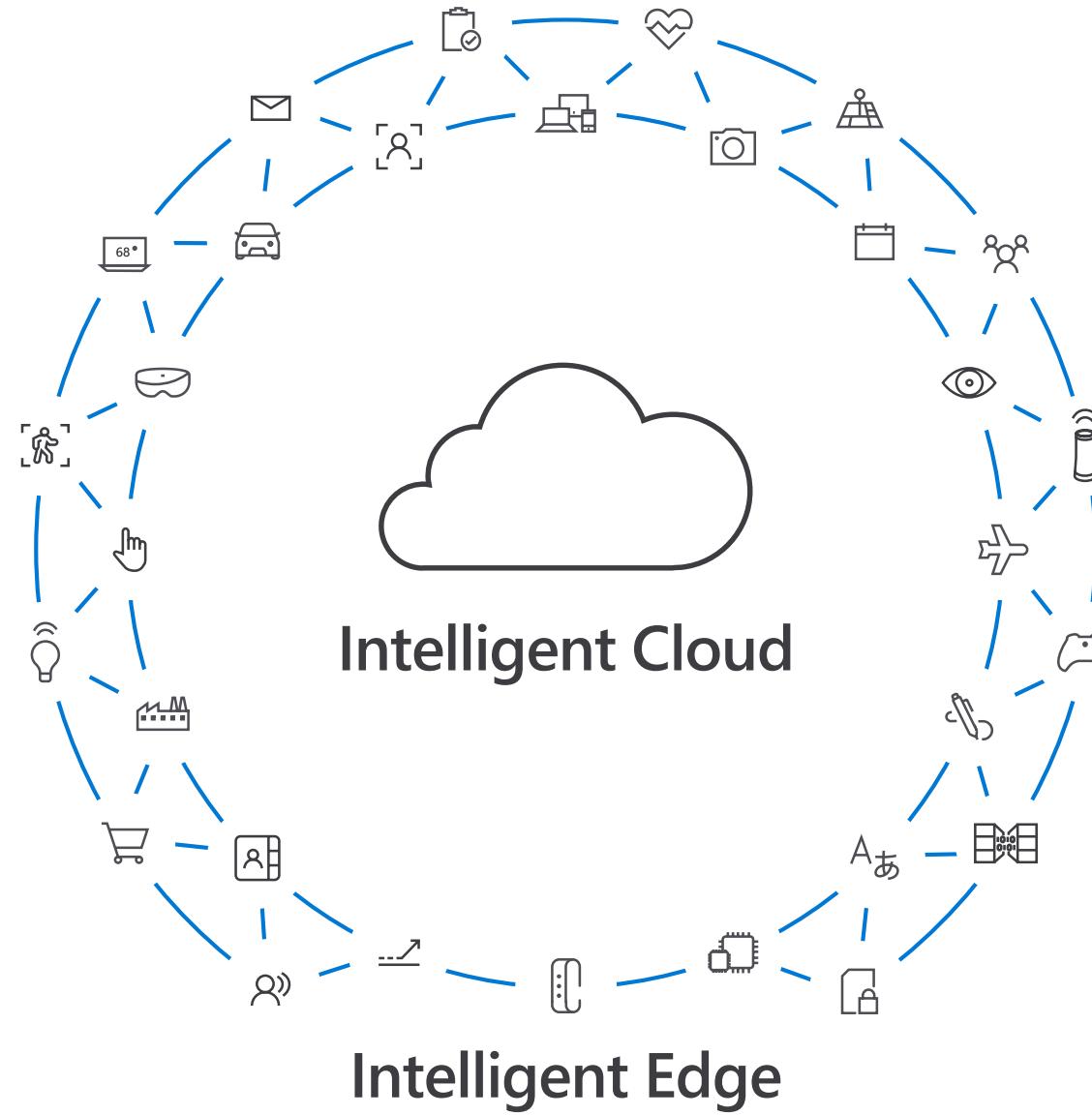


# Azure Stack / Databox Edge with IoT

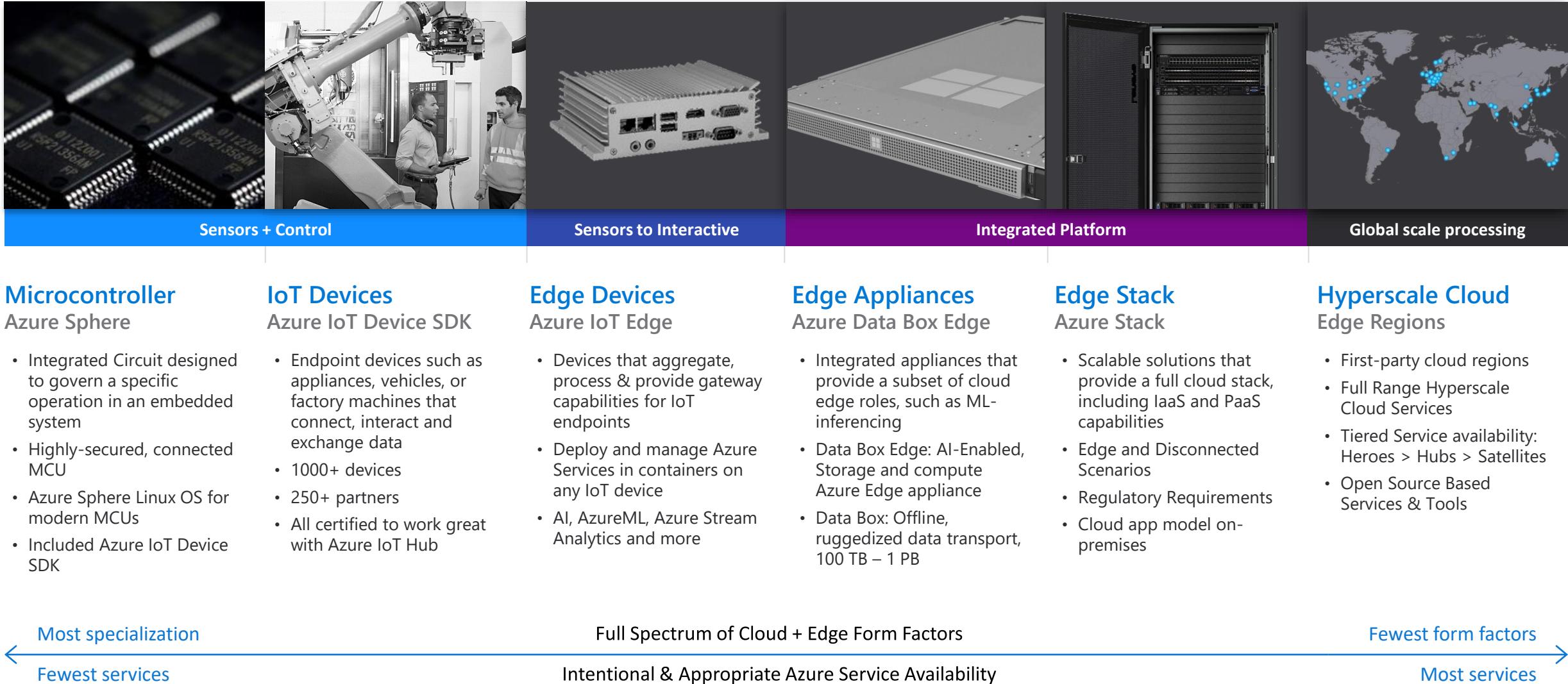
## Bringing Azure to the Edge

Alexander Ortha  
GBB Technical Specialist Edge Platform  
C+E Blackbelt Team  
Twitter [@AlexanderOrtha](https://twitter.com/AlexanderOrtha)  
Microsoft

# Enabling an Intelligent Cloud and Intelligent Edge



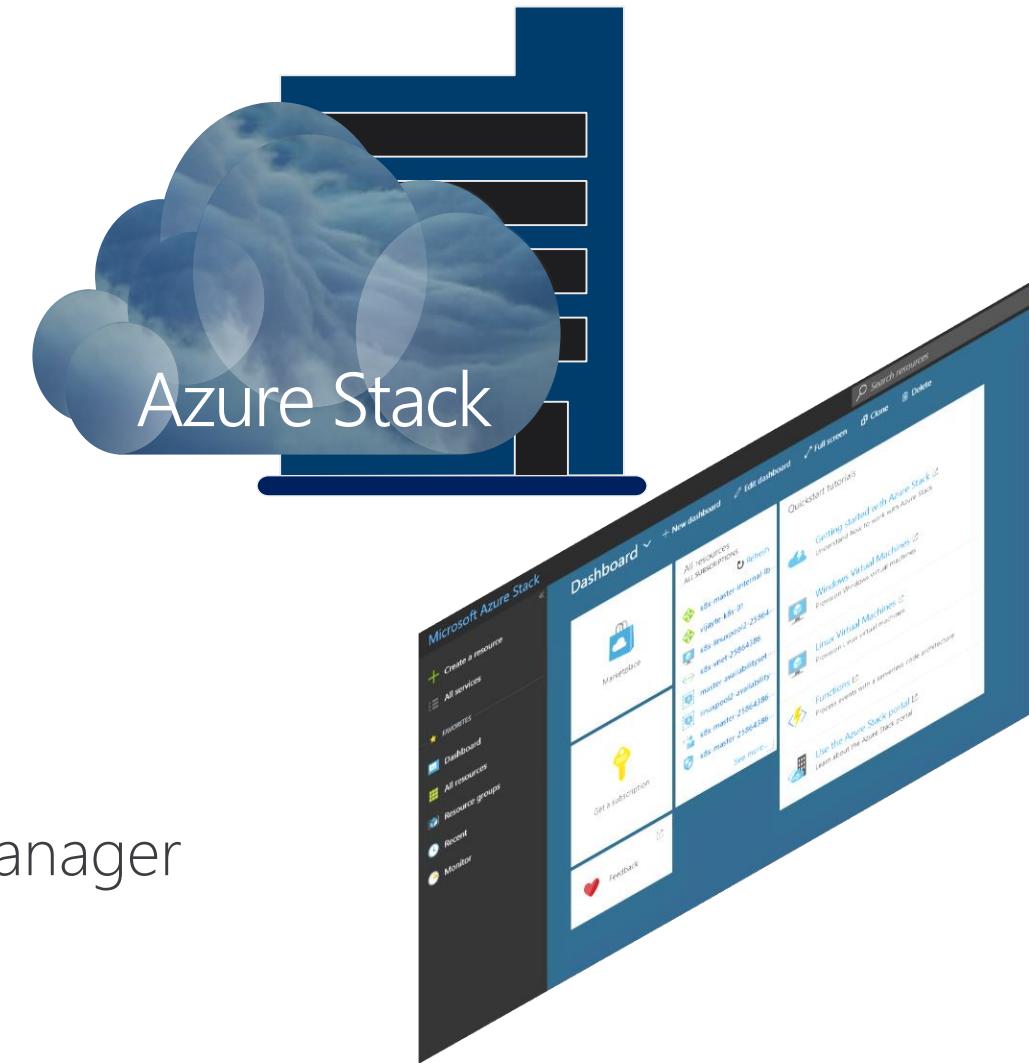
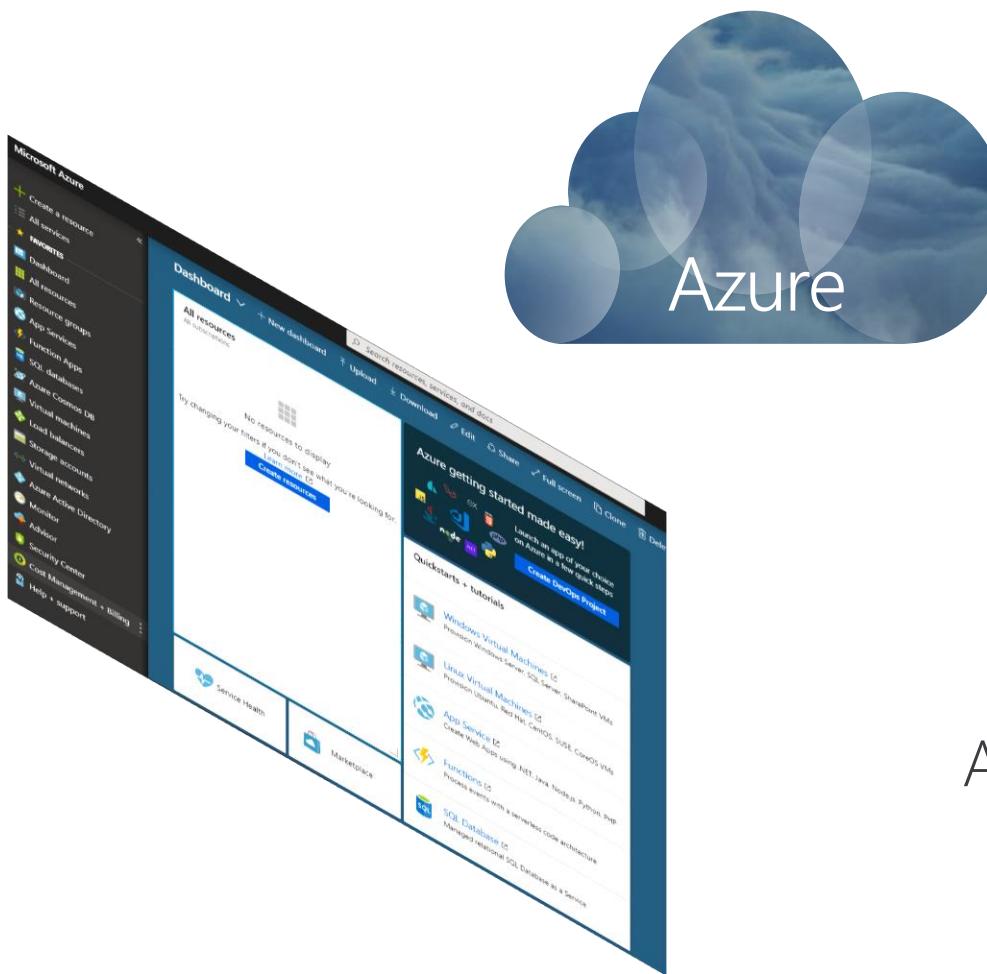
# Azure Intelligent Edge + Cloud Taxonomy



# Azure Stack

# Azure Stack is an extension of Azure

*Only consistent hybrid cloud platform*



Portal  
Azure Resource Manager  
API's

# Demo Azure Stack

# Azure Stack



## Complete autonomous cloud

Only consistent hybrid cloud that can run at the connected or disconnected



## Cloud application model

Common application model, tools and APIs with Azure simplifying DevOps



## Azure Services & Marketplace

Azure web services, containers, Azure Functions, & Azure Marketplace



## Integrated System

Cloud inspired infrastructure via integrated systems from major H/W partners



Edge & Disconnected

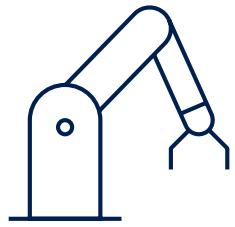


Regulatory & Data Sovereignty



Application Modernization

# Azure Stack Use Cases



At the edge and disconnected



Meet every regulatory requirement



Modernize legacy systems

# Customer Scenarios: Azure Stack



## Financial services

Customer analytics

Financial modeling

Risk, fraud, threat detection



## Health and life sciences

Clinical and claims data

IoT device analytics

Social analytics



## Retail

Assortment optimization

Data-driven stock, inventory, ordering

Store design and ergonomics

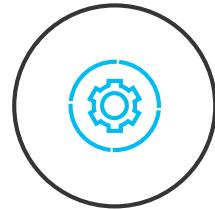


## Oil, gas, and energy

Digital field/production

Industrial IoT

Supply-chain optimization



## Manufacturing

Predictive maintenance

Safety and security

Quality assurance

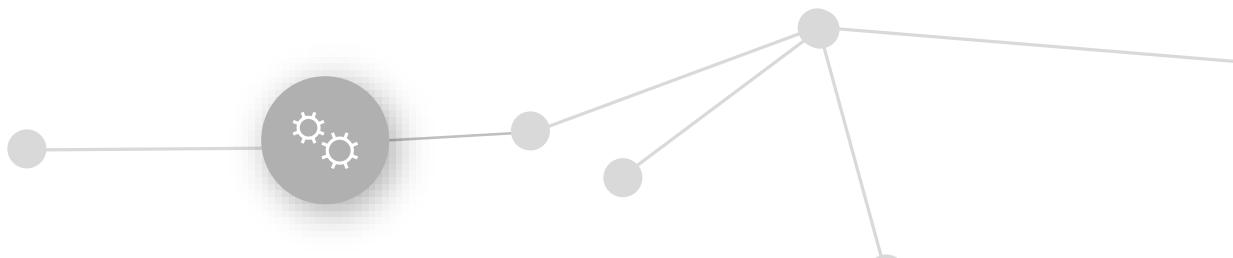
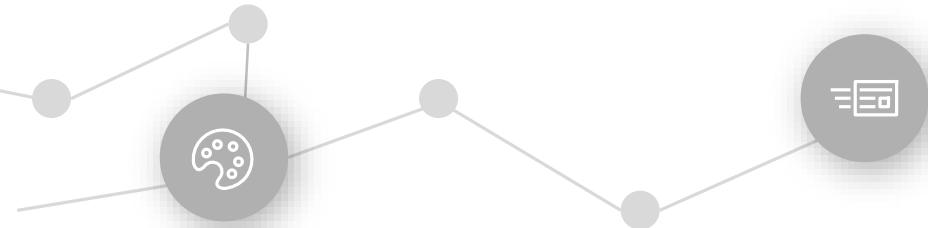


## Public Sector

Smart city

Revenue management

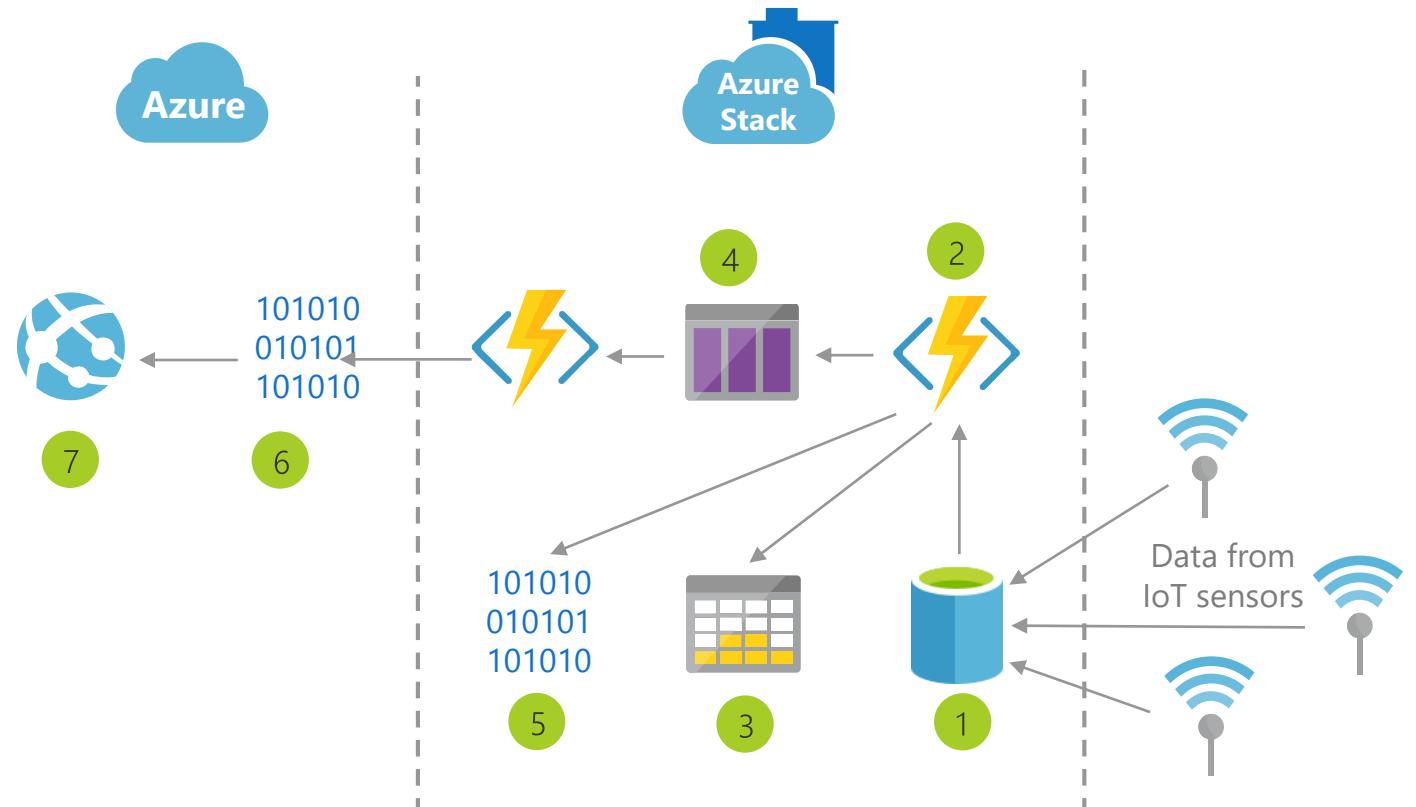
Citizen engagement



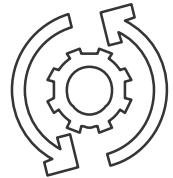
# Solution Architecture: Asset Management & Predictive Maintenance



- 1 Data flows from fleet-based sensors & IoT devices into a storage account
- 2 Data is analyzed for anomalies and/or appropriate compliance requirements
- 3 High priority data, such as operational maintenance data, is displayed immediately in the dashboard
- 4 Strategic data requiring deeper analysis is queued up for upload to Azure
- 5 Data is stored into a locally accessible archive account
- 6 Azure Stack uploads data from the queue to the Azure cloud
- 7 Globally-relevant, strategic insights are aggregated to the global application



# Azure Stack: an extension of Azure



Consistent application  
development



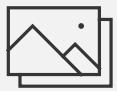
Azure services  
available on-premises



Purpose-built  
integrated system



Tools



Experiences



Deployments



Application  
patterns



Automations



Operations

# Azure Stack: an extension of Azure



Consistent application  
development



Azure services  
available on-premises



Purpose-built  
integrated system

---

Available now

---



Virtual  
Machines



IaaS-based  
Containers



Networking



Storage



Key Vault



Databases



Service  
Fabric



Azure App  
Service



Azure  
Functions



Azure  
Marketplace

---

In development

---



Event Hubs



IoT Hub



Kubernetes



SQL Server 2019



Blockchain  
Template



Azure Stream  
Analytics

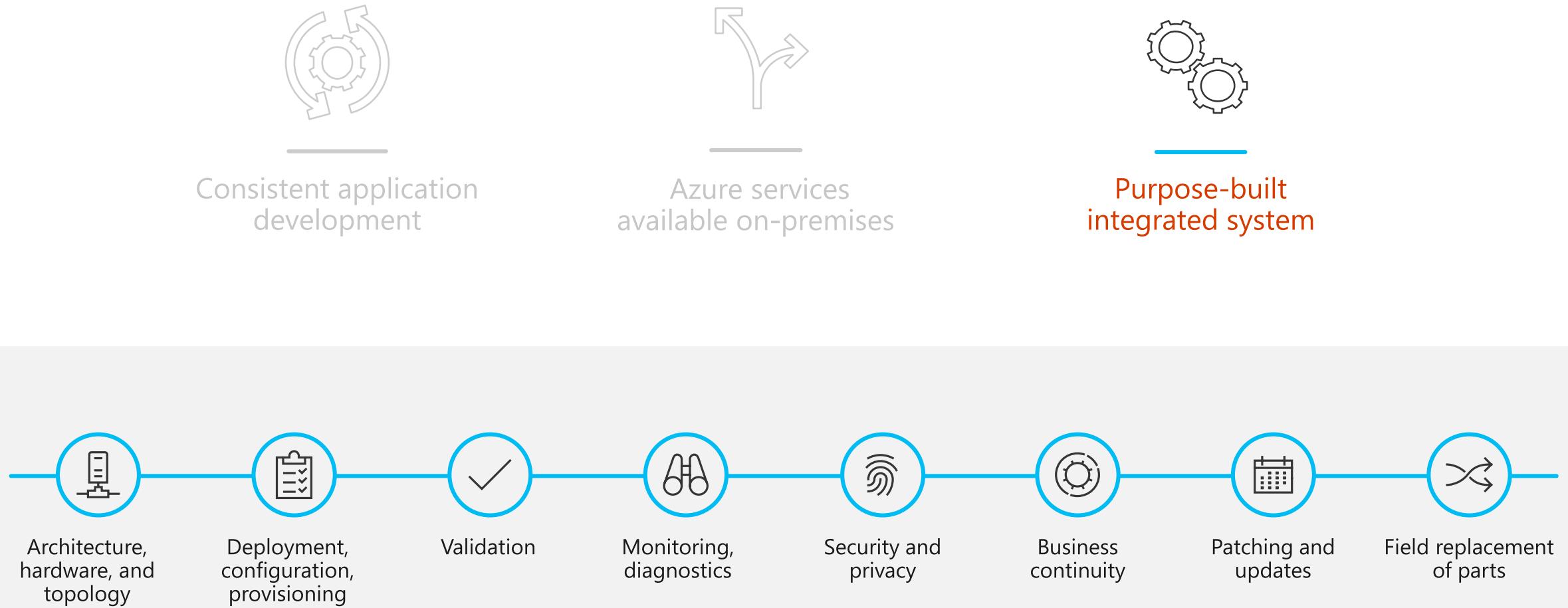


Cognitive Services



Azure API Management

# Azure Stack: an extension of Azure



# Data Box Edge

# Azure Data Box Edge



An AI-enabled Edge computing appliance  
with network data transfer capabilities



## Network Storage Gateway

Network data transport to Azure while retaining local access to files



## Edge compute/data preprocessing

Use IoT Edge compute modules to analyze, filter, and transform data as it moves to Azure



## FPGA powered by Azure Machine Learning

Accelerate ML inferencing of images and video streams to get results close to the data source



## Cloud managed

Easily manage your fleet from the Azure portal

# Data Box Edge and Gateway use cases



Data Box Edge



Data Box Gateway



## Network data transfer from Edge to cloud

Easily and quickly transfer data to Azure to enable further compute and analytics, or for archival purposes



Data Box Edge

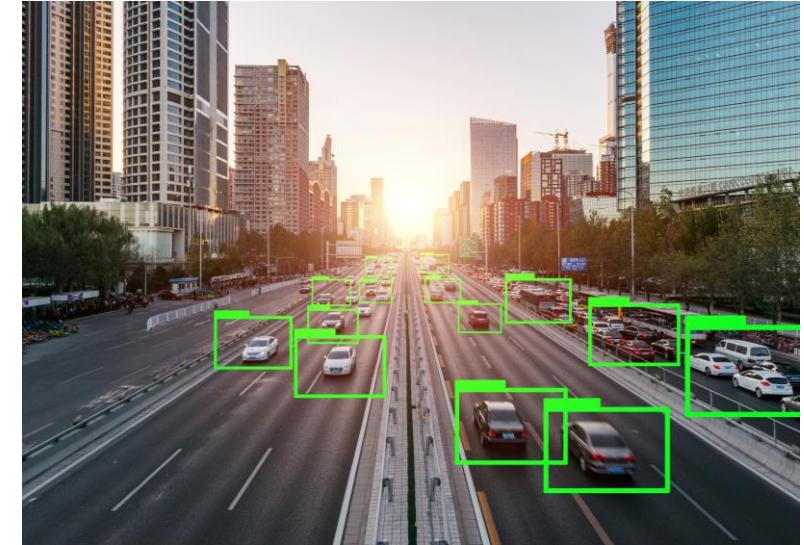


## Data pre-processing at the Edge

Analyze data from on-premises or IoT devices to get results quickly and close to where data is being generated. Transferring the full data set to the cloud or filter or transform it before uploading; save on bandwidth



Data Box Edge

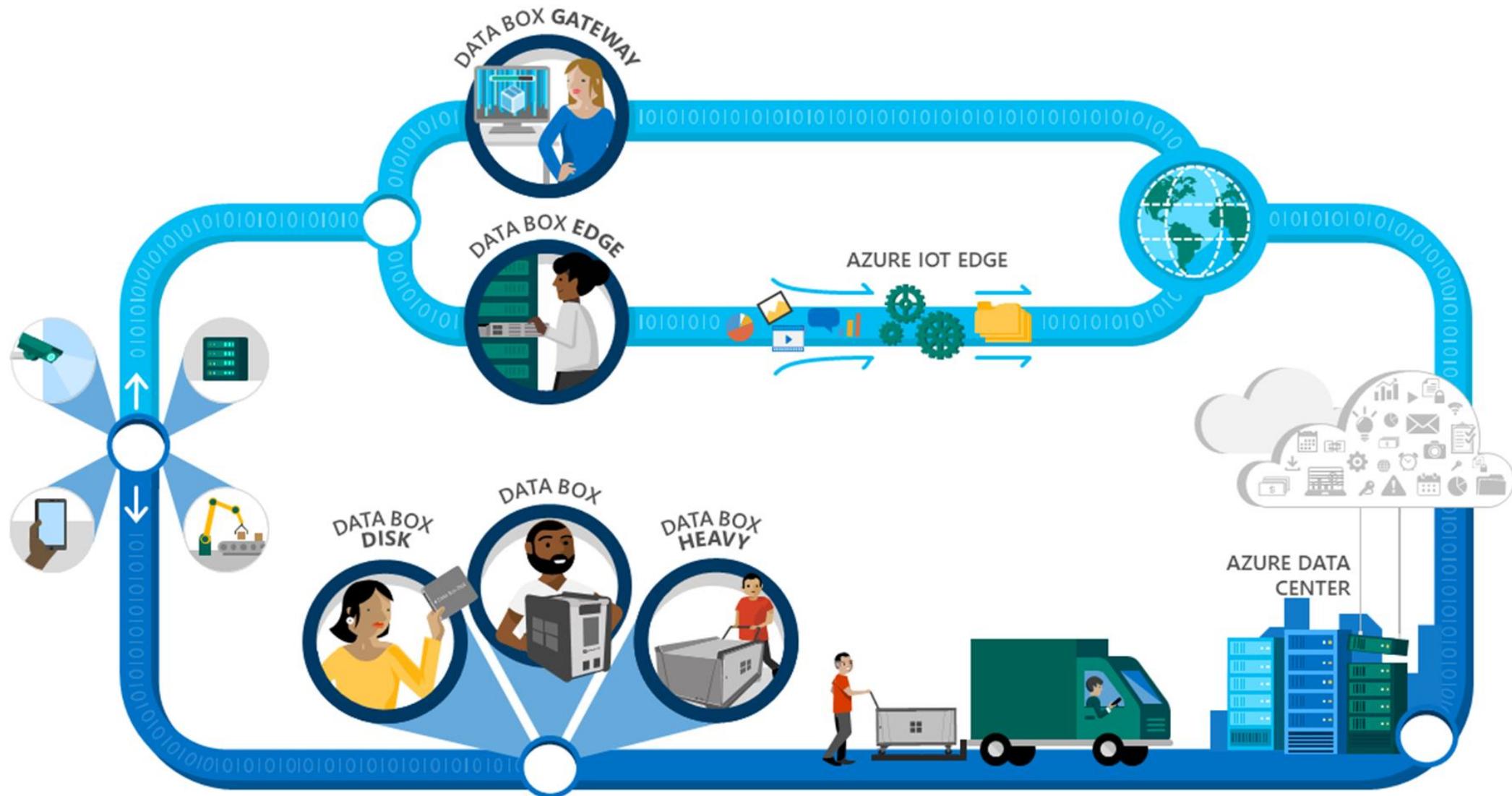


## Machine Learning inferencing at the edge

Run Machine Learning (ML) models at the edge to get quick results that can be acted on without round tripping to the cloud, while transferring the full data set to Azure to retrain and improve your models

# AZURE DATA BOX

GETS YOUR DATA TO THE CLOUD, OFFLINE OR ONLINE

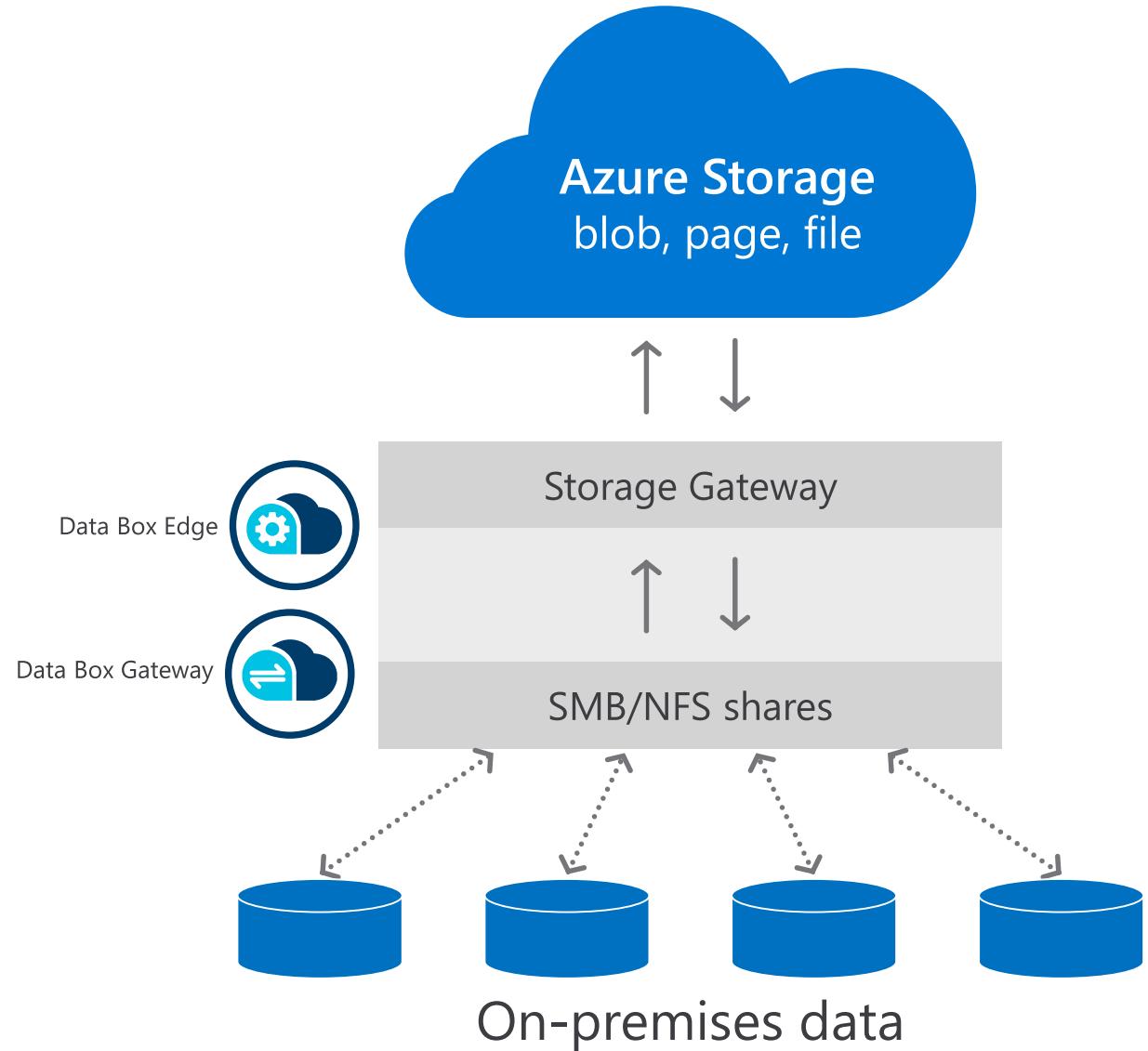


# Storage Gateway extends Azure storage to Edge

Exposes SMB and NFS shares on your local network, creating a gateway into your Azure Storage account

Keeps a local cache of your most recent files for fast local access

All you need to do is copy to a local file share and we upload



# Network data transfer from Edge to cloud



## Ongoing data pipeline to the cloud

Move data to the cloud from systems that are constantly generating data just by having them copy that data straight to the Storage Gateway. If they need to access that data later, it's right there where they put it



## Big data migrations

Storage Gateway can help you move large quantities of data to the cloud over your network. Takes the hassle out of bandwidth management and network interruptions

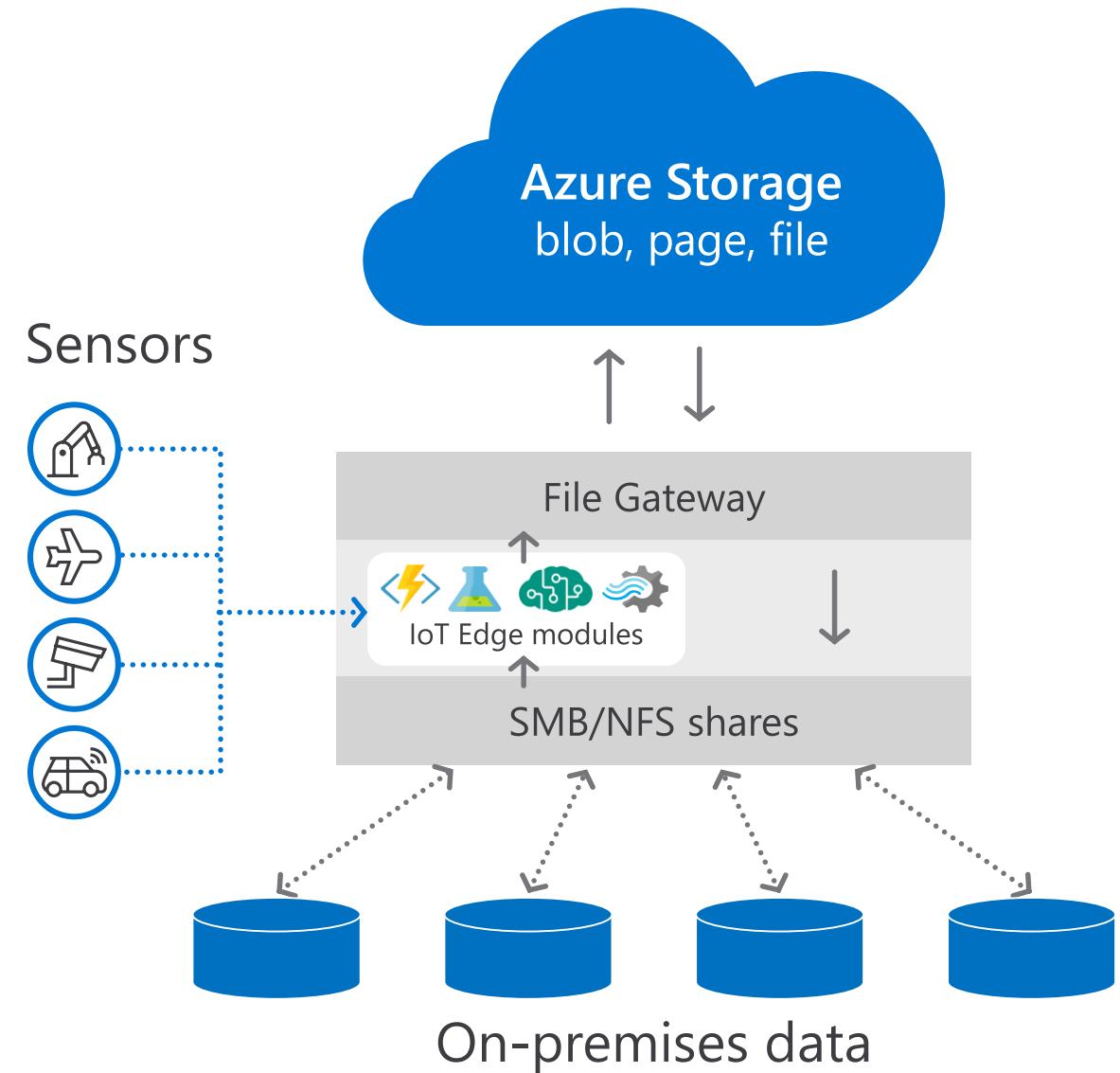


## Managing bursts of data

Manage big quantities of data that shows up all at once, like when an autonomous car pulls back into the garage or a gene sequencing machine finishes its analysis. Copy all that data to the Storage Gateway at fast local speeds then let Storage Gateway upload it as your network allows

# Data Box Edge combines edge compute and Storage Gateway

Compute pipeline powered by IoT Edge  
Integrated with Storage Gateway so modules can easily operate on Storage Gateway files  
Modules can connect with on-premises sensors and systems to process all kinds of inputs



# Azure IoT Edge

## IoT Edge modules



Run Azure services directly on any device.  
AI, Azure ML, stream analytics, functions, SQL  
or bring your own code



## IoT solutions



## Secure

Designed for security from the ground up  
and only secure devices get certification



## Real-time AI and analytics



## Open source & cross platform

Open source and supports Linux, Windows  
and an expanding set of OS's



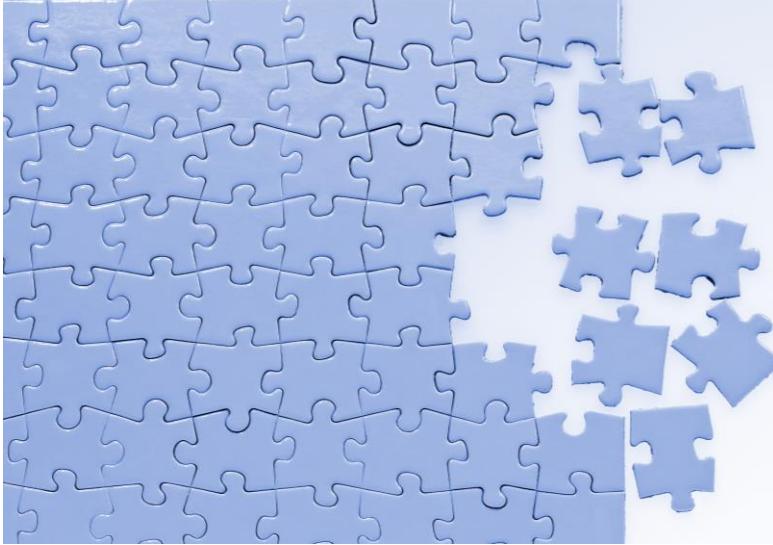
## Device connectivity and management



## Cloud managed

Remotely configure, update, monitor, and  
manage IoT Edge devices

# Using compute at the Edge to manage data



## Aggregate

Combine or standardize data from different sources into the format you want for cloud storage and archiving as part of your upload pipeline



## Modify

Remove data that for legal or compliance reasons can't be stored in the cloud, e.g., personally identifying information



## Filter

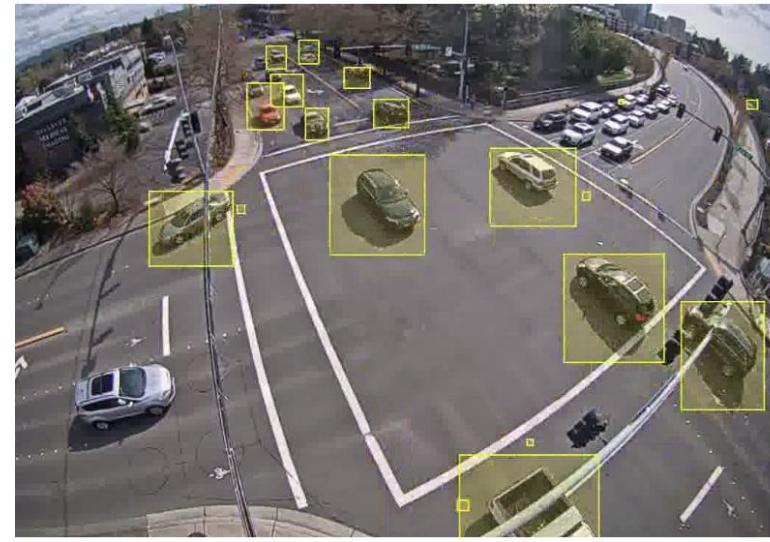
Sensors and devices can generate huge amounts of data, but often most of that data is repetitive and uninteresting. Identify the important data you want in the cloud for further processing or long-term storage and discard less important data

# Using ML at the Edge on Data Box Edge



## Process at Edge for immediate results

Process images and video as they are generated for immediate results. Drone video footage can be analyzed in the field, or quality control issues can be identified right at the factory before the product hits the market



## Filter with AI analysis at Edge

Constantly monitor traffic camera feeds to detect collisions or “near collisions” and store one minute of video around these events for human analysis and model training. Retrain in cloud and send updated model to edge

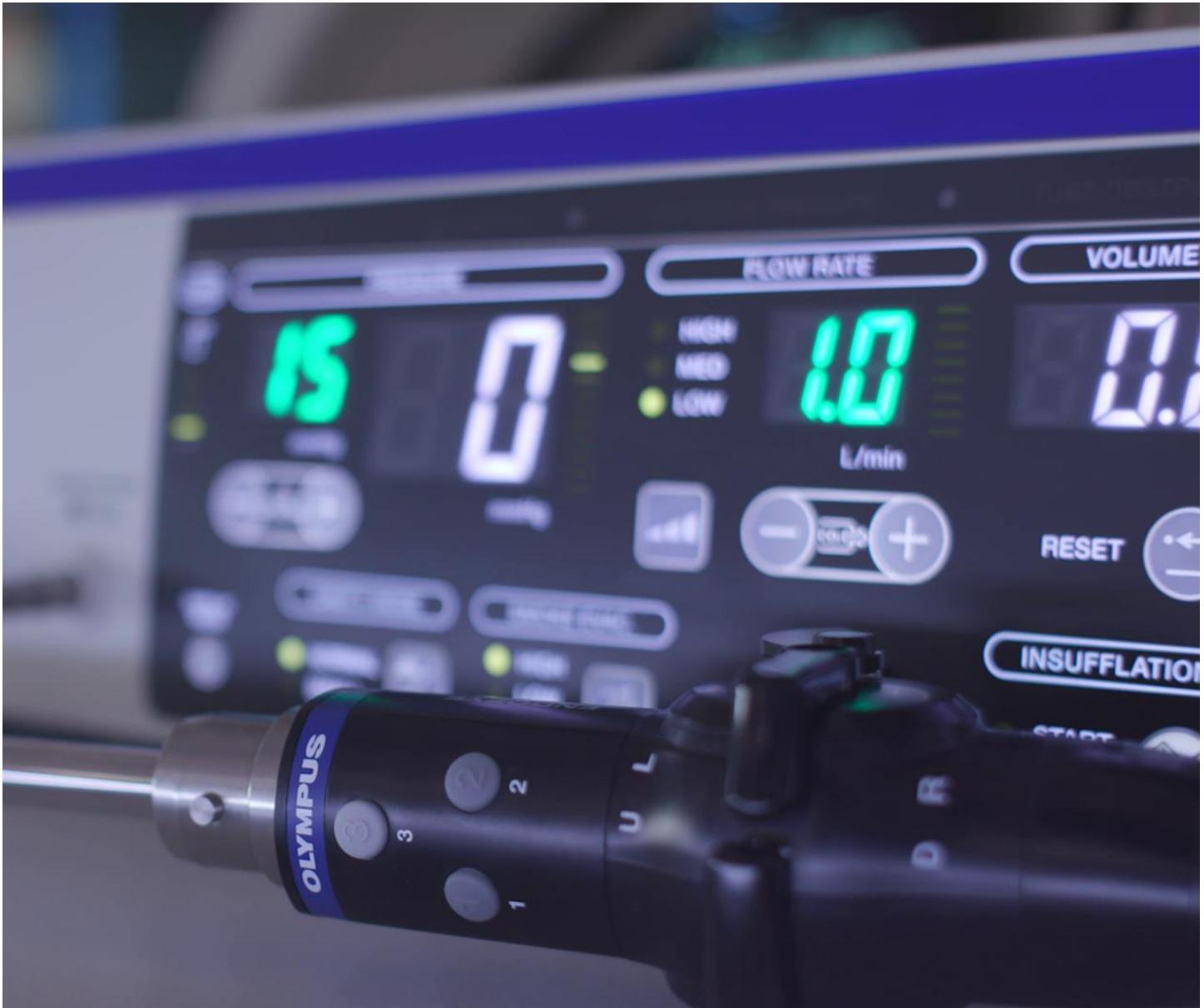


## Remove sensitive data at Edge

Automatically blur PII data, e.g., faces or license plates, from images and video before they are uploaded and archived in Azure, protecting against privacy issues if you have a legal requirement around storing PII in the cloud

# OLYMPUS

---

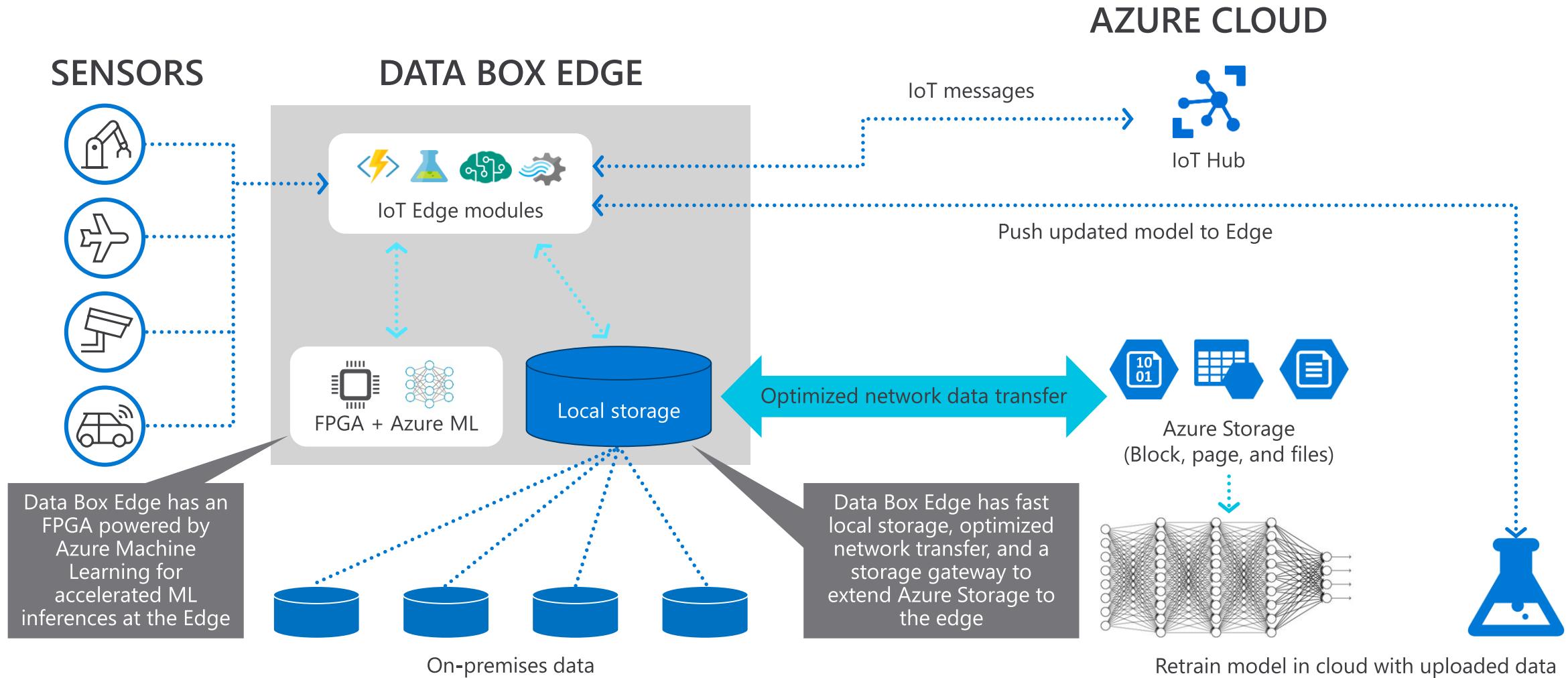


# **OLYMPUS**

---



# Data Box Edge with IoT Edge and FPGA powered by Azure ML



# Cloud managed

Fully managed from the Azure portal. Configure your system, monitor health, and install updates from the cloud

The screenshot shows the Microsoft Azure portal interface for managing an Azure Data Box Edge (DBE) service. The URL in the browser is <https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/930112e1-abe5-449c-820a-342t>.

The left sidebar menu includes:

- Preview
- Microsoft Azure
- Create a resource
- All services
- Favorites
- Dashboard
- All resources
- Resource groups
- App Services
- Function Apps
- SQL databases
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Security Center
- Cost Management + Bill...
- Help + support

The main content area displays the "amazon-DBE" resource details under the "Azure Data Box Edge - PREVIEW" category. The "Overview" tab is selected. Key details shown include:

- Resource group: demo-dbe
- Status: Online
- Location: East US
- Subscription: Data Box Edge Internal
- Subscription ID: 930112e1-abe5-449c-820a-342b9ea94b18
- Time zone: Pacific Standard Time
- Capacity: 370.94 GB

The "Shares" section lists two shares:

NAME	STATUS	TYPE	STORAGE ACCOUNT	STORAGE SERVICE
demoshare1	OK	SMB	amasondbe	Block Blob
demotestshare	OK	SMB	amasondbe	Block Blob

# Demo Data Box Edge

# Start with Azure Edge platform

Microsoft Azure – free account: <https://azure.microsoft.com/konto/kostenfrei>

Learn path “Azure Fundamentals” - Learn | Microsoft Docs: <https://docs.microsoft.com/en-us/learn/patterns/azure-fundamentals>

End-to-End Hybrid Application: <https://aka.ms/azshybridsample>

Hybrid Tutorials: <https://aka.ms/azsdevtutorials>



1

Develop



2

Validate



3

Deploy

# Thank you

# Introducing Azure Data Box Edge



An AI-enabled Edge computing appliance  
with network data transfer capabilities



## Network Storage Gateway

Network data transport to Azure while retaining local access to files



## Edge compute/data preprocessing

Use IoT Edge compute modules to analyze, filter, and transform data as it moves to Azure



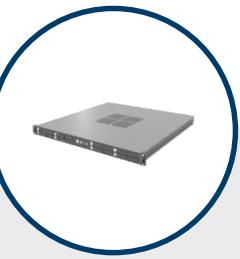
## FPGA powered by Azure Machine Learning

Accelerate ML inferencing of images and video streams to get results close to the data source



## Cloud managed

Easily manage your fleet from the Azure portal



## Azure Data Box Edge

An AI-enabled edge computing appliance with network data transfer capabilities

### **Network storage gateway**

Simple network data transport to Azure while retaining local access to files

### **Edge compute**

Use IoT edge compute modules to analyze, filter, and transform data as it moves to Azure

### **FPGA powered by Azure Machine Learning**

Accelerate ML inferencing of images and video streams to get results close to the data source

### **First-party from Microsoft**

Acquire and manage your appliance from the Azure portal as part of a monthly meter



## Azure Data Box Gateway

A virtual network appliance that moves data in and out of Azure

### **Network storage gateway**

Simple network data transport to Azure while retaining local access to files

### **Virtual machine**

Runs as a Hyper-V or VMware virtual machine on your hardware

### **Cloud managed**

Easily manage Data Box Gateway and Data Box Edge from the Azure portal