



# IoT in Action

#IoTinActionMS



# Unlocking IoT's Potential

**Tony Shakib**

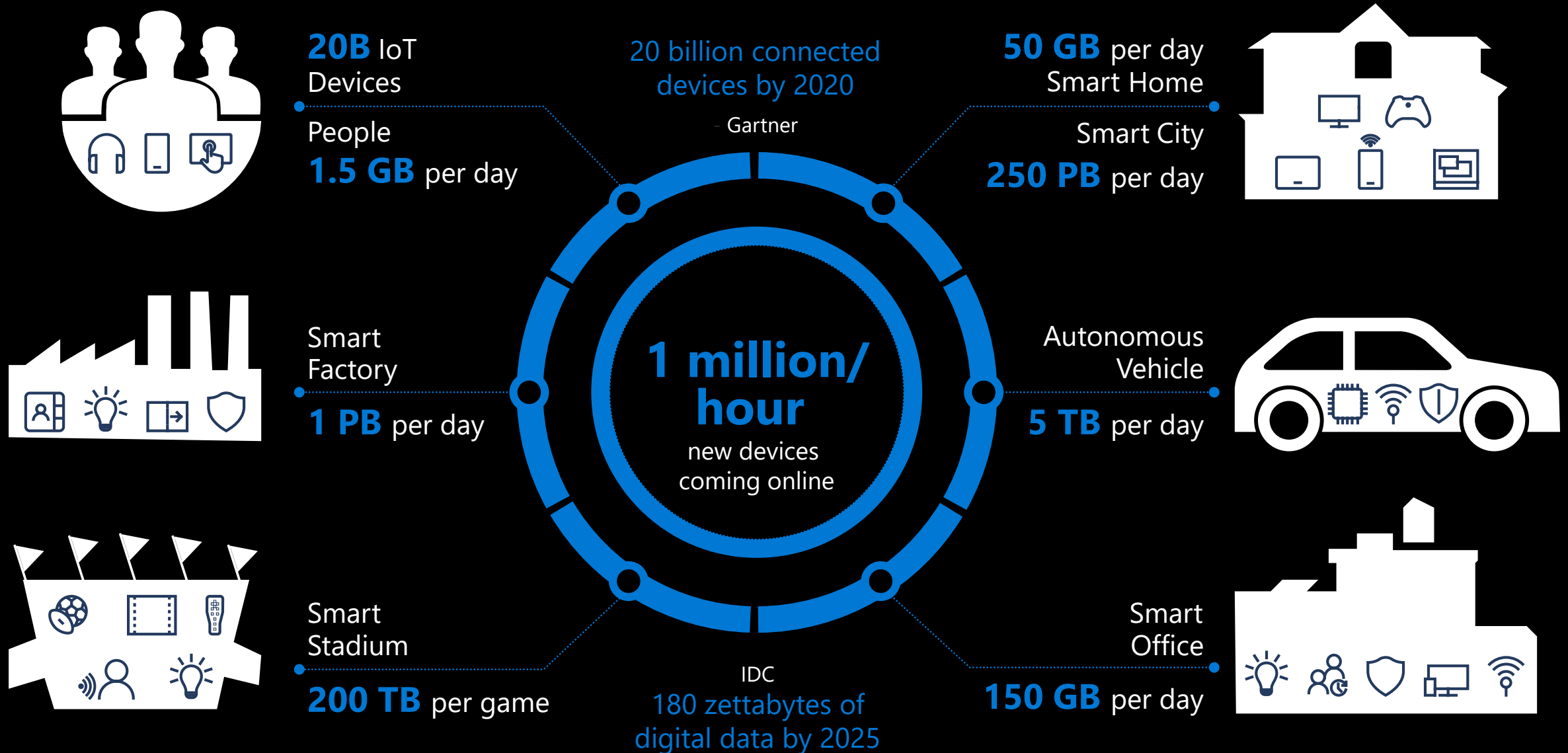
General Manager

Azure IoT

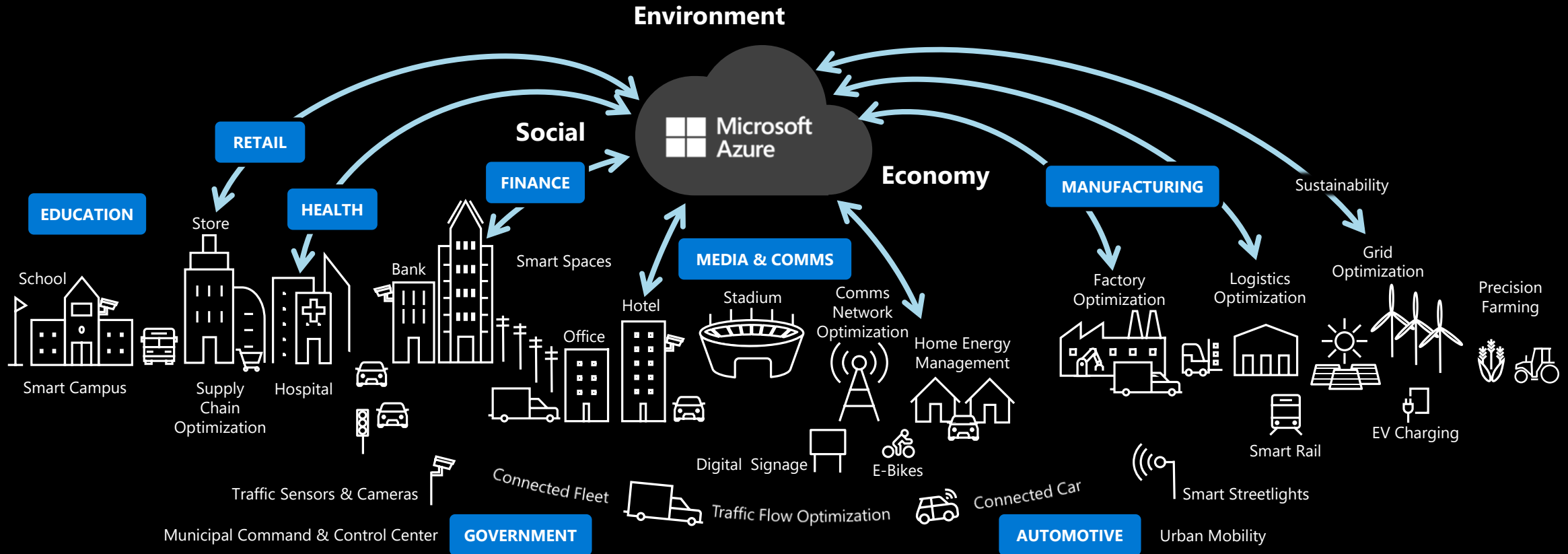
Microsoft

**IoT** in Action

# IoT fuels digital transformation

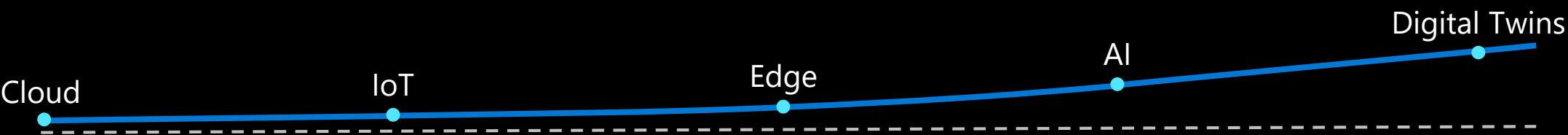



# Microsoft invests \$5 billion in IoT















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





Azure Security Center for IoT

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 IoT Hub Device Provisioning Service Azure Digital Twins Azure Time Series Insights Azure Maps	Azure Stream Analytics Azure Cosmos DB Azure AI Azure Cognitive Services Azure ML Azure Logic Apps	Azure Active Directory Azure Monitor Azure DevOps Power BI Azure Data Share Azure Spatial Anchors			
IoT & Edge Device Support		Azure Sphere Azure IoT Device SDK Azure IoT Edge Data Box Edge	Windows IoT Azure Certified for IoT—Device Catalog Azure Stream Analytics Azure Storage	Azure ML Azure SQL Azure Functions Azure Cognitive Services			

# Intelligent cloud



# IoT Hub – Most Mature, Scalable, Secure Cloud Platform

## Azure IoT Hub



### Bi-directional communication

- Millions of devices
- Multi-language, open source SDKs
- HTTPS/AMQPS/MQTTs
- Send telemetry
- Receive commands
- Device management
- Device Twins
- Queries & jobs



### Enterprise scale and integration

- Billions of messages
- Scale up and down
- Declarative message routes
- File upload
- WebSockets and 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
- Azure Security Center Support

## Device Provisioning Service

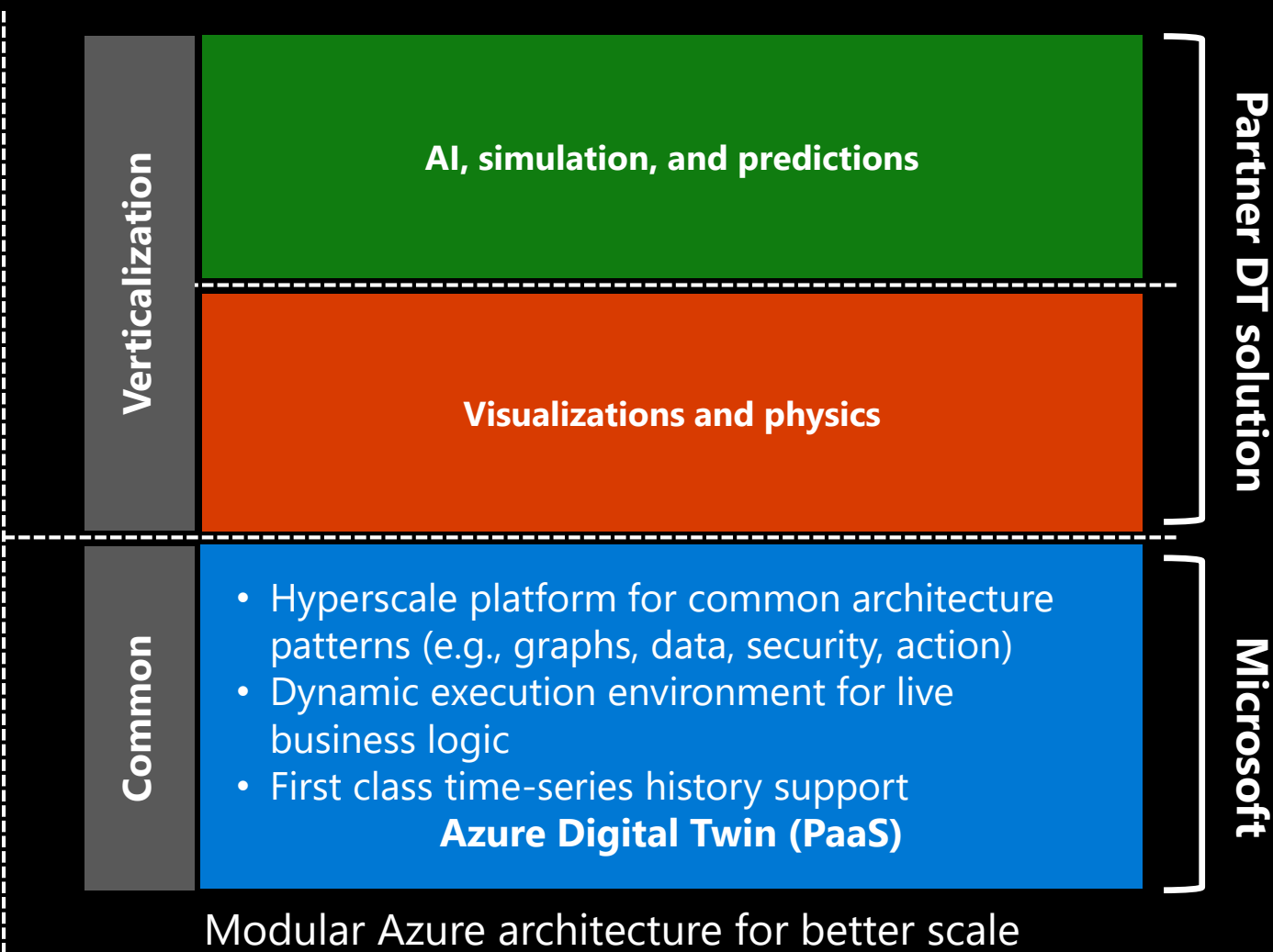
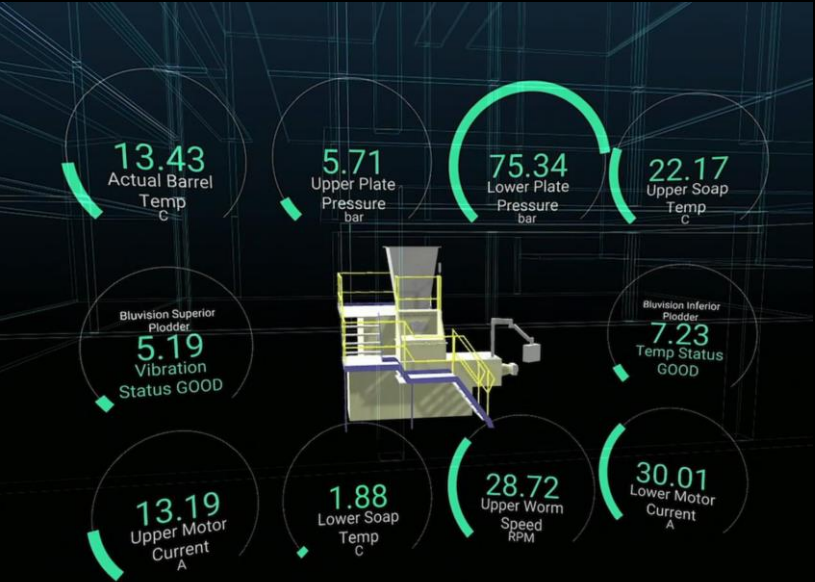
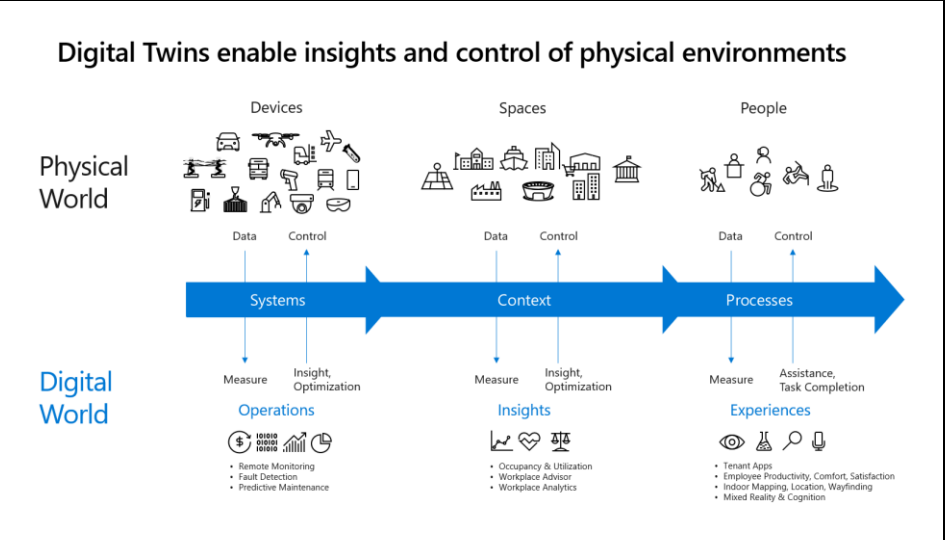


### IoT-scale automated provisioning

- Zero-touch provisioning
- Centralize your provisioning workflow
- Load balance across multiple IoT Hubs
- Re-provisioning support
- Supports TPM + X.509

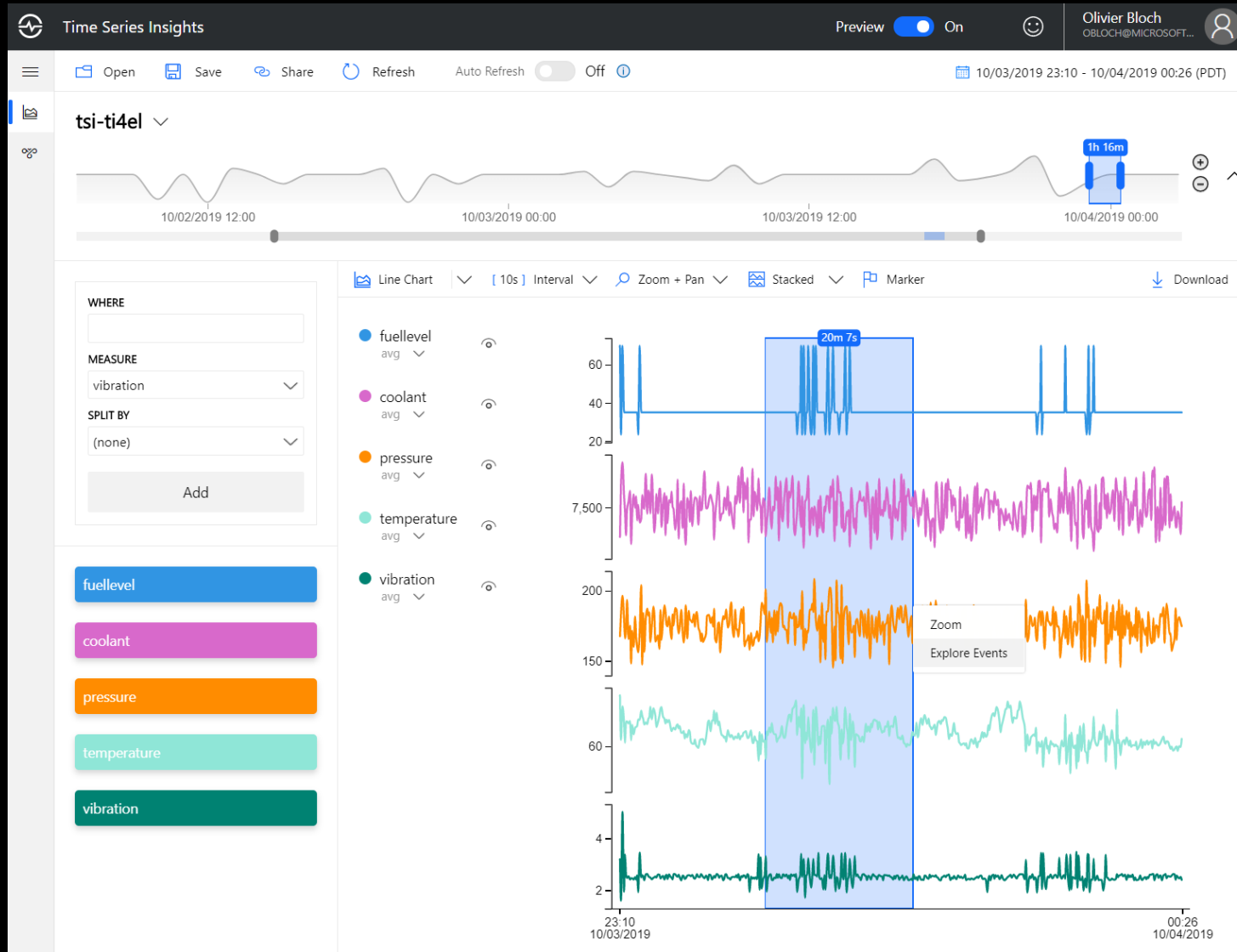


# Digital Twins

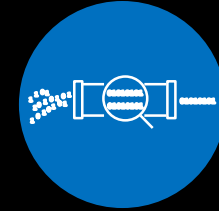




# Time Series Insights



## Industrial IoT data characteristics



IoT data **lacks** structural consistency

IoT data **needs** contextualization

IoT data is **used with** other data from first or third party sources

IoT data is **characterized** by infinite retention

# Azure Maps

A platform of geospatial APIs for the enterprise



## 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



## Search and geocoding

Convert places and addresses to coordinates



## Traffic

Show real time traffic information



## Time zones

Obtain time zone and current time information



## Geolocation

Obtain IP-based location information



## Spatial operations

Perform common geospatial operations, including geofencing, buffers, and closest point functions



## Mobility (transit)

Access real-time intelligence for transit stops and routes

# Bringing Plug and Play to IoT

## Benefits

### DEVELOPERS

Dramatically reduces the effort needed to build software on devices

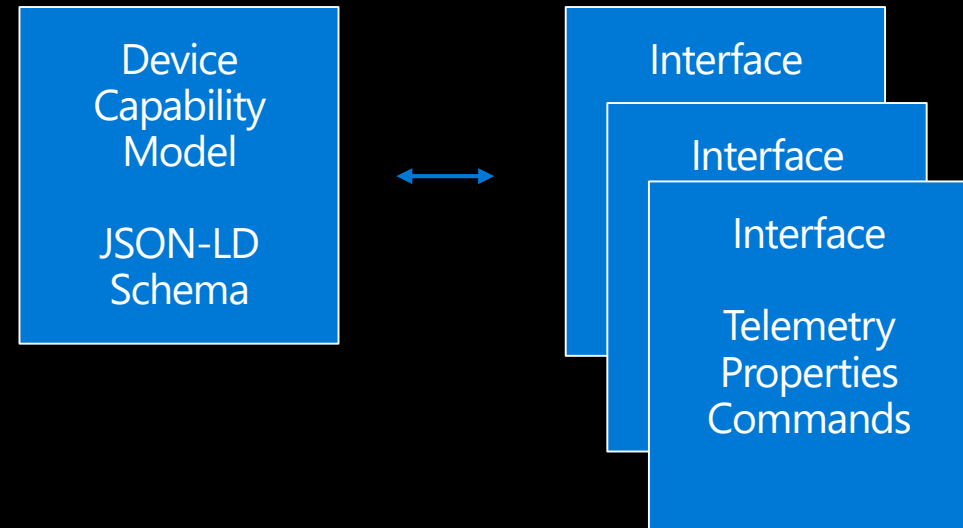
### CUSTOMERS & PARTNERS

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

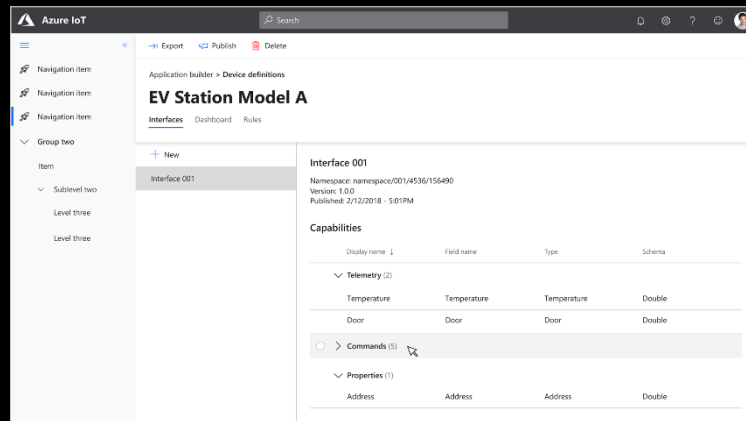
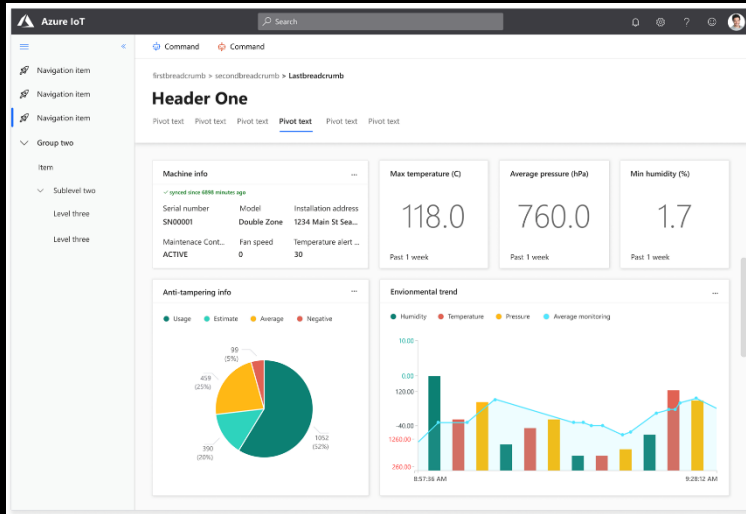
### DEVICE PROVIDERS

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

## Open source and using open standards



# IoT Central



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



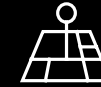
White labeling



Plug and Play



Extensibility and customization



Location telemetry and geofence



Industry solution templates (coming soon)



Edge support (coming soon)

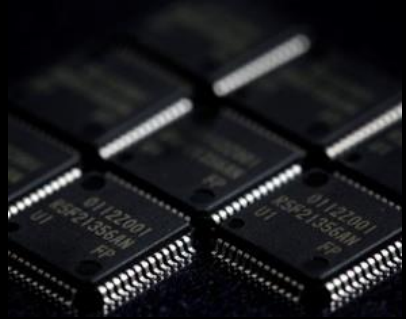
# Intelligent Edge



## Intelligent Edge



# The most comprehensive IoT and Edge offerings in the market



## Devices + Sensors

### IoT devices

#### Azure IoT Device SDK

Endpoint devices such as appliances, vehicles, or factory machines that connect, interact, and exchange data

1,300+ devices, 300+ partners—all certified to work great with Azure IoT Services

Cross-platform and open source: Windows IoT, Linux, RTOSs, ThreadX and more

### Device security

#### Azure Sphere

Integrated hardware, software, and cloud services work seamlessly together to deliver security by default

Deployment options to securely connect existing equipment and build security into new edge devices

Over 10 Years of security and OS updates delivered directly to each device by Microsoft

## Sensors to interactive

### Edge devices

#### Azure IoT Edge

Devices that aggregate, process, and provide gateway capabilities for IoT endpoints

Deploy and manage Azure Services in containers on any IoT device

AI, Azure ML, Azure Stream Analytics, and more

Cross-platform and open source: Windows IoT, Linux

## Integrated platform

### Edge appliances

#### Azure Data Box Edge

Integrated appliances that provide a subset of cloud edge roles, such as ML-inferencing

Data Box Edge: AI-enabled, storage, and compute Azure Edge appliance

Data Box: Offline, ruggedized data transport, 100 TB–1 PB

### On-premises platform

#### Azure Stack

Scalable solutions that provide a full cloud stack, including IaaS and PaaS capabilities

Edge and disconnected scenarios

Regulatory requirements

Cloud app model on-premises

## Global scale processing

### Hyperscale cloud

#### Edge Regions

First-party cloud regions

Full range hyperscale cloud services

Tiered service availability: Heroes > Hubs > Satellites

Open source-based services and tools

Most specialization

Fewest services

Full spectrum of Cloud + Edge form factors

Intentional and appropriate Azure service availability

Fewest form factors

Most services



# 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

Compromised regulatory status or certifications

Brand impact (loss of trust)

Recovery costs

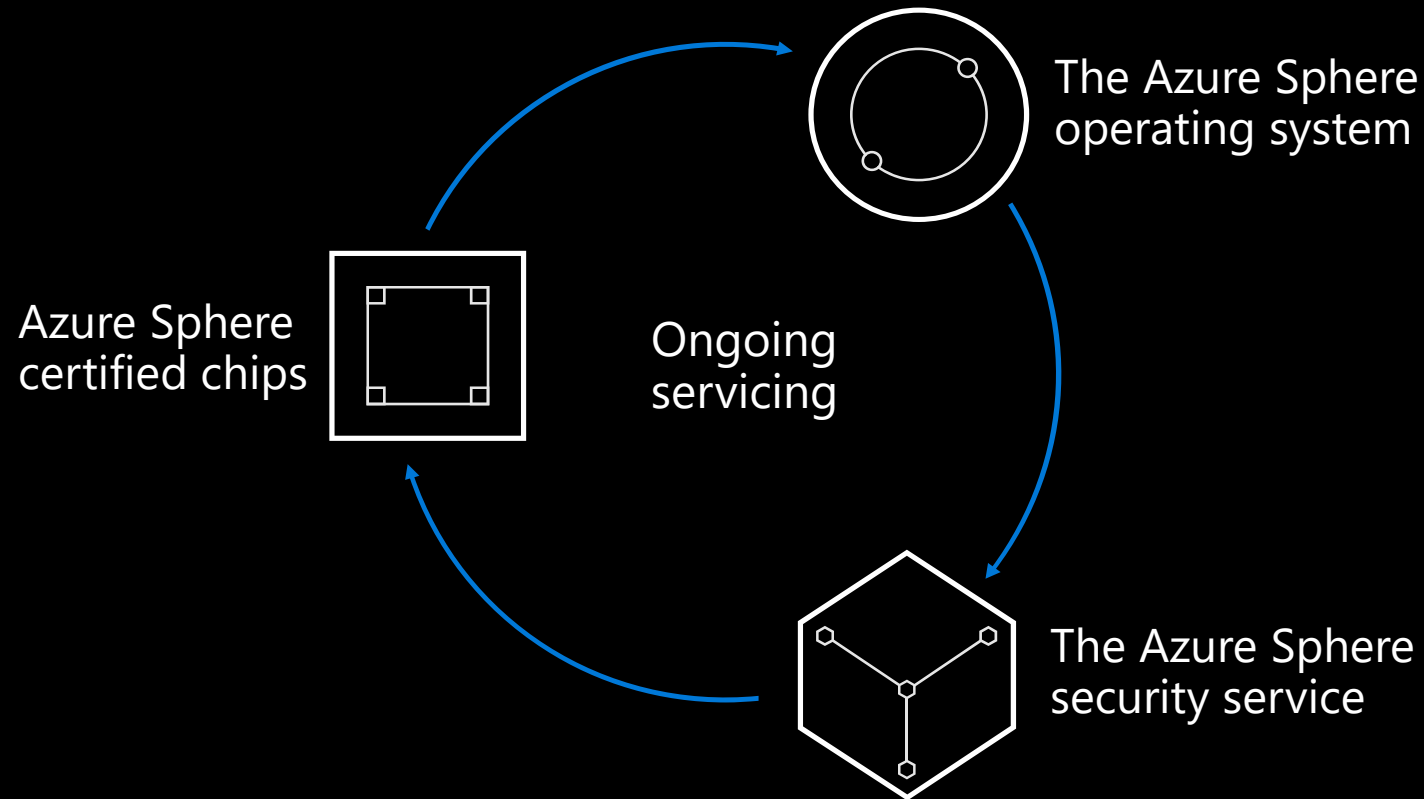
Financial and legal responsibility

Downtime

Security forensics

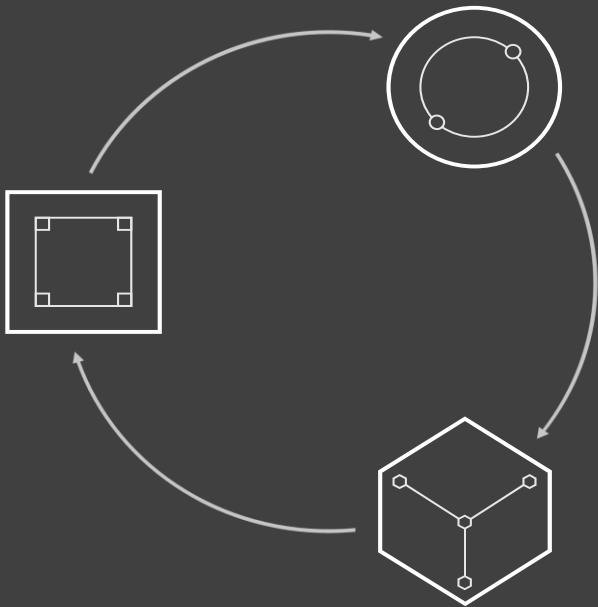
# Azure Sphere

An end-to-end solution for securely connecting existing equipment and to create new IoT devices with built-in security. Ongoing updates from Microsoft keep your devices secured over time as threats evolve.



Over 10 years of security and OS updates delivered directly to each device by Microsoft

Protect your data, privacy,  
physical safety and infrastructure  
with Azure Sphere.



**Integrated hardware, software, and cloud services** work seamlessly together and deliver active security by default.



**Defense in depth** provides multiple layers of protection to help guard devices against and respond to threats.



**Ongoing security and OS updates** from Microsoft keep your devices secured over time.



**Implementation options** allow you to secure existing equipment and build security into new IoT devices.



**Simplified business model with one-time upfront price** includes hardware, security service, and full OS update servicing for over a decade.

# 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

# 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

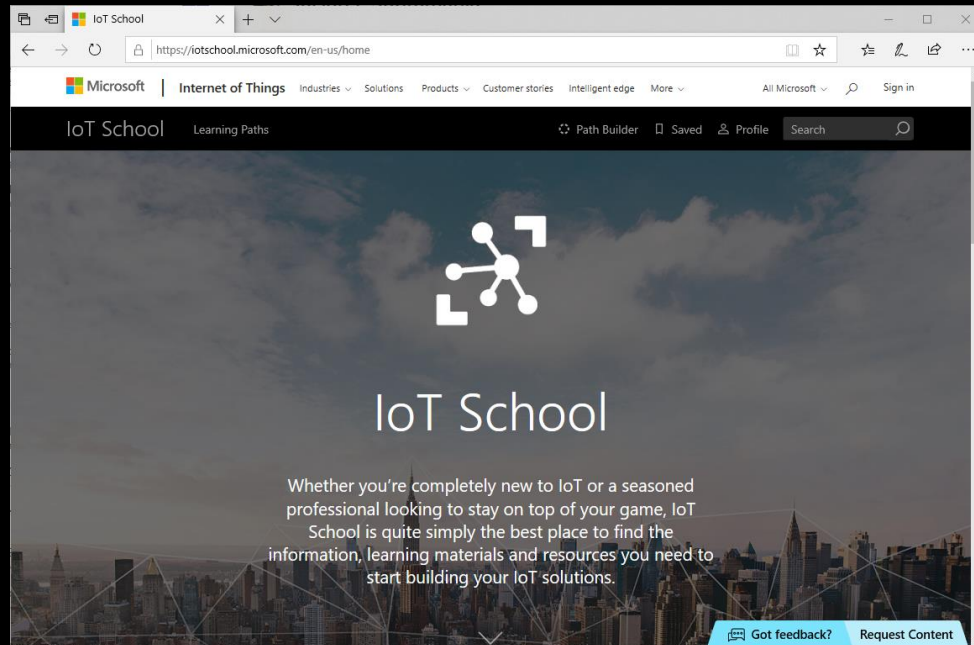
Enhanced security capabilities



10 years of OS Support, security & manageability

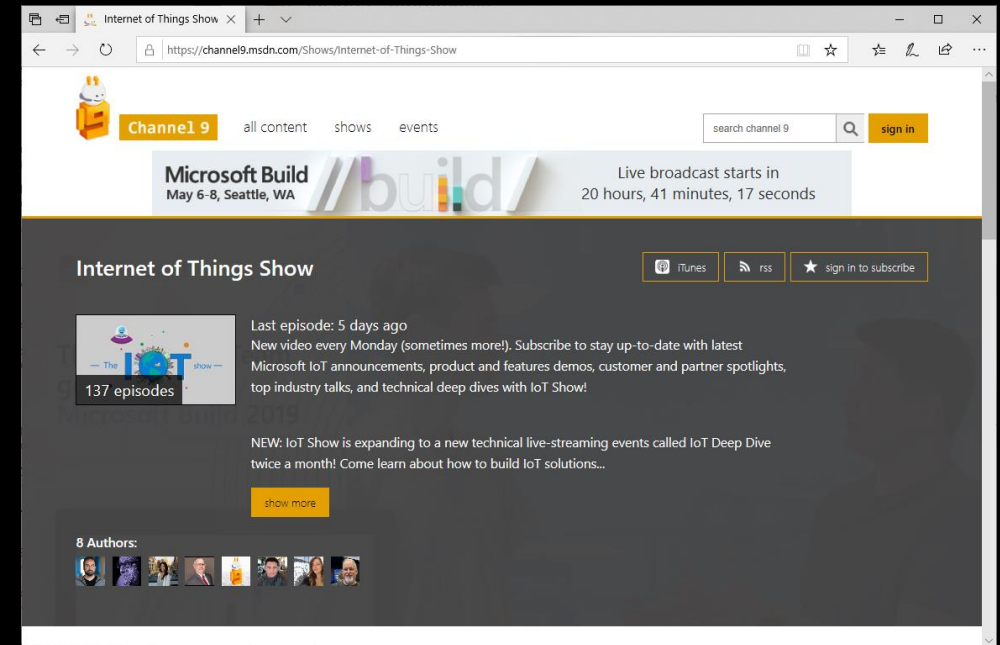
# Great resources for developers

## Learn IoT



<http://aka.ms/learn/iot>

## IoT Show



<http://aka.ms/iotshow>



# Why choose Microsoft



## Platform

Most comprehensive IoT services—mouse trap to nuclear power stations



## Fast

Easy to build solutions



## Ecosystem

Thousands of partner solutions across ISVs, advisories, systems integrators and connectivity providers



## Powerful GTM channel

Relationships with the largest enterprise customers



Thank you

