

WinHEC
2018

Azure IoT and Intelligent Edge Devices

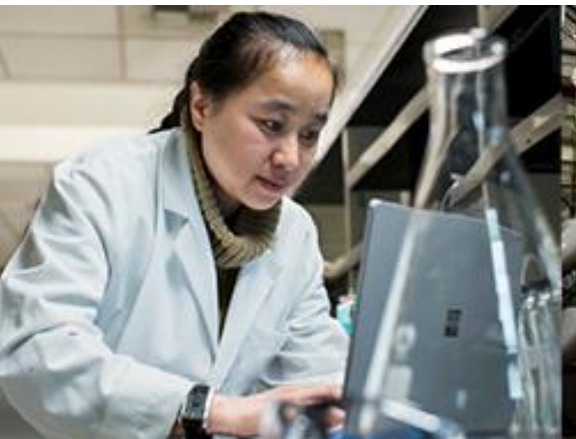
Koichi Hirao, Azure IoT S. PM
Xumin Sun, Win IoT S. PM



MICROSOFT WILL INVEST \$5 BILLION IN IoT

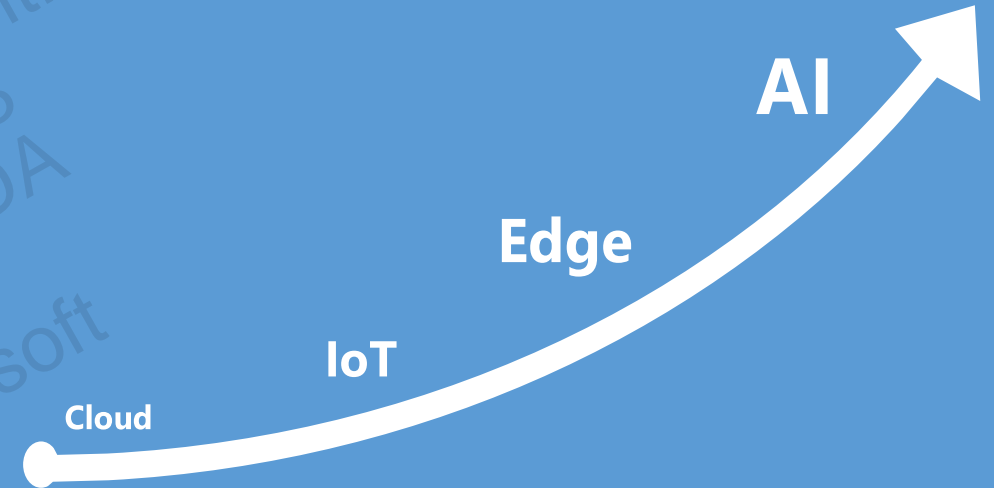


Our goal is to give every customer the ability to transform their businesses, and the world at large, with connected solutions

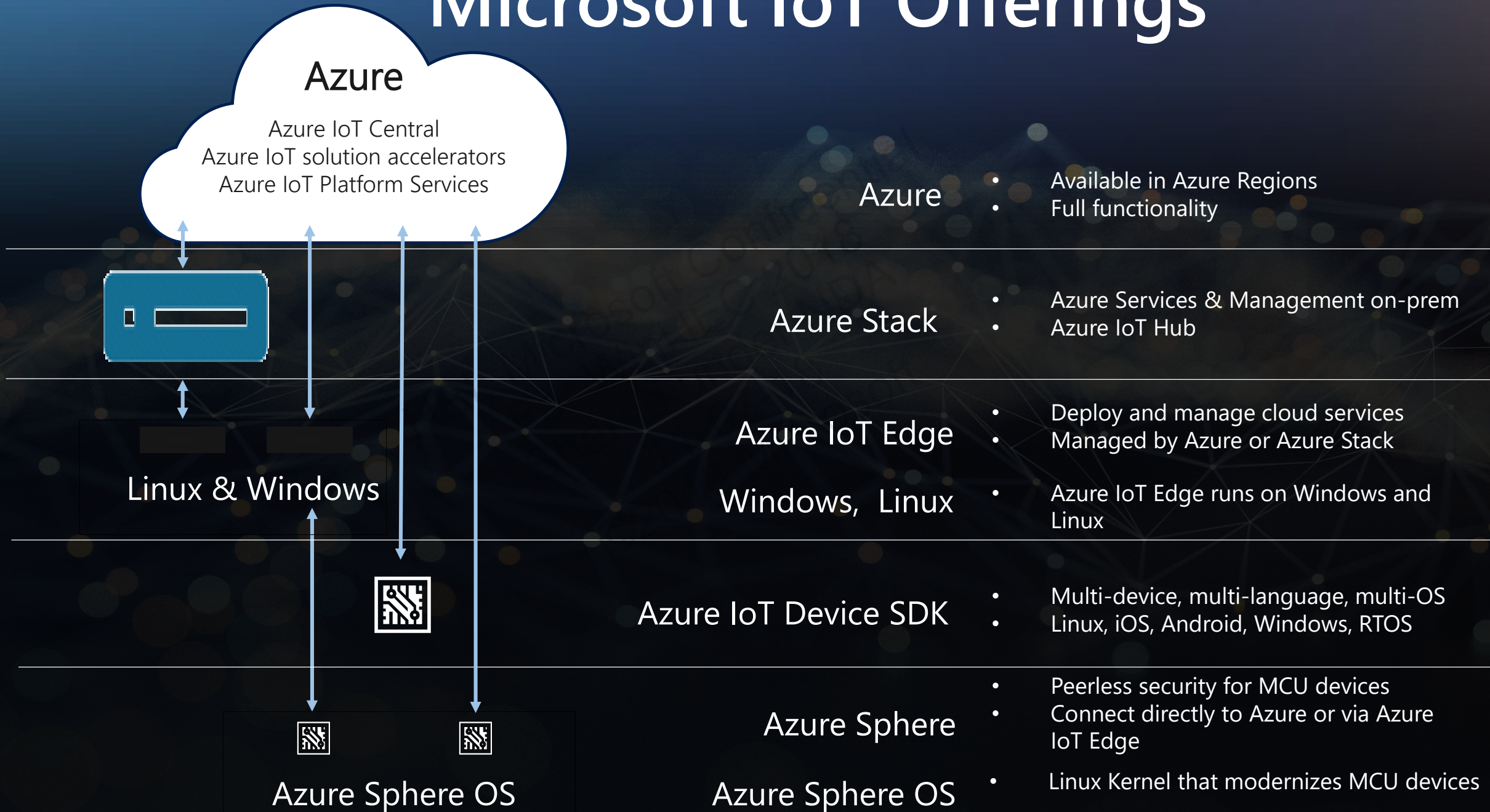


Waves of Innovation

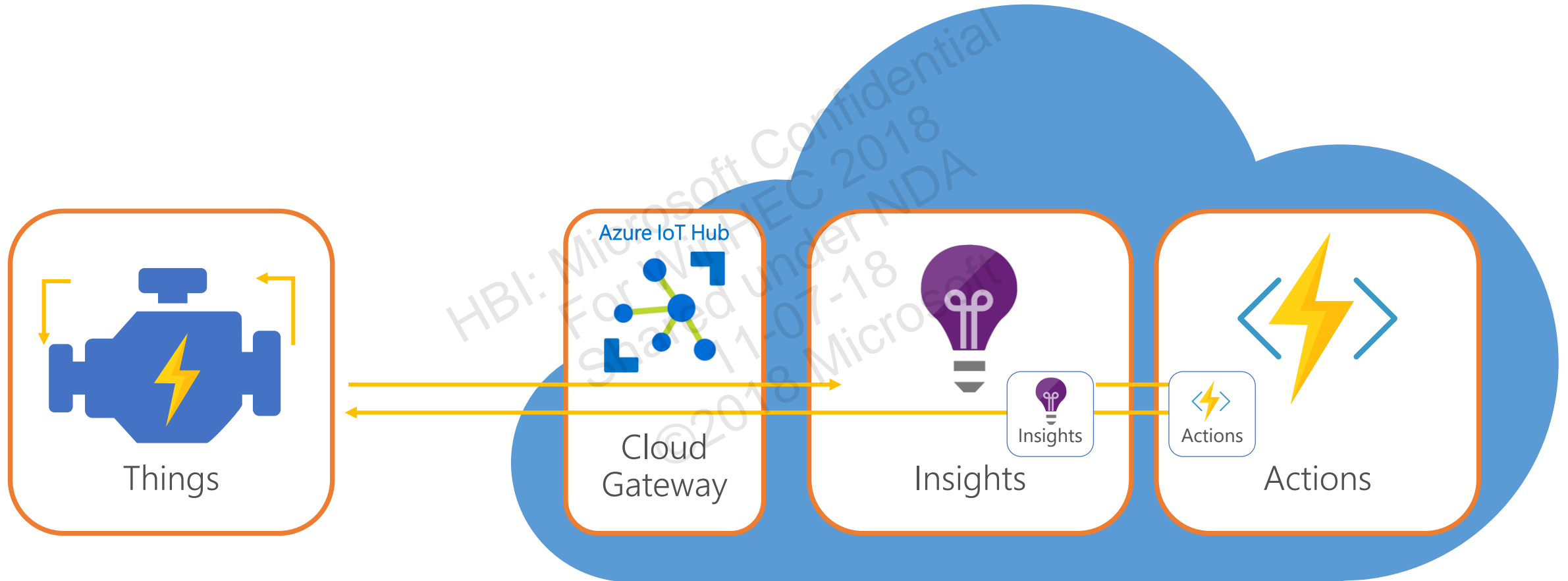
- Cloud
 - Globally available, unlimited compute resources
- IoT
 - Harnessing signals from sensors and devices, managed centrally by the cloud
- Edge
 - Intelligence offloaded from the cloud to IoT devices
- AI
 - Breakthrough intelligence capabilities, in the cloud and on the edge



Microsoft IoT Offerings



IoT application Pattern + Edge



Azure IoT Edge

OPEN

Open source Azure IoT Edge

Container approach

Ecosystem of edge hardware
and software marketplace

SECURE

Run IoT Edge in the cloud or
on-premise

Secure solution from chipset to
cloud

Enterprise-grade scalability

INTELLIGENT

AI and analytics modules easily
deployed via runtime

Purpose-built hardware for
advanced processing

DJI M210 with Nvidia TX2 **payload** running Azure IoT Edge



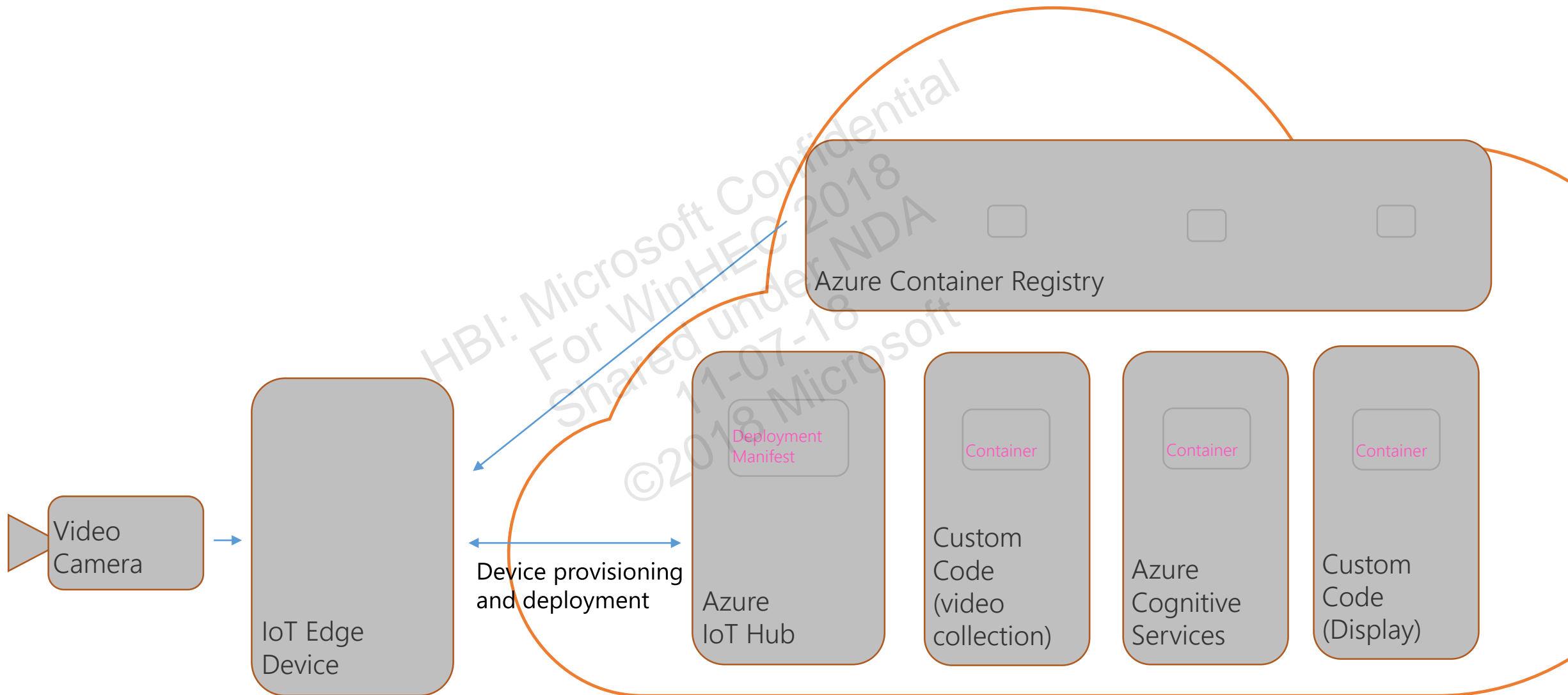
Azure IoT Edge Scenario

- Scenario: Deploy and manage at scale



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Azure IoT Edge Deployment



What's new with Azure IoT Edge

Extended Offline (Preview)

Third party Edge modules in Azure Marketplace (GA)

New Azure Blob storage module (GA)

Tooling – support for Visual Studio and more (Preview)

OpenVino (from Intel) tools for IoT Edge

Azure IoT Edge – GA For Windows

Coming soon

Closing the gaps

Windows 10 IoT Core & Enterprise, Windows Server

Intelligent Edge Scenarios

- Edge device as a gateway
 - Transparent gateway
 - Protocol translation
 - Identity translation
- Local compute to find insights at the edge
 - Filter data
 - Deploy event processing
 - ML
 - Image recognition
 - Other high value AI
- Bring intelligence to Local Storage
 - Blob Storage
 - SQL
 - SQLite

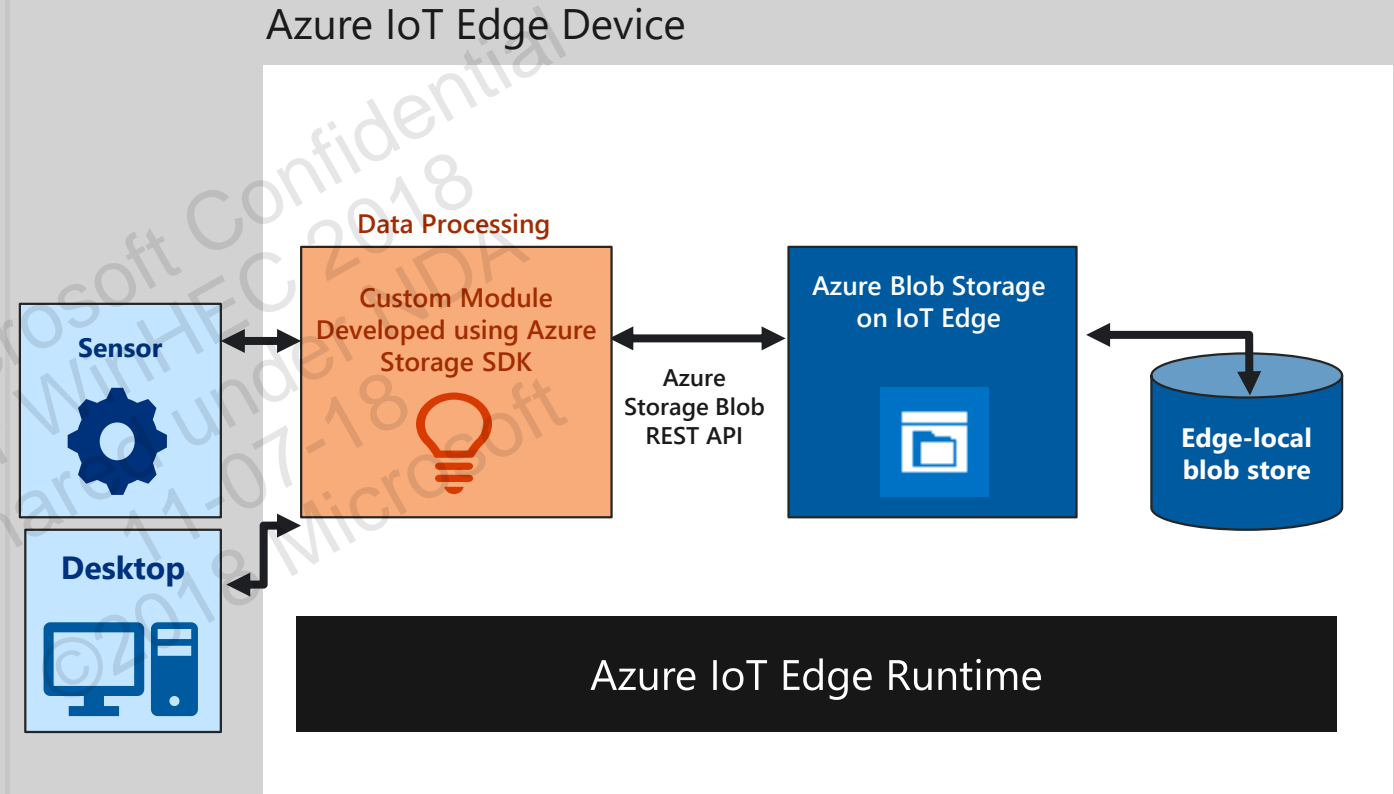
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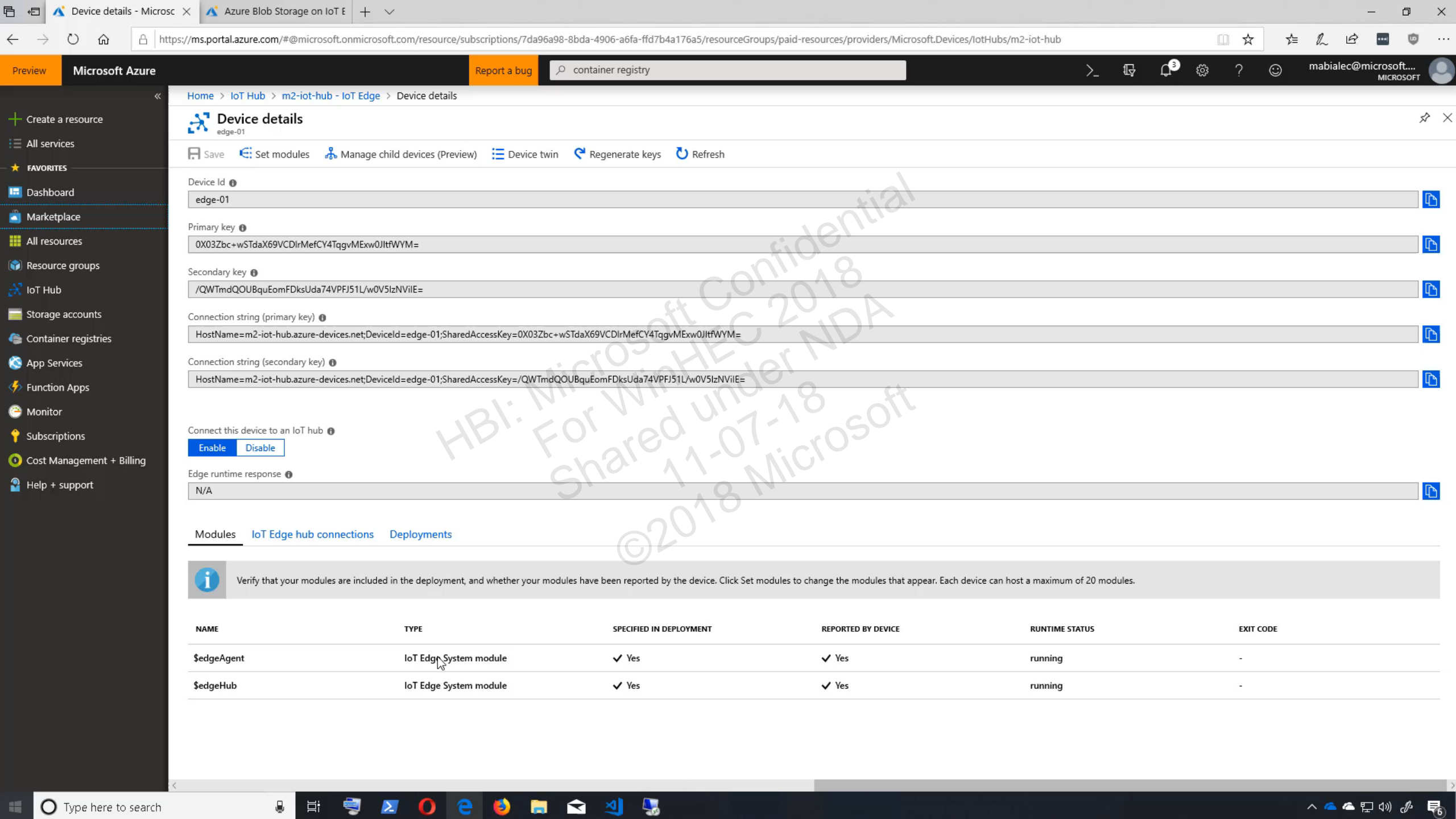
Blob Storage module Overview

Azure Blob Storage on IoT Edge is a light-weight Azure consistent module which provides local block blob storage

Developers can use Azure Storage SDK to access block blobs at the edge

[Aka.ms/AzureBlobStorage-IoTModule](https://aka.ms/AzureBlobStorage-IoTModule)





Device details edge-01

Save Set modules Manage child devices (Preview) Device twin Regenerate keys Refresh

Device Id 📄
edge-01

Primary key 📄
0X03Zbc+wSTdaX69VCDlrMefCY4TqgvMExw0JltfWYM=

Secondary key 📄
/QWTmdQOUBquEomFDksUda74VPFJ51L/w0V5lzNVilE=

Connection string (primary key) 📄
HostName=m2-iot-hub.azure-devices.net;DeviceId=edge-01;SharedAccessKey=0X03Zbc+wSTdaX69VCDlrMefCY4TqgvMExw0JltfWYM=

Connection string (secondary key) 📄
HostName=m2-iot-hub.azure-devices.net;DeviceId=edge-01;SharedAccessKey=/QWTmdQOUBquEomFDksUda74VPFJ51L/w0V5lzNVilE=

Connect this device to an IoT hub 📄

Enable Disable

Edge runtime response 📄
N/A

Modules IoT Edge hub connections Deployments

📄 Verify that your modules are included in the deployment, and whether your modules have been reported by the device. Click Set modules to change the modules that appear. Each device can host a maximum of 20 modules.

NAME	TYPE	SPECIFIED IN DEPLOYMENT	REPORTED BY DEVICE	RUNTIME STATUS	EXIT CODE
\$edgeAgent	IoT Edge System module	✓ Yes	✓ Yes	running	-
\$edgeHub	IoT Edge System module	✓ Yes	✓ Yes	running	-

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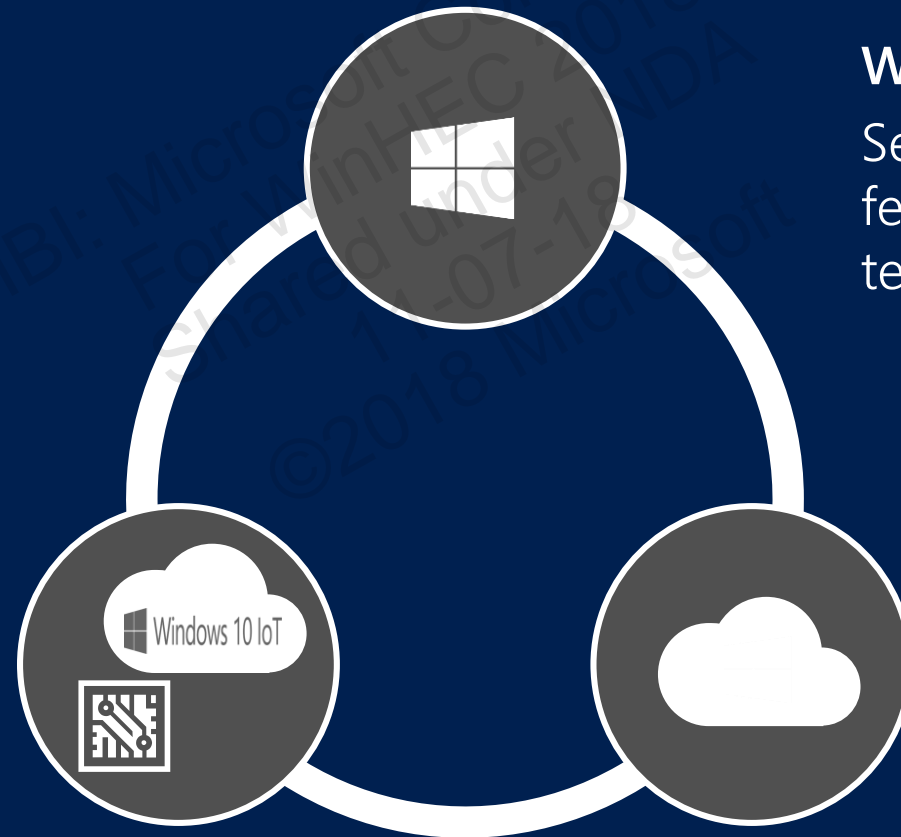
Why Windows 10 IoT with Azure

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, manageable, full-
featured IoT OS with long-
term support

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



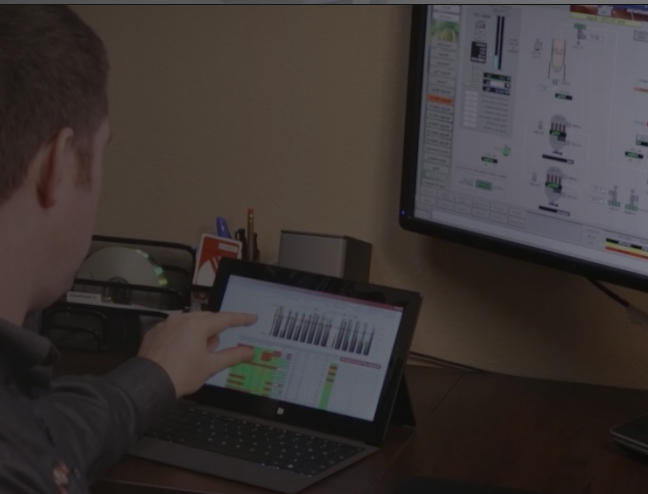
**Windows Update +
Device Update Center**
Keeps devices secure,
giving full control to the
device maker

Windows 10 IoT edition comparison highlights

	Windows 10 IoT Core	Windows 10 IoT Enterprise*
User experience	Single UWP app active in foreground at one time with supporting background apps & services	Traditional Windows shell with advanced lockdown features
Headless supported	Yes	Yes
App architecture supported	UWP	UWP & Win32
Cortana	Cortana SDK	Yes
Management	Azure IoT DM, Intune, MDM & DUC	Azure IoT DM, Intune, MDM & traditional agent-based (e.g. SCCM)
Device security technologies	TPM, Secure Boot, BitLocker, Device Guard, Device Health Attestation	TPM, Secure Boot, BitLocker, Device Guard, Device Health Attestation, Windows Advanced Threat Protection
CPU architecture support	x86, x64 & ARM	x86 & x64
System resources	512MB RAM + 2GB storage	1GB RAM + 16GB storage**
Licensing	Online licensing terms agreement and embedded OEM agreements, subscription	Direct and indirect embedded OEM agreements
Usage scenarios	<ul style="list-style-type: none"> Digital signage & kiosks IoT gateway Manufacturing devices 	<ul style="list-style-type: none"> Small medical devices Wearables Smart building

Primary Migration Path





Windows 10 IoT Core 1809 highlights

- 10 years of support available for IoT Core and IoT Enterprise via the **Long Term Servicing Channel (LTSC)**
- IoT Core support for **NXP i.MX 6/7/8M**
- Windows IoT **Core Services** – a subscription service for support, servicing and security
 - 10 years of LTSC support, otherwise supported via SAC
 - Device Update Center for securely servicing devices
 - Device Health Attestation for increased device security
- **Azure IoT Edge** support to move cloud computing to the Intelligent Edge

NXP + Windows 10 now available

Windows 10 IoT Core on several i.MX6/7/8M SoCs

Hundreds of evaluations in progress

Unique security capabilities like trusted I/O

Commercial release end of 2018

Get started today – <http://aka.ms/iotnxp>

Windows+ Azure Certified i.MX 6 & i.MX7 Reference Boards & Contacts

- Aaeon PICO-IMX6

- David Hung (DavidHung@aaeon.com.tw)



- Keith & Koep [pConXS](#) with [Trizeps VII](#)

- Charalampos Tzintziras
(tzintziras@keith-koep.com)



- Advantech [RSB-4411](#)

- Renee Chiang
(Renee.Chiang@advantech.com.tw)
- Winnie Weng
(Winnie.weng@advantech.com.tw)



- SolidRun [HummingBoard Edge](#)

- Ilya Viten (ilya@solid-run.com)
- Systems with Windows 10 pre-installed available



- Kontron [SMARC-sAMX6i](#)

- Martin Unverdorben
(martin.unverdorben@kontron.com)



Additional devices under development

Windows+ Azure Certified i.MX 6 & i.MX7 Reference Boards & Contacts – Pending Certification

- Compulab [IoT-Gate](#)

- Igor Vaisbein (igor@compulab.co.il)



- VIA [VAB-820](#)

- Mike Fox (MichaelFox@via.com.tw)
- Dream Ku (DreakKu@via.com.tw)



- Geniatech [SoM-iMX6Q-Q7](#)

- Mike Decker (mike.decker@geniatech.com)
- Fang Jijun (Fjj@geniatech.com)



- PHYTEC [phyBOARD-i.MX7-Zeta](#)

- Brad Dodson (sales@phytec.com)



- Geniatech [SoM-iMX7D](#)

- Mike Decker (mike.decker@geniatech.com)
- Fang Jijun (Fjj@geniatech.com)



- Ka-Ro [TX6UL, TX6S, TX6DL & TX6Q](#)



Additional devices under development

Introducing Windows 10 IoT Core Services

Commercialize your project with enterprise-grade security and support



Updates

- Take control of Windows updates with cloud-based **IoT Core Device Update Center (DUC)**
- Manage updates for OS, apps, settings, and OEM-specific files from the cloud
- Distributed over same global CDN used by Windows Update



Security

- Help ensure the safety of your network and devices with cloud-based **Device Health Attestation (DHA)**
- Backed by the **same security research team and validation process** used by 500M Windows 10 devices
- Leverage hardware and cloud services to provide tamper proofing and remote attestation of device health



Support

- Count on stable systems with **10 years of LTSC (Long Term Servicing Channel) support** with security updates only (no new features) Access to monthly published Windows IoT Core packages
- Official Microsoft Lifecycle Support statement - links to software license agreement
- Access to monthly published Windows IoT Core packages for **building fully patched images** with OEM tools

Windows 10 IoT Enterprise: Assigned Access Overview

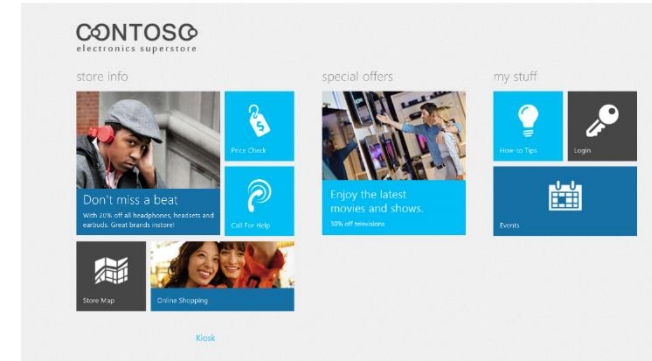
More manageable, more locked down

Single app kiosk experience

Restrict the user experience to a single universal windows application.

Examples:

- Digital signage
- Interactive display
- ATM, POS, Healthcare



Multi-app kiosk experience

Restrict the user experience to a curated set of applications.

Examples:

- Interactive kiosk
- Tablets used by store employees for business operation



Windows 10 IoT Long Term Support Silicon

• Windows 10 IoT Enterprise

- AMD® 6th Generation Processors Series Ax-8xxx & E-Series Ex-8xxx & FX-870K
- AMD® 7th Generation Processors Series Ax-9xxx & E-Series Ex-9xxx & FX-9xxx
- AMD® Ryzen™ 3/5/7 1xxx
- AMD® Ryzen™ 3/5/7 2xxx
- AMD® G-Series, R-Series
- AMD® V1xxx
- 4th 5th 6th 7th 8th Generation Intel® Core™ Processors
- Intel® Atom™ processor E3900 series
- Intel® Atom™ x5-E8000 Processor
- Intel® Atom™ x5-Z8350 Processor
- Intel® Atom™ Processor E3800 Product Family
- Intel® Pentium® and Celeron® Processor N and J Series

• Windows 10 IoT Core

- Broadcom® 2836 (Raspberry Pi 2)
- Broadcom® 2837 (Raspberry Pi 3)
- Intel® Atom™ processor E3900 series
- Intel® Atom™ x5-E8000 Processor
- Intel® Atom™ x5-Z8350 Processor
- Intel® Atom™ Processor E3800 Product Family
- Intel® Pentium® and Celeron® Processor N and J Series
- NXP® i.MX 6QuadPlus, 6Quad, 6DualPlus, 6Dual, 6DualLite
- NXP® i.MX 6SoloX, 6SoloLite, 6ULL
- NXP® i.MX 7Solo
- NXP® i.MX 7ULP
- NXP® i.MX 8M Family
- Qualcomm® Snapdragon™ 410E

Windows Server as Intelligent Edge OS

- High availability
- High security
- ML
- Windows Admin Center
 - Completely integrated with Azure
 - System Insights
- Azure IoT Edge
 - Azure Blob Storage on the Edge accelerates edge-local processing like local video analytics
 - SQL, SQLite
- Edge HCI





Demo Time!





System Insights



System Insights

PREVIEW ⓘ

 Invoke  Settings  Enable  Disable

Capability name ↑	State	Status	Status description
CPU capacity forecasting	Enabled	 Ok	CPU usage is forecasted to remain within the available capacity.
Networking capacity forecasting	Enabled	 Ok	Network usage is forecasted to remain within the available capacity.
Total storage consumption forecasting	Enabled	 Ok	Disk usage is forecasted to remain within the available capacity.
Volume consumption forecasting	Enabled	 Critical	(E:) is forecasted to exceed available capacity in the next 7 days.

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- Tools
- Search Tools
- Certificates
- Devices
- Events
- Files
- Firewall
- Installed Apps
- Local Users & Groups
- Network
- PowerShell
- Processes
- Registry
- Remote Desktop
- Roles & Features
- Scheduled Tasks
- Services
- Storage
- Storage Migration Service
- Storage Replica
- System Insights**
- Updates
- Settings

System Insights PREVIEW ⓘ

Invoke Settings Enable Disable 4 items Search

Capability name ↑	State	Status	Status description	Last run
CPU capacity forecasting	Enabled	✓ Ok	CPU usage is forecasted to remain within the available capacity.	9/12/2018 3:00:00 PM
Networking capacity forecasting	Enabled	✓ Ok	Network usage is forecasted to remain within the available capacity.	9/12/2018 2:26:29 PM
Total storage consumption forecasting	Enabled	✓ Ok	Disk usage is forecasted to remain within the available capacity.	9/12/2018 3:00:02 AM
Volume consumption forecasting	Enabled	! Critical	(E) is forecasted to exceed available capacity in the next 7 days.	9/12/2018 3:00:02 AM

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Calling AFS programmatically

Set-up

Initiate AFS

1. Determine which volume reported a critical status
2. Securely authenticate to Azure
3. Define all sync variables
4. Create the sync group and cloud endpoint
5. Create the server endpoint for the critical volume

```
$RegisteredServer = Get-AzureRmStorageSyncServer -SubscriptionId $SubscriptionId
                -ResourceGroupName $ResourceGroupName -StorageSyncServiceName $StorageSyncName

# Step 4: Create the sync group and cloud endpoint
Function Create-Sync-Group-And-Cloud-Endpoint {
    New-AzureRmStorageSyncGroup -SyncGroupName $SyncGroupName
    -StorageSyncService $StorageSyncName

    # Get a storage account with desired name
    $StorageAccount = Get-AzureRmStorageAccount -ResourceGroupName $ResourceGroupName
    | Where-Object { $_.StorageAccountName -eq $StorageAccountName
    }

    # Get or create an Azure file share within the desired storage account
    $FileShare = Get-AzureStorageShare -Context $StorageAccount.Context | Where-Object {
        $_.Name -eq $FileShareName -and $_.IsSnapshot -eq $false
    }

    if ($FileShare -eq $null) {
        $FileShare = New-AzureStorageShare -Context $StorageAccount.Context
        -Name $FileShareName
    }

    # Create the cloud endpoint
    New-AzureRmStorageSyncCloudEndpoint
        -StorageSyncServiceName $StorageSyncName
        -SyncGroupName $SyncGroupName
        -StorageAccountResourceId $StorageAccount.Id
        -StorageAccountShareName $FileShare.Name

# Step 5: Create the sync group and cloud endpoint
Function Create-Server-Endpoint {
    $CloudTieringDesired = $true
```

Sync-Group-System-Insights-Volume-E

Sync group

Add cloud endpoint Add server endpoint Refresh Delete

1 cloud endpoints

AZURE FILE SHARE	PROVISIONING STATE	RESOURCE GROUP
file-share-insights-volume-e	✔	system-insights-ignite-rg

1 server endpoints

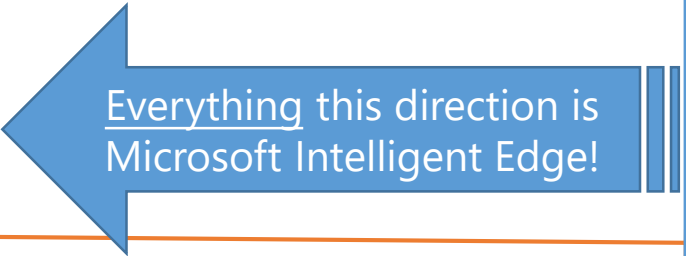
SERVER	HEALTH	FILES NOT SYNCING	SYNC ACTIVITY	PATH	CLOUD TIERING	LAST STATUS
gw-vm01.redmond.corp.microsoft.com	✔	0		E:\	Enabled	9/13/2018 7:30 AM

Canonical Intelligent Edge roles

Pattern#1

Data collection,
protocol bridging

("Complex")
IoT device



Power of
Intelligent Cloud



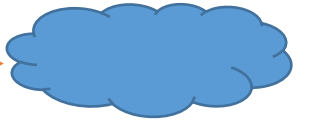
Pattern#2

Data collection

("Simple")
IoT device

Protocol bridging, pre-
processing/annotating

IoT Gateway



Pattern#3

Data collection

(Either) IoT
device

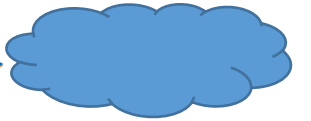
Protocol bridging, pre-
processing/annotating

IoT Gateway

Data buffering, Local
reactive, predictive &
cognitive analytics

Edge Server(s)

One or all these boxes are Optional*



Pattern#4

Data collection

(Either) IoT
device

Protocol bridging, pre-
processing/annotating

IoT Gateway

Data buffering, Local
reactive, predictive &
cognitive analytics

Edge Server(s)

One or all these boxes are Optional*

Broad range of cloud-
consistent PaaS services

Hybrid cloud



MS product offerings

<p>Azure Sphere, Windows IoT Core & IoT Enterprise</p>	<p>Windows IoT Enterprise (Azure IoT Edge), Windows Enterprise Client (Azure IoT Edge)</p>	<p>Windows Server (Azure IoT Edge), Azure Databox Edge</p>	<p>Azure Stack</p>	<p>Azure</p>
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Recap: Windows as Intelligent Edge OS

Commercialize your project with enterprise-grade security and support

Windows IoT Core

- SoC: Intel, Raspberry Pi, Qualcomm, **NXP**
- Small footprint: 512MB RAM+2G storage
- IoT Core Services
 - **DUC**
 - **LTSC**
- Security
- Machine Learning
- Azure IoT Edge

Windows IoT Enterprise

- SoC: Intel, AMD
- Windows 10 IoT Enterprise **LTSC** 1809
- Lockdown
 - **assigned access**
- Security
- Machine Learning
- Azure IoT Edge

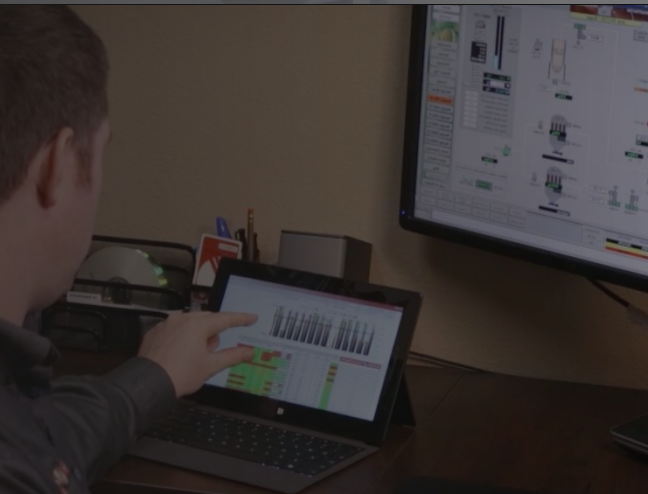
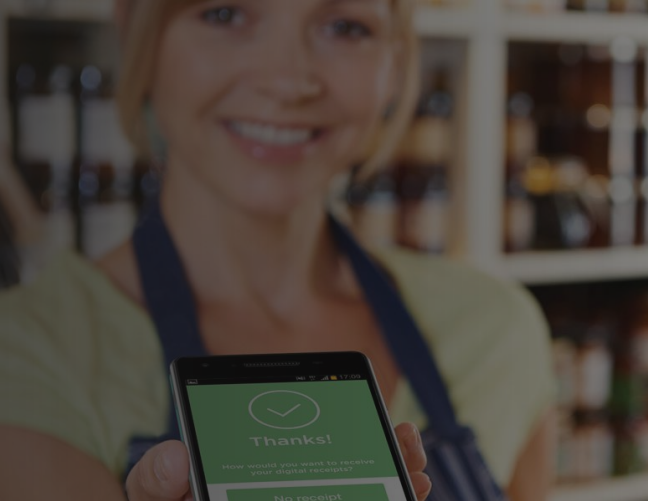
Windows Server

- SoC: Intel, AMD
- **Windows Server 2019**
- **Windows Admin Center**
 - **System insights**
 - Azure backup
- Security
- Machine Learning
- **High Availability**
- **Hyper Converged Infrastructure (HCI)**
- Azure IoT Edge

Call to Action

- Download and test Windows IoT, provide feedback
- Download and test Azure IoT Edge, provide feedback
- Start Azure IoT Edge certification process and get certified
- Plan and build Intelligent Edge devices
- Check out NXP on Windows IoT Core <https://aka.ms/iotnxp>
- Start planning Intelligent Edge capability on Windows Server

Contact us iotcertdisc@microsoft.com, EEAPIOTPartner@microsoft.com



Thank You!

