

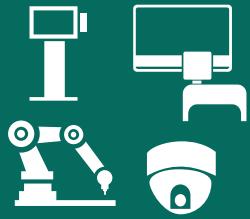


Azure IoT

Hancom MDS Inc.

Elements of the Internet of Things

Things



Connectivity



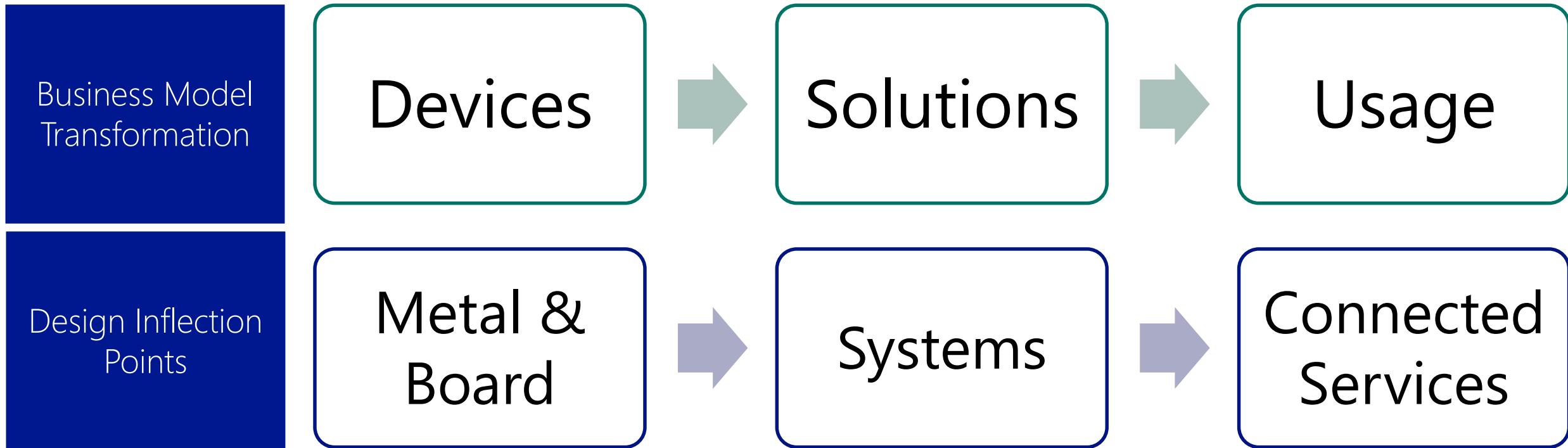
Data

10101
01010
00100

Analytics

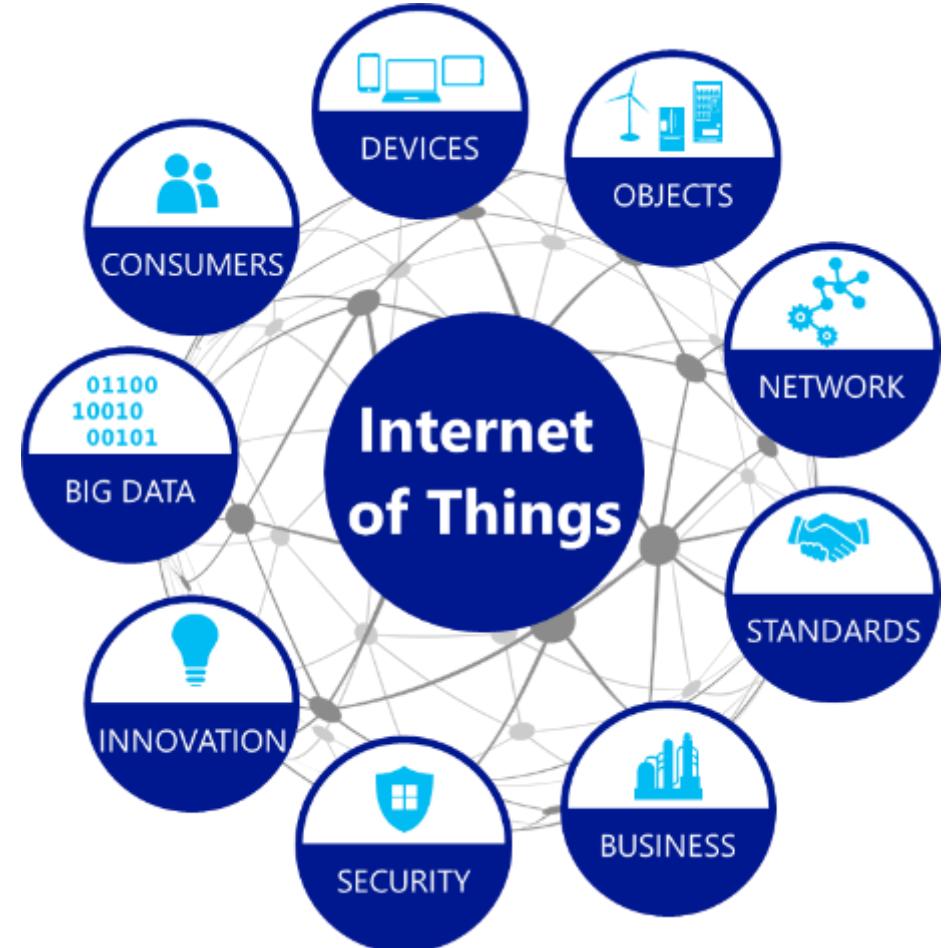


From Embedded to IoT



Challenges of an IoT Solution

Scale	Pace	Environment	Business Models
<ul style="list-style-type: none"># devices >> # users, and growing fastVolume of data (and network traffic)World Wide Deployments	<ul style="list-style-type: none">Innovation pressure: analysis, command and control, costSkill pressure: data science, new platforms	<ul style="list-style-type: none">IT/OT collaborationSecurity and privacy threatsEmerging standardsNew competitors	<ul style="list-style-type: none">Pay per FeaturesPay per UsageAdd value from Data



Key Technology points

Device Bring Up and deployment

Device capabilities and topology

Application development platform across devices

D2D, D2C and C2C Protocols / Comm.

Large Scale Data Ingress

Powerful Data Analytic Tools

Visualization Tools

Flexibility:
On-premise, hybrid, and cloud

Devices

Cloud

Secure & Open Platform

The Microsoft platform



Solutions for the Internet Of Things



Windows

Windows 10 IoT Enterprise

Full Windows. Desktop Shell, Win32 apps, Universal Windows Apps and Drivers. Reduced Consumer Features.

Lock Down and Granular UX



Windows 10 IoT Mobile Enterprise

Modern Shell, Universal Windows Apps and Drivers
Enterprise Lock-Down
ARM, Mobile Platform



Windows 10 IoT Core

Core Windows 10
Universal Windows Apps and Drivers
X86 or ARM



Azure



Windows Server

Reference Board



MinnowBoard MAX

Atom E3800
Dual-core 1.33 GHz
1GB LPDDR2 SDRAM
GPU : Intel HD Graphics
PWM, GPIO



Raspberry Pi 2

Broadcom 2836
Quad-core ARM Cortex-A7
1GB LPDDR2 SDRAM
GPU : VideoCore IV
GPIO, I2C, SPI



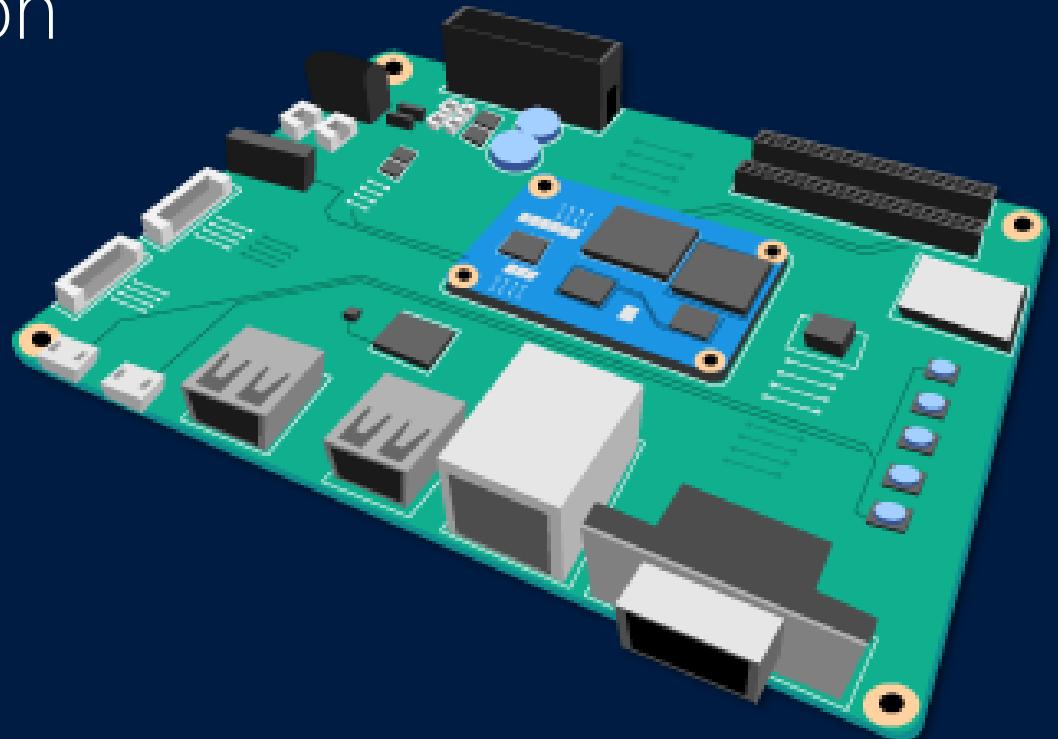
DragonBoard 410C

APQ8016
Quad-core ARM Cortex-A53
1GB LPDDR3 SDRAM
GPU : Adreno 306
GPIO, I2C, SPI

MDS Technology NeoFalcon



- Build innovative solutions using Windows & Qualcomm Snapdragon
- Hardware specs:
 - Qualcomm Snapdragon 410 (APQ8016)
 - 2GB LPDDR3, 16GB eMMC
 - MicroSD, WiFi 802.11a/b/g/n, BT4.1 + LE
 - GPIO, I2C, I2S, SPI



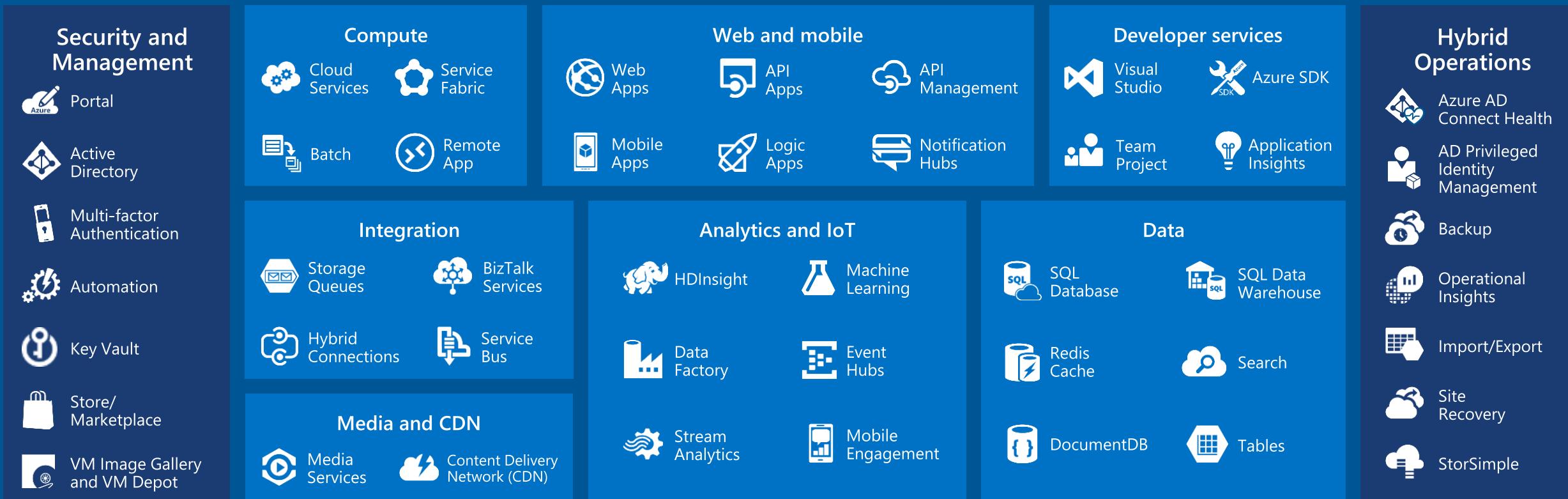
Benefit from a Hyper-Scale Cloud

- 36 Regions Worldwide
- Hyperscale, Hybrid, On-Prem
- Largest Compliance Portfolio in the Industry
- Enterprise-Grade Security
- Rich, Open Ecosystem



AZURE REGIONS

Platform Services



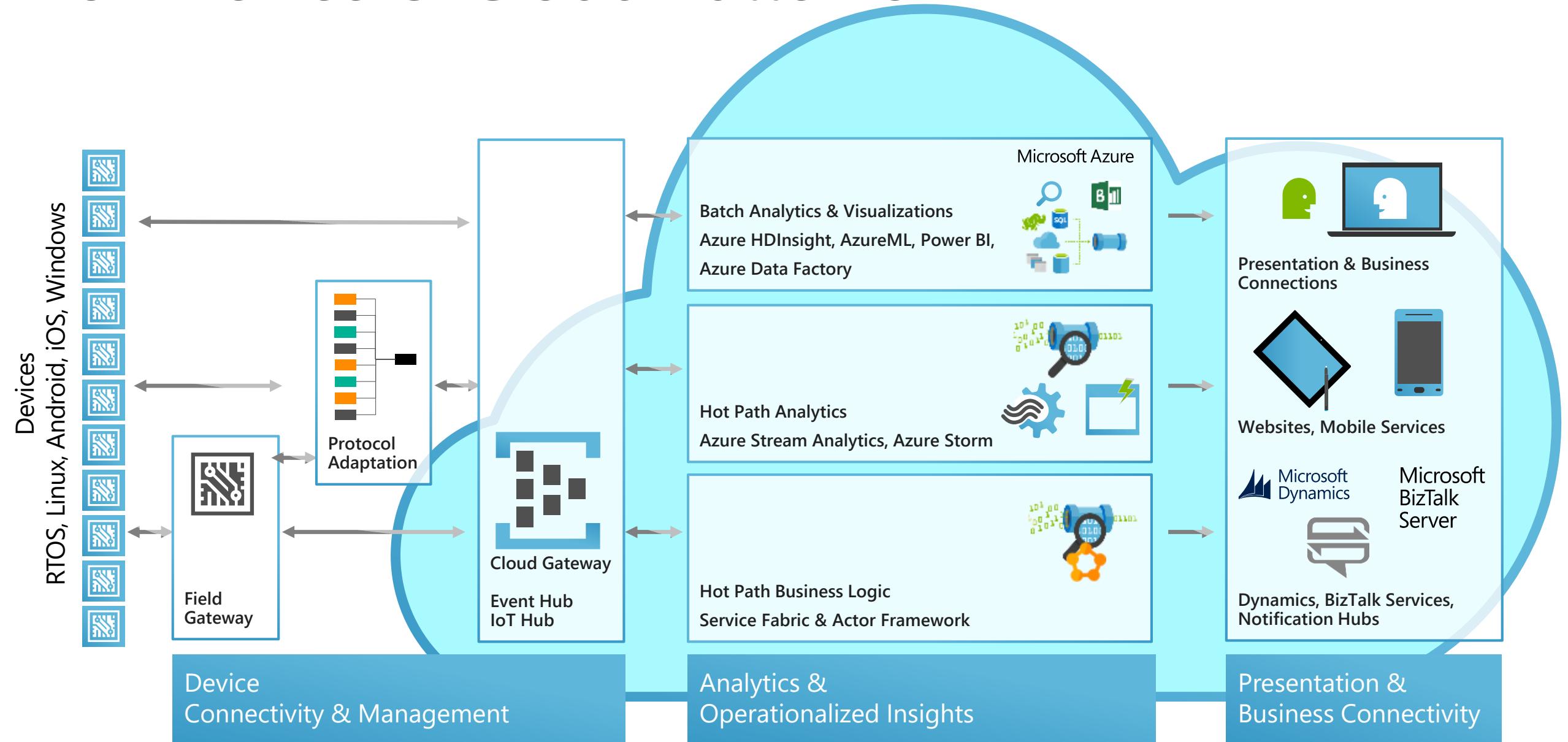
Infrastructure Services



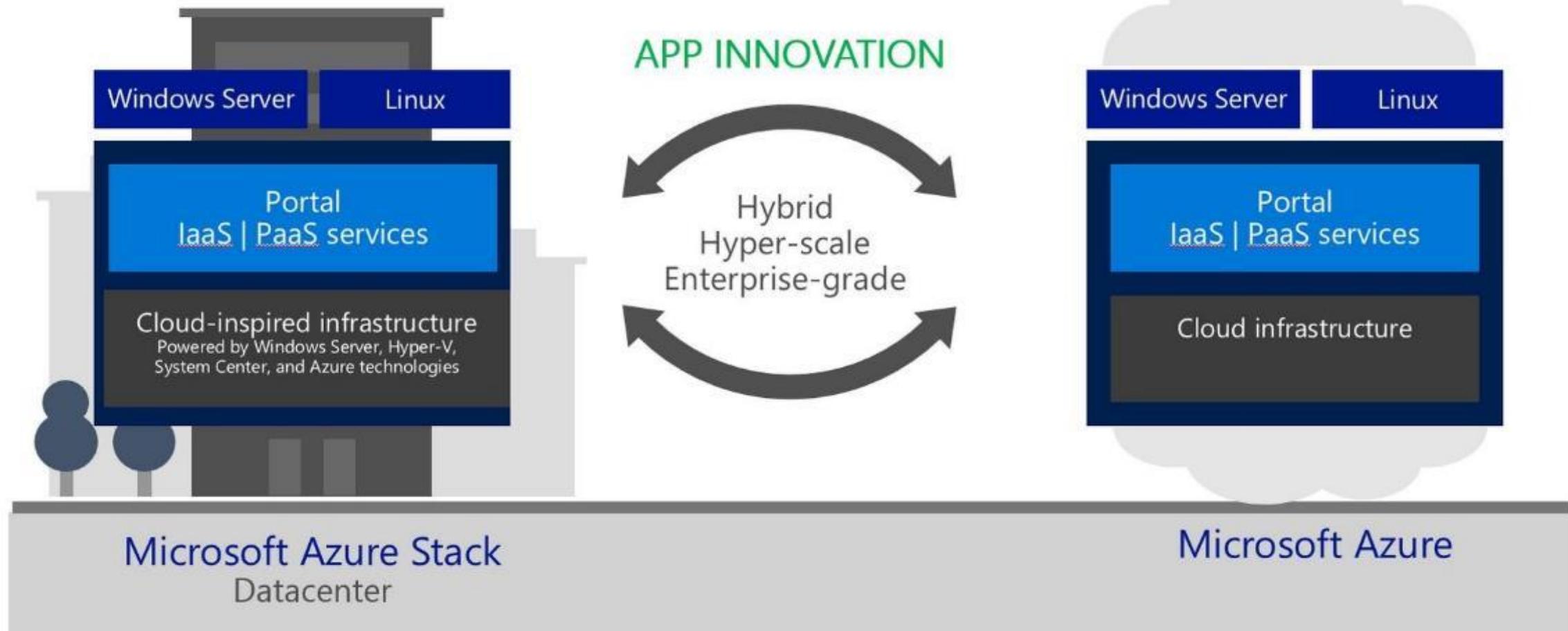
Datacenter Infrastructure (24 regions, 19 online)



IoT Device & Cloud Patterns



On-premise, hybrid, and cloud availability



Azure IoT Suite

Azure IoT Hub

Building a solution

Connect and scale
with efficiency



Real-time
operating
systems



And
more

Analyze and act
on new data



Analytics
Device Registry
Rules and Actions
Dashboards & Visualization

Integrate and transform
business processes



10101001110100101→

SAP
ORACLE

Microsoft
Dynamics
salesforce

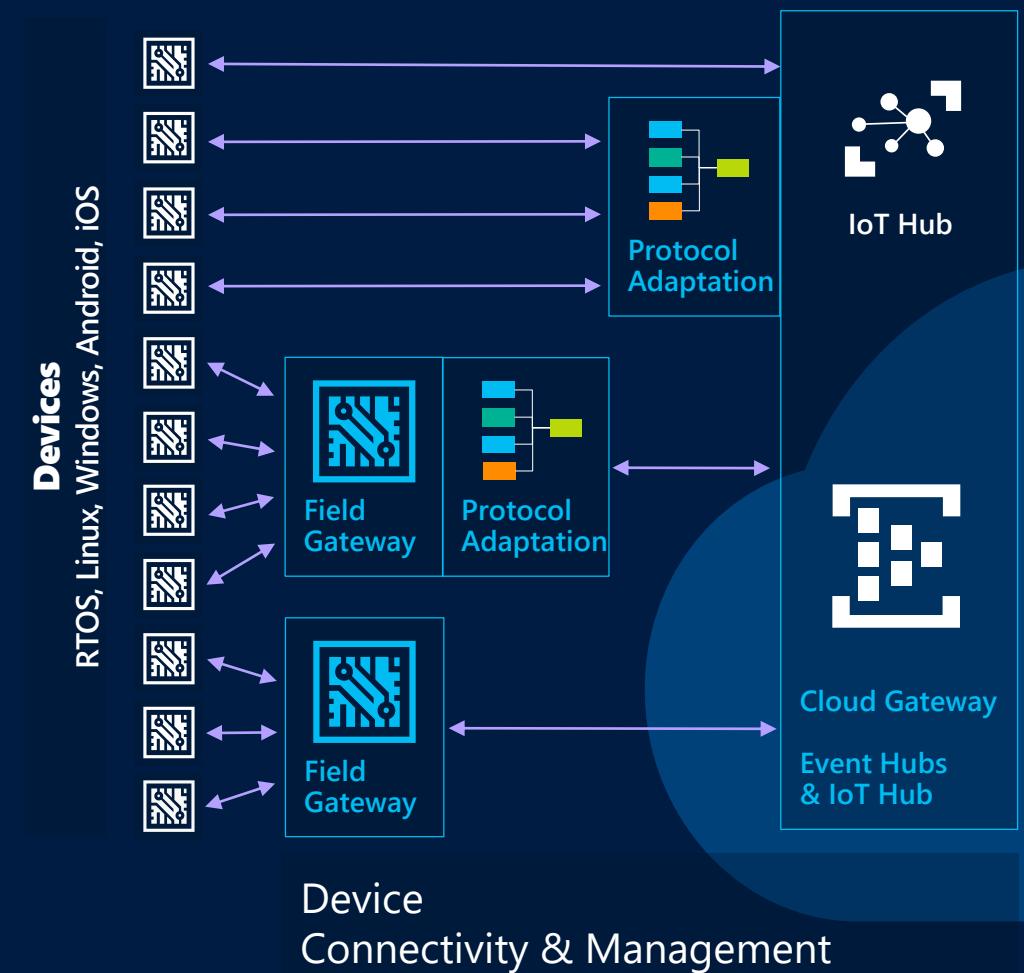
IBM DB2

WebSphere

Informix.
software

Office 365

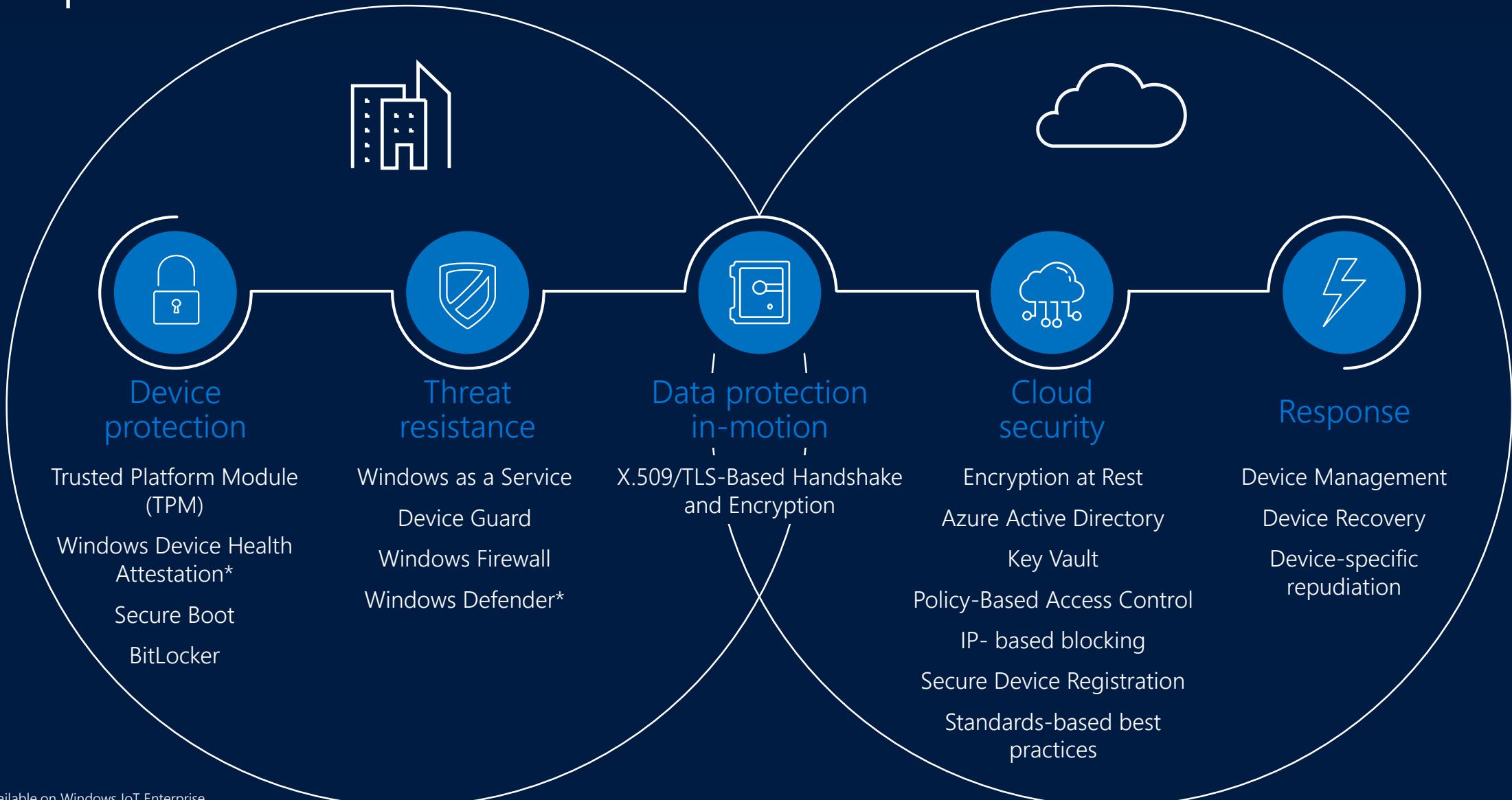
Azure IoT Hub



Azure IoT Hub

- Capability of the Azure IoT Suite
- Bi-directional device <-> cloud
- Up to 10 million devices
- Telemetry ingestion
- Command & control
- Device registry & identity
- Device Management
- HTTP/AMQP
- Extensible protocol support / MQTT

IoT protection stack



Azure IoT Components

Stream Analytics (ASA) - event processing



Uncover real time insights

Perform real time analytics across multiple streams

Rapid Deployment

Use simple SQL syntax, auto distributed for scale

Mission critical reliability

Fully managed, low latency, high throughput

Create real time alerts

Flag alerts and alarms for attention

High volume

Analyze millions of data points per second

Highly scalable

Enterprise grade, predictable solution.

Data visualization with PowerBI



Highly accessible analytics

Cloud based dashboard and analytics tool,

360° view of business KPI's

Customize dashboards to address concerns and performance metrics.

Cross platform support

View data via web platform, on any device

Pre-built dashboards

Utilize standard dashboards for rapid deployment, based on popular solution demands.

Real time capabilities

Ingest, analyze and display data as it happens

Secure access

Secure, live communication with data source

Query data

Intuitive, natural language query tool

Integrated systems

Integrate with other business systems and enrich device data with intelligence from other business systems, eg: CRM, ERP

Data visualization with PowerBI



Rich visuals

Standard and custom graphing options

Custom dashboards

Build heat maps and visually track data

External data

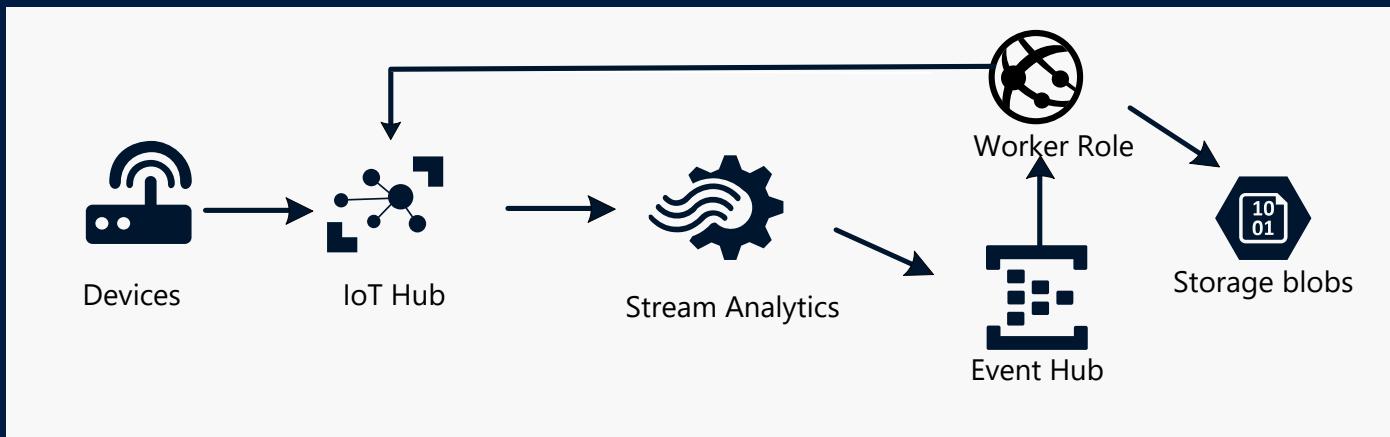
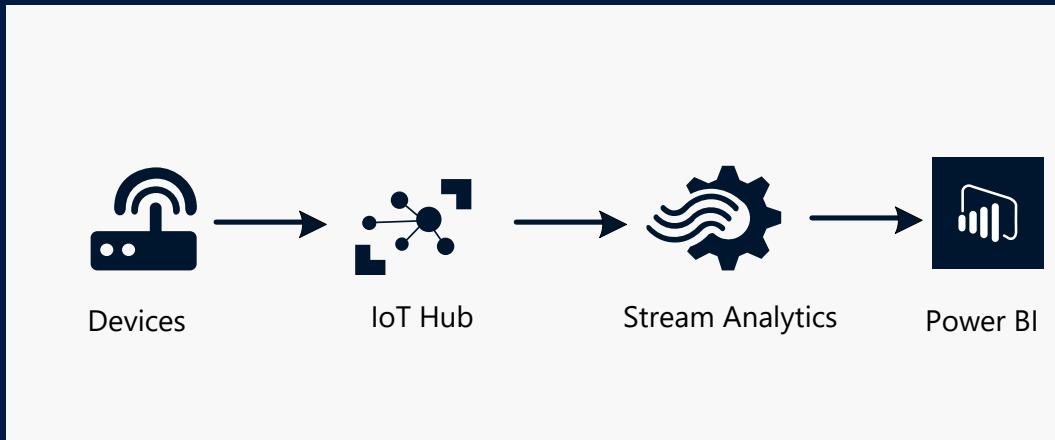
Integrate external data feeds to add value to device data, or pull in external information such as weather or market information.

Sample Azure IoT scenarios

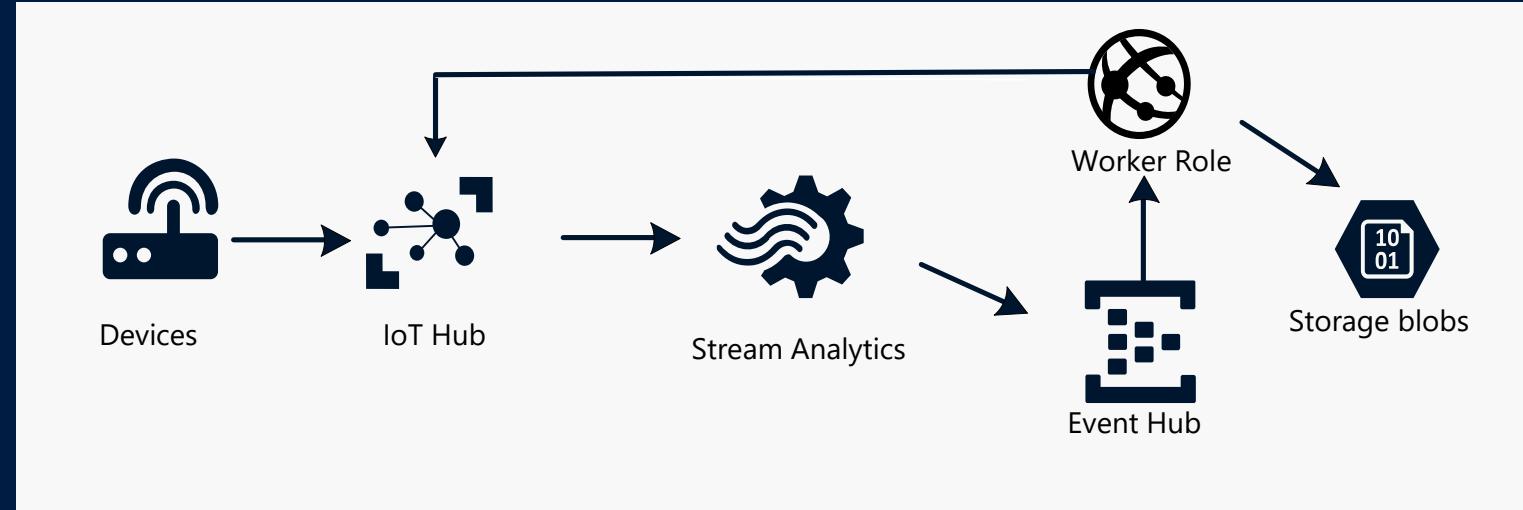
1. Connect IoT Devices

2. Real time monitoring

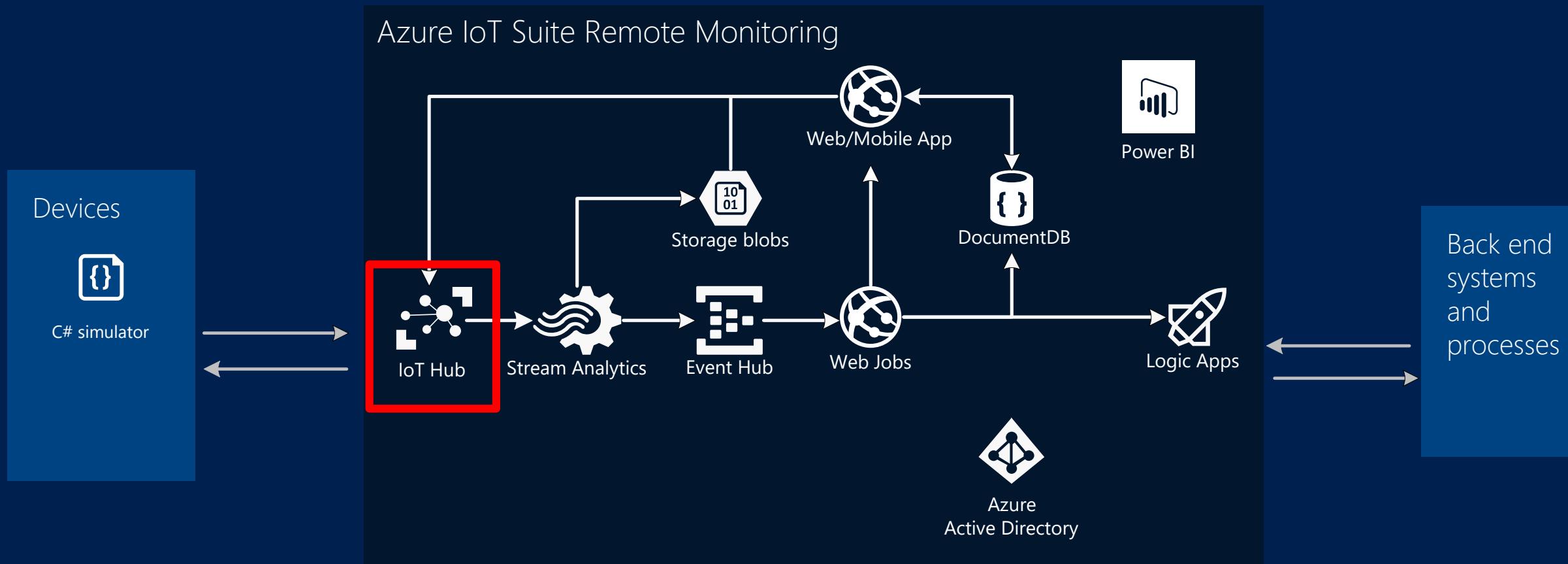
3. Anomaly detection in real time



HOL 3-1 Azure IoT



Azure IoT Suite Architecture Example

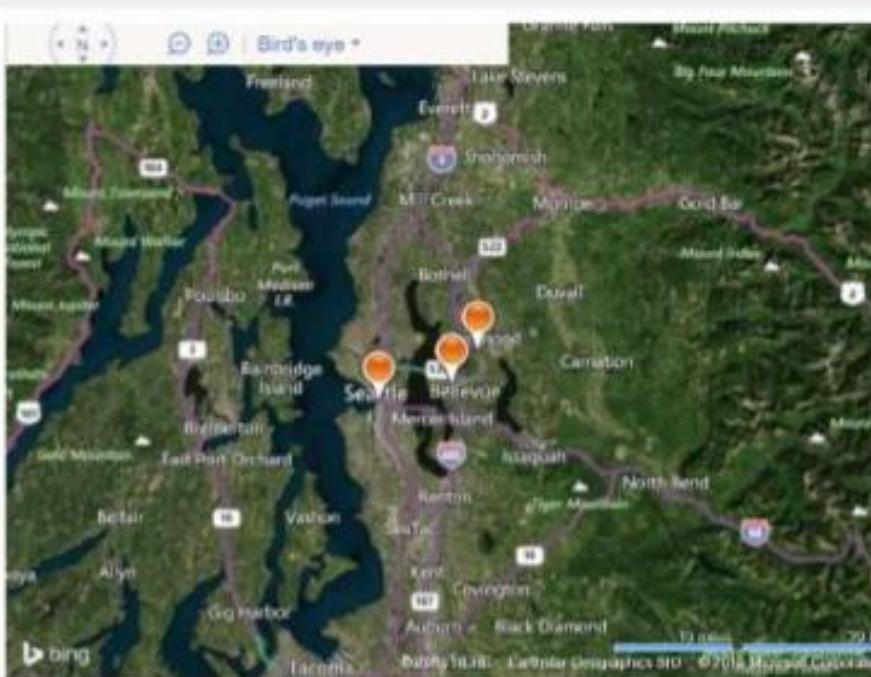


Open Source Customizable Dashboard

Microsoft Azure IoT Suite ⓘ | RMSolution | ADMINISTRATOR | Sign Out

DASHBOARD | DEVICES | RULES | ACTIONS | ADD A DEVICE

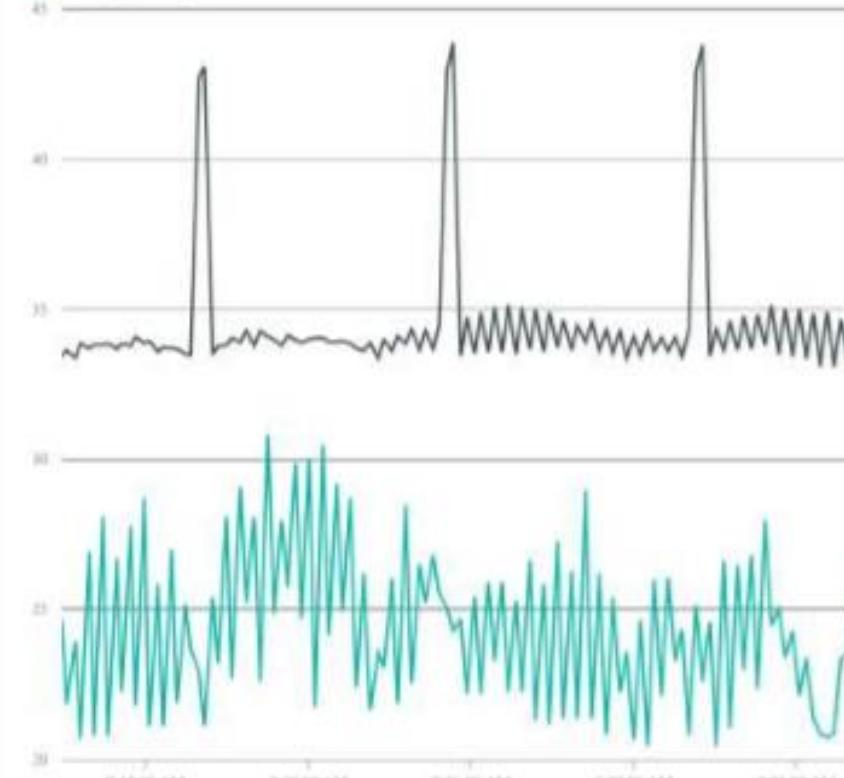
Bird's eye view



Device to View: SampleDevice001_363

Telemetry History

Humidity • Temperature



Alarm History

TIME	DEVICE ID	RULE OUTPUT	VALUE
09/29/2015 9:22:25 AM	SampleDevice001_363	AlarmTemp	43.617
09/29/2015 9:22:25 AM	SampleDevice001_363	AlarmHumidity	22.568
09/29/2015 9:22:23 AM	SampleDevice001_363	AlarmTemp	42.933
09/29/2015 9:22:23 AM	SampleDevice001_363	AlarmHumidity	25.135

Max of device humidity

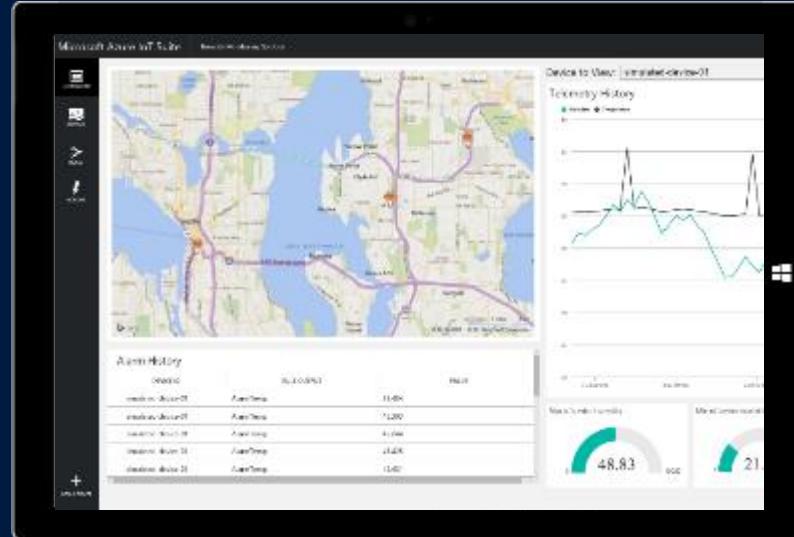
Min of device humidity

Average of device humidity



Accelerate time to value with preconfigured solutions

Start quickly with preconfigured solutions



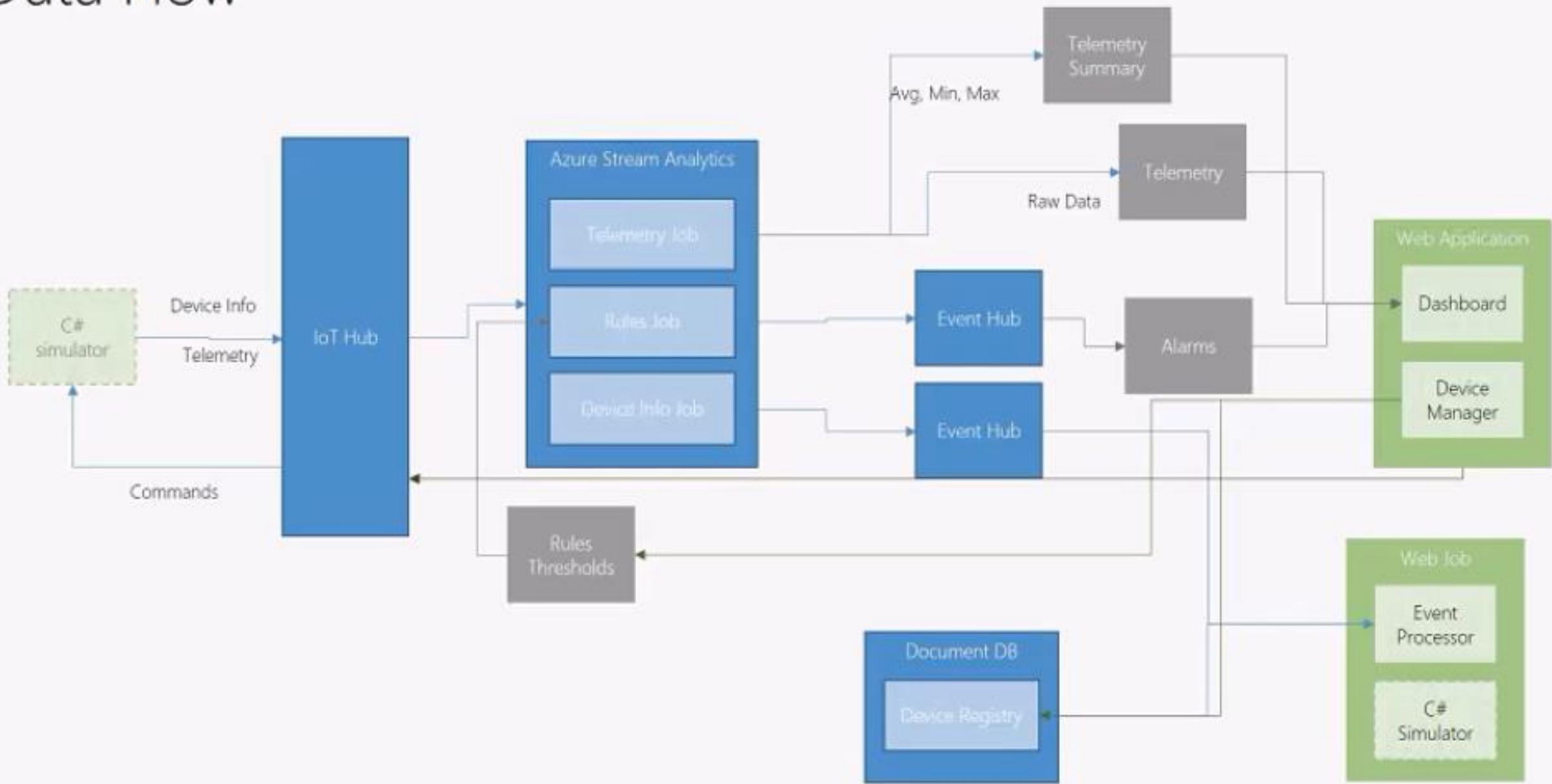
- Get started in minutes
- Modify existing rules and alerts
- Add your devices and begin tailor to your needs

Leverage Partners to tailor your IoT solutions



- Fine-tuned to specific assets and processes
- Highly visual for your real-time operational data
- Integrate with back-end systems

Data Flow



Azure / azure-iot-remote-monitoring

[Watch 89](#)[Star 34](#)[Fork 21](#)[Code](#)[Issues 6](#)[Pull requests 2](#)[Wiki](#)[Pulse](#)[Graphs](#)

Azure IoT Remote Monitoring preconfigured solution

[382 commits](#)[12 branches](#)[1 release](#)[11 contributors](#)Branch: **master** ▾[New pull request](#)[New file](#)[Find file](#)[HTTPS ▾](#)<https://github.com/Azure/az>[Download ZIP](#)

	jame... Update DeploymentLib.ps1	...	Latest commit 3afa3e1 18 days ago
	.nuget	Initial commit	2 months ago
	Common	Update DeploymentLib.ps1	18 days ago
	DeviceAdministration	minor cleanup	27 days ago
	EventProcessor/EventProcessor.Web...	Typo for storage name	a month ago
	Simulator/Simulator.WebJob	Merge branch 'october-integration' into vertigo-davidb-unrecognized-c...	a month ago
	WebJobHost	Splitting RemoteMonitoring WebJobs into two project	a month ago
	.gitattributes	Initial commit	2 months ago
	.gitignore	Remove unneeded exclusion	a month ago
	AppRolesForManifest.txt	Initial commit	2 months ago

HOL 3-2 Azure IoT Suite

Demo

Customized Azure IoT Suite

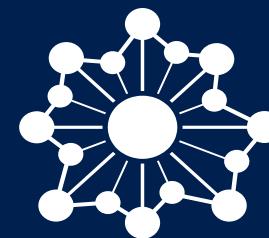
IoT Suite Microsoft Azure



Remote
Monitoring

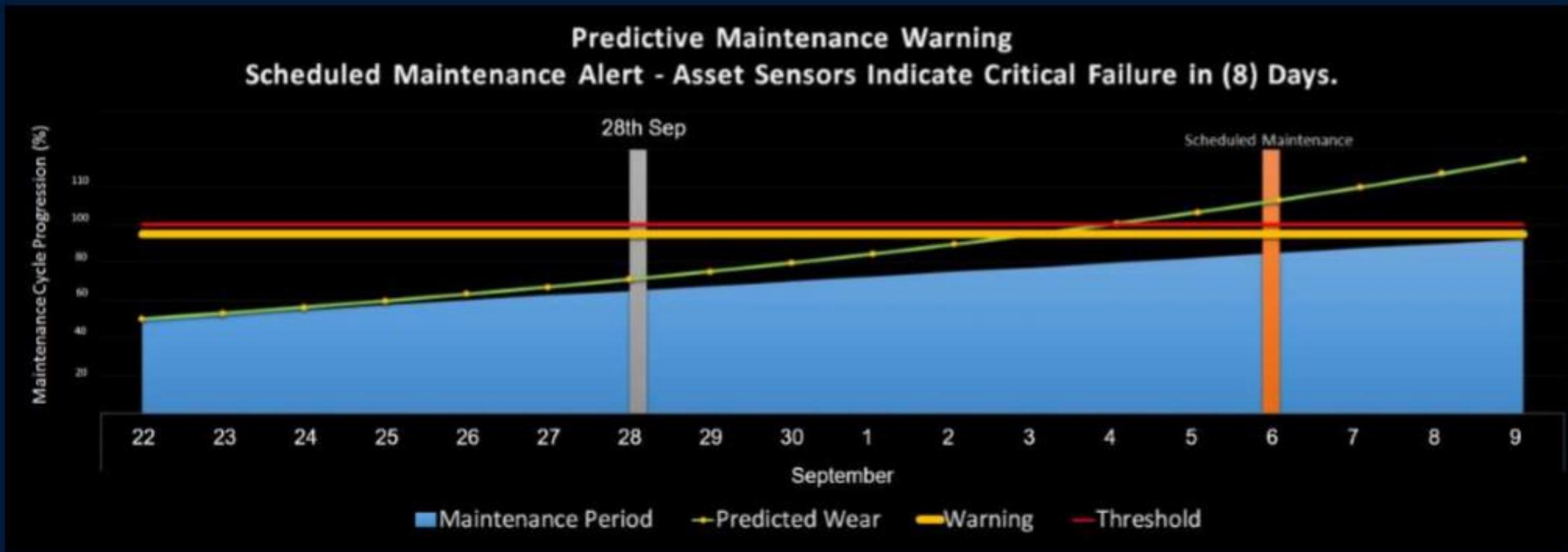


Asset
Management



Predictive
Maintenance

Azure Machine Learning - predictive analytics



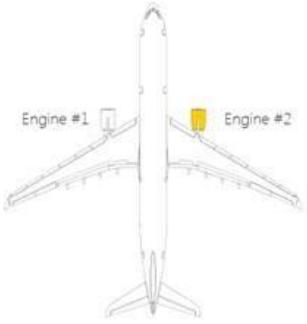
Empower with proactive analysis

Machine learning solutions allow for powerful predictive analytics solutions, leveraging historical data and real time device ingestion input.

Predictive Maintenance

Microsoft Azure IoT Suite

DASHBOARD



Engine #1 Engine #2

48
47
46

4:13:15 AM 4:13:30 AM 4:13:45 AM 4:14:00 AM

Engine 1 Engine 2

Sensor 14

9.00
8.50
8.00

4:13:15 AM 4:13:30 AM 4:13:45 AM 4:14:00 AM

Engine 1 Engine 2

Sensor 15

9.080
9.060
9.040

4:13:15 AM 4:13:30 AM 4:13:45 AM

Remaining Useful Life (RUL) IN CYCLES

217 ENGINE #1 149 ! ENGINE #2

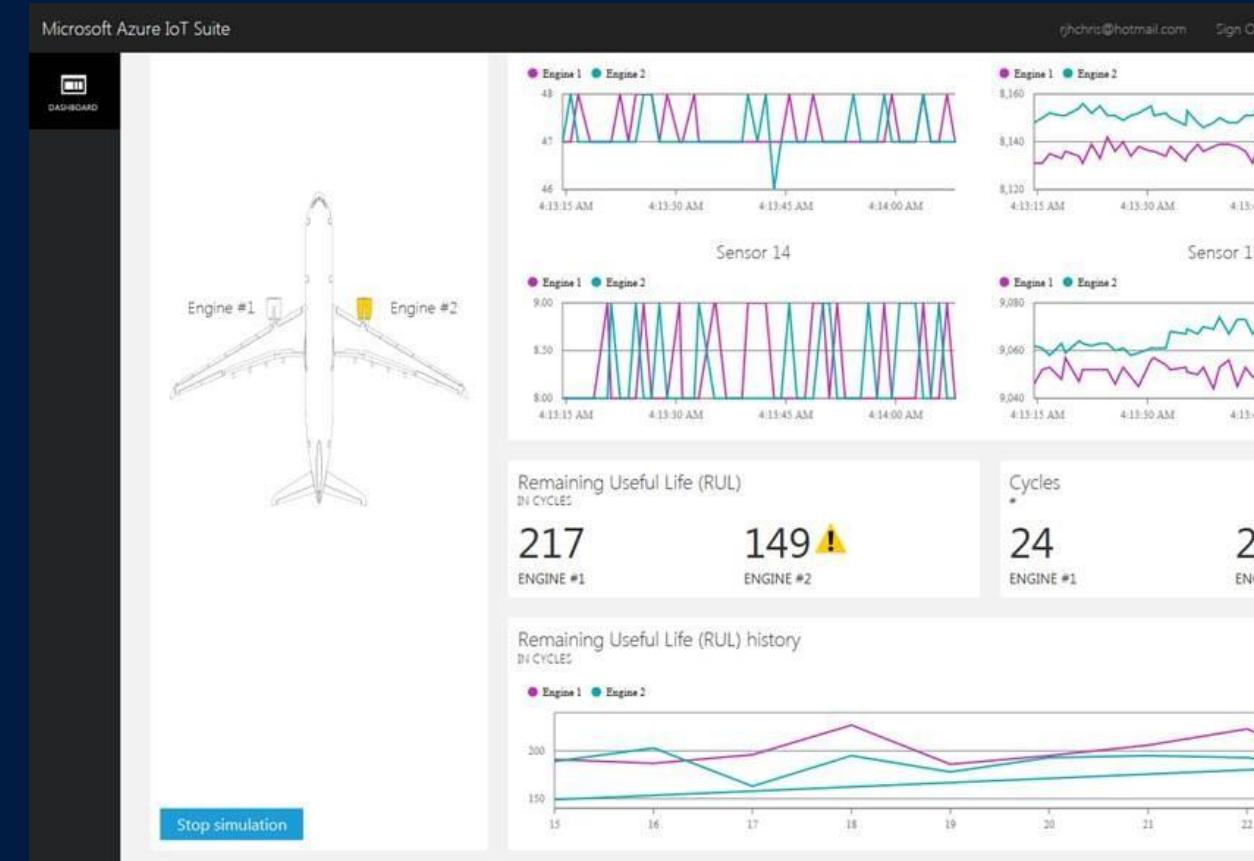
Cycles * 24 ENGINE #1 25 ENGINE #2

Remaining Useful Life (RUL) history IN CYCLES

200
150

15 16 17 18 19 20 21 22

Stop simulation



Microsoft Azure Machine Learning | Home Studio Gallery

MDSIoTPredictive

Properties

Experiment Properties

- START TIME 12/4/20...
- END TIME 12/4/20...
- STATUS CODE Finished
- STATUS DETAILS None

Summary

Enter a few sentences describing your experiment (up to 140 characters).

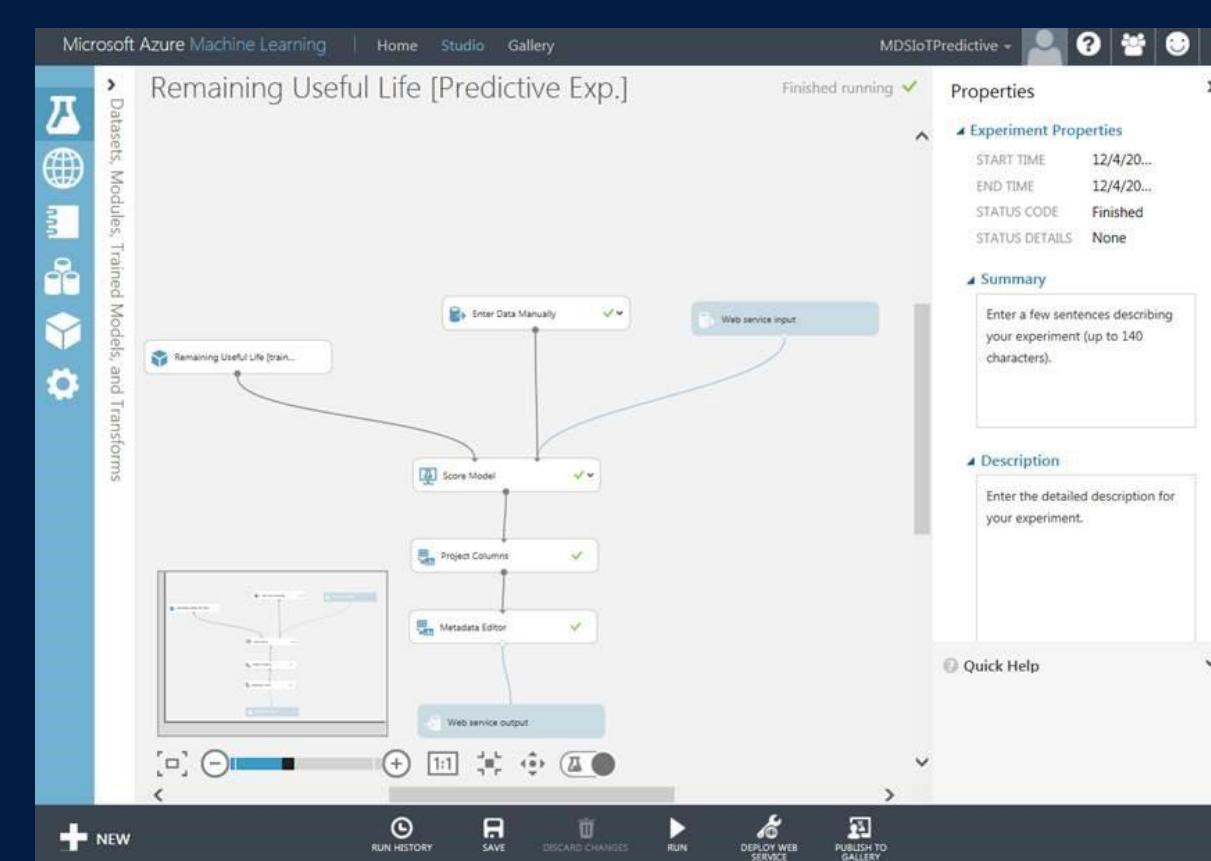
Description

Enter the detailed description for your experiment.

Remaining Useful Life [Predictive Exp.]

Finished running ✓

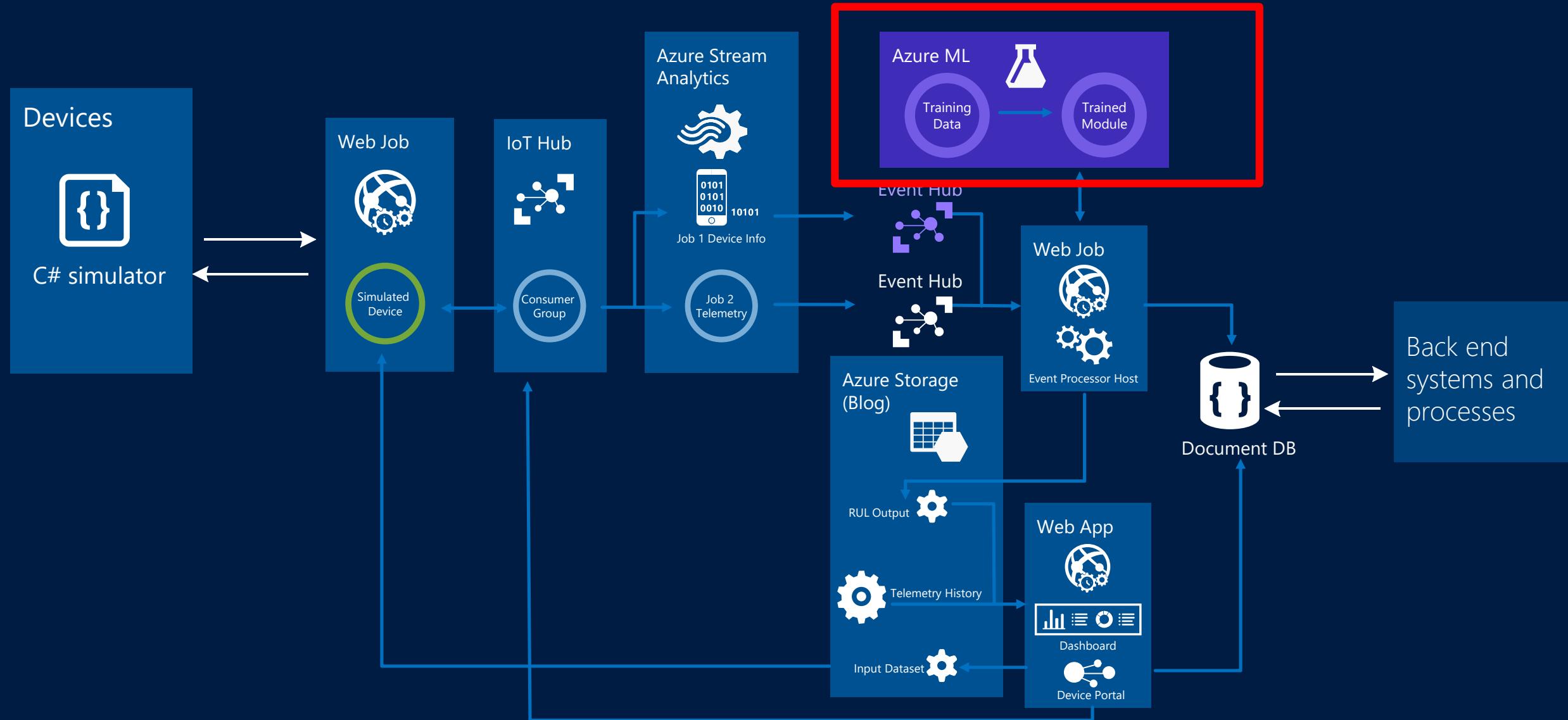
Datasets, Modules, Trained Models, and Transforms



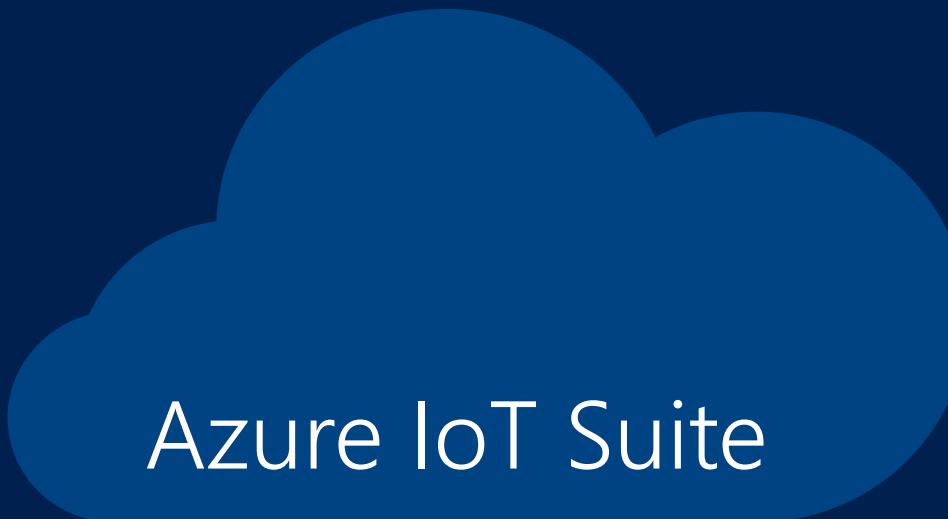
```
graph TD; A[Enter Data Manually] --> B[Score Model]; C[Project Columns] --> D[Metadata Editor]; D --> E[Web service output]
```

NEW RUN HISTORY SAVE DISCARD CHANGES RUN DEPLOY WEB SERVICE PUBLISH TO GALLERY

What you get with predictive maintenance solution



Introducing Azure IoT Suite



Azure IoT Suite

Get started at:

www.internetofyourthings.com

Comprehensive solution

Connect millions of devices and integrate your business systems with new insights to transform your business.

Accelerate time to value

Get started quickly with preconfigured solutions for common IoT scenarios.

Rich partner network

Leverage a worldwide ecosystem of experienced IoT partners to tailor IoT solutions to your needs.

Azure IoT Recent Innovations

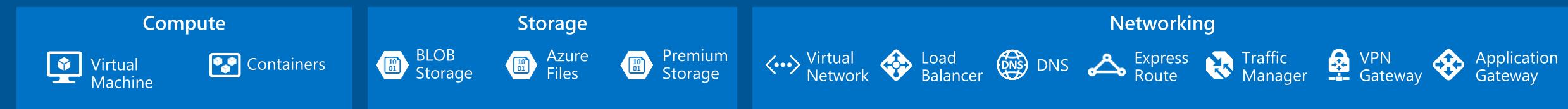
<p>Security Program for Azure IoT</p> 	<p>Azure IoT Hub Device Mgmt.</p> 	<p>Azure IoT Hub Device Provisioning</p> 	<p>Azure IoT Edge</p> 	<p>Microsoft IoT Central</p> 
<p>Matchmaking with IoT security auditors</p>	<p>Cross platform and fully extensible at scale</p>	<p>Cross platform and fully extensible at scale</p>	<p>Cross platform and open source</p>	<p>Fully managed and hosted IoT SaaS</p>
<p>Security Partnerships /DICE</p> 	<p>Azure IoT Hub message routing</p> 	<p>Azure IoT Suite connected factory</p> 	<p>Azure Stream Analytics for Edge</p> 	<p>Azure Time Series Insights</p> 
<p>Secure hardware attestation for constrained devices</p>	<p>Simple, powerful, declarative</p>	<p>Pre-configured Solution for Insights from OPC installations</p>	<p>Complex event processing on Azure IoT Gateway SDK</p>	<p>Fully managed Time Series Store and UX</p>

Microsoft Azure Certified for IoT

Platform Services



Infrastructure Services



Datacenter Infrastructure (24 regions, 19 online)



Heterogeneous Agent Library



SDK, agent libraries

Easily accessible libraries in GitHub

Cross platform support

Choose real time OS, platform and language

Device support

IP and access control capabilities

Connect IP, and non-IP devices

Support for direct connection devices and resource strained or non-IP devices via gateway and field protocols

Open source framework

Develop custom agents for your devices

Secure communication

Simple and secure D2C and C2D connectivity for messaging, device management and command and control.

OS support

RTOS, Linux, Windows, Android, iOS etc.

Agent support

Operating systems supported:

Debian Linux (v 7.5)

Fedora Linux (v 20)

mbed OS (v 2.0)

Raspbian Linux (v 3.18)

Ubuntu Linux (v 14.04)

Windows Desktop (7, 8, 10)

Windows IoT Core (v 10)

Windows Server (v 2012 R2)

Yocto Linux (v 2.1)

C Libraries supported:

Debian Linux (v 7.5) HTTPS, AMQP, MQTT

Fedora Linux (v 20) HTTPS, AMQP, MQTT

mbed OS (v 2.0) HTTPS, AMQP

Ubuntu Linux (v 14.04) HTTPS, AMQP, MQTT

Windows Desktop (7,8,10) HTTPS, AMQP, MQTT

Yocto Linux (v 2.1) HTTPS, AMQP

Node.js library:

Node.js (v 4.1.0) HTTPS

Java library:

Java (v 1.7/8) HTTPS, AMQP

C# libraries supported:

Windows Desktop (7,8,10) HTTPS, AMQP

Windows IoT Core (10) HTTPS

[Code](#)[Issues 13](#)[Pull requests 11](#)[Pulse](#)[Graphs](#)

SDks for a variety of languages and platforms that help connect devices to Microsoft Azure IoT services <http://azure.github.io/azure-iot-sdks/>

605 commits

8 branches

4 releases

31 contributors

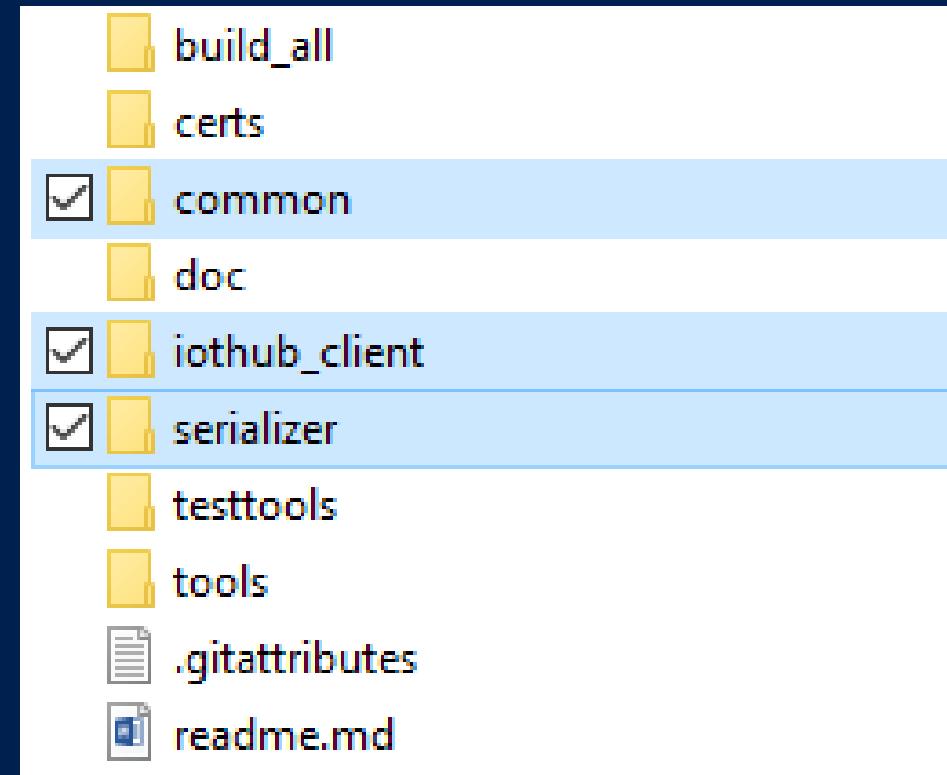
Branch: master ▾

[New pull request](#)[New file](#)[Find file](#)[HTTPS ▾](#)<https://github.com/Azure/az>[Download ZIP](#)

tameraw	Merge pull request #156 from dominicbetts/working-install simplify	...	Latest commit 192fe94 19 hours ago
build	bump iothub-explorer version (line ending problem in package)		9 days ago
c	Merge branch 'master' into develop		18 days ago
csharp	Merge pull request #156 from dominicbetts/working-install simplify		19 hours ago
doc	Add note about installing CMake to FAQ. See issue #147		8 days ago
java	Merge pull request #136 from dominicbetts/working-docissues		15 days ago
media/add_requirement	Add requirements creation workflow and big changes guidance to contr...		2 months ago
node	Release v20151113		18 days ago
tools	Update provision_device.md in response to issue #140		8 days ago
.gitattributes	Azure IoT SDks		2 months ago

Azure IoT device SDK for C

- ▶ ANSI C (C99) to maximize portability
- ▶ Send event data to Azure IoT Hub
- ▶ Maps server commands to device functions
- ▶ Batched messages to improve efficiency
- ▶ HTTPS, AMQP, MQTT
- ▶ JSON Serialization



Azure IoT device SDK for C

Common

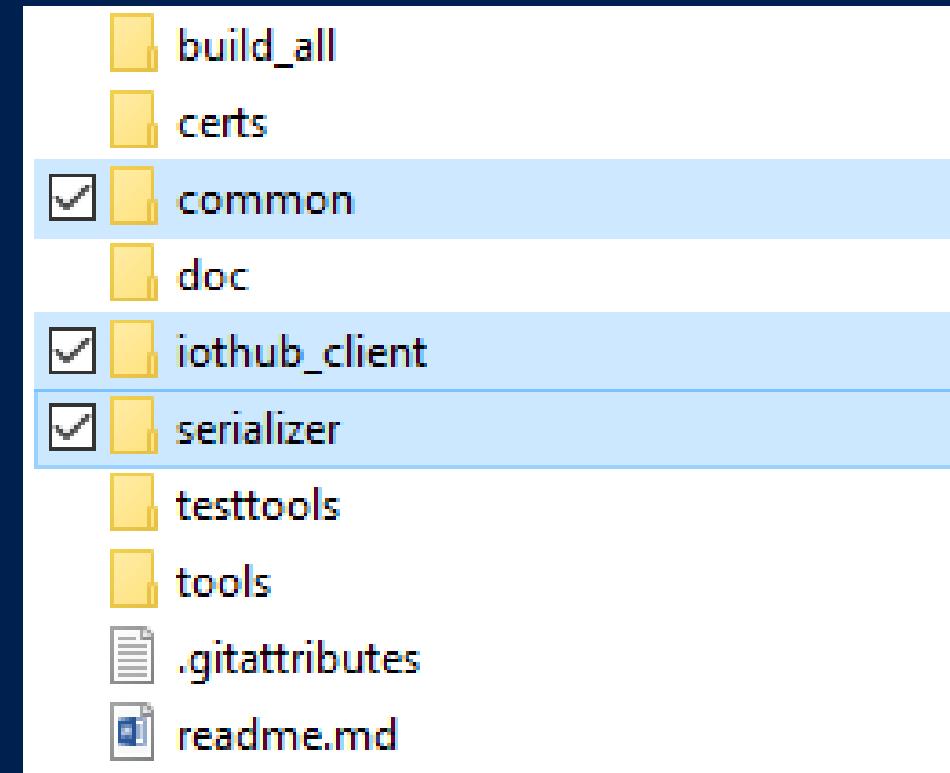
- ▶ Components

IoThub_Client

- ▶ Raw message capabilities

Serializer

- ▶ Modeling and JSON Serialization



Microsoft Azure Certified for IoT Details

New program

- ▶ Designed to help you find a device partner for your IoT project
- ▶ Device partners will deliver Azure IoT Suite tested, certified hardware, platforms and services as part of the program

Azure Certified for IoT available on 9/29

Texas Instruments

Intel Edison

Freescale FRDM K64

Resin.io

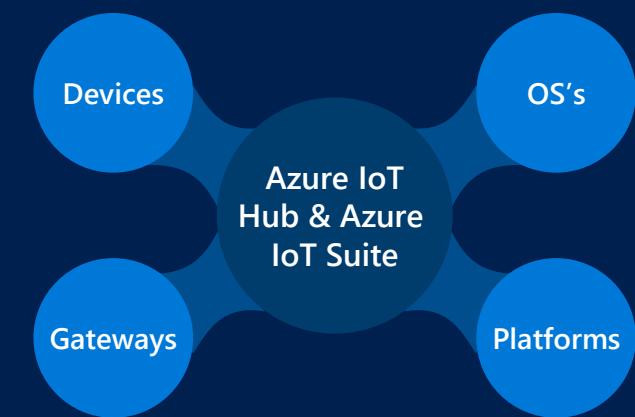
Arrow

Beaglebone Black

Seeed

Raspberry Pi 2

Minnowboard max

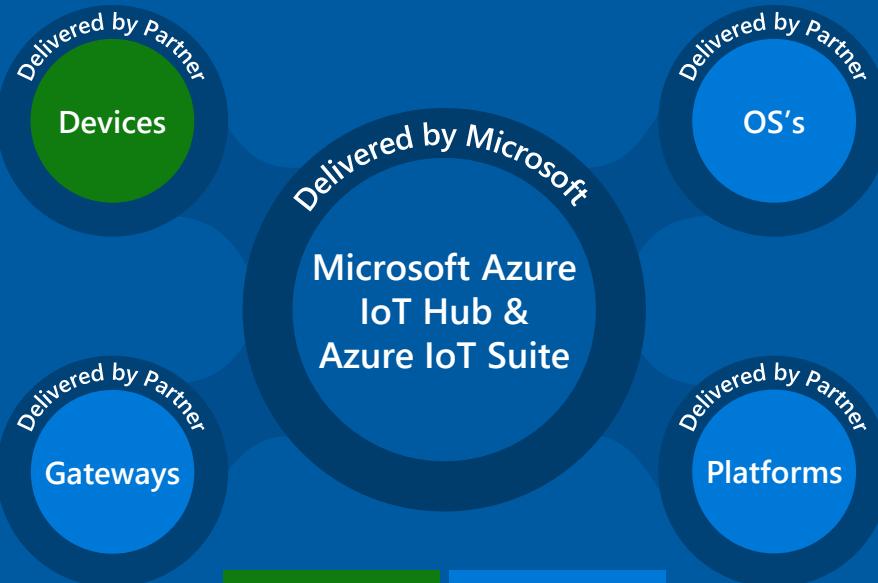


Introducing Microsoft Azure Certified for IoT

Capitalize on IoT opportunities by getting certified

Program overview

- Showcases partners with pre-tested offerings that easily connect to Microsoft Azure IoT solutions
- Guides businesses to partners who can help jumpstart IoT projects



Why certify?



Extend your reach to new customers

Differentiate your offering, build customer confidence and expand your customer base



Get certified with ease

Rapidly certify with a step-by-step test framework and tools provided by Microsoft



Work with a leader in IoT

Market your IoT offerings with Microsoft, and join an industry-leading IoT ecosystem

How the program works

Get certified – Partner requirements

- Choose the OS platform and programming language(s)
- Run Microsoft Azure IoT SDK's successfully
- Provide:
 - Packaging for agent installation
 - An example using your device with Azure IoT

Certification process



Get results – Partner benefits



PR opportunities



Logo featured on
Microsoft sites



Exclusive Azure
Certified Badge

- Rapid program enrollment
- Company logo showcased on Microsoft websites
- Joint PR such as press releases and blog posts
- Opportunity to request Microsoft executive quotes
- Azure Certified badge

Strong Partner Ecosystem



For developers and architects

Value of the Microsoft Azure Certified for IoT program

Jumpstart your IoT projects with confidence

when you use pre-tested device and platform combinations that easily connect with Microsoft Azure IoT offerings.

Spend less time testing device compatibility,
and start today with trusted devices that are
certified as compatible with the Microsoft Azure
IoT Suite and Azure IoT Hub.

→ Find details on these and other certified devices
at Azure.com/iotdev

Intel Edison



Arrow DragonBoard 410c



Texas Instruments CC3200



Freescale FRDM-K64F



BeagleBone Green



BeagleBone Black



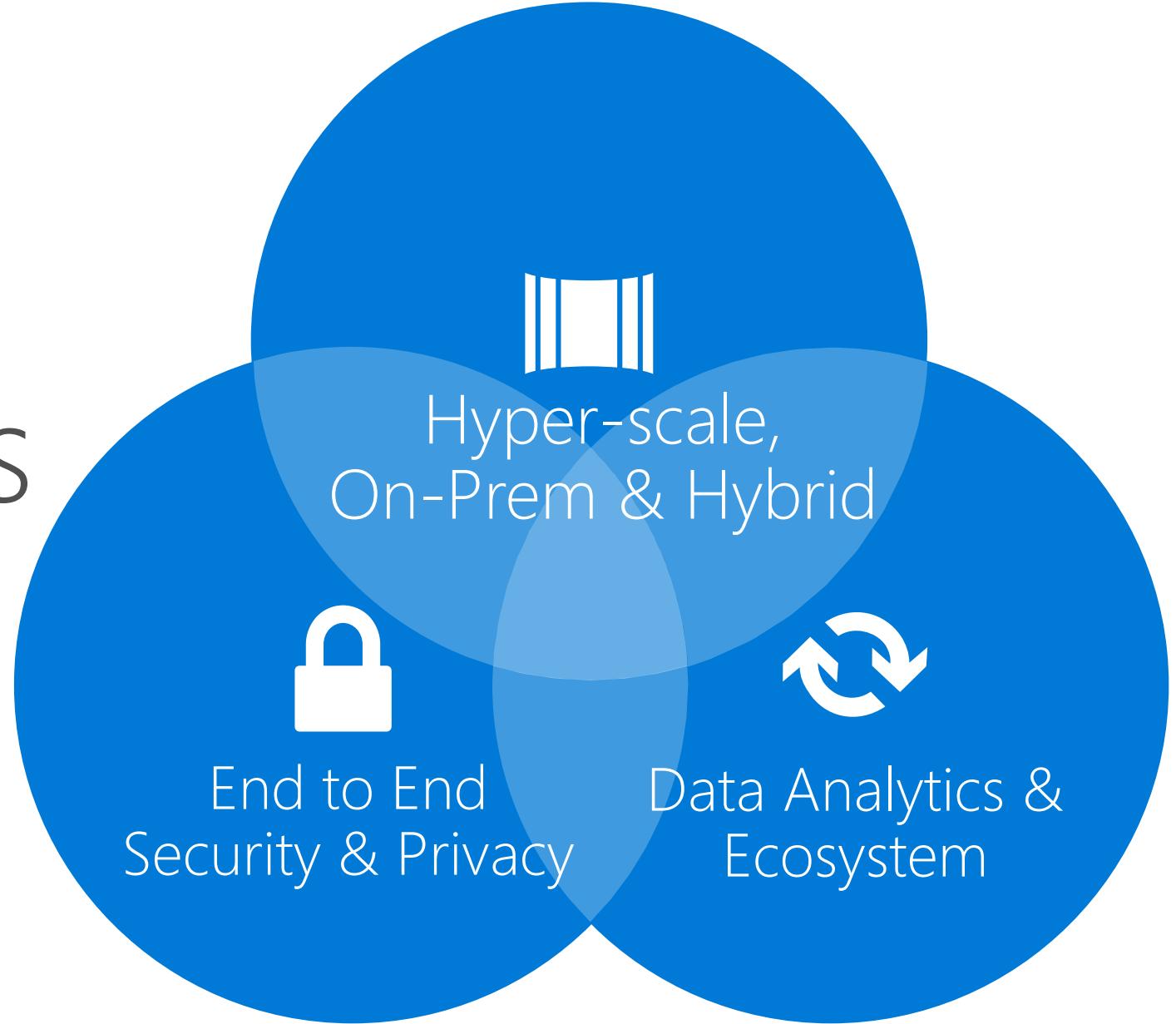
Raspberry Pi 2



MinnowBoard MAX



How Microsoft differentiates with Azure IoT



Visit www.InternetOfYourThings.com
to get started