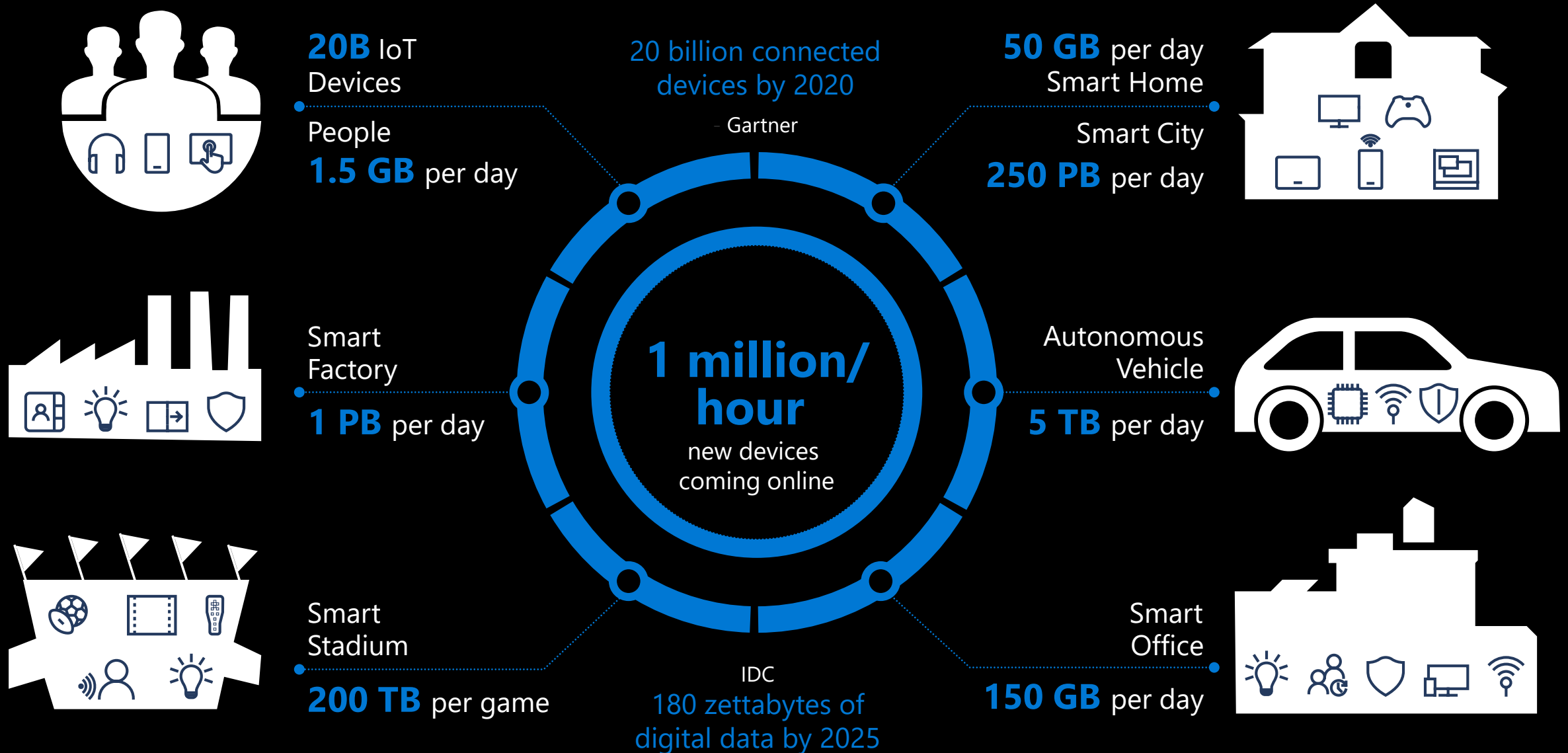# Unlocking IoT's Potential

Bryan Von Axelson – B V A
Principal Solution Specialist, Microsoft

Manisha Kumari
Cloud Solution Architect, Microsoft
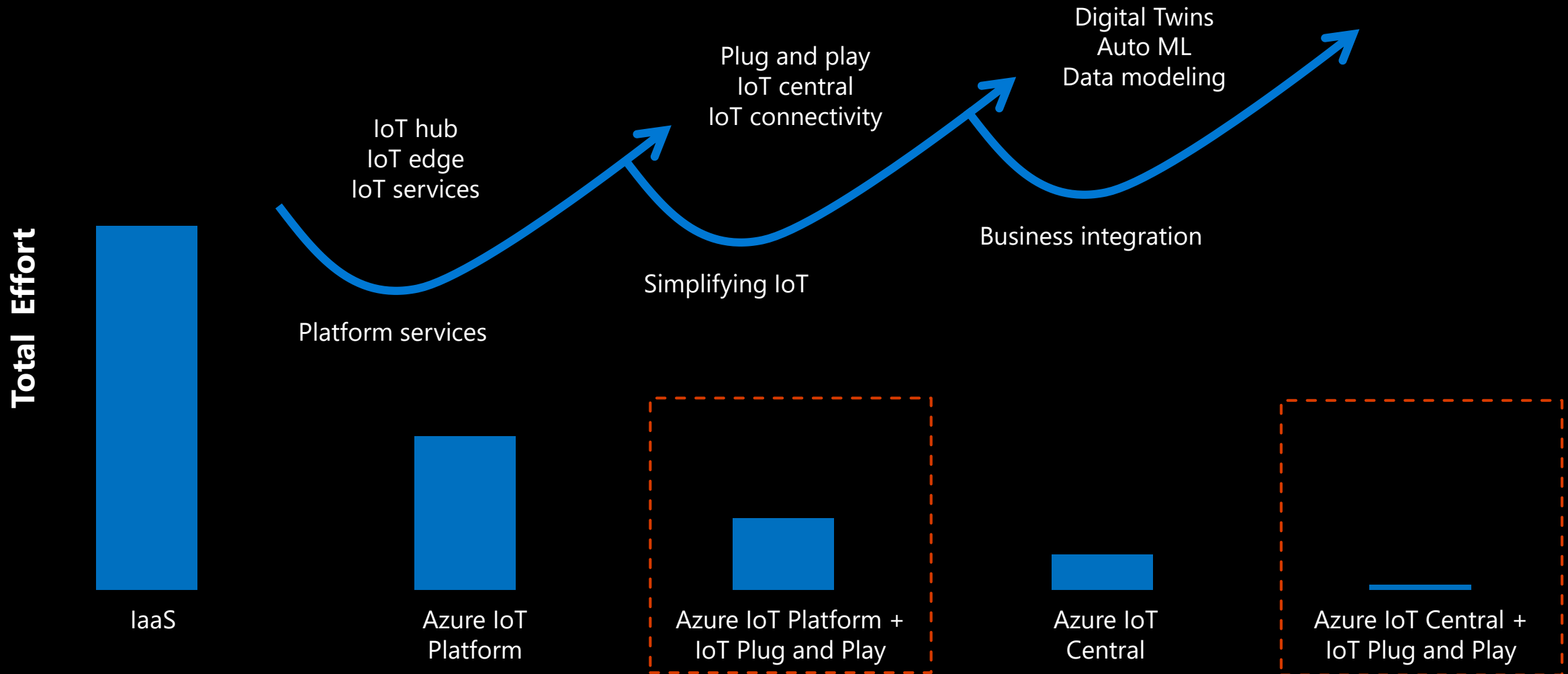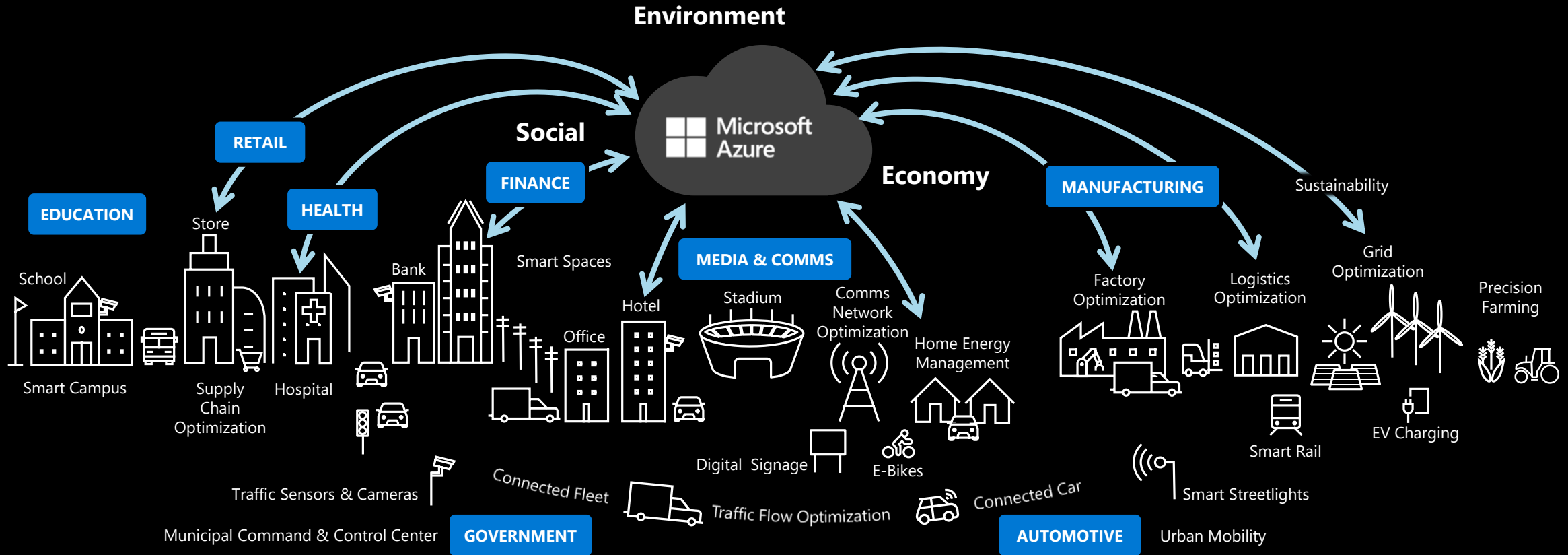
IoT in Action

IoT fuels digital transformation

20B IoT Devices

People
1.5 GB per day

20 billion connected devices by 2020

– Gartner

50 GB per day Smart Home

Smart City
250 PB per day

Smart Factory

1 PB per day

1 million/ hour
new devices coming online

Autonomous Vehicle

5 TB per day

Smart Stadium

200 TB per game

IDC
180 zettabytes of digital data by 2025

Smart Office

150 GB per day

How can I make sense generate business insights from sensor values?

Accelerating IoT adoption
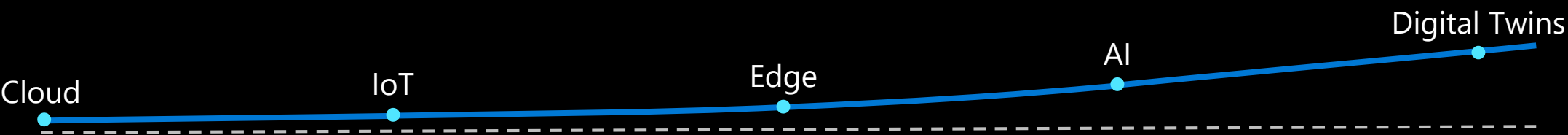## The total effort to build and operate an IoT Solution is rapidly decreasing

Digital Twins
Auto ML
Data modeling

Plug and play
IoT central
IoT connectivity

IoT hub
IoT edge
IoT services

Business integration

Simplifying IoT

Total Effort

Platform services

IaaS

Azure IoT
Platform

Azure IoT Platform +
IoT Plug and Play

Azure IoT
Central

Azure IoT Central +
IoT Plug and Play

Microsoft invests $5 billion in IoT

Our goal is to give every customer the ability to transform their businesses, and the world at large, with connected solutions

Microsoft's comprehensive IoT portfolio

Cloud — IoT — Edge — AI — Digital Twins

	Azure IoT priority verticals	Manufacturing	Retail	Agriculture	Energy	Smart Cities	Healthcare	Transportation

Azure IoT Solutions

- Azure IoT Central (SaaS)
- Azure IoT Reference Architecture & Accelerators (PaaS)
- Dynamics Connected Field Service (SaaS)

Azure Services for IoT

Azure IoT Hub	Azure Stream Analytics	Azure Active Directory
Azure IoT Hub Device Provisioning Service	Azure Cosmos DB	Azure Monitor
Azure Digital Twins	Azure AI	Azure DevOps
Azure Time Series Insights	Azure Cognitive Services	Power BI
Azure Maps	Azure ML	Azure Data Share
	Azure Logic Apps	Azure Spatial Anchors

IoT & Edge Device Support

Azure Sphere	Windows IoT	Azure ML
Azure IoT Device SDK	Azure Certified for IoT— Device Catalog	Azure SQL
Azure IoT Edge	Azure Stream Analytics	Azure Functions
Data Box Edge	Azure Storage	Azure Cognitive Services

Azure Security Center for IoT

Intelligent cloud

IoT Hub – Most Mature, Scalable, Secure Cloud Platform
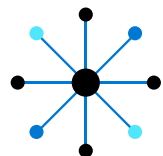
Establish bi-directional communication with billions of IoT devices

Enhance security with per device authentication
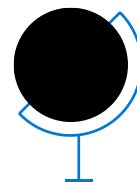
Provision devices at scale with IoT Hub Device Provisioning Service

Manage devices at scale with device management
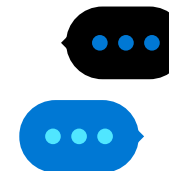
Multi-language and open source SDKs

Connect, Manage and Monitor millions of devices at scale

Rockwell Automation

Rolls-Royce

ECOLAB®

Schneider Electric

IoT Hub

NEW **Capabilities**

Telemetry events on Event Grid
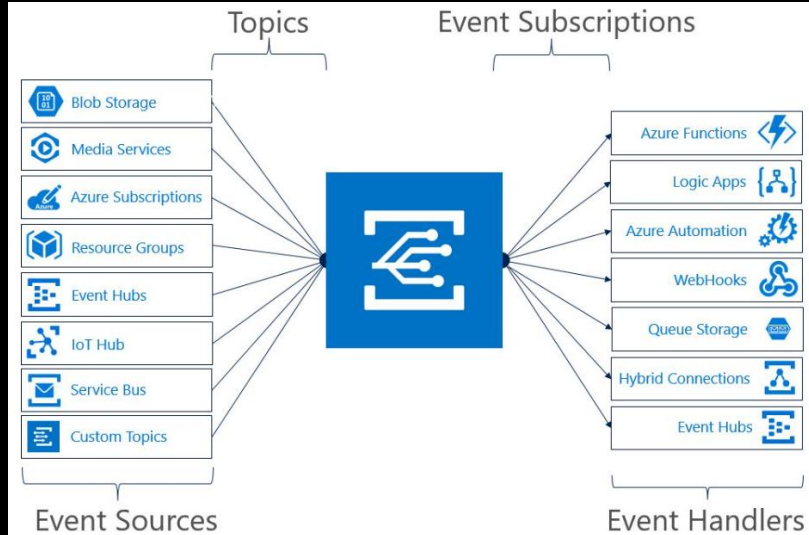
Easily integrate IoT device telemetry messages into serverless application via Event Grid

IoT Hub message enrichments
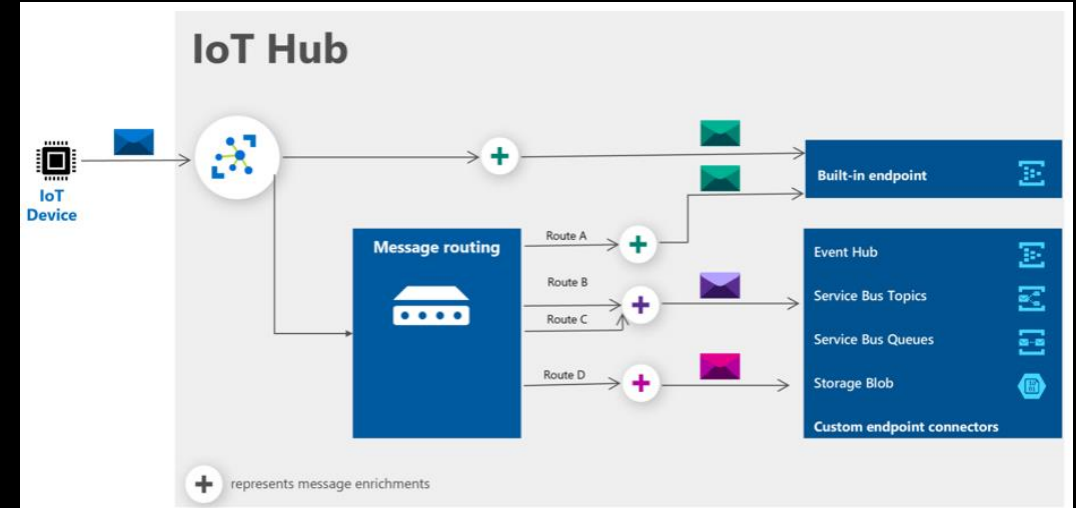
Add intelligence by enriching messages from IoT devices and simplify process to send them to different Azure services

Time Series Insights

Ingest, process, store, and query highly contextualized, time-series-optimized, IoT-scale data
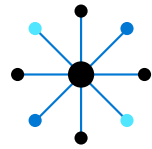
Connect to a variety of data solutions using TSI's flexible data platform

Use rich analytics APIs and UX for ad-hoc exploration and operational intelligence

Use JavaScript control library for building custom analytics apps on the TSI platform

Turn data into decisions with actionable real-time IoT insights

Time Series Insights

✓ **Multi layered storage with warm and cold analytics**

✓ **Flexible data platform to take data stored in open source Apache Parquet to other advanced data solutions for predictive maintenance, machine learning and AI**

✓ **Rich query APIs and user experience to support interpolation, scalar and aggregate functions, categorical variables, scatter plots, and time shifting between time series signals for in-depth analysis**

✓ **Enterprise grade scale and performance at all layers of the solution to support customers' industrial IoT solution needs**

✓ **Rich extensibility through PowerBI connector for a unified BI and analytics view**
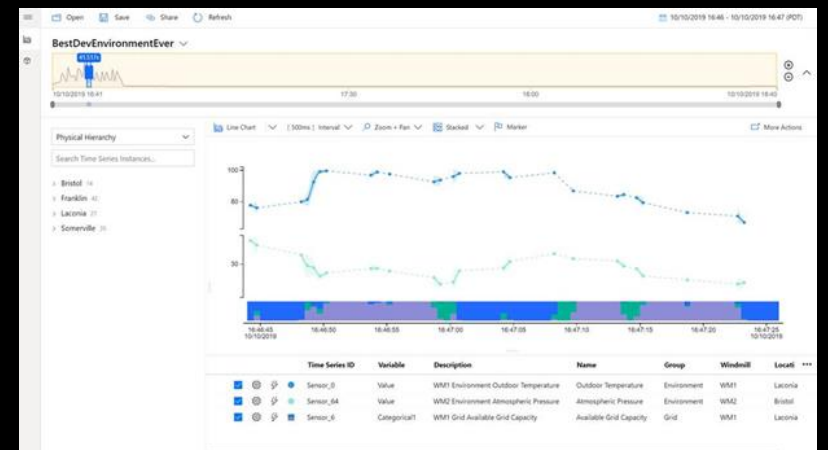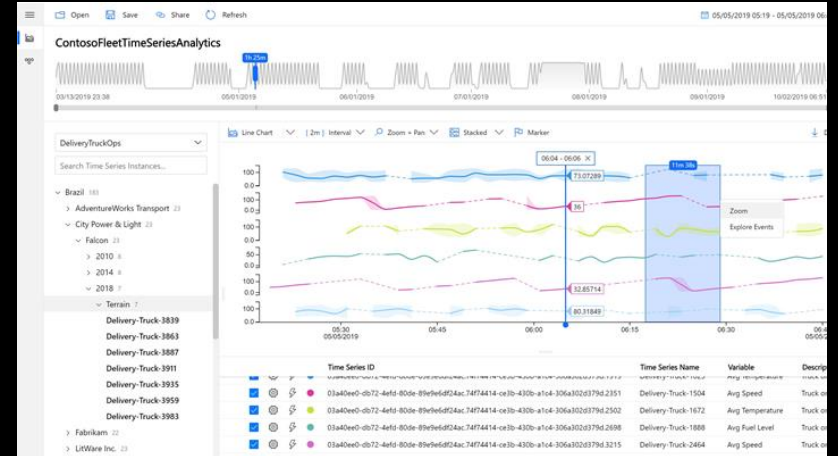
IoT Central

A fully managed IoT app platform

- ✓ **Highly secure**
- ✓ **Enterprise-grade**
- ✓ **Predictable pricing**
- ✓ **Industry-focused**

Get connected
Connect IoT devices to the cloud faster than any other platform.
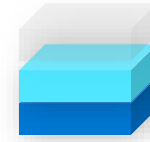
Stay connected
Reconfigure and update devices with centralized device management.
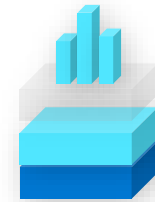
Transform
Bridge the gap with connectors and extensibility APIs.

Existing solution builders

MESHSYSTEMS™   cradlepoint Connect Beyond   sage**greenlife**   flex   C.H. ROBINSON   imec

FOOTMARKS   Kroger   jda.   (Starbucks)   BOSCH   QUEST BORN TO ENGINEER

DEMO – IoT Central

www.AzureIoTCentral.com

IoT Central

NEW **Capabilities**

White labeling your SaaS – your brand	App templates for Industry Verticals	Azure IoT Edge support	Multitenancy Support	API Support	IoT Plug and Play Support	New 2-tiered pricing model announced, based on message volume

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

Benefits and outcomes

- 11 Industry-focused app templates across retail, healthcare, energy, and smart city for kickstarting solution builders

- Seamless device connectivity: Introducing Edge device management within IoT Central

- Extensibility to business applications to bring IoT insights to where decisions are made

- Scale: Connect millions of devices and manage ingress/egress of data from IoT Central

Azure Maps

- ✓ IoT spatial analytics using Azure Map

- ✓ **Real-Time Public Transit & Ride Share data** in partnership with Moovit

- ✓ Certified for the highest grade of Accessibility rating

- ✓ Azure Maps Spatial Operations (General Availability)

- ✓ New Cartography and styling updates

- ✓ Geopolitical view to see map boundaries based local country views

- ✓ Azure Maps Data feedback tool

- ✓ **Power BI Integration** (Public Preview)

- ✓ Availability on the Gov Cloud (Public Preview)

- ✓ **Azure Maps Weather Services** preview (with Accuweather)
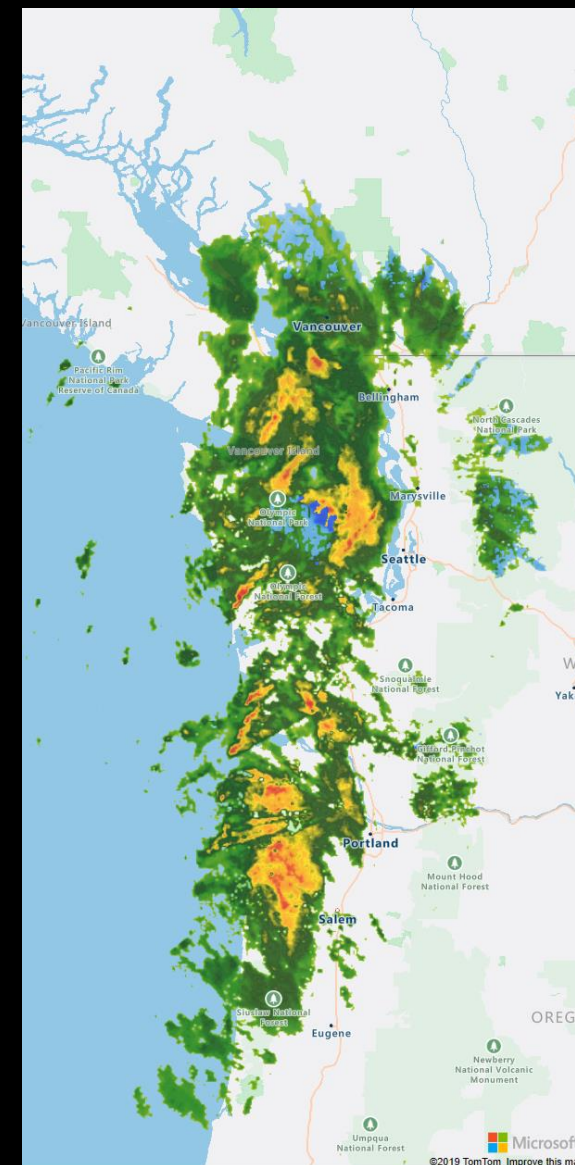
Azure Security Center for IoT

- ✓ **Visibility into security posture and state of your IoT Solution**

- ✓ **Single pane of glass to manage IoT and hybrid cloud security infrastructure**

- ✓ **Actionable, prioritized alerts to respond to any potential compromises of your IoT solution**

- ✓ **Integrate with Azure Sentinel or other SIEMs to streamline threat mitigation**

- ✓ **Define custom alerts based on advanced queries**
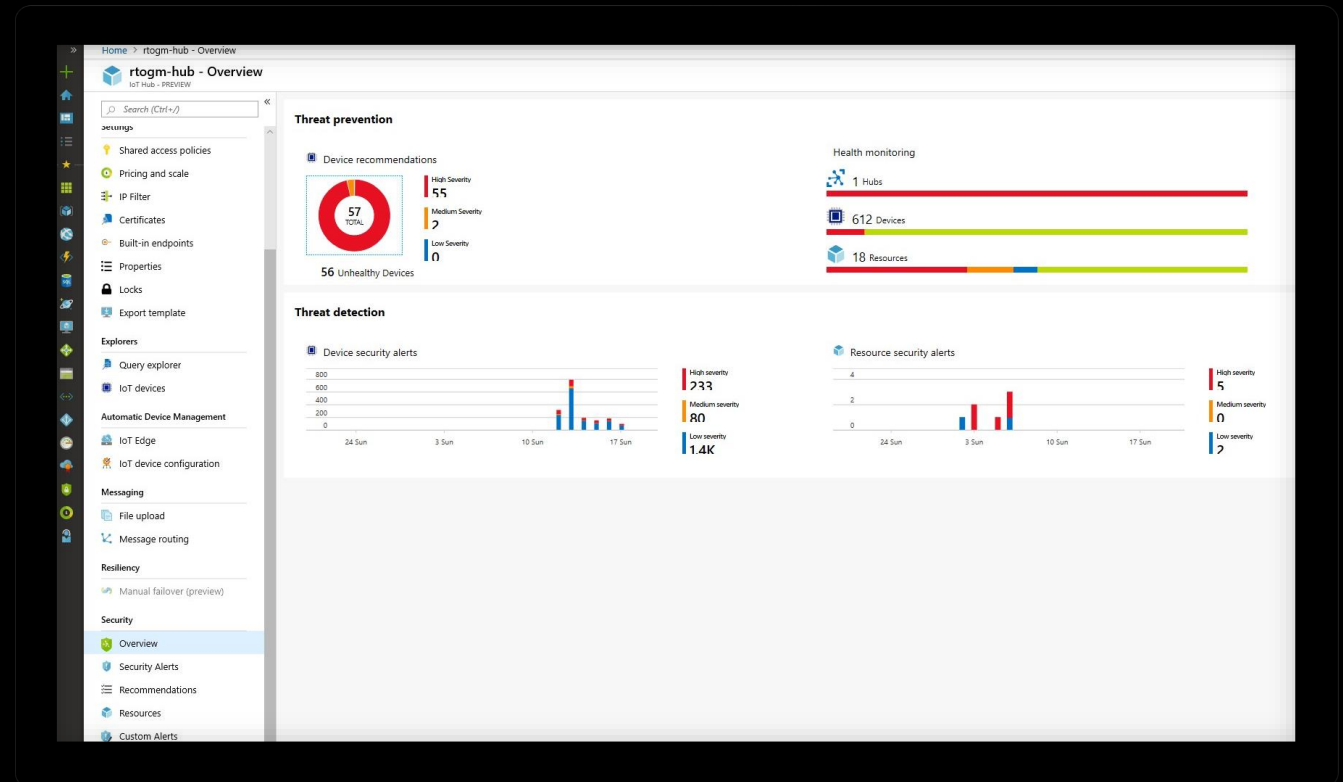
Changing the IoT conversation
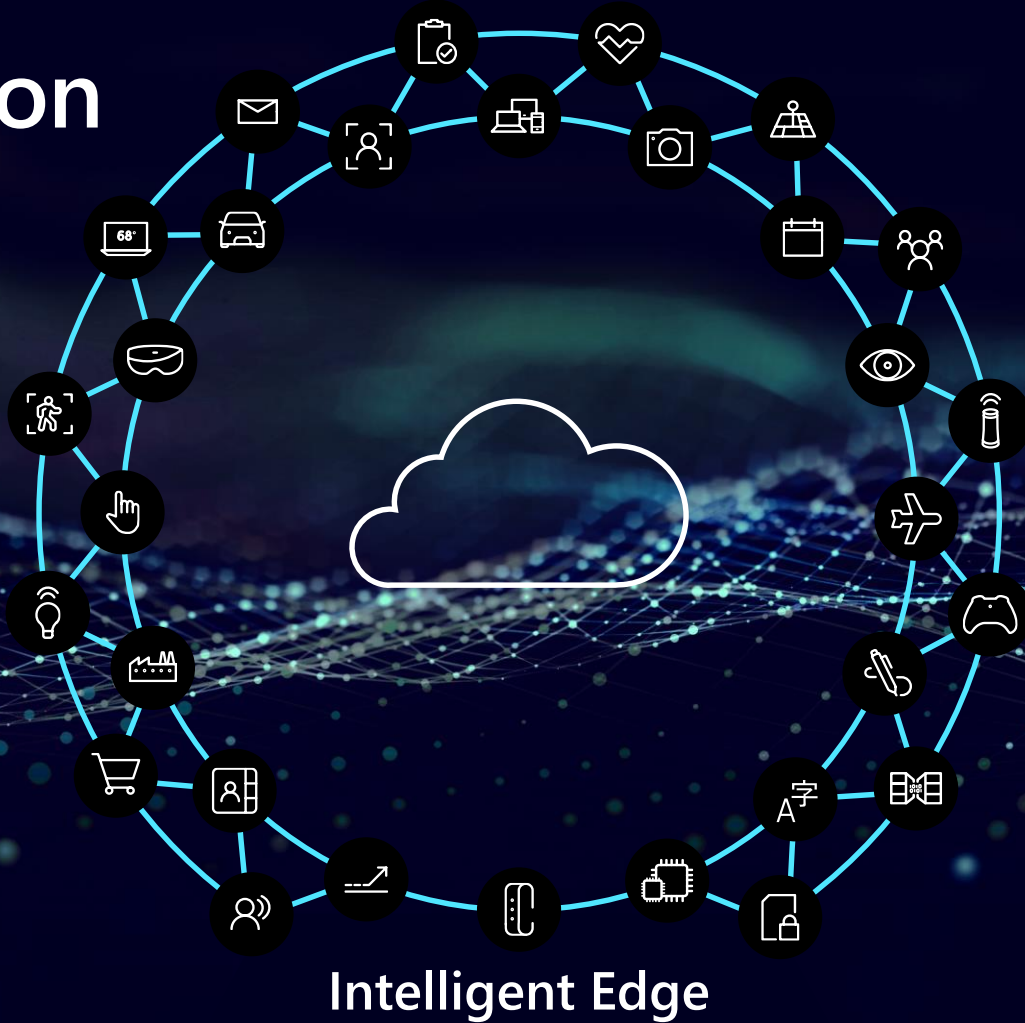
Intelligent Edge

Intelligent edge devices require a new approach

Time

Many IoT solutions require months to set up

Security & trust

IoT poses unique security, privacy and, compliance challenges

Modernization

Newer technologies like ML/AI require new skill sets

The most comprehensive IoT and Edge offerings in the market
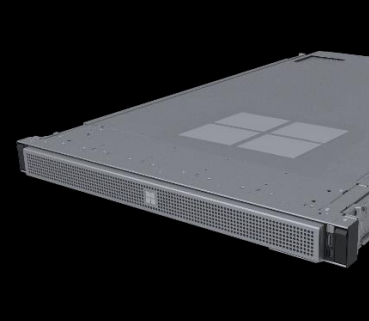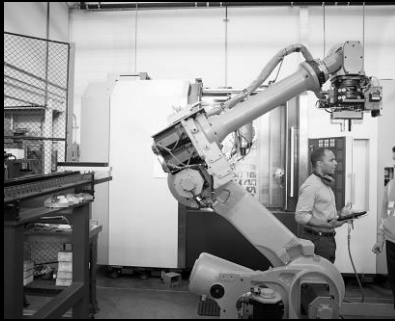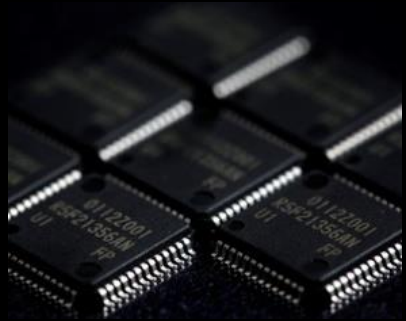
Devices + Sensors		Sensors to interactive	Integrated platform		Global scale processing

IoT devices
Azure IoT Device SDK

Device security
Azure Sphere

Edge devices
Azure IoT Edge

Edge appliances
Azure Data Box Edge

On-premises platform
Azure Stack

Hyperscale cloud
Edge Regions

Most specialization   Full spectrum of Cloud + Edge form factors   Fewest form factors

Fewest services   Intentional and appropriate Azure service availability   Most services

IoT Edge

Run Azure AI, Azure Services & Custom Services directly on IoT devices

Azure IoT Edge

- Open source, cross platform, container-based edge runtime

- Run Azure services & your own code on IoT class and larger devices – fully extensible

- Manage the devices and IoT Edge workloads centrally

- Supports offline operation

- Fully Visual Studio + Visual Studio Code developer support

- Azure DevOps + Jenkins CI/CD support

- **Over 80 Azure Certified for IoT, 3rd party IoT Edge devices**

Azure IoT Hub

Azure IoT Edge Devices
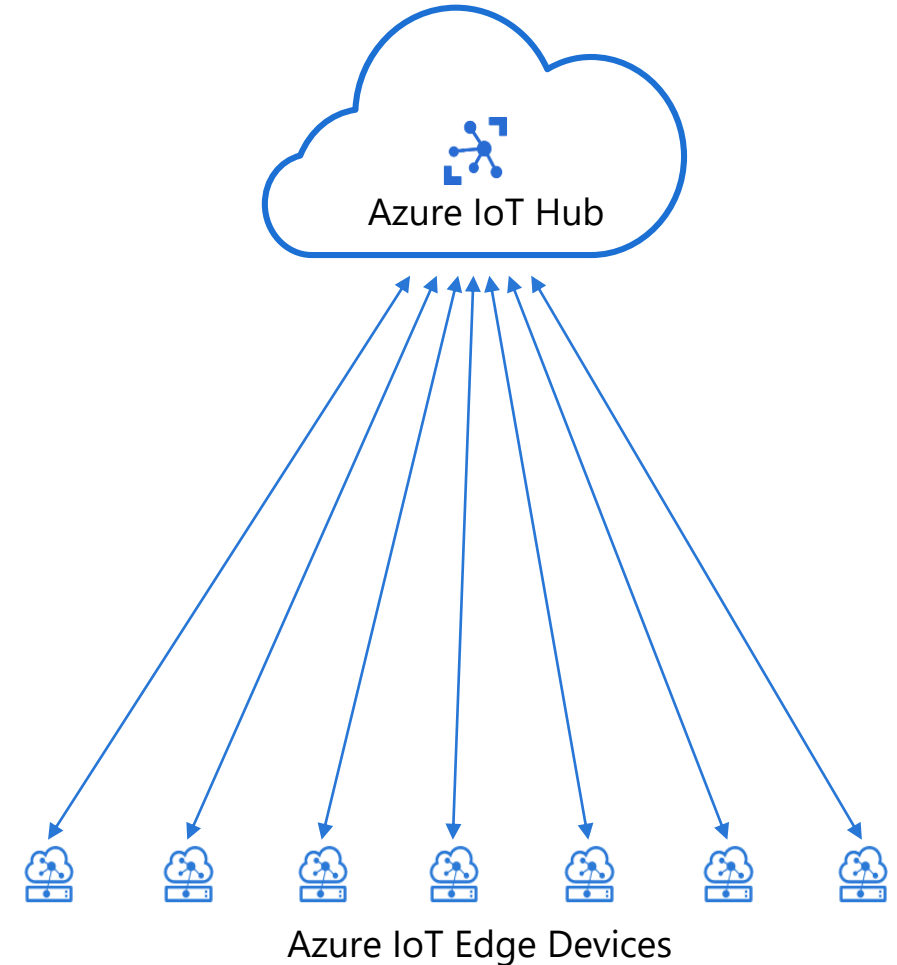
Bringing Plug and Play to IoT

Benefits

DEVELOPERS

Dramatically reduces the effort needed to build software on devices

CUSTOMERS & PARTNERS

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

DEVICE PROVIDERS

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

Open source and using open standards

Device Capability Model

JSON-LD Schema

Interface

Interface

Interface

Telemetry
Properties
Commands
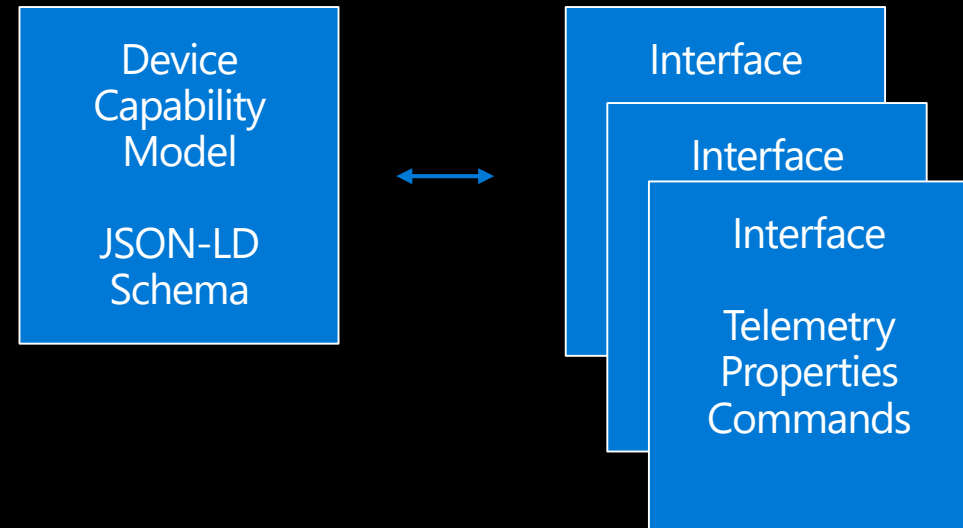
Azure RTOS

Azure RTOS ThreadX

Over 6.2 billion deployments, making it one of the most deployed RTOS in the world.

Partnership announcement

- Microsoft & Renesas combine forces to simplify the Device-to-Cloud experience
- Integration of Azure RTOS ThreadX with the Renesas Flexible Software Package
- Seamless and easy out-of-box support for Azure RTOS

Express Logic acquisition

IoT attacks put businesses at risk

Devices bricked or held for ransom

Devices are used for malicious purposes

Data and IP theft
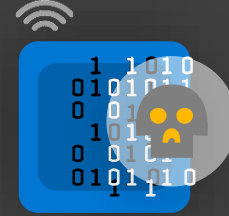
Data polluted and compromised

Devices used to attack networks

The cost of IoT attacks

Stolen IP and other highly valuable data

Brand impact (loss of trust)

Financial and legal responsibility

Compromised regulatory status or certifications

Recovery costs

Downtime

Security forensics

Azure Sphere

A comprehensive solution for securing IoT devices. Integrated hardware, software, and cloud services work seamlessly together and deliver active security by default.

Customers

The **Azure Sphere OS** multi-layer, defense-in-depth operating system with **robust application isolation**

Azure Sphere certified chips, from our silicon partners, with built-in Microsoft **hardware root of trust**

The **Azure Sphere Security Service** guards every Azure Sphere device. It **brokers trust**, **detects emerging threats,** and **renews device security**
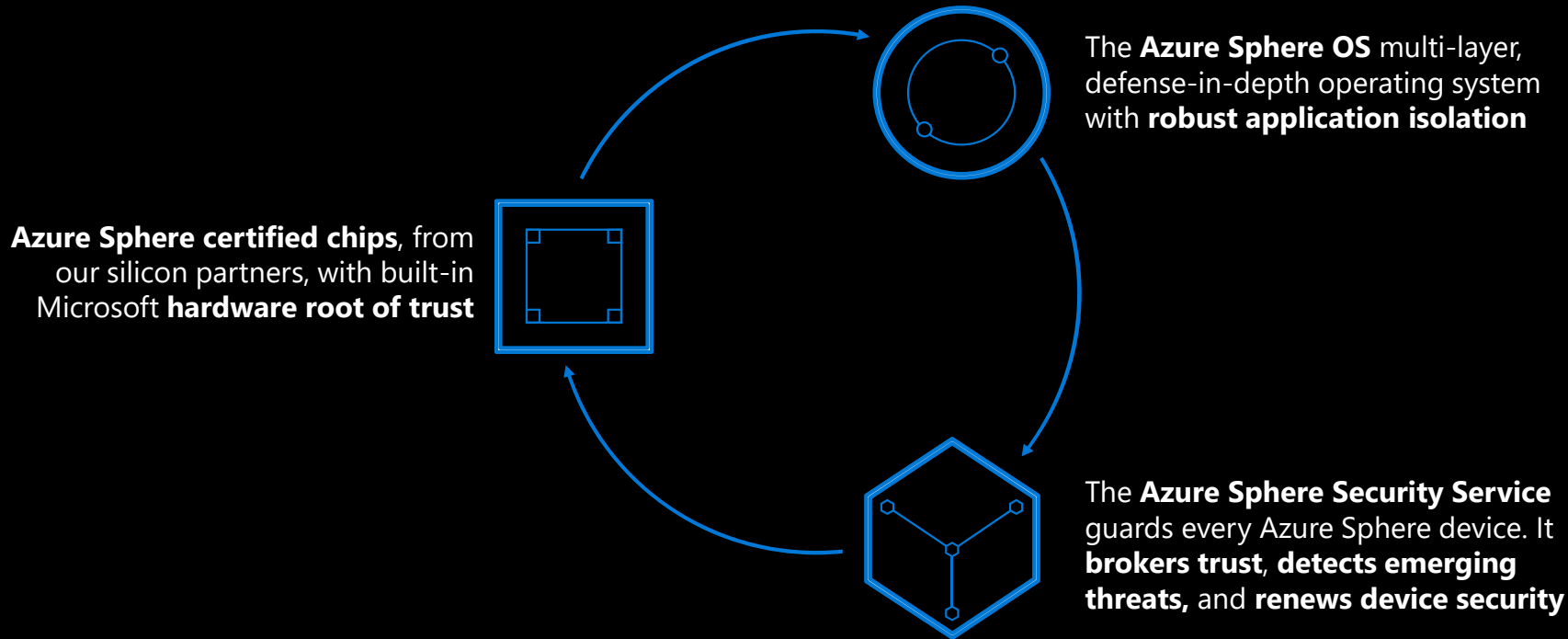
Ongoing servicing with over 10 years of security and OS updates delivered directly to each device by Microsoft

Giving Starbucks the confidence to connect their mission-critical equipment to streamline operations and to deliver quality customer experiences.

Ensuring Gojo's data integrity while monitoring hygiene compliance in hospitals.

Helping Leoni secure their intelligent cable systems that manage energy and data

Windows IoT family—fast, safe, smart

Windows 10 IoT Core

For small-footprint, smart devices

Enabling lower cost devices

Windows 10 IoT Enterprise

For fixed-function, smart devices

Locked down, full edition of Windows 10

Windows Server IoT 2019

Advanced data analysis and storage

Enhanced security capabilities

10 years of OS Support, security & manageability

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

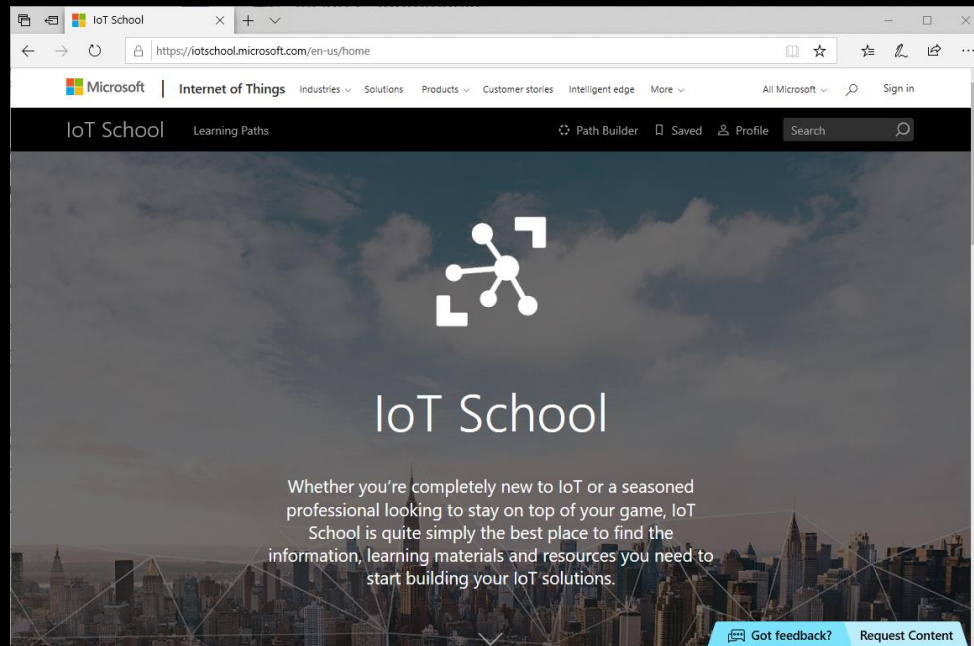*"You can't claim trust; you have to earn it every day. We want to make sure we are fully aligned with the success of partners and customers at all times."*   Satya Nadella
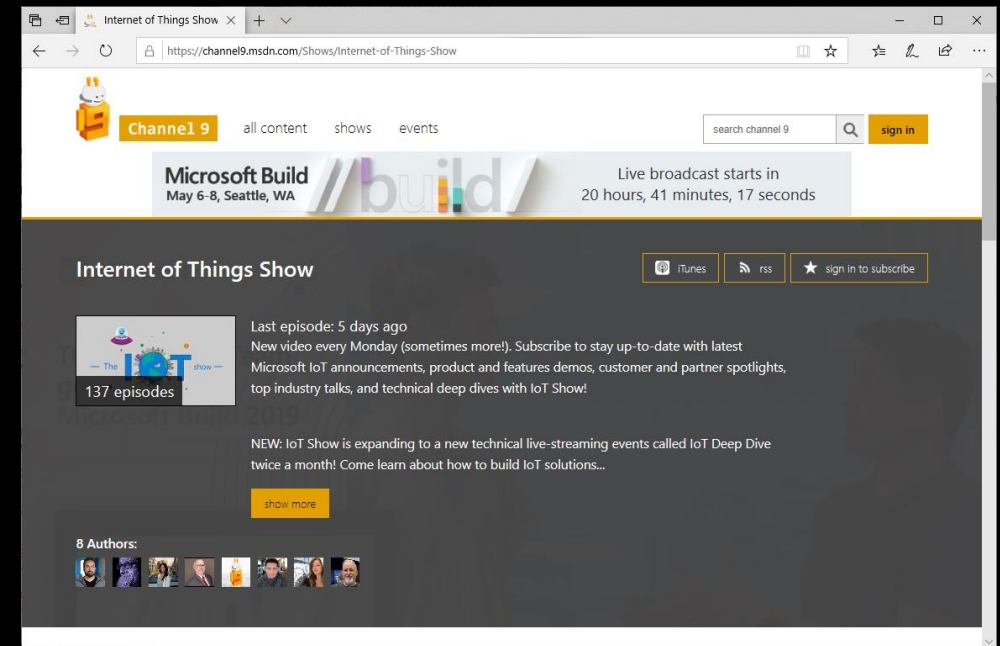
Microsoft

Ecosystem momentum

IHV · Device · Connectivity provider · ISV · Service provider · SI · Professional services · Consulting · Solutions · Customer

Developer community
- Visual Studio
- GitHub
- hadoop
- docker
- php
- nodeJS
- Powershell
- eclipse
- python
- ARM mbed
- MySQL
- Ruby
- Java
- mongoDB
- Chef + Puppet

Partner ecosystem

System integrators & advisors

accenture · CGI · HCL · EY Building a better working world · TATA CONSULTANCY SERVICES · HARMAN · eBECS · T··Systems·· · KPMG · Cognizant · Infosys · Tech Mahindra

SOGETI · avanade · pwc · DXC.technology · LARSEN & TOUBRO · REPLY · wipro · Capgemini CONSULTING.TECHNOLOGY.OUTSOURCING · robotron · MOQdigital.

Solution providers

Schneider Electric · ABB · esri · OSI · iCONICS · Rockwell Automation · ActionPoint · conplement the digital enablers · codit · Johnson Controls

Honeywell · SAP · ptc · C3 IoT · energisme · SIEMENS · Atos Worldline · DUNAV NET · Hitachi Solutions · Schlumberger · COPA-DATA · relayr.

Solution aggregators

ARROW · SYNNEX CORPORATION · MESHSYSTEMS™ · Insight · happiest minds · ICT+

AVNET · TechData · INGRAM MICRO · Mobiliya · SIGMA · AT&T · M

Devices

STMicroelectronics life.augmented · RENESAS · CISCO · kontron · Raspberry Pi · DELL · libelium · Itron

intel · MOXA · Qualcomm · cradlepoint · BECKHOFF · HITACHI Inspire the Next · embedded systems · TOSHIBA Leading Innovation

Panasonic · NEXCOM Building The Digital Infrastructure · Hewlett Packard Enterprise · ADVANTECH · FUJITSU · Toradex Swiss Embedded Computing · ARBOR

Great resources for developers

Learn IoT

http://aka.ms/learn/iot

IoT Show

http://aka.ms/iotshow

Thank you!