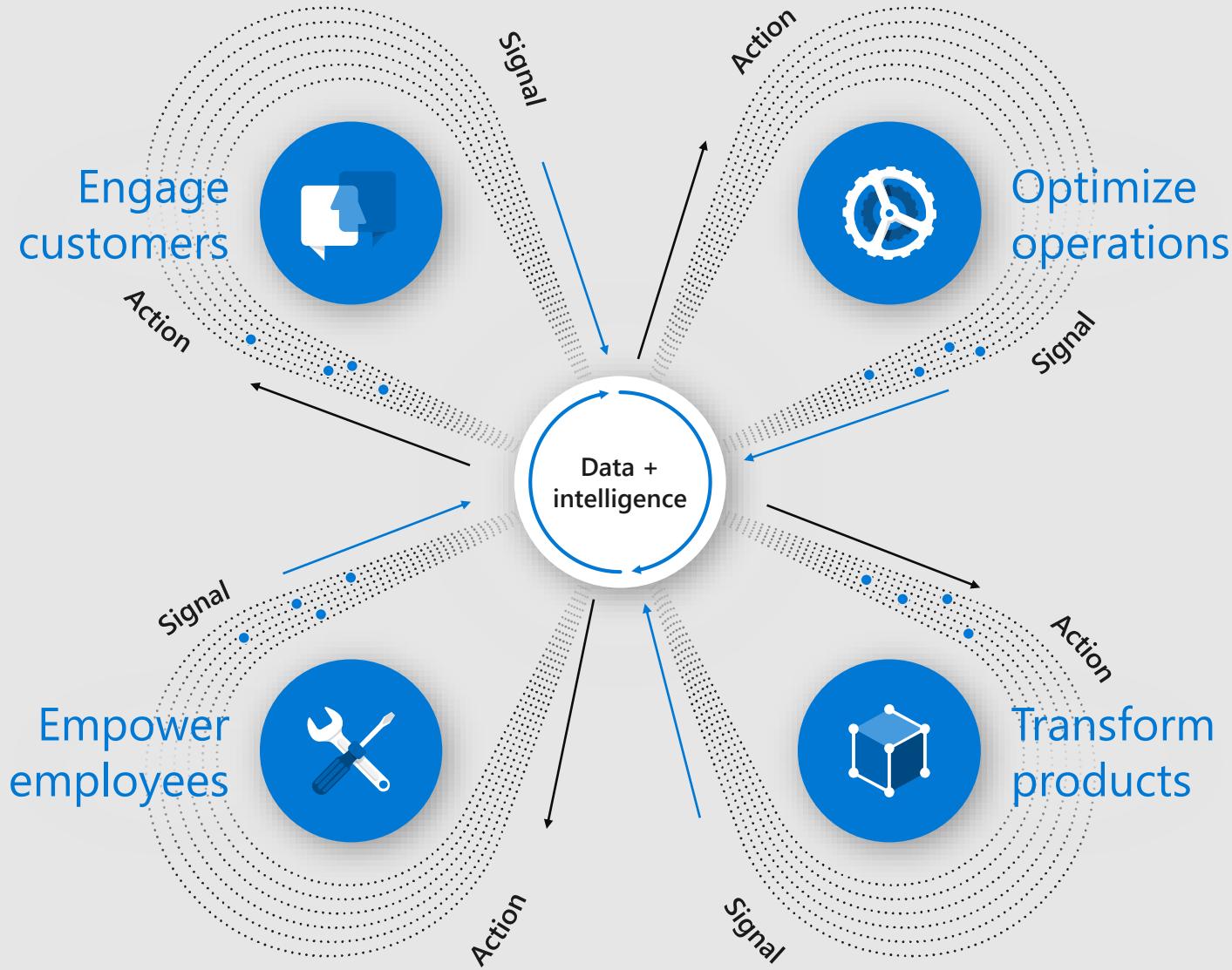


# Azure IoT Overview

Name

Title and/or group





**80B**

Connected “things” by 2025 generating 180ZB of data



**\$130B**

New monetization avenues due to IoT-related services



**80%**

Companies that increased revenue as a result of IoT implementation



**\$100M**

Average increase in operating income (avg. 8%) among the most digitally transformed enterprises

## Cloud



Globally available,  
unlimited compute  
resources

## IoT



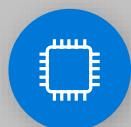
Harnessing signals from  
sensors and devices,  
managed centrally  
by the cloud

## AI

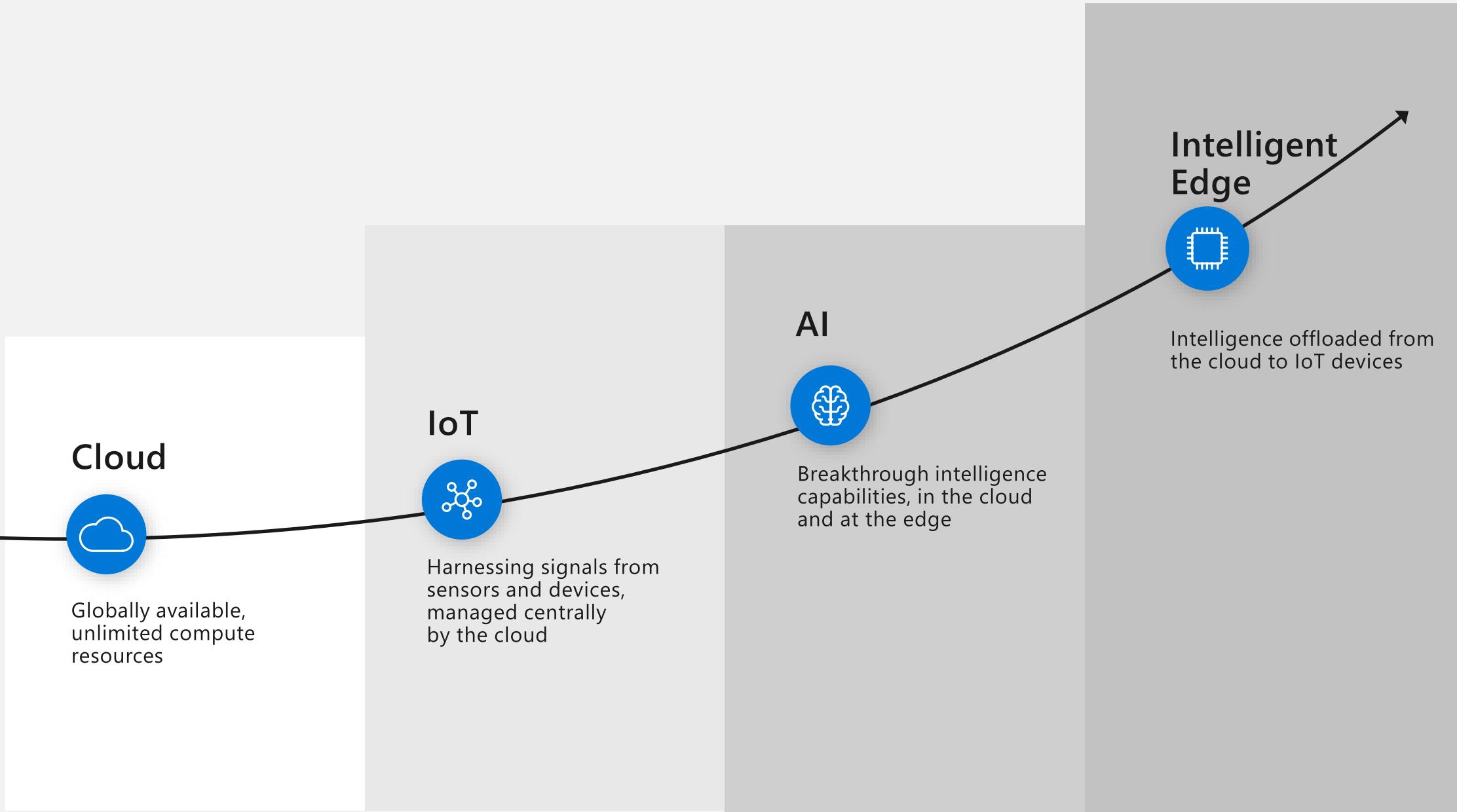


Breakthrough intelligence  
capabilities, in the cloud  
and at the edge

## Intelligent Edge



Intelligence offloaded from  
the cloud to IoT devices





**Johnson Controls**

Connected chillers come back online **9x faster** than unconnected equipment, avoiding more than **\$300,000** in hourly downtime costs



**DUNAV**  
NET

Keeping farmers informed about when to irrigate, how to control diseases, and how to fight pests, has led to **increased yields of 30%**, and a **20% reduction** in water use



**ROLLS**  
**R**  
**ROYCE**

**Rolls-Royce**

Rolls Royce provides maximize aircraft availability by employing "power by the hour" model; cutting fuel usage by 1 percent could save **\$250,000** per plane per year



coop

MARS

btt<sup>TM</sup>

BUNN  
Quality Service Since 1946



powel



T-Systems



ATF  
SERVICES

thyssenkrupp



DRONEWORKS



RAC

Steelcase

Schneider  
Electric

SANDVIK  
Coromant

JABIL

ABB



weka health  
solutions

KUKA

evoQUA  
WATER TECHNOLOGIES

GOJO®



LIEBHERR

Rockwell  
Automation



Rolls-Royce

FINNING CAT



targetbase\*

KOHLER

HERSHEY'S

origis<sup>®</sup>

ECOLAB<sup>®</sup>

Purell<sup>®</sup>

quorum

JABIL

COATS



WEIR



Schlumberger

fathym

DAIMLER

POLITECNICO  
MILANO 1863

TEXA

avaterion

Transport  
for London



ABT  
POWER MANAGEMENT



ABUS  
Security Tech Germany

Mondelēz  
International

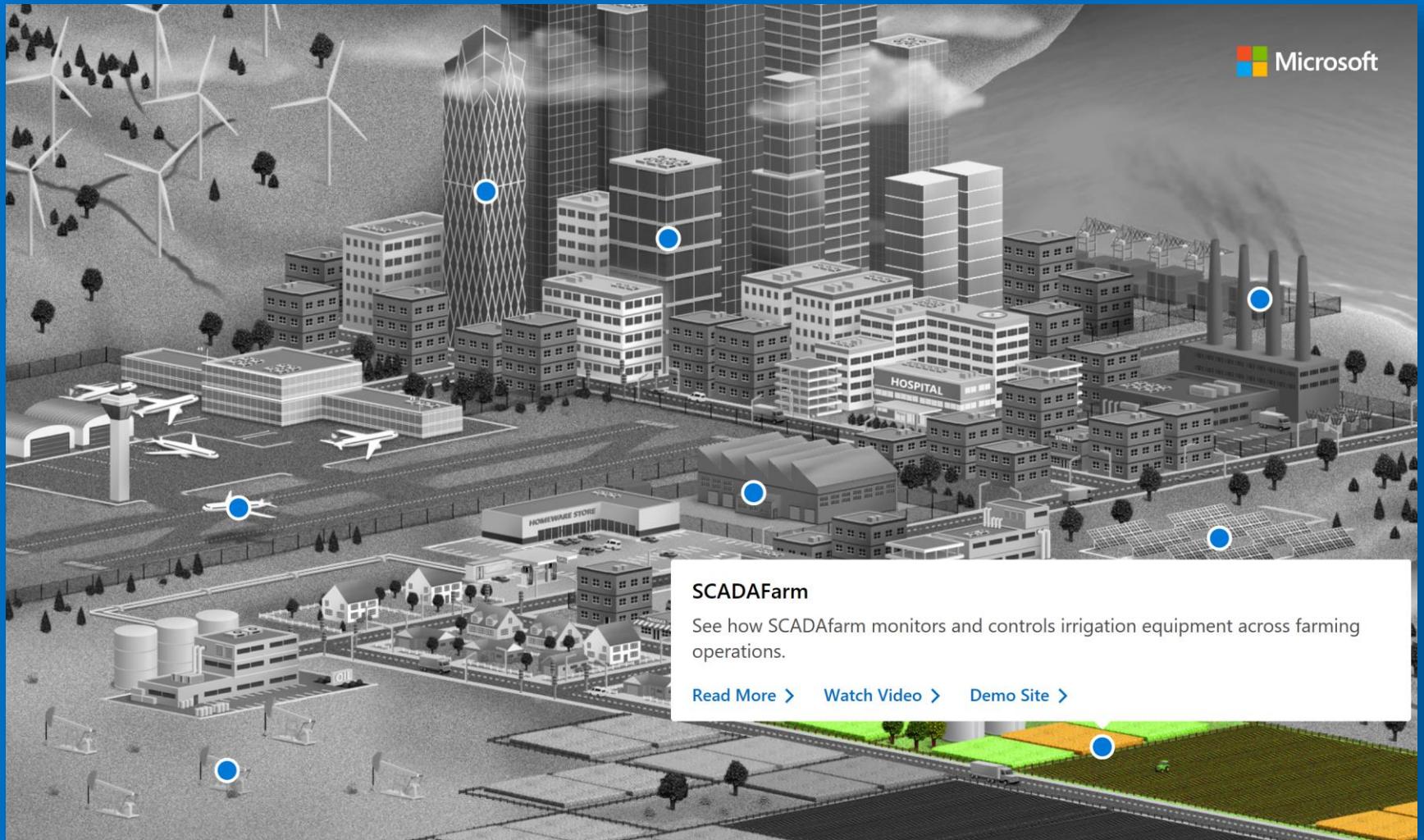
STOCKROSE:  
SMART BUILDINGS-AS-A-SERVICE

STEIGENBERGER  
AIRPORT HOTEL  
FRANKFURT

FUJITSU

KONGSBERG

# Demos





**Productive**



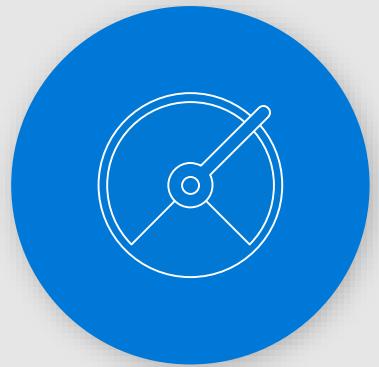
**Hybrid**



**Intelligent**



**Trusted**



**Productive**



**Hybrid**



**Intelligent**



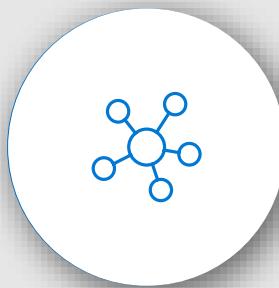
**Trusted**



# Azure IoT: Productive



Deploy  
in minutes



Build on open  
source innovation



Solutions and partners to help  
you at every step



# Azure IoT: Hybrid



Connect devices, OS and  
protocols you already use



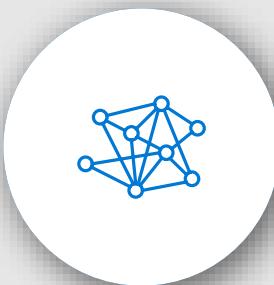
Deploy cloud logic to the edge



Connect only when needed



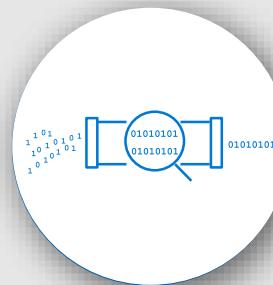
# Azure IoT: Intelligent



Create intelligent analytics to predict future outcomes



Build spatial and edge intelligence into your solution



Explore and analyze time-series data



# Azure IoT: Trusted



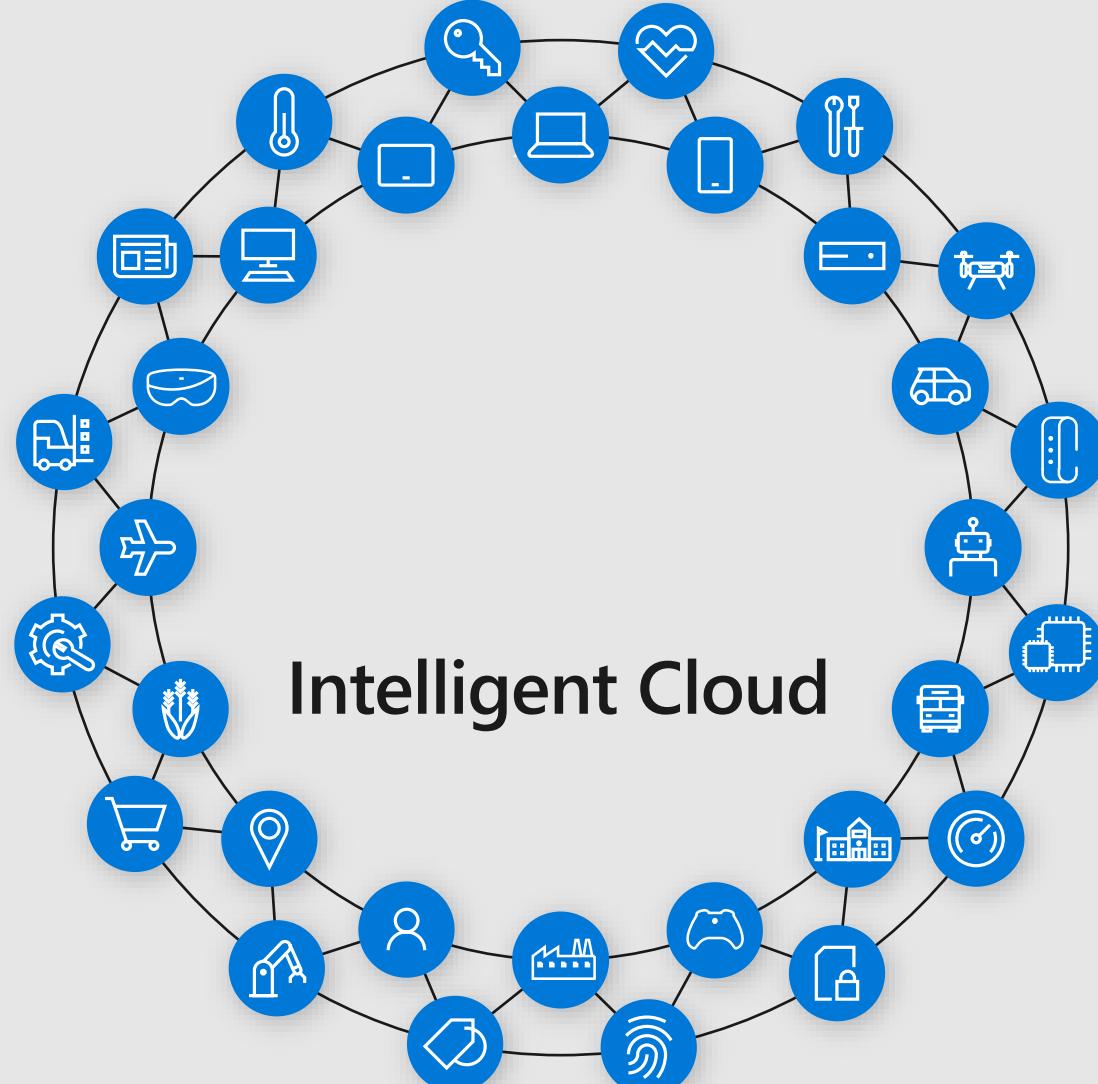
Securely provision and manage your IoT devices from anywhere



Build on proven enterprise-ready IoT solutions



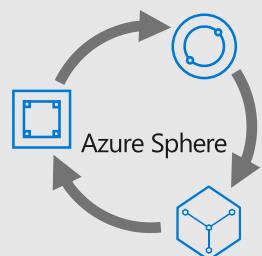
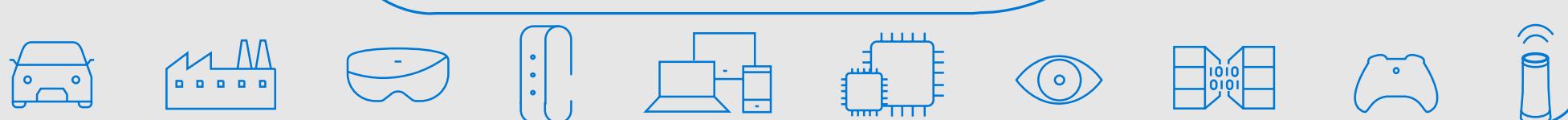
Leverage built-in security features and best practices



Intelligent Cloud

Intelligent Edge

Azure IoT  
solutions and services



Azure IoT Edge

**SaaS****Managed Solutions**

IoT Central



Connected Field Service

**Solution Accelerators**

Remote monitoring



Predictive maintenance



Connected factory

...

**Device Support**

Azure IoT Hub

**Data & Analytics**

Azure Time Series Insights

**Visualization & Integration**

Azure Logic Apps

**IoT Edge****Partner Solutions**



WELCOME JEFF

Thyssenkrupp

Profile

New

Location

San LaMonte Building

MAX Data

100 Points for Health & Safety  
Autostarting  
Self-service  
Emergency  
Car Repairs  
Customer Support  
Maintenance  
Inspection  
Relocation  
Accessories  
Branding

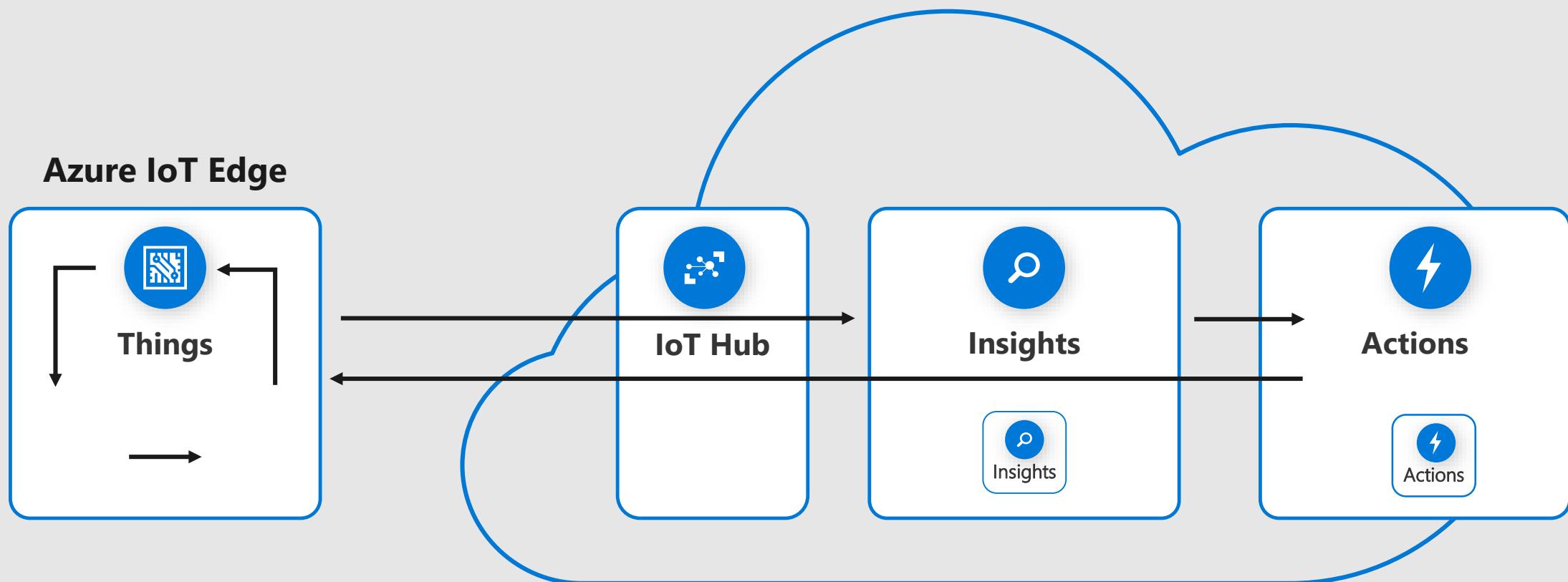
## Transforming elevators with predictive service

thyssenkrupp's elevators predict the maintenance needs using Azure IoT reduces the costs of maintaining elevators and improving uptime for its customers. Using Hololens, thyssenkrupp technicians receive remote assistance by subject matter experts who can provide visual and audible advice

[LEARN MORE >](#)

 thyssenkrupp

# IoT Edge

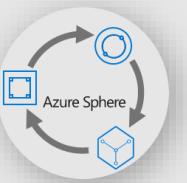




## Edge analytics makes remote asset management easier

Schneider Electric was interested in enhancing their remote management solution to do more than just respond to real-time situations. It has now the flexibility to run machine learning in the cloud or at the edge.

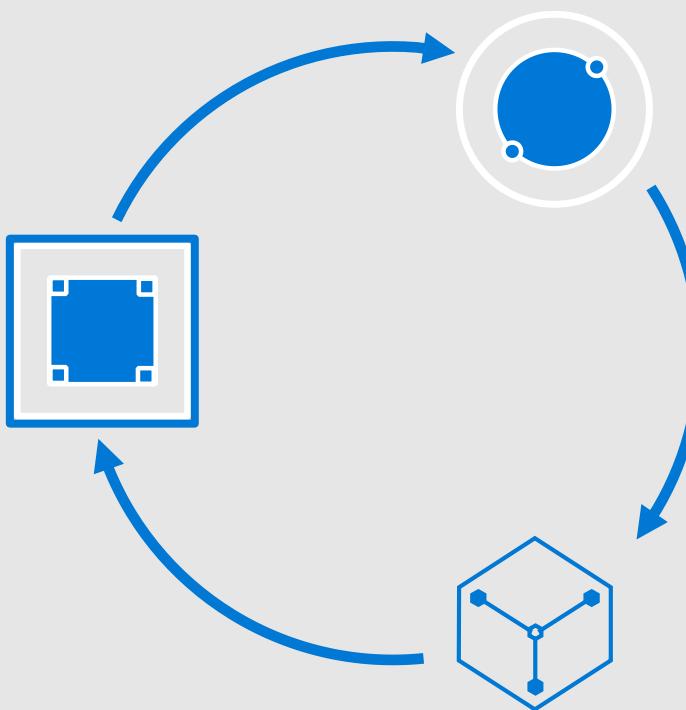
[LEARN MORE >](#)



# Azure Sphere

an end-to-end solution for securing MCU powered devices

A new **Azure Sphere class of MCUs**, from silicon partners, with built-in Microsoft security technology provide connectivity and a dependable **hardware root of trust**.



A new **Azure Sphere OS** secured by Microsoft for the devices 10-year lifetime to create **a trustworthy platform** for new IoT experiences

The **Azure Sphere Security Service** guards every Azure Sphere device; it **brokers trust** for device-to-device and device-to-cloud communication, **detects emerging threats**, and **renews device security**.

# A large and growing ecosystem

System integrators



Solution providers



Azure certified  
for IoT



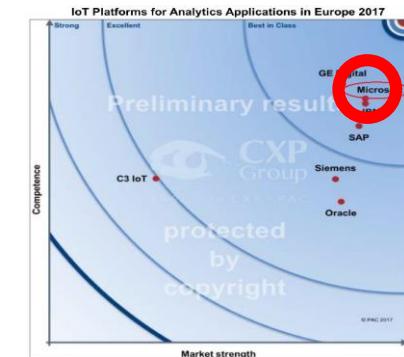
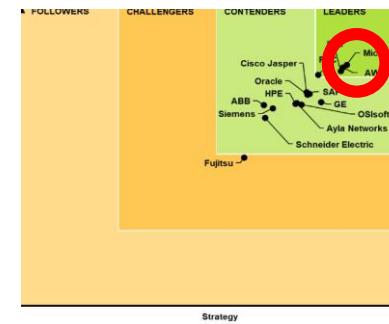
Developer, IT  
and, productivity



# Microsoft is the first hyperscale cloud solution provider to deliver

IoT solution accelerators | SaaS and PaaS for IoT | AA/AI at the edge

Solve device provisioning at scale | Support OPC UA for manufacturing



**FORRESTER®**

Microsoft is a leader in the Forrester Wave for IoT Software Platforms

**IDC**  
Analyze the Future

Microsoft is a Leader in the IDC MarketScape for IoT platforms across various use cases

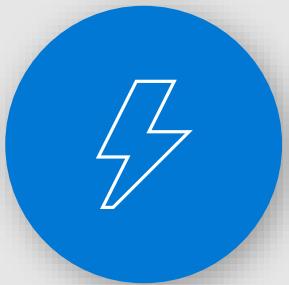
**NAVIGANT**

Microsoft is a leader in the Research Leaderboard assessment of strategy and execution for 15 IoT platform providers

**CXP Group**  
A CXP GROUP COMPANY

Azure IoT is the only cloud platform that was determined as best in class in every category

# Azure: IoT for every business



Accelerate  
your IoT  
journey



Build on the most  
**comprehensive**  
IoT portfolio &  
ecosystem



Work with a  
**trusted** IoT  
leader

# Get Started Today

## Looking to USE an IoT Solution?

Use managed and industry-specific solutions to get started quickly and easily. [Try IoT solutions](#)

## Ready to BUILD IoT Applications?

Find everything you need to develop advanced IoT apps using familiar languages and tools. [Build IoT apps](#)

1

[Go to Azure.com/IoT](#)

2

[Skill up at IoT School](#)

3

[Select a partner](#)

4

[Contact Us](#)



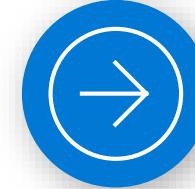
A woman with blonde hair, wearing a flight suit and glasses, is looking at a tablet device. The tablet screen displays a complex interface with various charts, graphs, and data tables, likely representing aircraft performance metrics. She is pointing her finger at the screen. In the background, the interior of a cockpit is visible, featuring numerous physical control panels with buttons, switches, and analog dials.

# Azure IoT solution accelerators

-  End-to-end implementation
-  Completely customizable
-  Open-source microservices based architecture
-  Device connectivity and management
-  Dashboards, visualization, and insights
-  Workflow automation and integration
-  Command and control
-  Preconfigured solutions
-  Remote Monitoring
-  Connected Factory
-  Predictive Maintenance
-  Device Simulation

# Accelerate time to value

Start quickly for  
common IoT scenarios



Finish with your  
IoT application



Get started in minutes

Modify existing rules and alerts

Add your devices and begin tailor to your needs

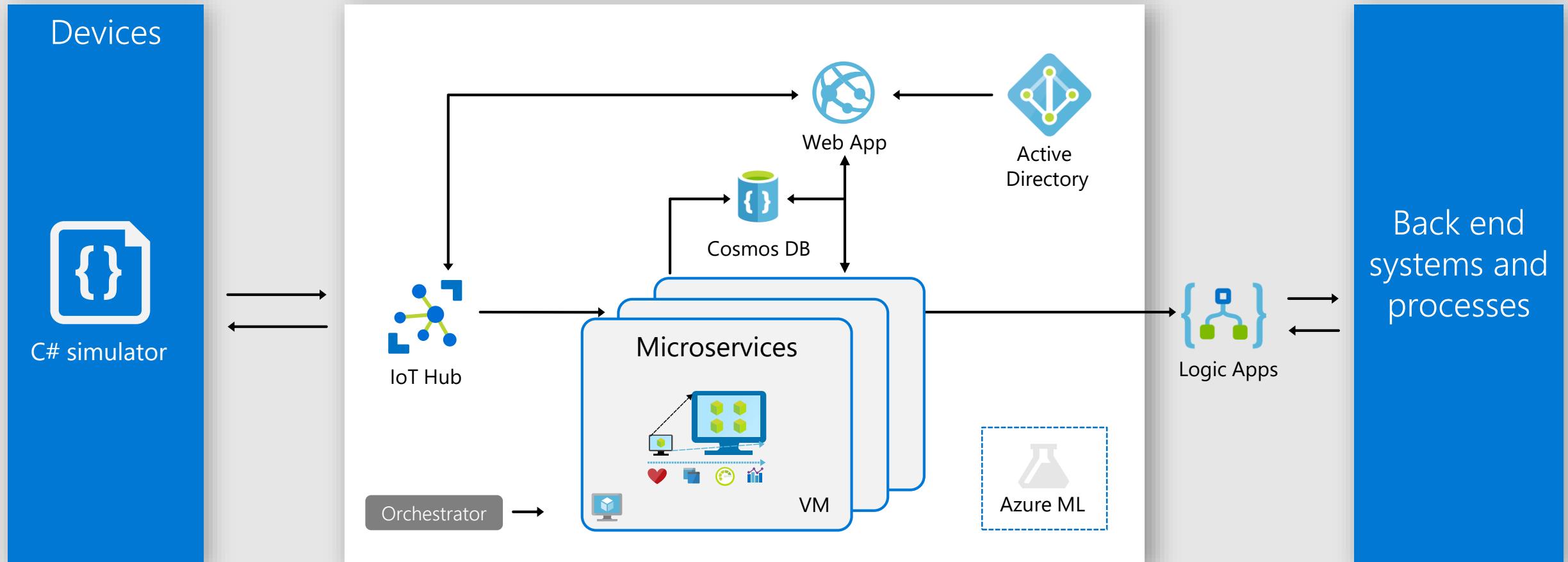
Fine-tuned to specific assets and processes

Highly visual for your real-time operational data

Integrate with back-end systems

# Components of a pre-configured solution

Remote monitoring | Predictive maintenance | Connected factory | Device simulation





# Azure IoT Central



Fully hosted and managed by Microsoft



No cloud development expertise required



Device connectivity and management



Monitoring rules and triggered actions



User roles and permissions

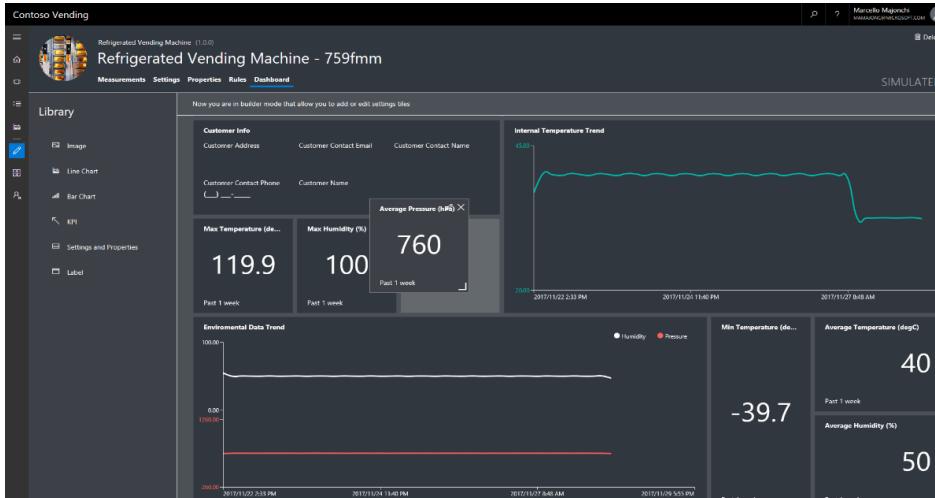


Analytics, dashboards and visualization



Risk-free trial with simplified pricing

# Builder



Product modeler



Device settings



Template management



Rules workflows



User and identity management

# Operator



Device management



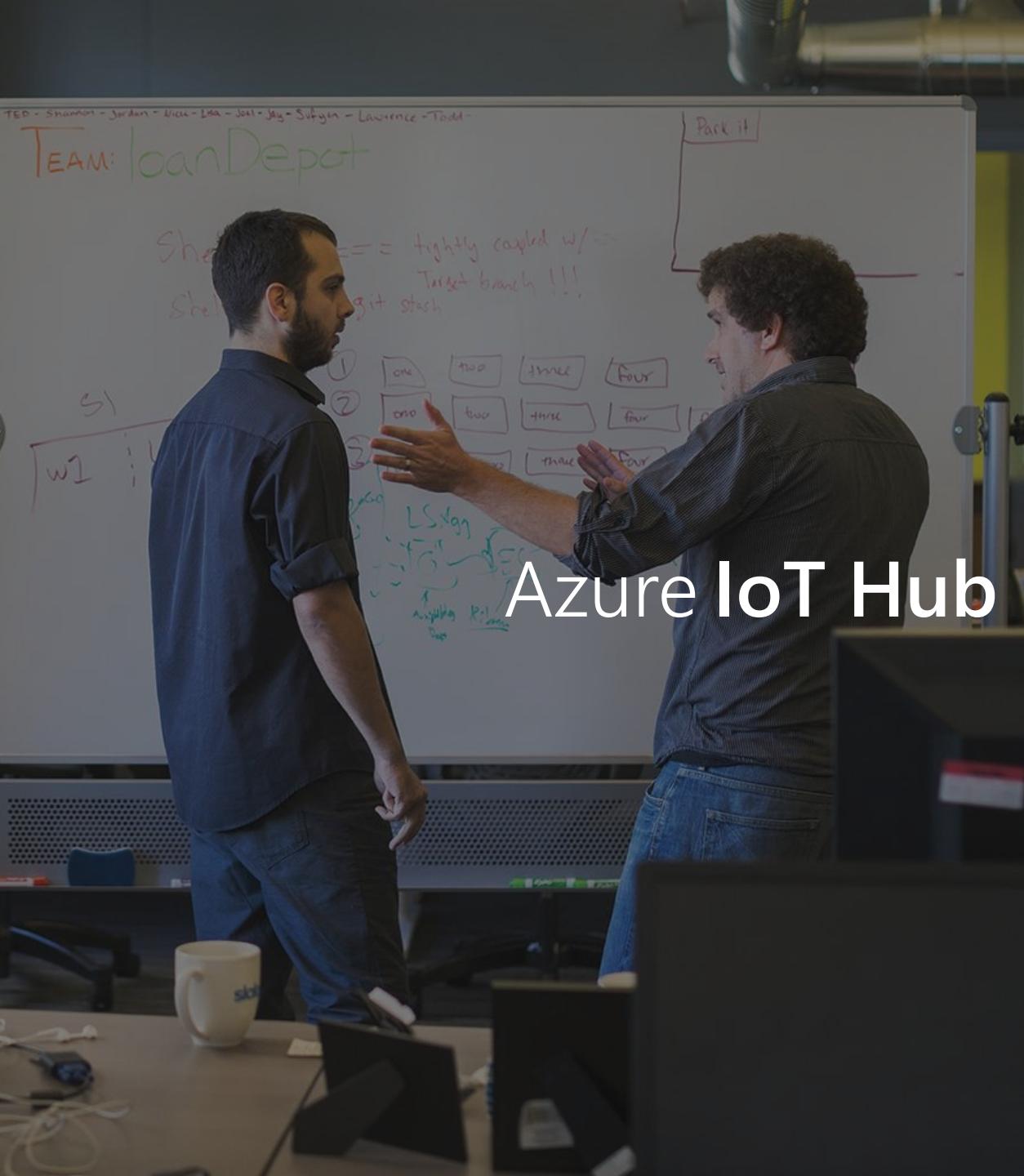
Analytics & dashboards



Time-series Insights



Alerts and actions



# Azure IoT Hub



Establish bi-directional communication with billions of IoT devices



Enhance security with per device authentication



Provision devices at scale w/IoT Hub Device Provisioning Service

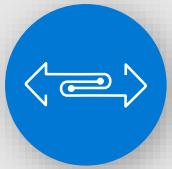


Manage devices at scale with device management



Multi-language and open source SDKs

# Azure IoT Hub



## Bi-directional communication

- Millions of Devices
- Multi-language, open source SDKs
- HTTPS/AMQPS/MQTT-S
- Send Telemetry
- Receive Commands
- Device Management
- Device Twins
- Queries & Jobs



## Enterprise scale & integration

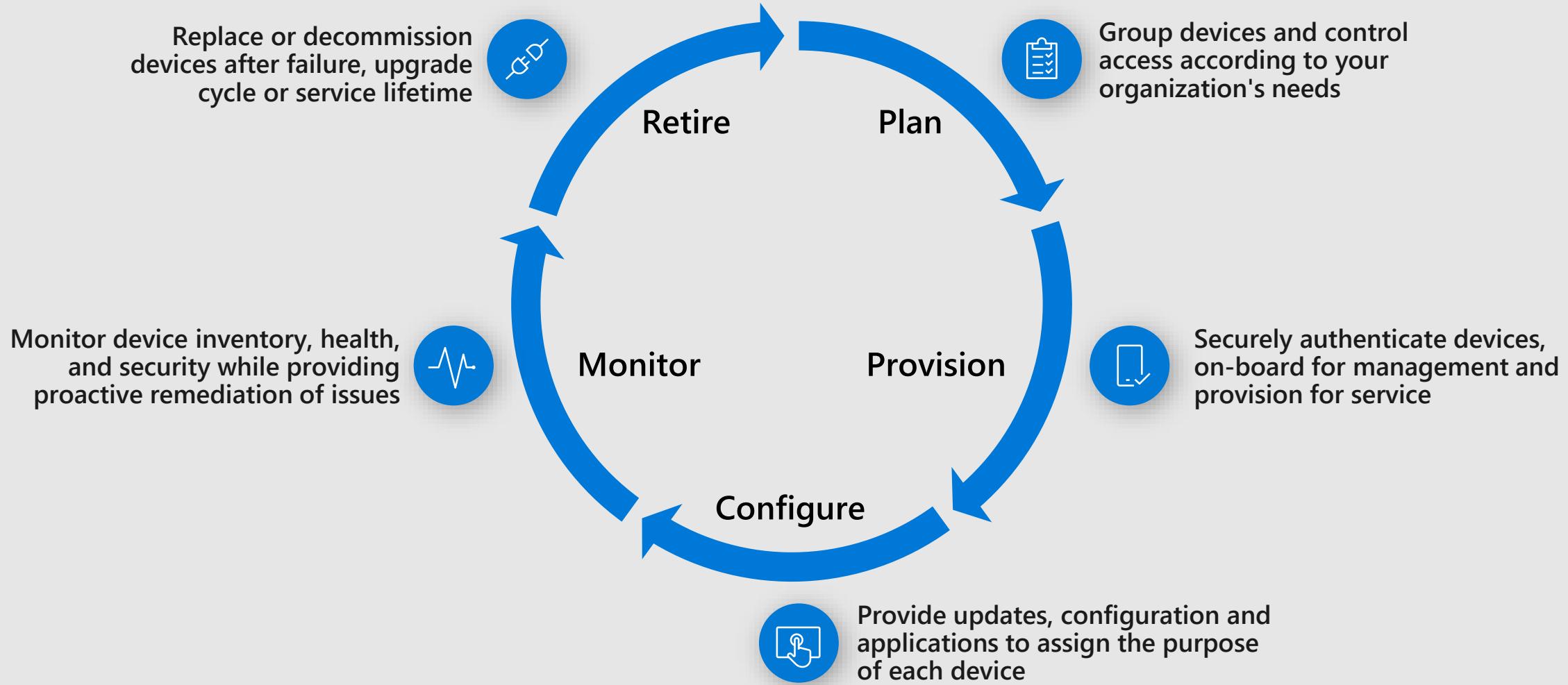
- Billions of messages
- Scale up and down
- Declarative Message Routes
- File Upload
- WebSockets & Multiplexing
- Azure Monitor
- Azure Resource Health
- Configuration Management



## End-to-end security

- Per Device Certificates
- Per Device Enable/Disable
- TLS Security
- X.509 Support
- IP Whitelisting/Blacklisting
- Shared Access Policies
- Firmware/Software Updates

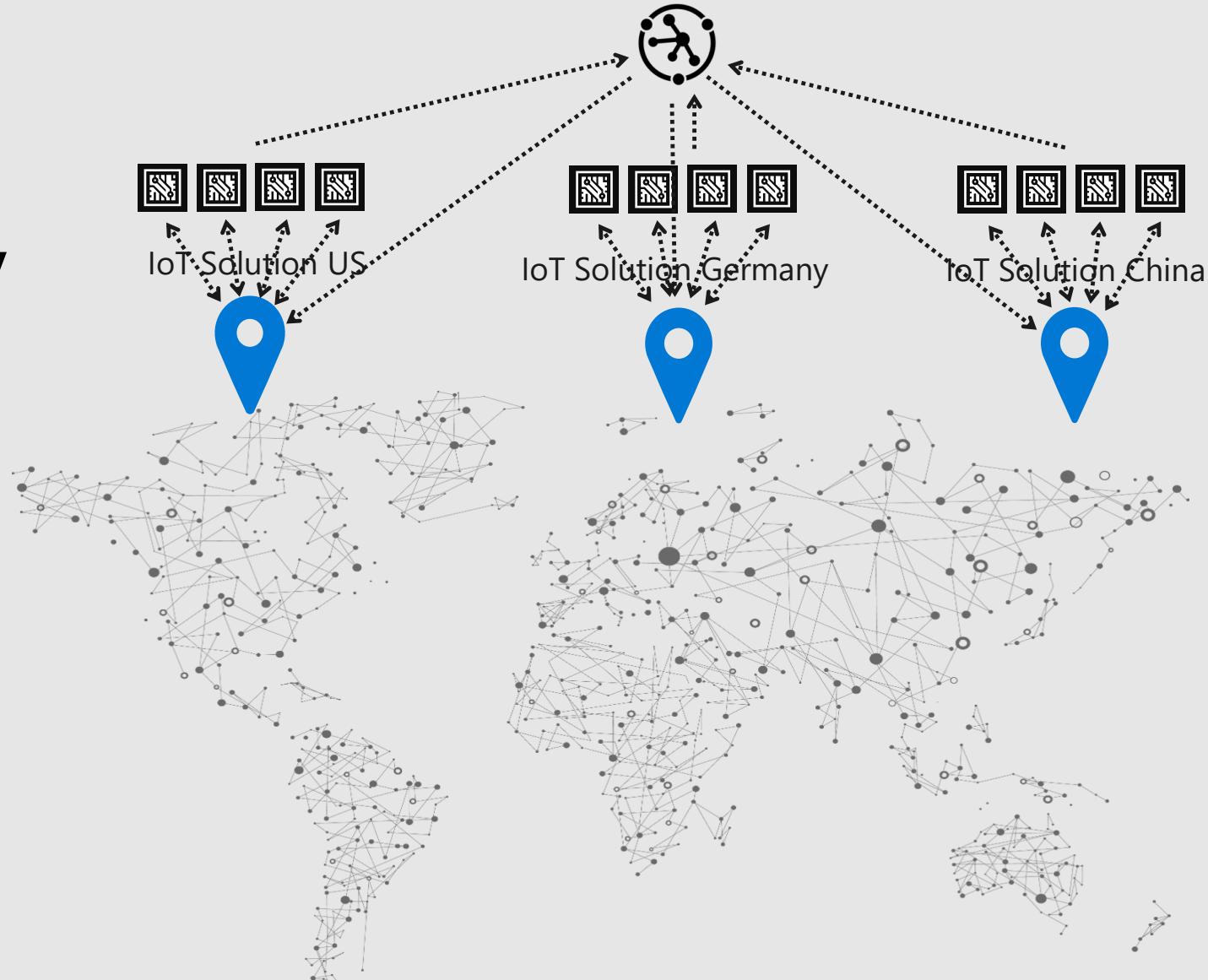
# IoT device management lifecycle

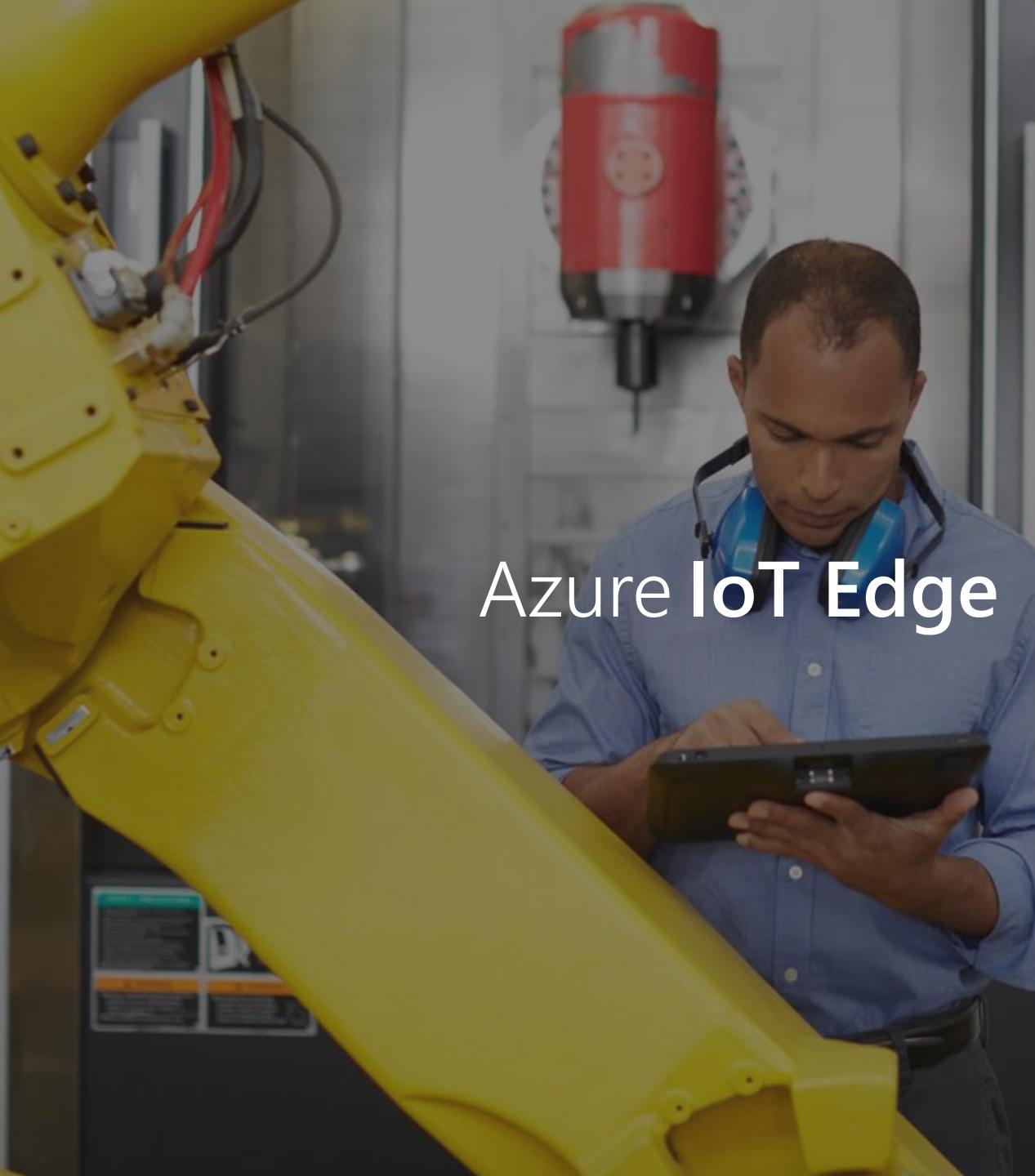


# Azure IoT Hub Device Provisioning Service

**Register and provision devices with zero-touch in a secure and scalable way**

- Simple "plug and play" provisioning
- Minimize manual connection requirements
- Enhanced security through HSM
- Global availability





# Azure IoT Edge



Move cloud and custom workloads to the edge, securely



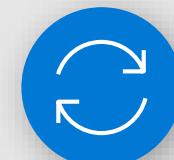
Seamless deployment of AI and advanced analytics



Configure, update and monitor from the cloud



Compatible with popular operating systems

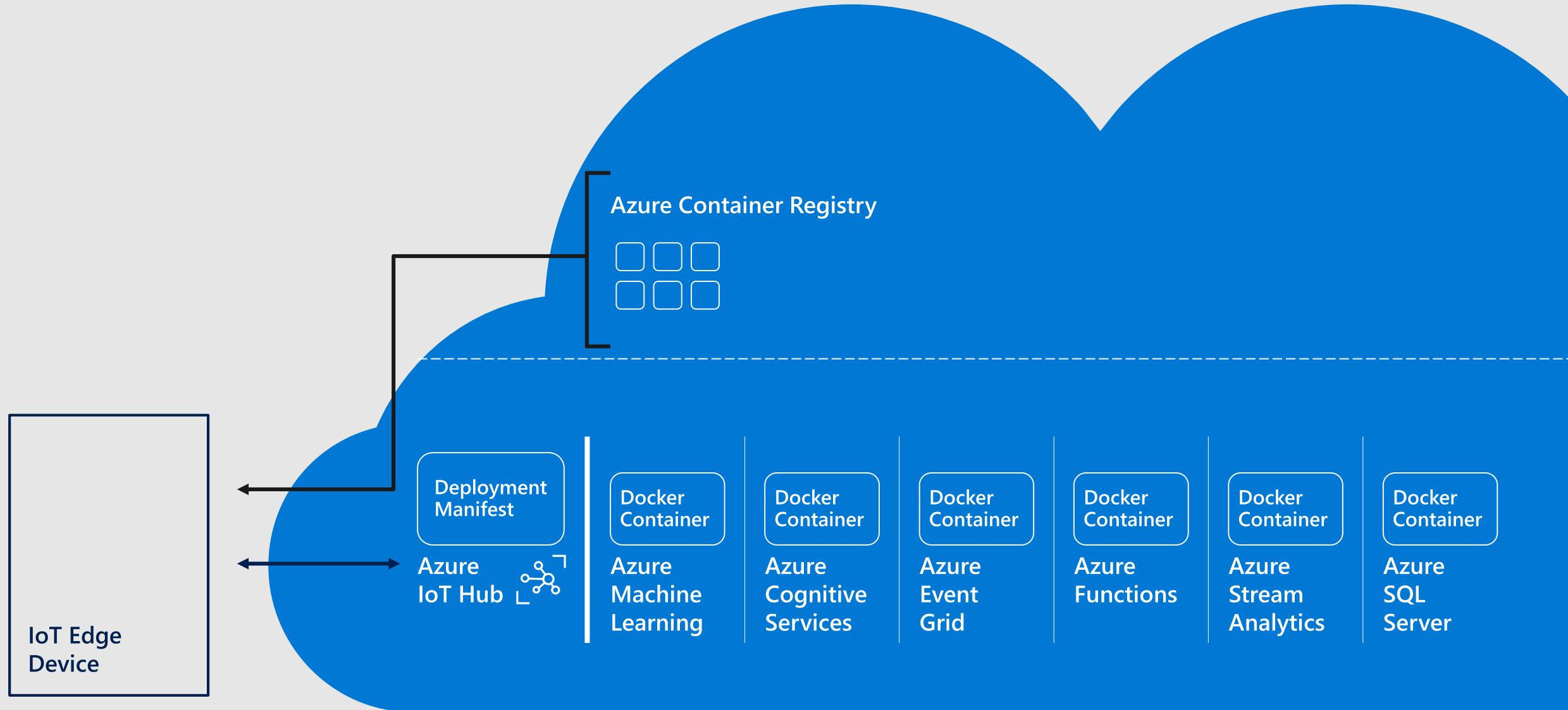


Code symmetry between cloud and edge for easy development and testing

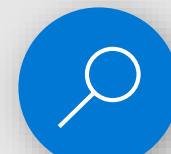


Secure solution from chipset to cloud

# Azure IoT Edge Deployment



# Azure Time Series Insights

- 
-  IoT scale time-series data store
  -  Schema-less store, just send data
  -  Easy IoT Hub connection
  -  Store, query, and visualize billions of events
  -  Get near real-time insights in seconds
  -  Build apps using Time Series Insights APIs

# Azure Time Series Insights

## New features coming!

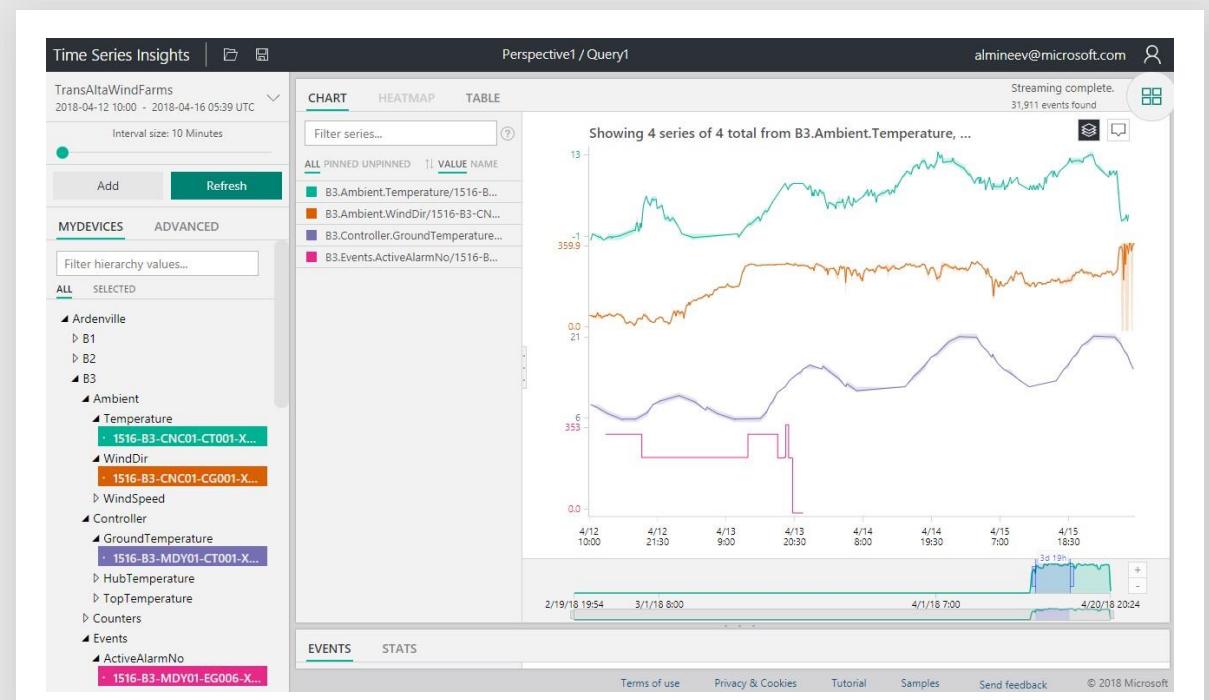
"Tag-based" user experience that makes it easy to group time series data into logical "things" and hierarchies of "things"

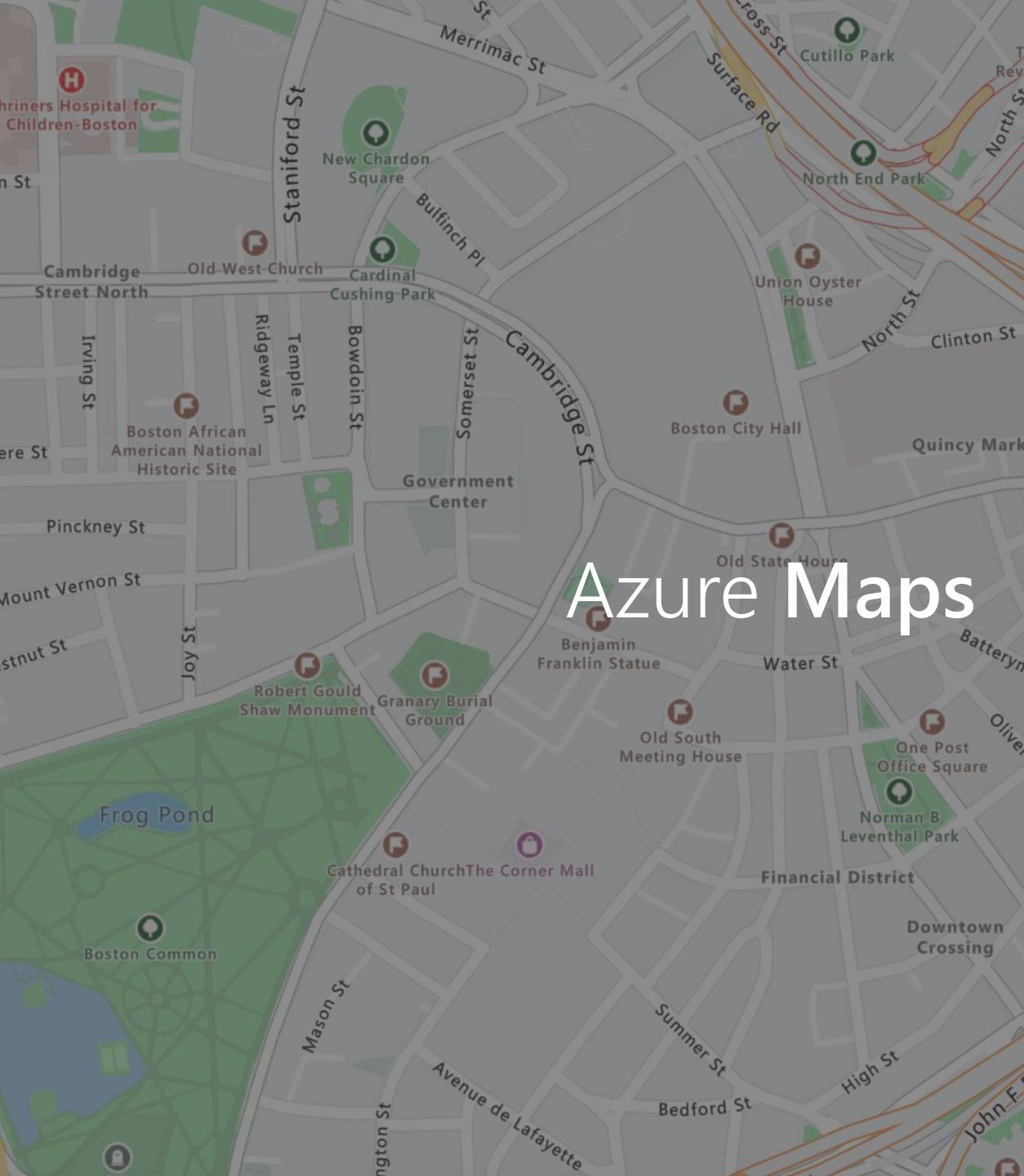
Business reports with Power BI integration

Predictive analytics with Azure Machine Learning integration

Data analysis with Jupyter and Apache Zeppelin notebook integration

Advanced analytics with Azure Databricks, Apache Hadoop and Apache Spark integration





# Azure IoT solution accelerators integration

## Azure IoT Central integration in progress



### Maps

Render maps and satellite imagery across many geographies



### Map Control

Integrate rich mapping visualizations into applications



### Routing

Calculate routes from N to N points for optimal calculations



### Search and Geocoding

Convert places and addresses to coordinates; or, convert coordinates to addresses or cross streets



### Traffic

Show real time traffic information



### Time Zones

Obtain time zone and current time information

# Azure Maps

## Location is at the heart of everything

Accurate, real time geospatial data is fundamental to the digital transformation of a wide range of industries and use cases, among them...



Mobility Solutions



Field Service



Automotive



Internet of  
Things (IoT)



Logistics



Web & Mobile Apps

## Why use Azure Maps?

Key reasons for customers to opt for Azure Maps for their geospatial needs



In-vehicle use  
licensing rights



Unrivalled traffic data  
and commercial routing



30+ languages  
supported



Integrated into  
Azure IoT



Custom data  
visualizations



Enterprise  
scale



# Azure Sphere



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The **Azure Sphere Security Service** guards every Azure Sphere device; it **brokers trust** for device-to-device and device-to-cloud communication, **detects emerging threats**, and **renews device security**



Open platform that seamlessly connects things, endpoints, and the cloud



Commercial OS for IoT devices and a modern user experience



Supports the languages and frameworks you already know



Trusted platform for security and servicing of cloud-connected devices



Bring power and capability to the edge



Enable a more natural user interface

# Windows 10 IoT + Azure

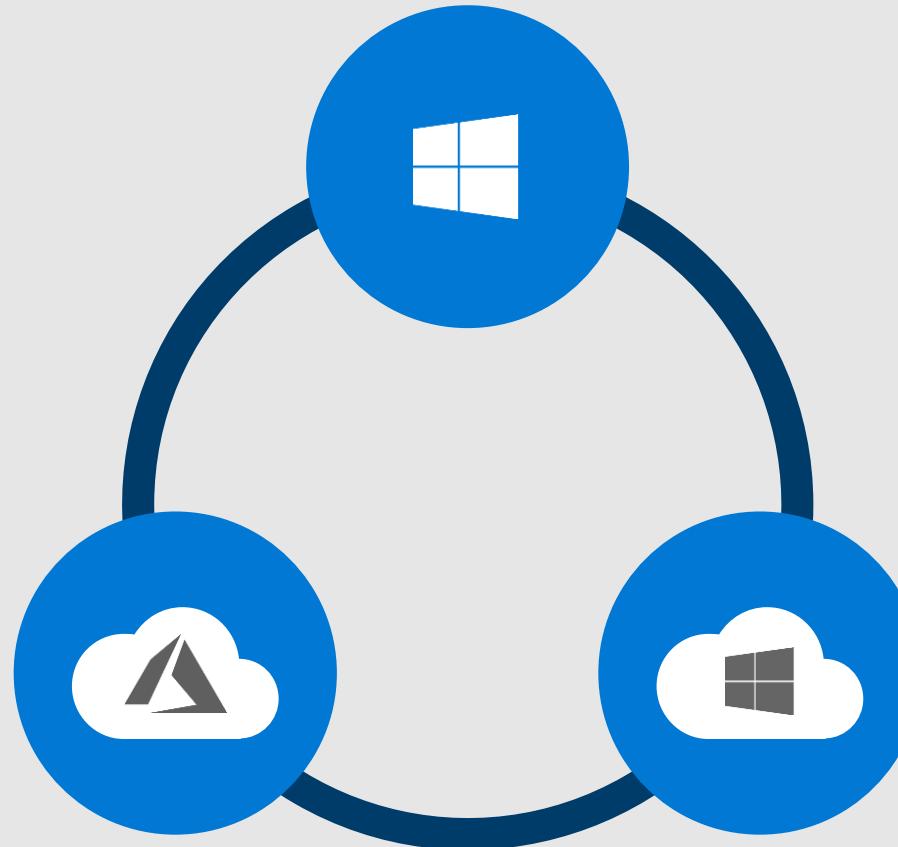
Device-to-cloud platform for secure, manageable intelligent edge devices

Azure ML + Azure IoT  
Edge + Windows AI  
Brings accelerated AI  
to your device

**Windows 10 IoT**  
Secure, and manageable IoT  
OS with long-term support

**Windows 10 IoT  
Device Management**  
Provided by Azure IoT  
Hub and enterprise  
device management

**Windows Update +  
Device Update Center**  
Keeps devices secure,  
giving full control to  
the device maker



# Azure, Azure Stack, IoT Edge, and IoT

## Azure

- Available in Azure Regions
- Full functionality

## Azure Stack

- Azure Services & Management on-prem
- Managed by Azure or Locally

## Azure IoT Edge

- Deploy and manage cloud services
- Managed by Azure or Azure Stack

## Windows IoT, Linux

- Azure IoT Edge runs on Windows and Linux

## Azure IoT Device SDK

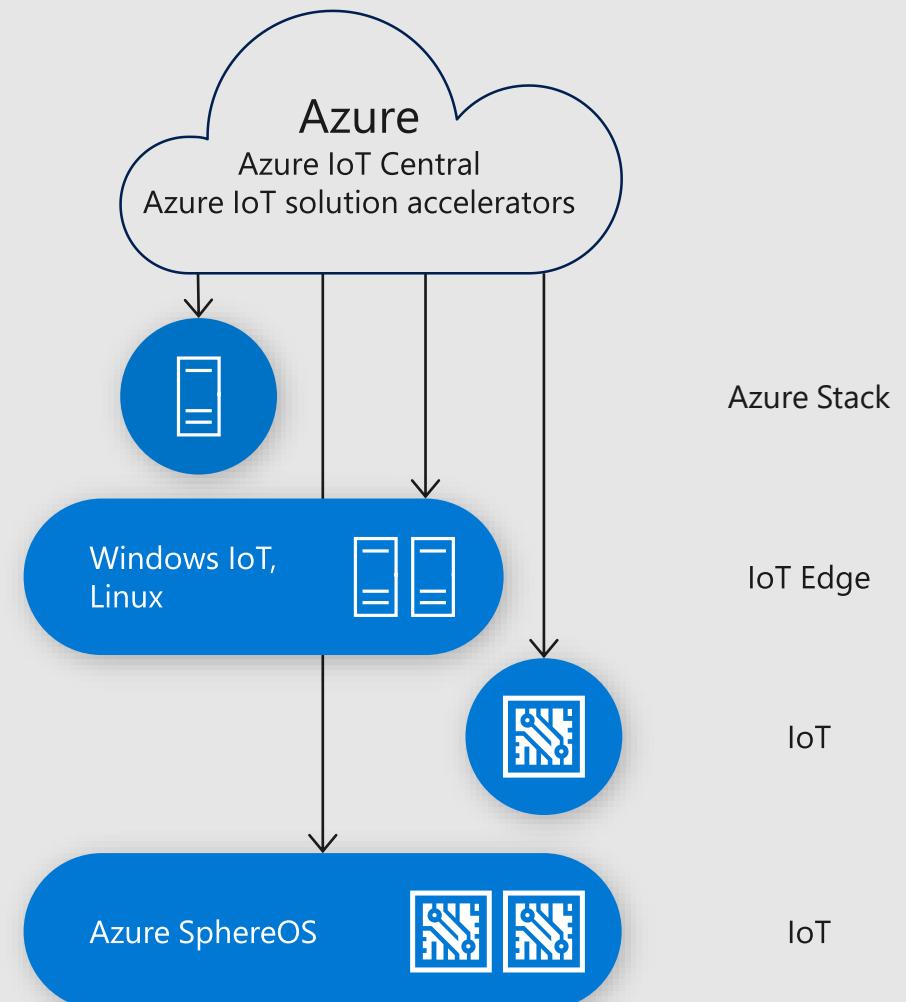
- Multi-device, multi-language, multi-OS
- iOS, Android, Windows, Linux

## Azure Sphere

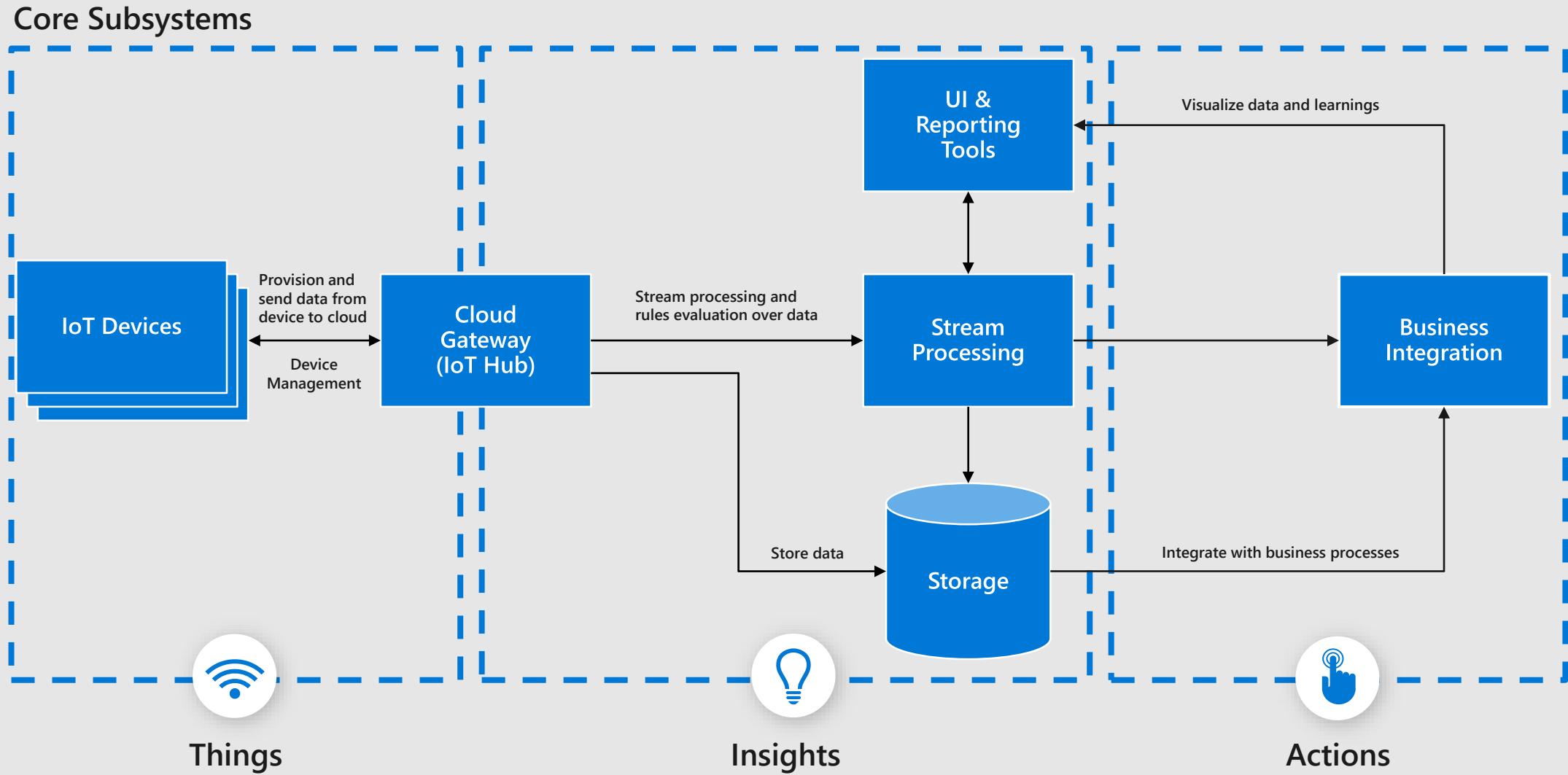
- Peerless security for MCU devices
- Connect directly to Azure or via Azure IoT Edge

## Azure Sphere OS

- Linux Kernel that modernizes MCU devices



# Azure IoT reference architecture



# Link to current Customer Stories

[Azure IoT Key Customer Stories](#)

+

Slides in appendix

# Manufacturing



## Selling Packaging as a Service

Connecting machines to collect real-time data has enabled performance and future failure monitoring, allowing Tetra Pak to revolutionize their business model

[LEARN MORE >](#)



## Optimizing the factory floor

Used IoT, machine learning, artificial intelligence, and CRM to optimize processes, planning, and predictive maintenance scheduling to avoid downtime

[LEARN MORE >](#)



## Rolls-Royce

## Filtering the signal from the noise

Used analytics to discover actionable insights around fuel usage, predictive maintenance and stop unscheduled delays

[LEARN MORE >](#)

# Manufacturing



## Transforming the urban landscape

Gathered data from sensors and systems to create valuable business intelligence and shift from reactive to proactive maintenance

[LEARN MORE >](#)



## Connecting the factory floor

Saving 17% on scrap and re-work and 10% on energy by using predictive maintenance on machinery and the factory floor

[LEARN MORE >](#)



## Keeping power on when it's needed most

Scheduling maintenance for generators with predictive models prevents potential issues from impacting customers

[LEARN MORE >](#)

# Smart Cities



**Schneider  
Electric**

## Proactive responses with edge analytics

Schneider Electric transformed their solution to better help customers protect their assets and the environment and boost workplace safety by leveraging edge intelligence

[LEARN MORE >](#)



**Johnson  
Controls**

## Building efficiency with IoT

Connected chillers are back online 9x faster than unconnected equipment, avoiding more than \$300,000 in hourly downtime costs

[LEARN MORE >](#)



**Steelcase**

## Increasing value with smart workspaces

A network of wireless infrared sensors on furniture allowed Steelcase to revolutionize the value their solutions bring to customers through real-time usage statistics and insights

[LEARN MORE >](#)

# Smart Cities



## Saving lives from earthquakes in Mexico

Utilizing IoT and analytics to predict disasters and send millions of notifications in less than two seconds—notifying citizens of earthquakes up to two minutes ahead of time

[LEARN MORE >](#)



## Using the intelligent edge to save water

Farmers in New Zealand integrate weather predictions and sensor data to adjust irrigation, saving 50% of water usage

[LEARN MORE >](#)



## Increasing value with smart workspaces

A network of wireless infrared sensors on furniture allowed Steelcase to revolutionize the value their solutions bring to customers through real-time usage statistics and insights

[LEARN MORE >](#)

# Transportation



**fathym**

## Enabling officials to keep drivers safe

Using highly localized road condition and weather data, Fathym keeps drivers safe by recommending reroutes, and avoiding unnecessary use of expensive assets

[LEARN MORE >](#)



**TEXA**

## Creating efficiency and agility with IoT

Texa S.P.A saw product orders increase 100% after using IoT to enhance their product offering, support business growth, reduce costs, and increase mechanic efficiency and safety

[LEARN MORE >](#)



 Transport  
for London

## Low cost connectivity for train sensors

Using Azure IoT and TV whitespaces, an infrastructure not built for connected devices now supports delivery of timely insights about traffic conditions and cable car equipment

[LEARN MORE >](#)

# Transportation



## DAIMLER

### Connecting vehicles for the long haul

Daimler connects their fleets for predictive maintenance, optimized fleet management and routing, and to create better vehicles for the future

[LEARN MORE >](#)



### Revolutionizing air-traffic control

Rich streams of data sent in-flight increases safety, reduces aircraft separation standards, allows more flights at peak times, and greater utilization of efficient routes

[LEARN MORE >](#)



### Ensuring forklifts never run out of power

This power management system, using IoT-enabled real-time alerts and predictive maintenance, cuts battery and power supply costs by 25%

[LEARN MORE >](#)

# Retail



**HERSHEY**  
THE HERSHEY COMPANY

## Machine learning + Twizzlers

Combining ML with data from licorice extruders allows Hershey to save on expensive ingredients and learn more about customer behavior

[LEARN MORE >](#)



**Mondelēz**  
International

## Smarter snack food

Using customer location and preference data allows Mondelez to provide highly personalized, informative customer snacking experiences

[LEARN MORE >](#)



**STEIGENBERGER**  
AIRPORT HOTEL  
FRANKFURT

## Personalized, efficient guest experiences

Using a wearable powered by Windows IoT and Azure IoT, hotel staff are able to execute up-to-the-minute service and provide an experience unique to each customer

[LEARN MORE >](#)

# Retail



**coop**

## The supermarket of the future

Coop Italia uses IoT technology to track customer behaviors and create interactive, informative displays based on customer location

[LEARN MORE >](#)



**MARS**

## Revolutionizing air-traffic control

Rich streams of data sent in-flight increases safety, reduces aircraft separation standards, allows more flights at peak times, and greater utilization of efficient routes

[LEARN MORE >](#)



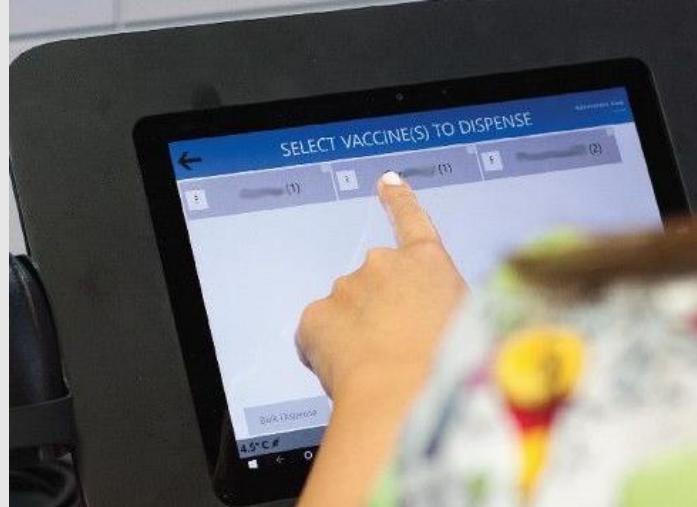
**BUNN**  
Quality Since 1840

## Connected coffee machines

Analyzing data from their customer's espresso machines allows BUNN to provide predictive maintenance, saving customers up to \$250 per incident

[LEARN MORE >](#)

# Health



## Smart fridge saves lives

Smart-fridges ensure the \$60k worth of life saving vaccines stored in each fridge are kept at the required temperature, delivered at the expected locations, and at the right times

[LEARN MORE >](#)



## Creating healthier hospitals

Using IoT to connect sanitization stations in hospitals, Gojo ensures hospital staff are properly and frequently sanitizing their hands to avoid spreading diseases

[LEARN MORE >](#)



## Wearables providing life saving insights

Working with partner, ixto GmbH's digilog platform, Ruppiner is using wearable technology to give patients 'boundary-less' health care that is saving lives

[LEARN MORE >](#)

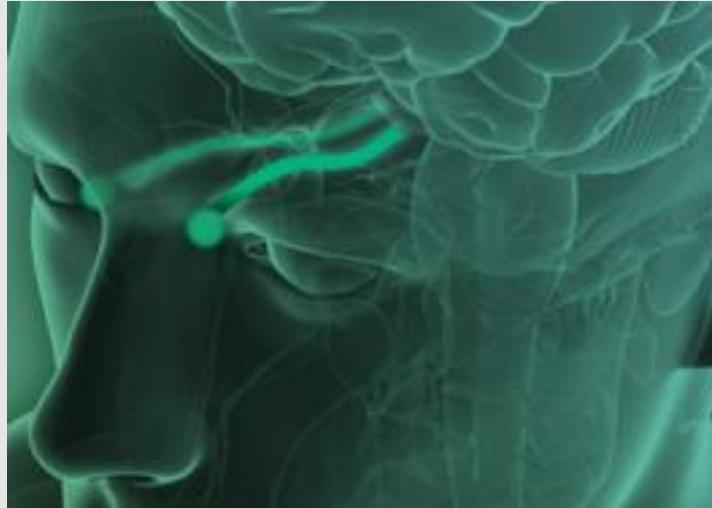
# Health



## Optimizing diagnostic devices

IoT enabled remote monitoring of diagnostic devices, optimized device utilization via predictive maintenance, and enhanced device recommendations based on patient data

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## Understanding brain disease

BTT Corp uses Microsoft IoT technology to detect, track, and analyze hyper-localized, minor changes in brain temperature to prevent and research brain diseases

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## Creating smarter diabetes management

Zion China uses personalized IoT solutions to help patients with diabetes manage their behavior and dietary habits to live healthier lives

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