

# The Age of Azure IoT Edge

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HAS ALTAIAR

AZURE NIGHTS - MELBOURNE

# whoami

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# What's IoT?

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IoT is a **network** of physical and virtual devices (“things”) that are **connected** and able to **exchange data**. Each thing is **uniquely identifiable** and capable of operating within the existing internet infrastructure. Typically, IoT devices exchange **massive** amounts of data at a **rapid pace**.

## Main Characteristics

Intelligent (Autonomous Control)

Connectivity

Scale (Network, Compute, Storage)

Sensing

Heterogeneity

Security (and Privacy)

# What's Edge Computing?

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**Edge computing** is a method of optimizing cloud **computing** systems by performing data processing at the **edge** of the network, near the source of the data.

**Azure IoT Edge moves** cloud analytics and custom business logic **to devices** so that your organization can focus on business insights instead of data management

# Azure IoT Edge

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**IoT Edge Runtime  
Environment**

**Modules**  
Custom Code

**Cloud-based Interface**  
Manage & Monitor

# Edge Computing Benefits

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Reduce bandwidth usage

Lower latency

Distribute compute load

Comply with Security and Privacy regulations

Solution for Occasionally-connected devices

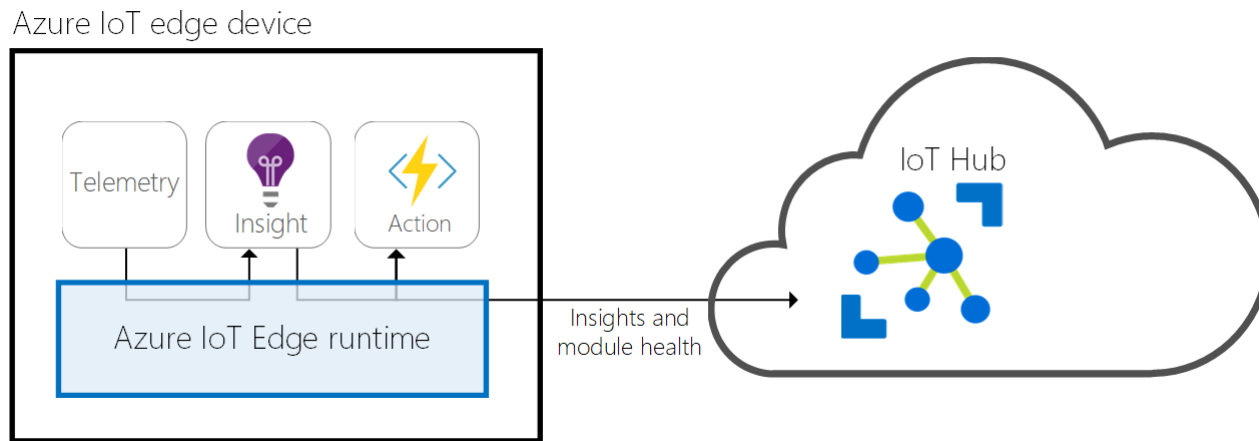
# How does it work?

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Code modules as Docker images

Configure modules on the IoT Hub

The Azure IoT Hub does the rest



# Azure IoT Edge Runtime

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Portable on most platforms (Win, Mac, Linux)

Pushed as a Python library

Uses Docker modules for everything

It has 2 main parts that are also Docker images (modules). These are:

- **IoT Edge Agent**
- **IoT Edge Hub**



# The Role of IoT Edge Runtime

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Installs/updates workloads

Maintains security standards

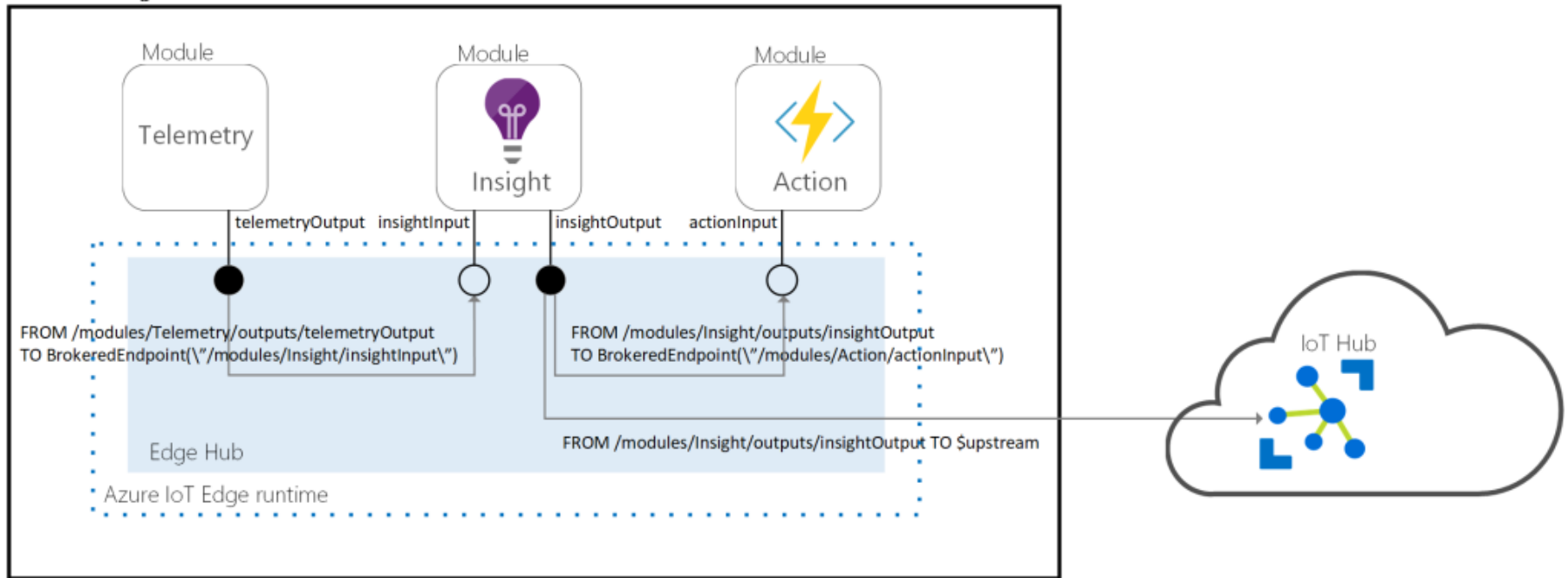
Manage Operations and Monitoring

Facilitates communications with the IoT Hub

Facilitates communication between modules

# IoT Edge Hub

Azure IoT Edge device



# IoT Edge Hub

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Acts as a proxy of the Azure IoT Hub

Not a full version of the IoT Hub running locally.

Optimizes no of real connections to the cloud.

Caches messages and twin updates locally when disconnected.

Facilitates module-to-module communication.

# IoT Edge Agent

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Responsible for instantiating modules

Ensures that modules continue to run

Reports the status of modules to the IoT Hub.

Ensures security (verify a module's image before starting it)

Like other module, Agent uses its module twin to store configuration data.

# Modules

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Modules are pieces of code wrapped in a Docker container.

Other types of module might appear in the future.

In Preview, modules can only be coded in C#/Python

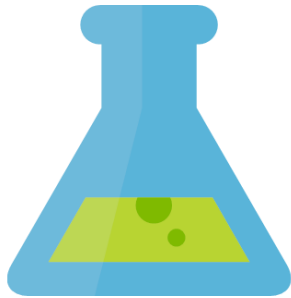
Composition happens in the deployment manifest file

Each Module has the following:

- Module image
- Module instance
- Module identity
- Module twin

# Azure-built Modules

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# Configuration & Monitoring

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Edge Runtime + IoT Hub provide full control over device lifecycle.

Configure a workflow (Build a data pipeline)

Target one device or a group of devices

Deploy modules and configuration with one click

# Intelligence on Cloud vs on Edge

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## In the Cloud

Remote monitoring & management

Merging multiple datasets

Larger compute & storage to train and develop advanced ML models

## On the Edge

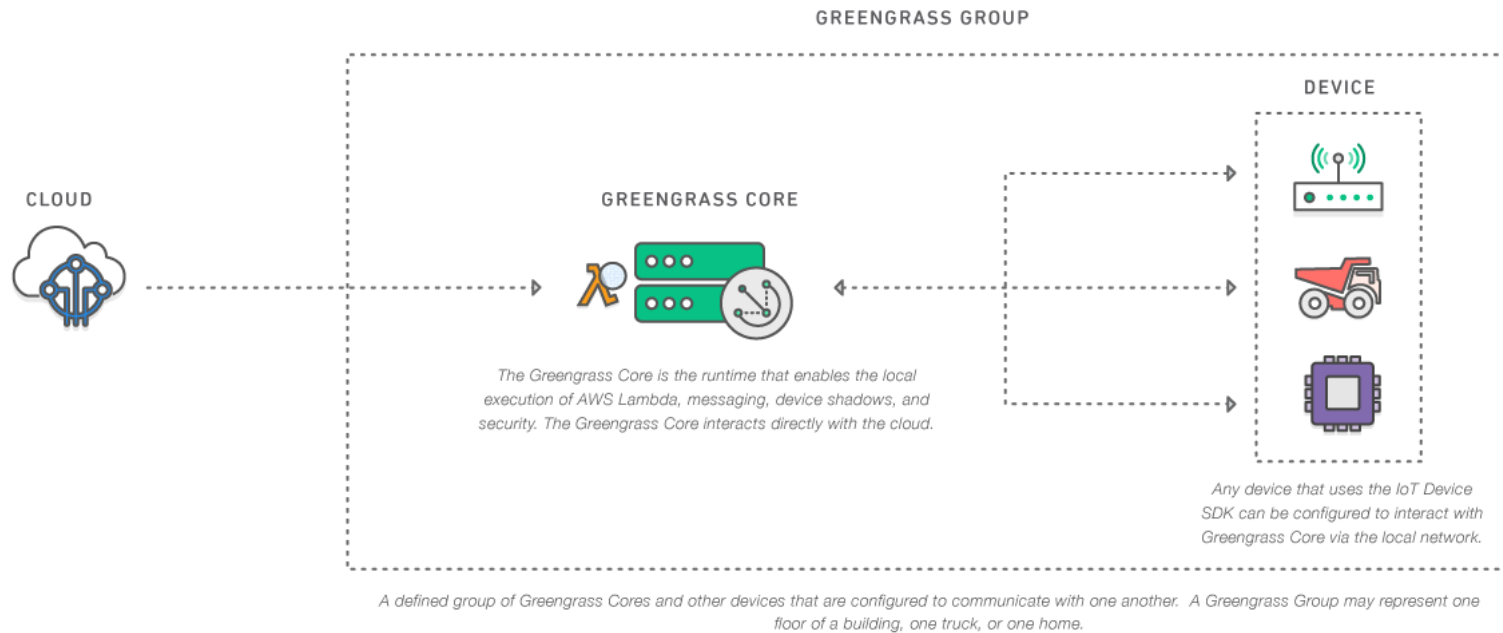
Low latency for near real-time scenarios

Protocol translation & data normalisation

Privacy & security of data.



# Similar Offerings – AWS Greengrass



# Demo 1

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Create an Azure IoT Edge device

# Demo 2

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Create a custom module

# Demo 3

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Create an Azure Stream Analytics module

# Conclusions

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- Edge computing can be great model for solving complex problems with Latency, data throughput, and Security (and Privacy) laws.
- Azure IoT Edge provides state-of-the-art suite of services for managing deployment, pipeline, configuration, and modules life-cycle.
- It's fairly easy to build custom modules on Azure IoT Edge, and the Azure team is adding pre-built modules continuously.
- The AI wave is just starting, it relies heavily on IoT to integrate the physical and the cyber world. This creates a great opportunity for Technologists.

Lastly,

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**Are you  
comfortable now  
with Living On The  
Edge?**



# Any Questions?