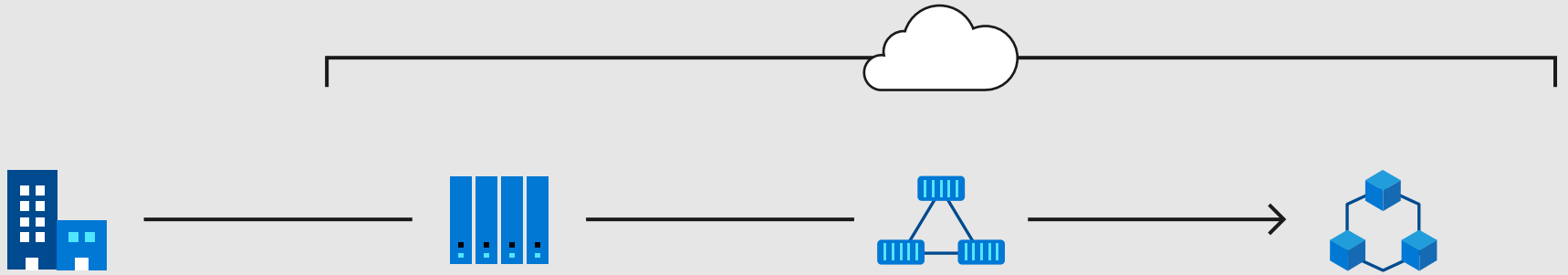


Remember these?



“Big Data” challenge 2.0

Journey to the cloud



On-premises

Infrastructure Platform

IaaS

Infrastructure Platform
"Lift and shift"

Serverless

Managed Container Platform

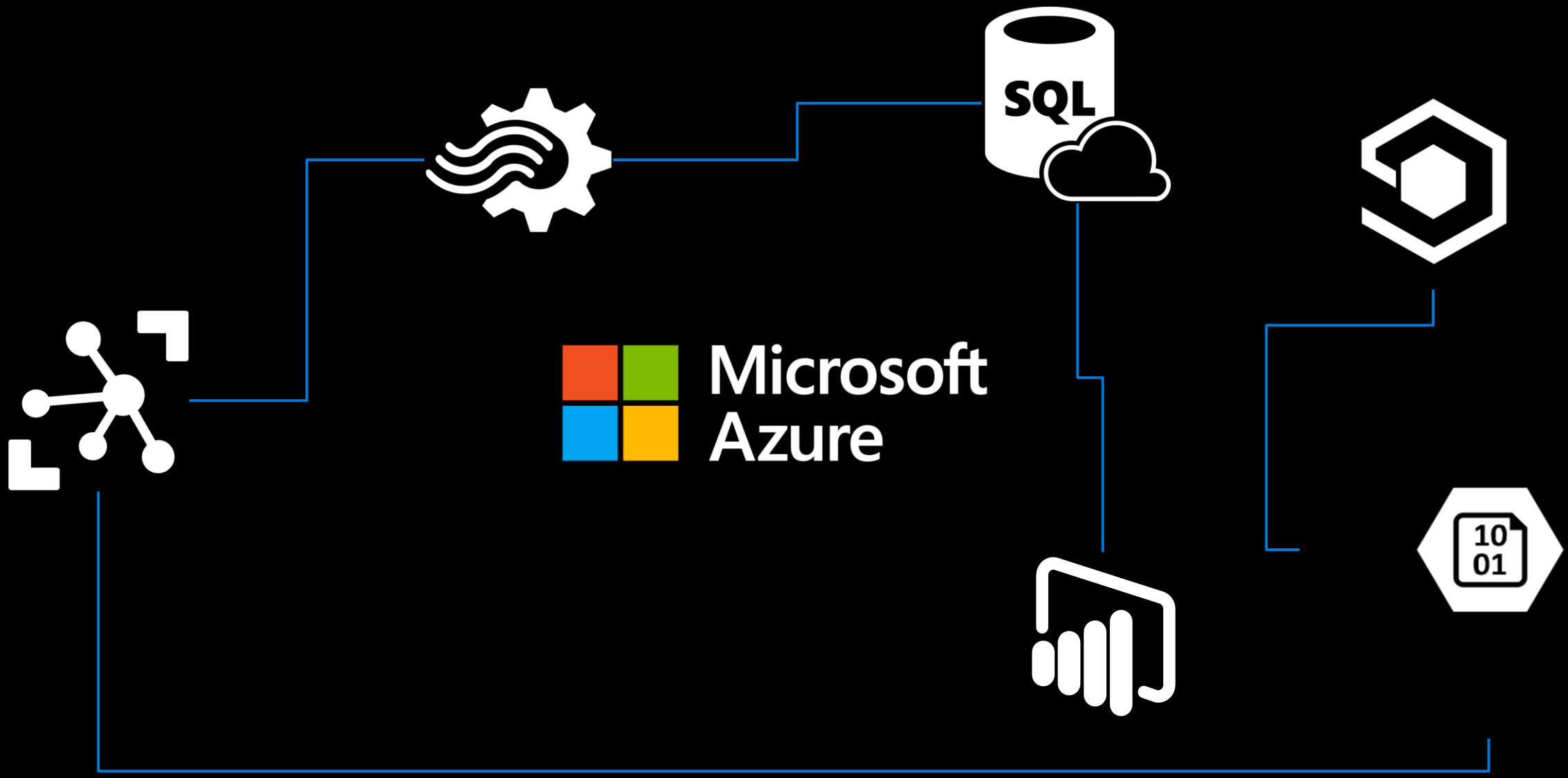
Less/no code

Application Platform

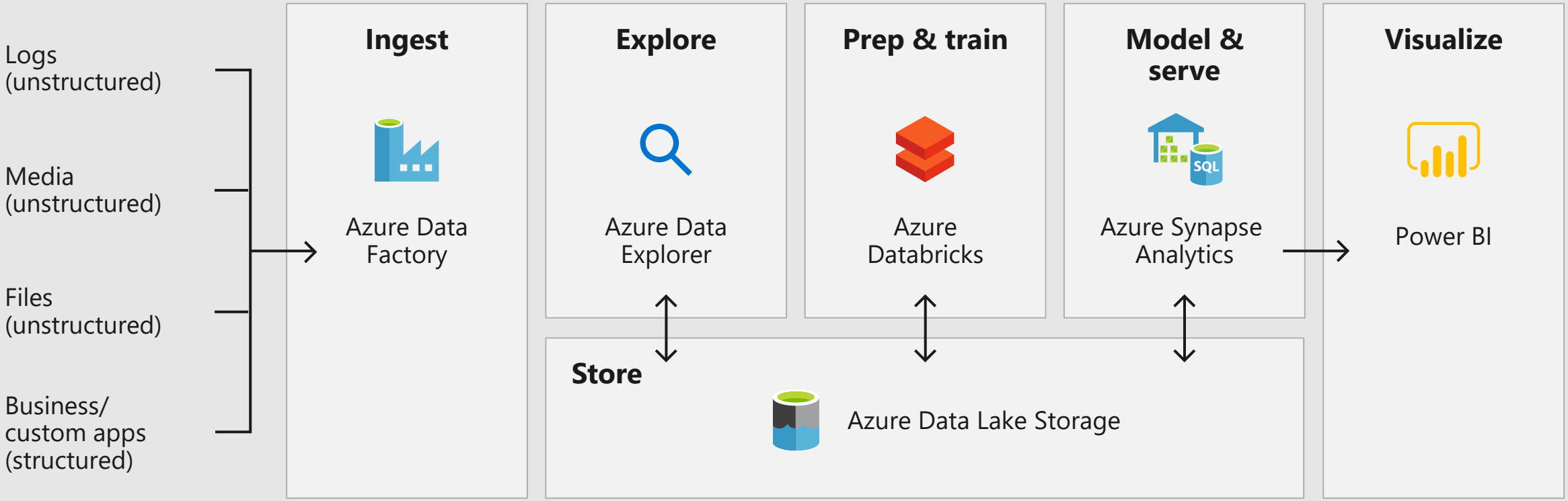
Migrate

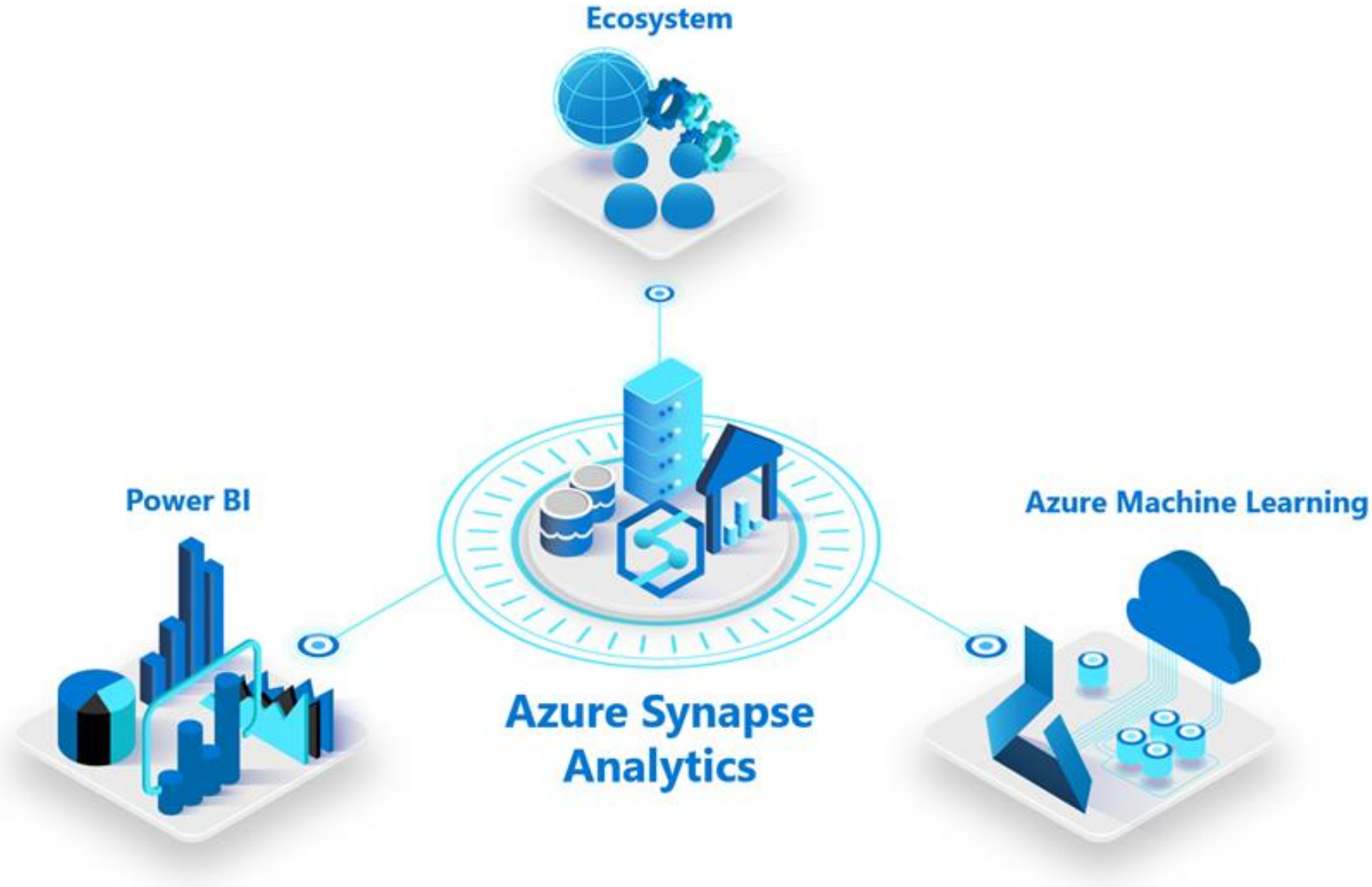
Innovate


Microsoft
Azure


SQL
Microsoft
Azure
10
01

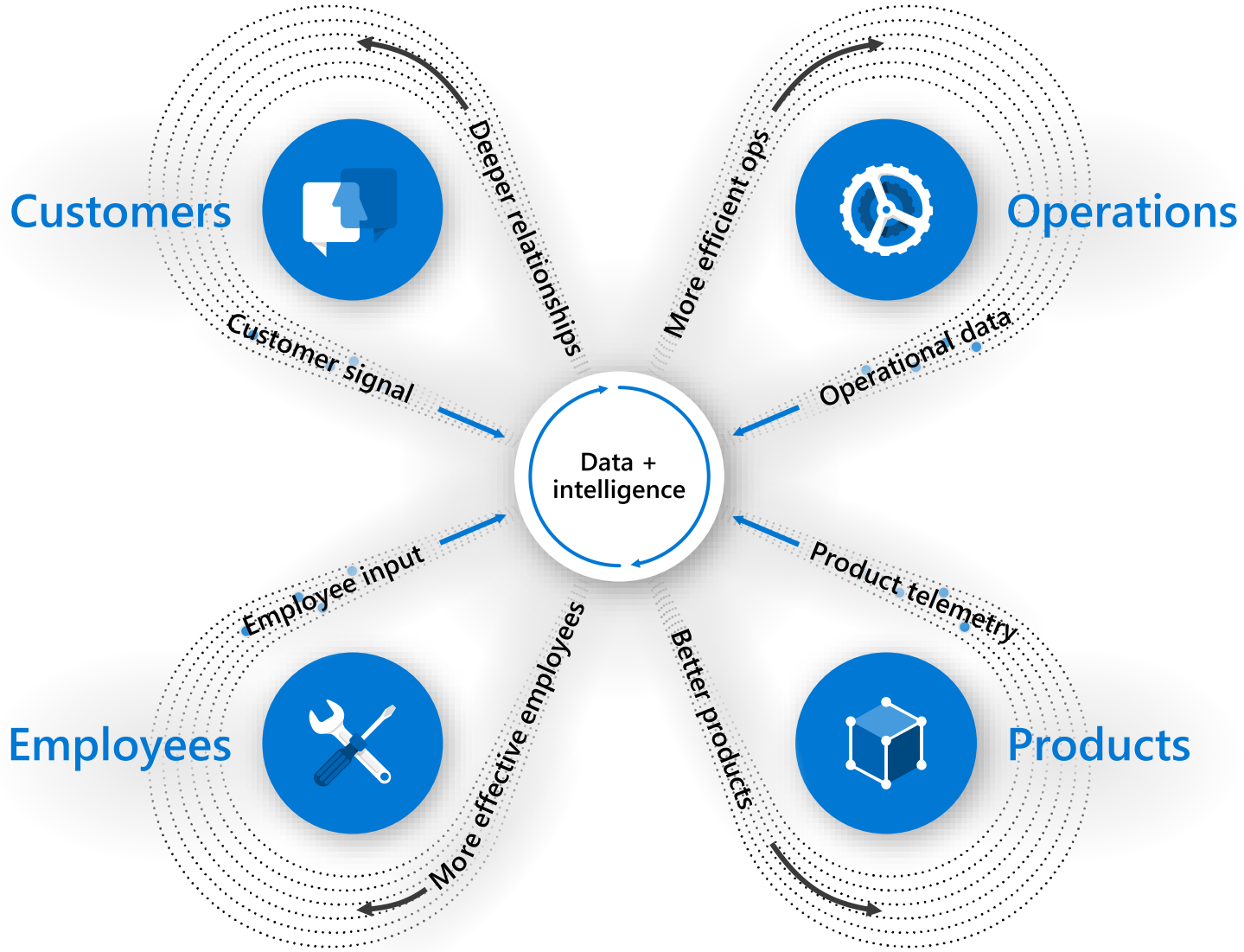
Azure enables analytics at cloud scale




Ecosystem
Power BI
Azure Machine Learning
Azure Synapse Analytics

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

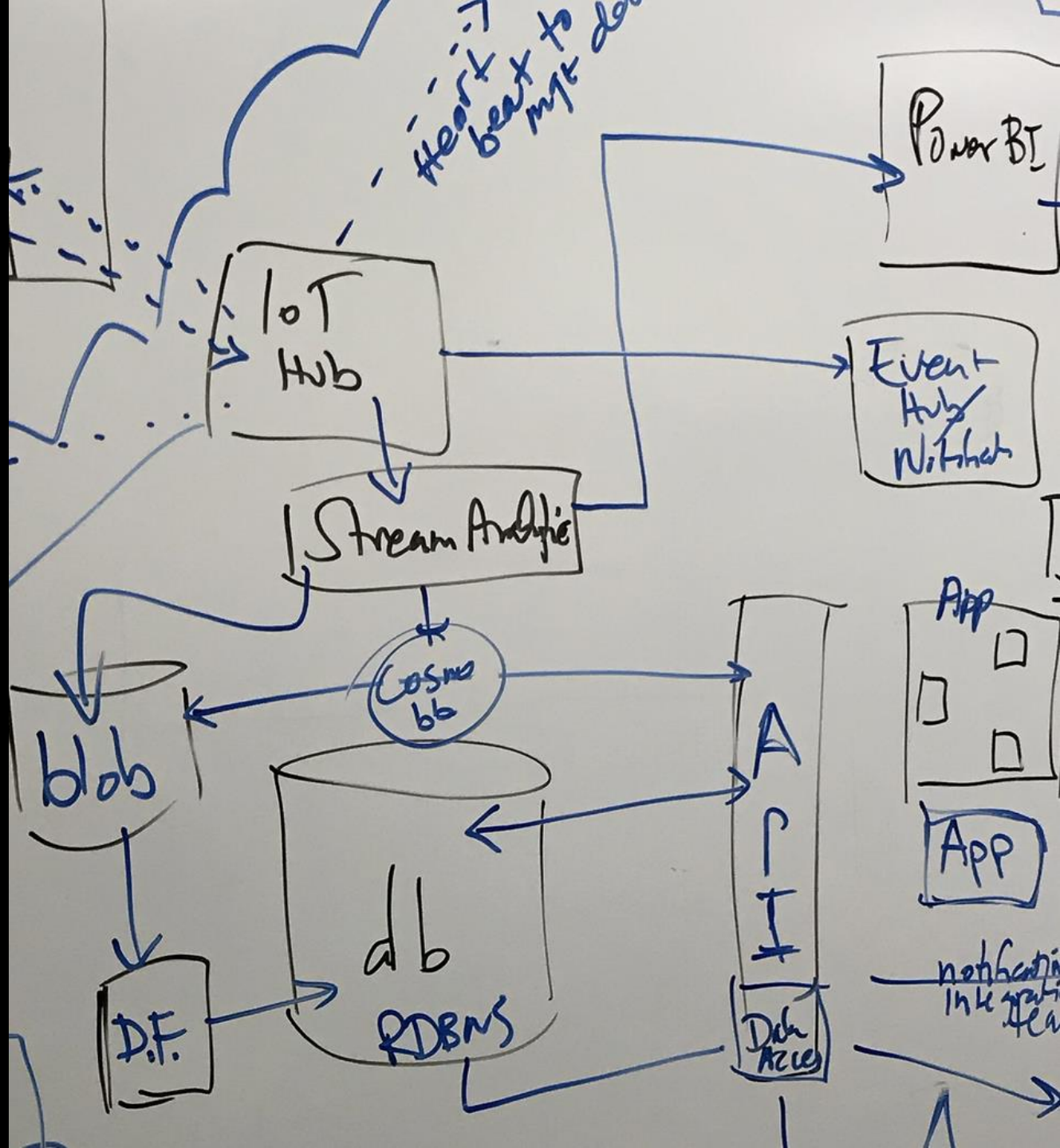
Valued transactions

Metering actions for billing

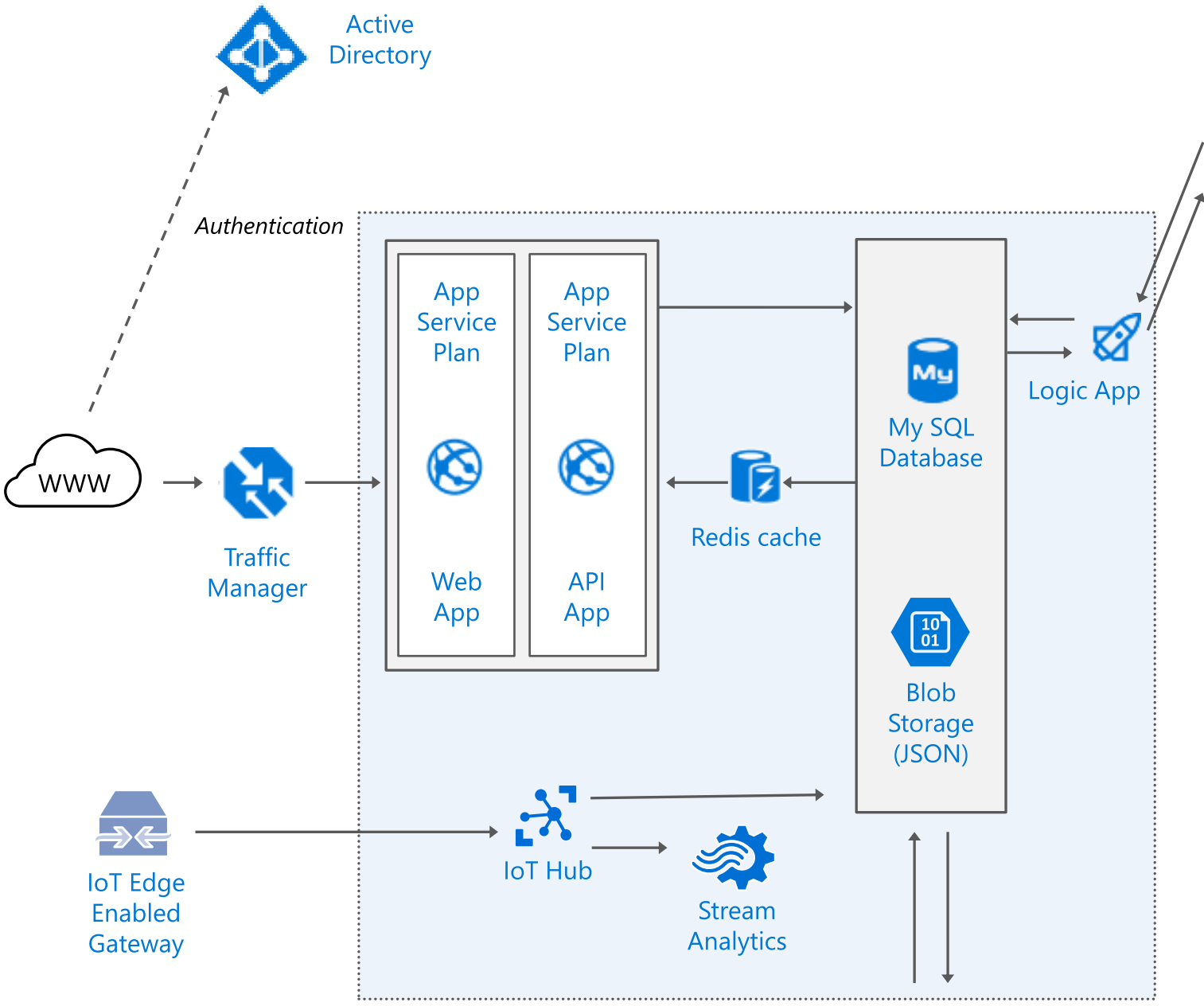
Events tracking e.g., violations for warranty management

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
Logic App
Blob Storage (JSON)
IoT Edge Enabled Gateway
IoT Hub
Stream Analytics

Yokogawa









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Microsoft

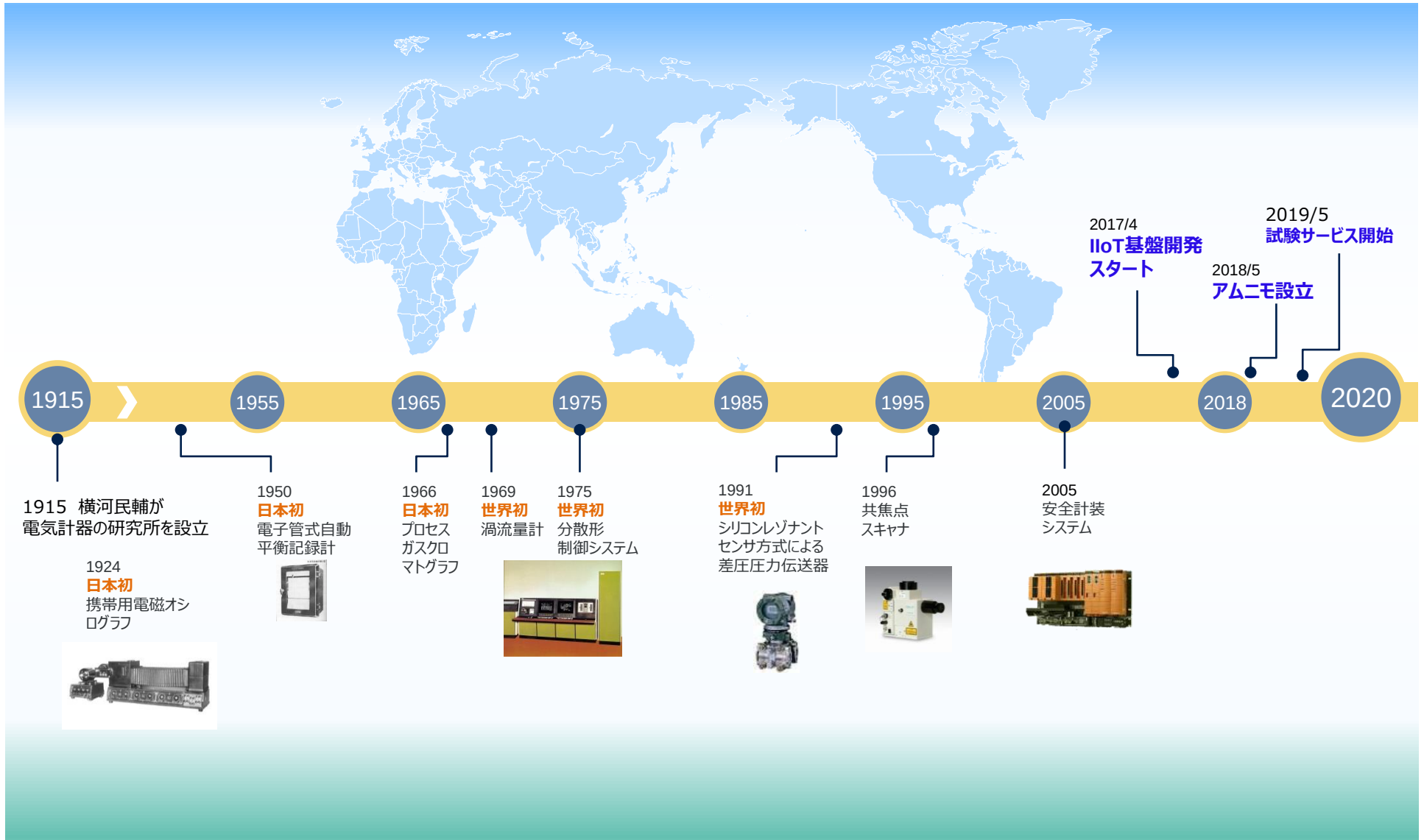
横河電機 産業用 IoT 基盤

鳥越 研児

横河電機株式会社
マーケティング本部
事業開発センター クラウドサービス開発部

IoT in Action

横河電機・アムニモ


1915
1955
1965
1975
1985
1995
2005
2018
2020
1915 横河民輔が
電気計器の研究所を設立
1924
日本初
携帯用電磁オシログラフ
1950
日本初
電子管式自動平衡記録計
1966
日本初
プロセスガスクロマトグラフ
1969
世界初
渦流量計
1975
世界初
分散形制御システム
1991
世界初
シリコンレゾナントセンサ方式による差圧圧力伝送器
1996
共焦点スキャナ
2005
安全計装システム
2017/4
IIoT基盤開発スタート
2018/5
アムニモ設立
2019/5
試験サービス開始

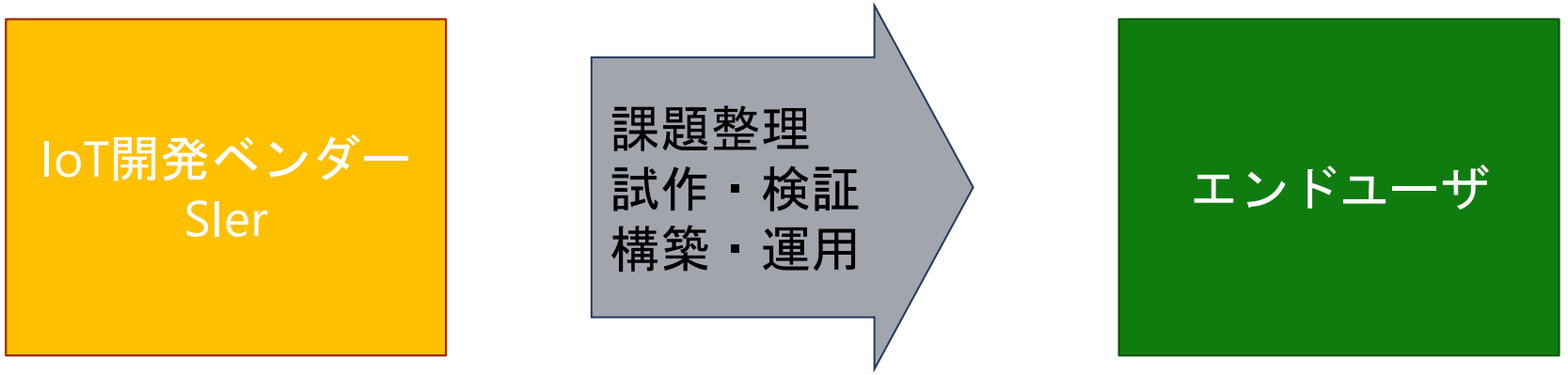
アムニモの目指すところ

・ヒト・モノの状況を、リアルタイムに把握・分析し、対処したい

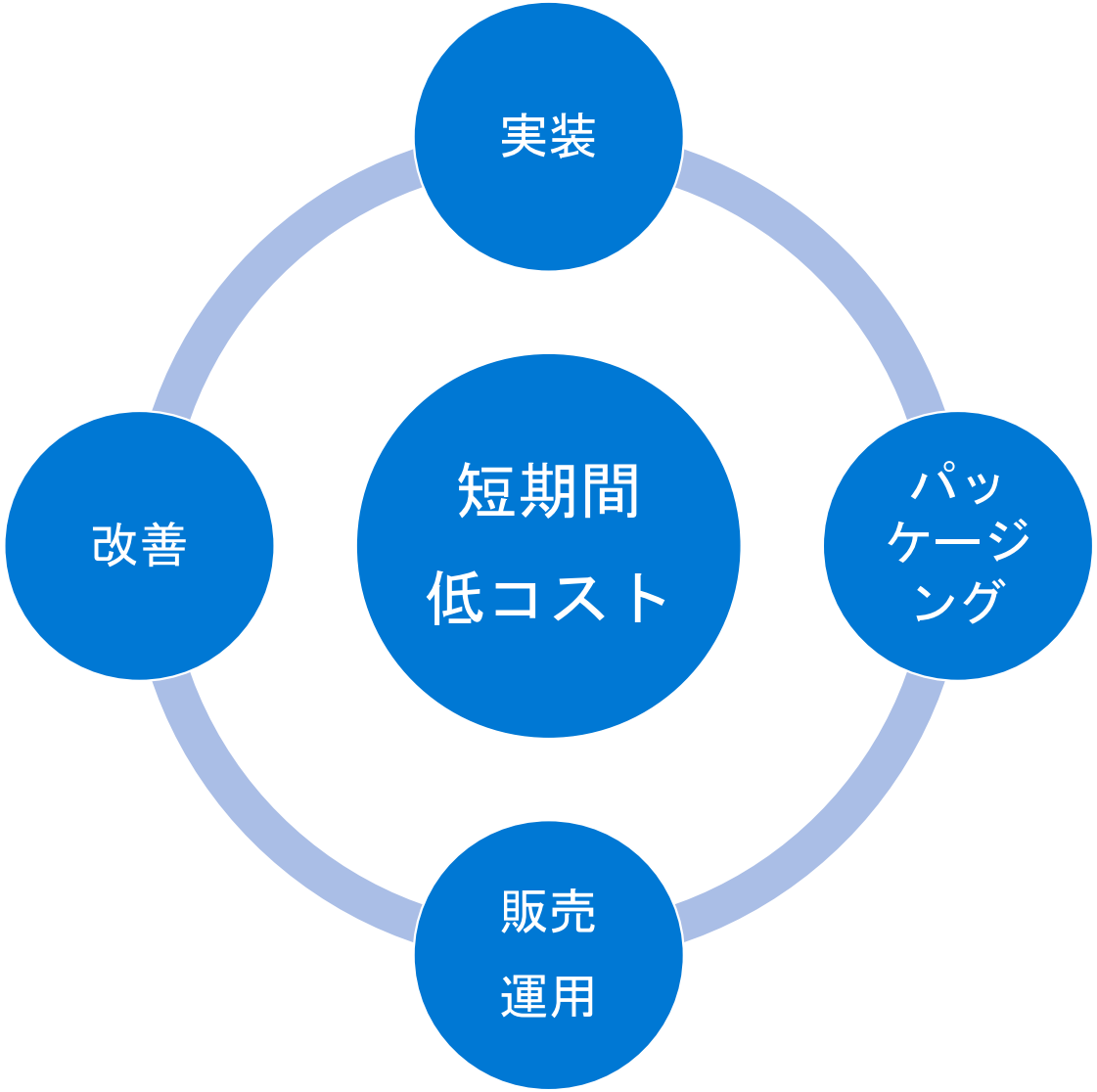
・予兆検知
  ・問題の早期発見と早期解決
・効率・品質の向上
  ・モノ: 機器の使い方の最適化
  ・ヒト: 働き方の最適化
・環境性の向上

課題：これまでのIoTシステム提供のあり方

「1個づくり」のシステムを、高額の費用をかけて構築・運用

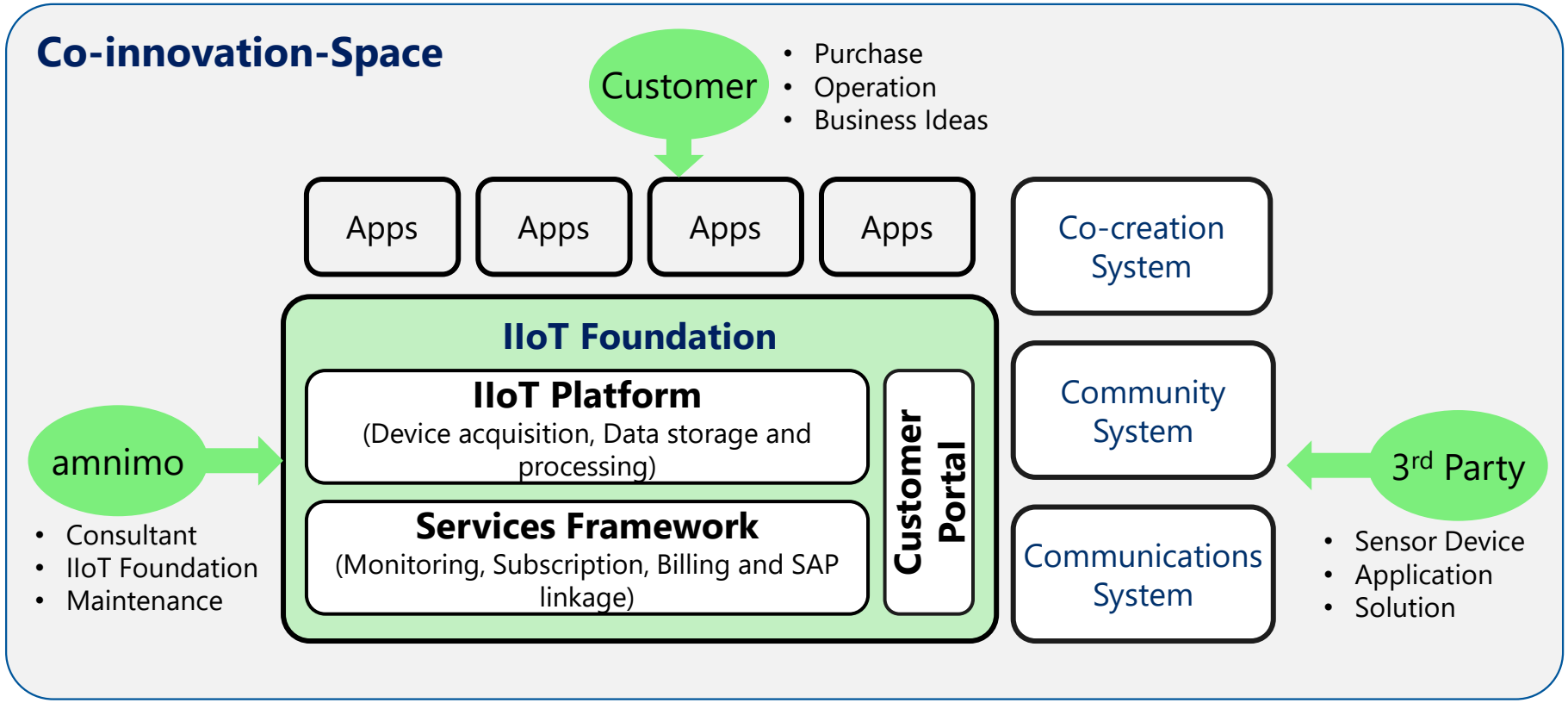


既存の発想からの脱却



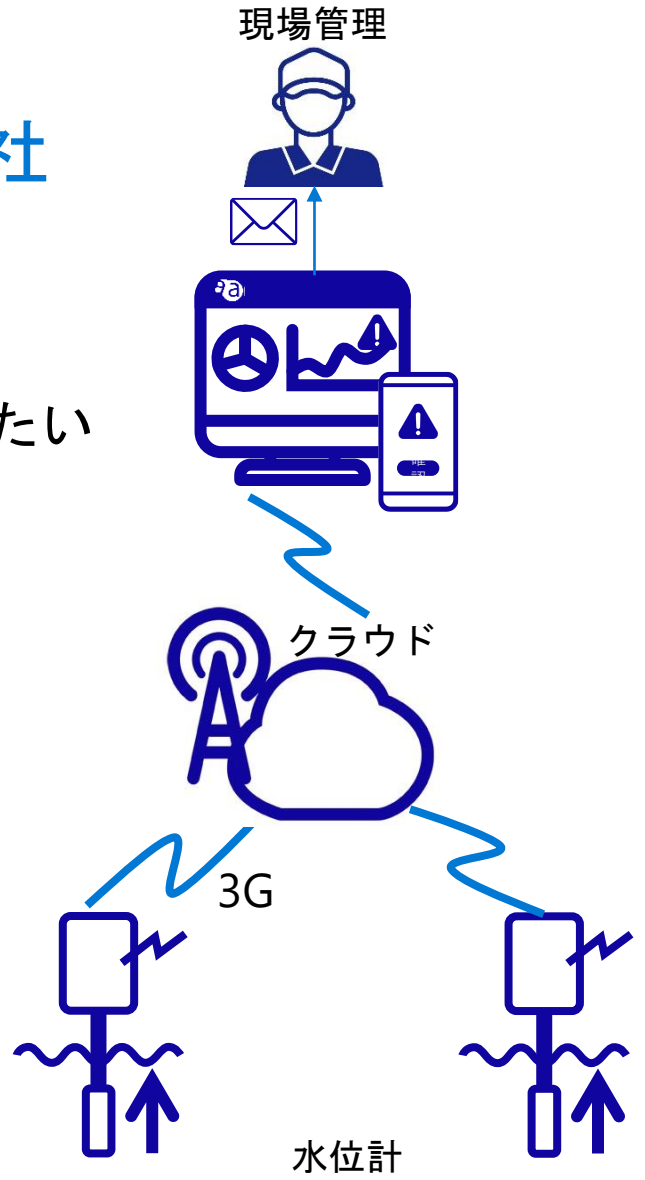
産業 IoT 基盤コンセプト

・データ収集・モニタだけではなく、お客様との共創の場とする

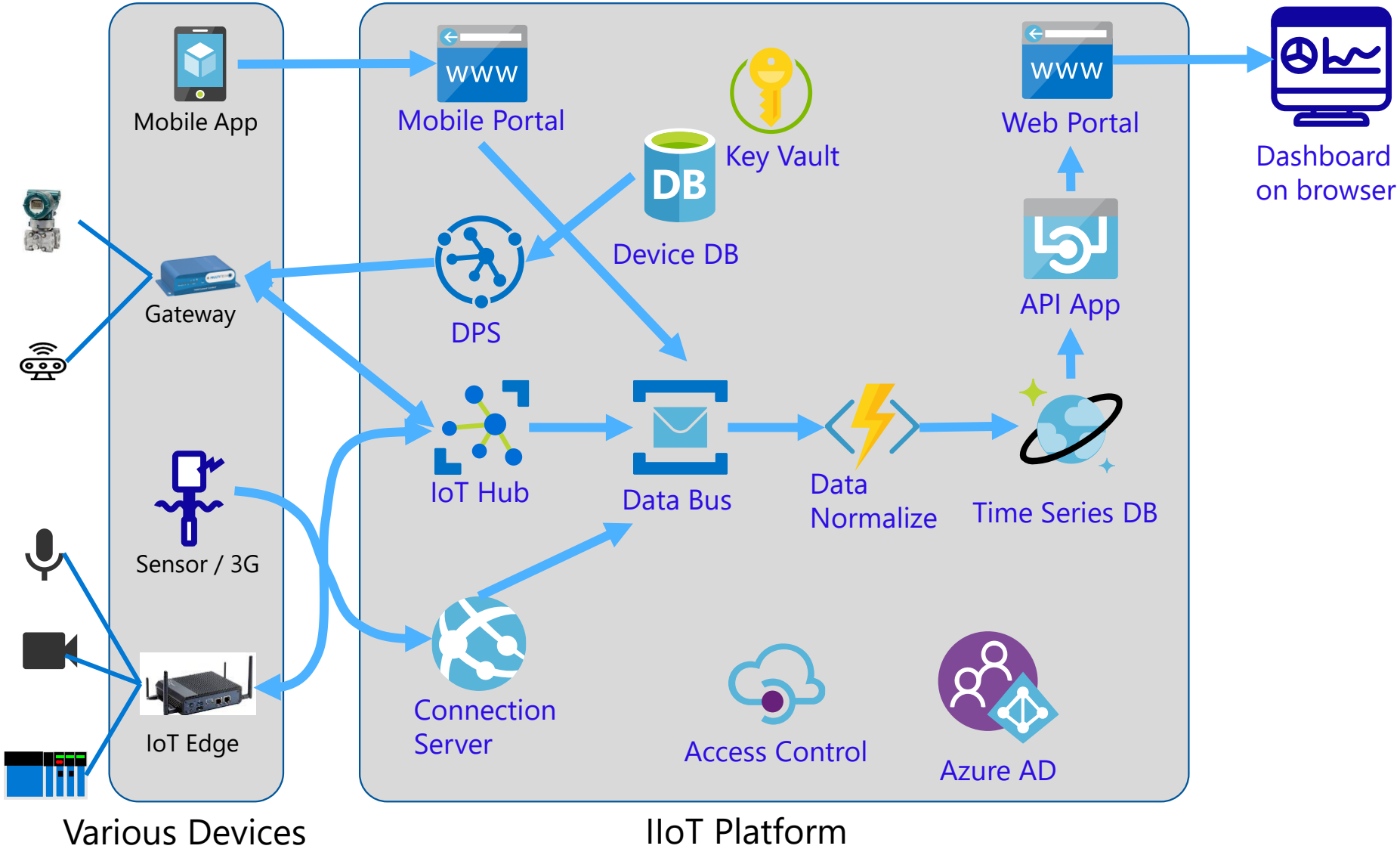


アプリケーション事例：水位計+災害対策

- パートナー様: 土木・建設コンサルティング会社
  - 災害対策工事のコンサルティング
- エンドユーザの困りごと
  - 雨量と水位の定量的な情報に基づいて、水害危険個所を特定したい
- 困りごとを解決する仕組み
  - 水害危険個所の特定に水位計+天気情報を利用
- エンドユーザが支出可能な額
  - サービス利用料 < 損害抑制効果＋業務効率向上

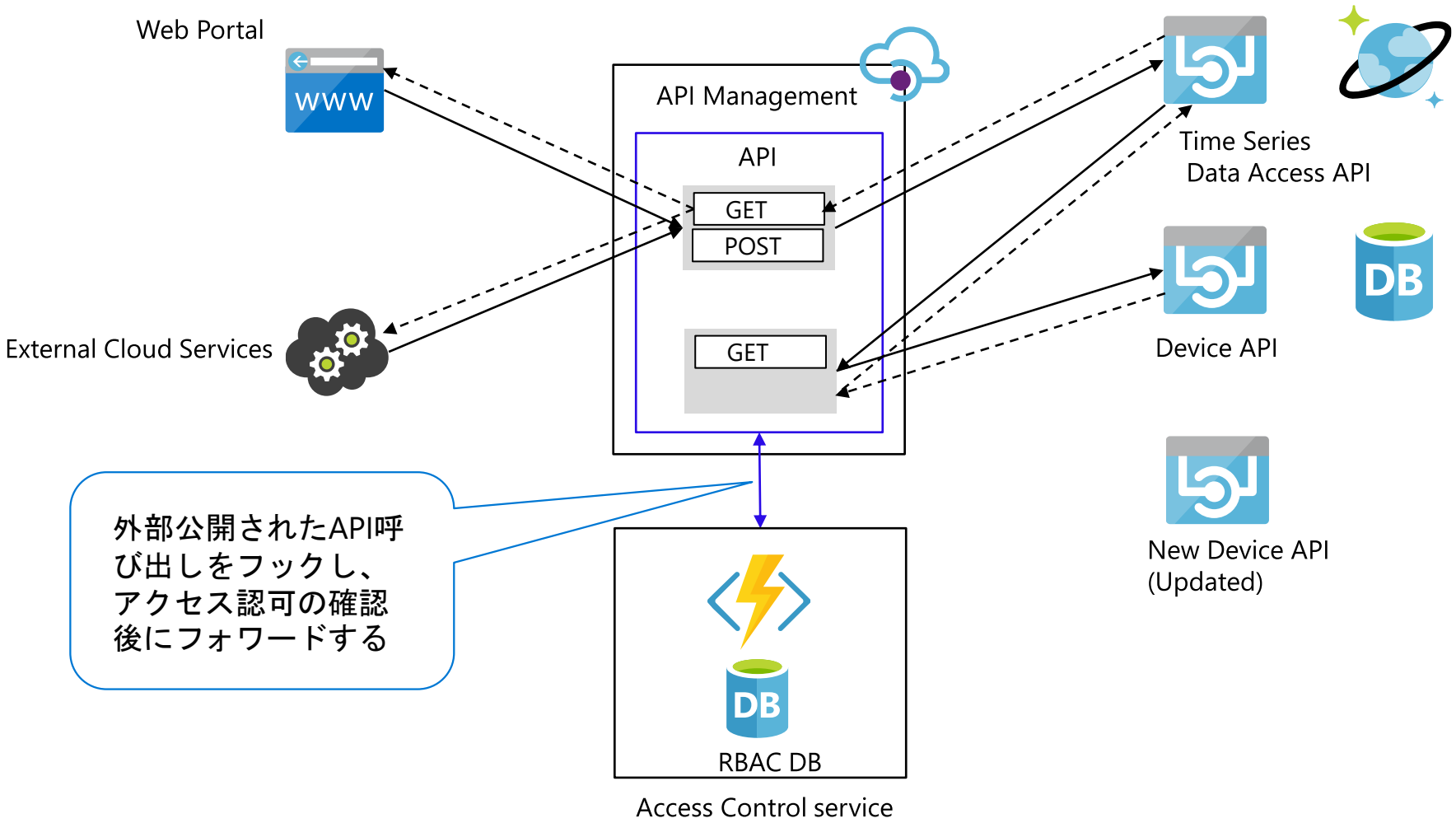


アーキテクチャー概要


Mobile App
Mobile Portal
Key Vault
Web Portal
Dashboard
on browser
DB
Device DB
Gateway
DPS
API App
IoT Hub
Data Bus
Data
Normalize
Time Series DB
Sensor / 3G
IoT Edge
Connection
Server
Access Control
Azure AD
Various Devices
IIoT Platform

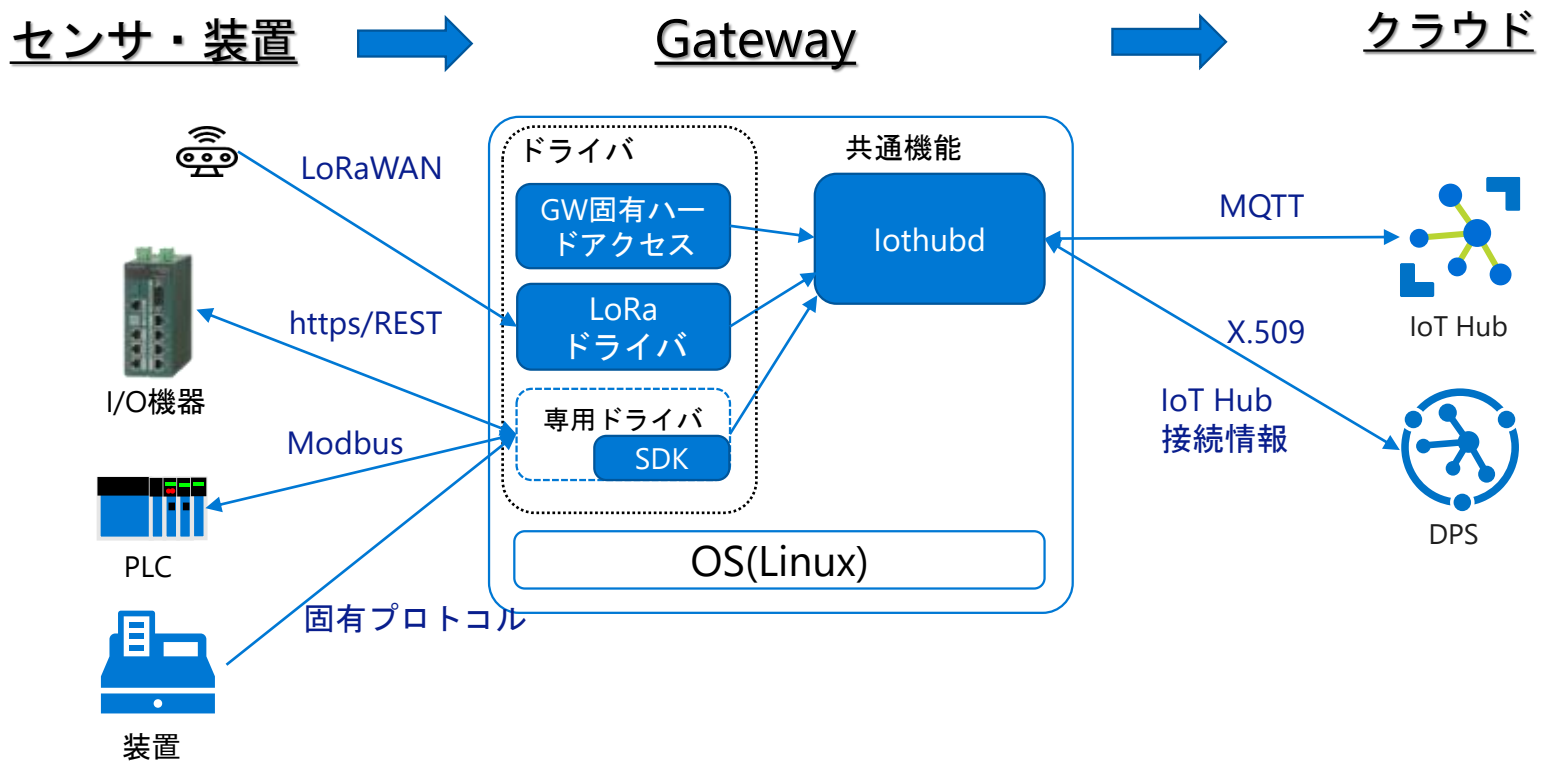
マイクロサービスアーキテクチャ

- API Management = マイクロサービスアーキテクチャのキーリソース

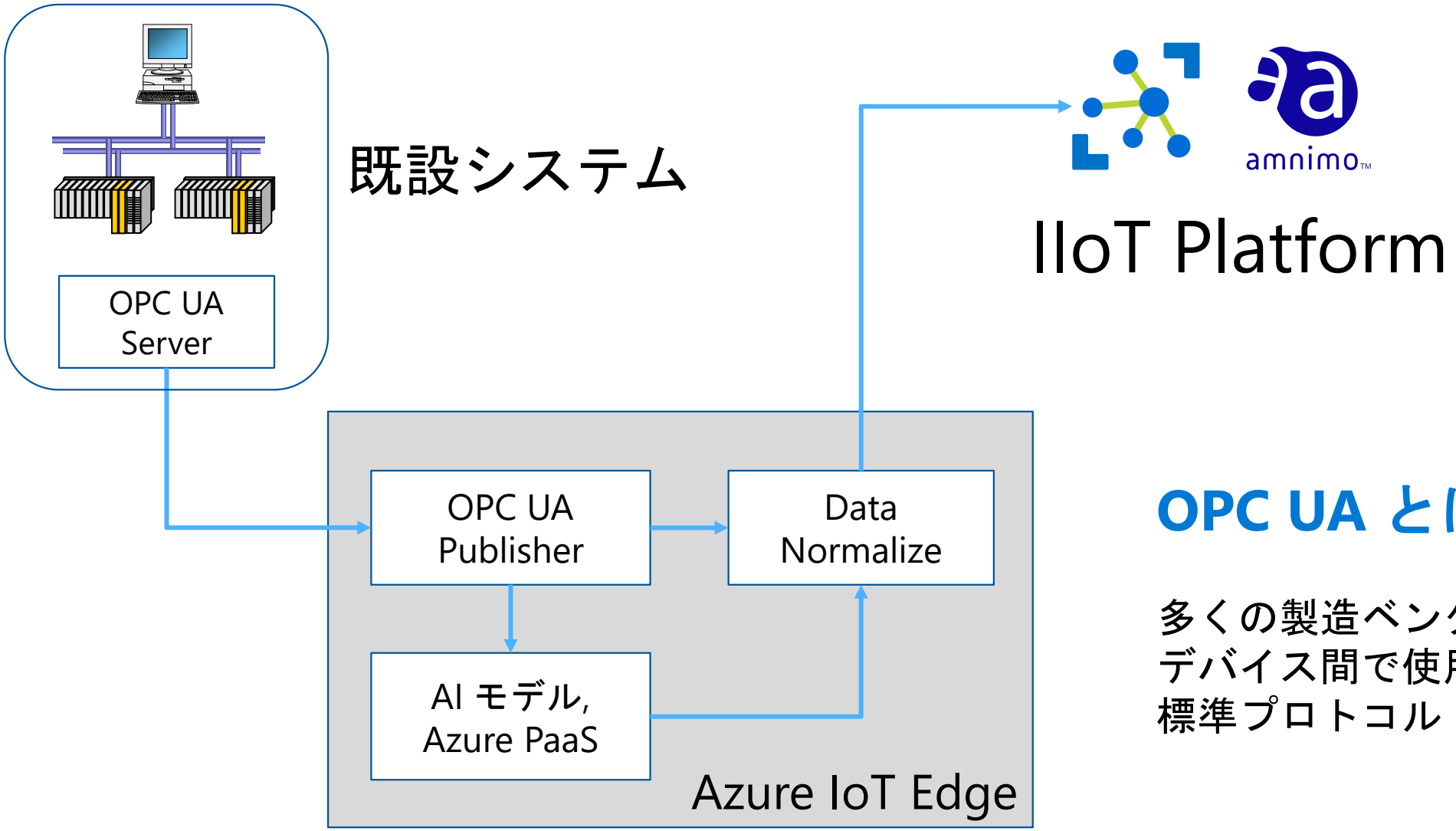


多様な機器を接続できる

- iothubd：IoTHub Device SDKで開発
- 専用ドライバ：pythonの開発環境を提供

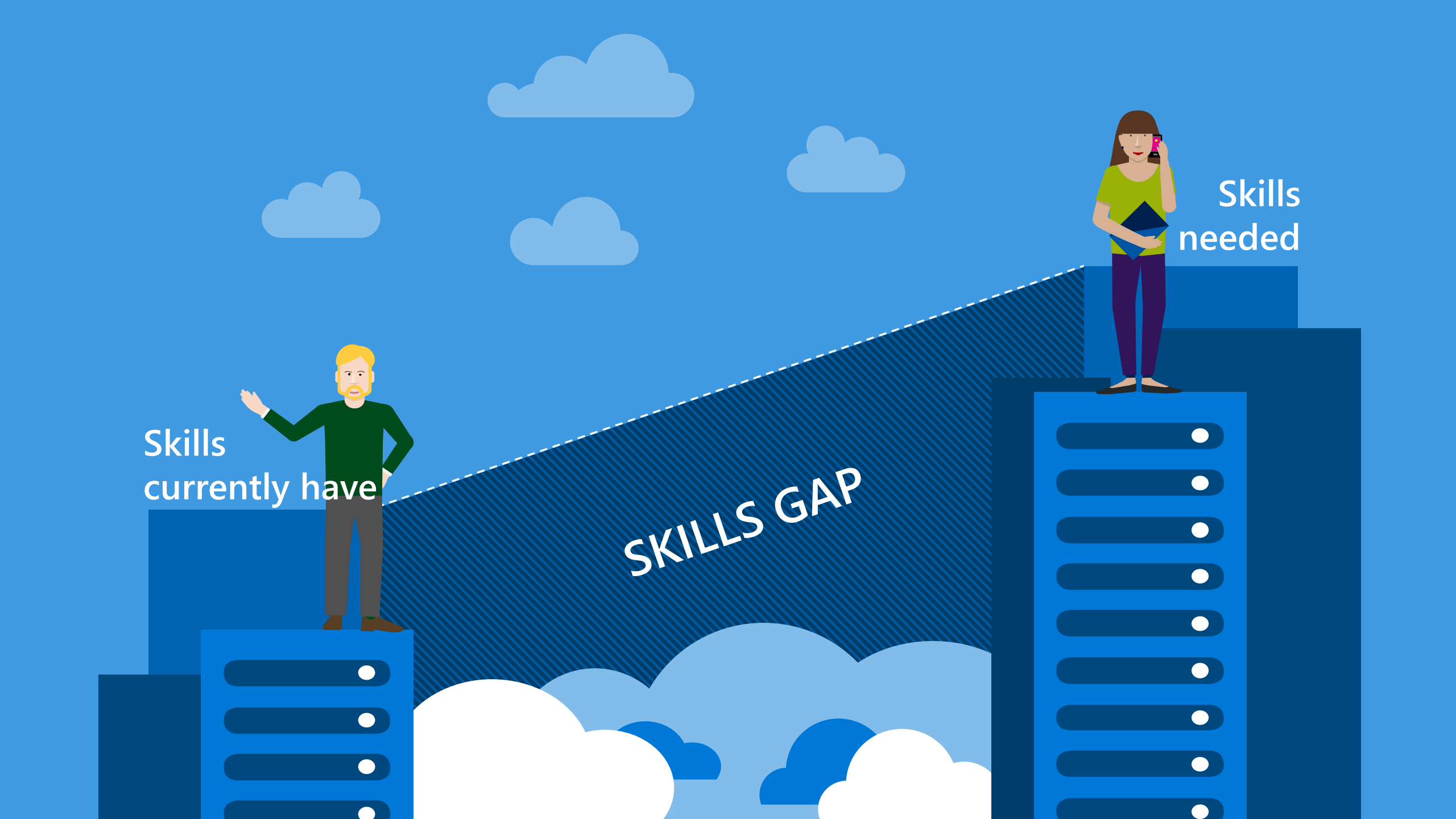


OPC UA on IoT Edge (PoC)



OPC UA とは？

多くの製造ベンダーの
デバイス間で使用される
標準プロトコル


Skills needed
Skills currently have
SKILLS GAP

Welcome to Microsoft Learn

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Time investment expectation

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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

Microsoft.com/learn

Azure fundamentals

12300 XP

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

Total XP= 12,300

Modules in this learning path

Cloud Concepts - Principles of cloud computing

1100 XP

1 hr 2 min • Module • 10 Units

★★★★★ 4.8 (23350)

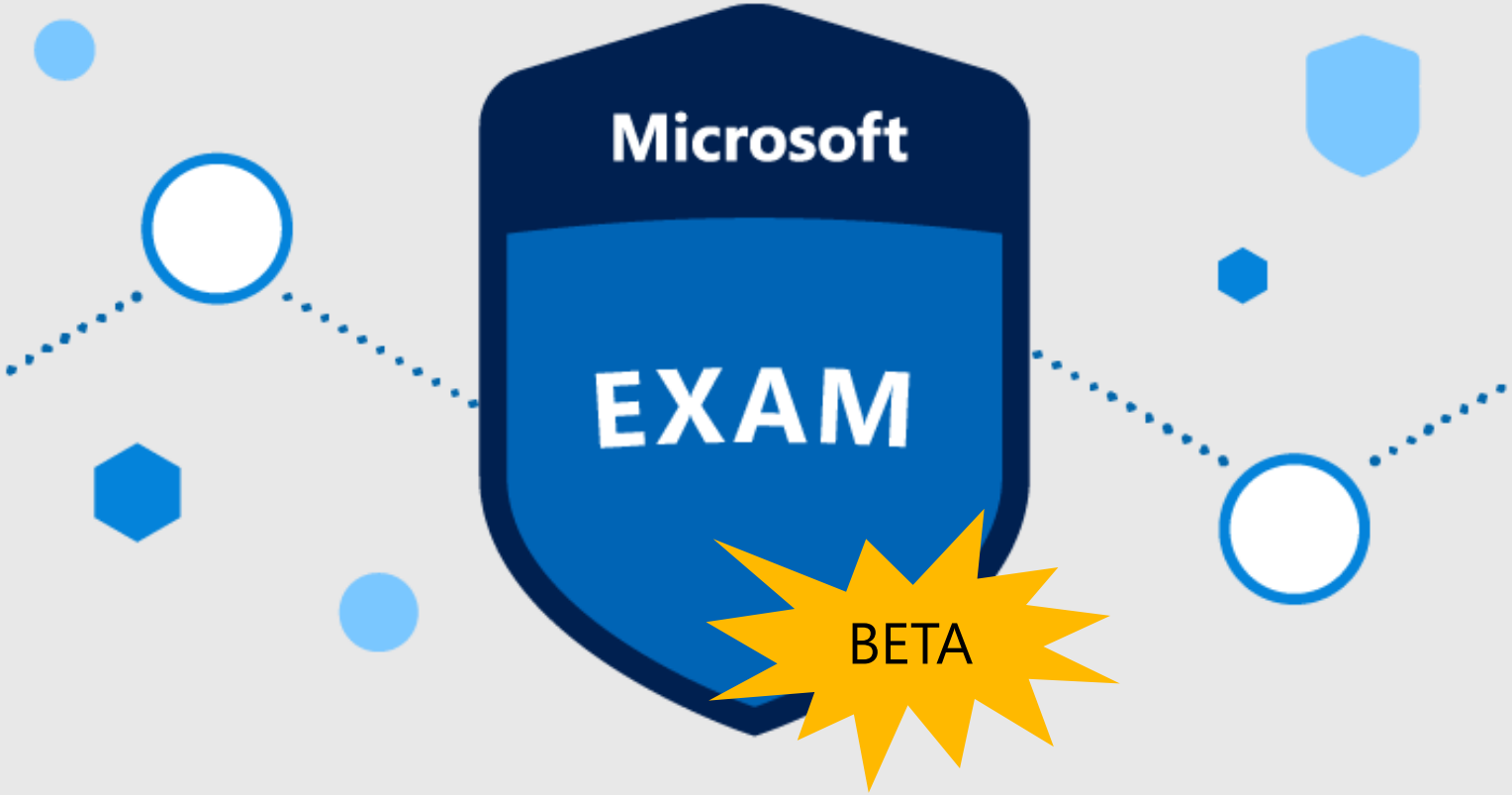
Explore the core concepts of cloud computing and how it can help your business.

Overview

Leveling up your Azure skillz with Microsoft Learn

ANNOUNCEMENT!

Microsoft Certified: Azure IoT Developer Specialty



Exam AZ-220: Microsoft Azure IoT Developer

Top challenges

Complexity
IoT PnP, IoT Central

Knowledge
MS Learn

Security
Confidential Computing

Solution == Partners

Project 15 from Microsoft

An Animal Conservation Initiative


00:15:00