

The Age of Azure IoT Edge

HAS ALTAIAR

AZURE NIGHTS - MELBOURNE

whoami

Has Altaiar

Solutions Architect – Independent Contractor

@HasAltaiar

<https://www.hasaltaiar.com.au>

What's IoT?

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?

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

**IoT Edge Runtime
Environment**

Modules
Custom Code

Cloud-based Interface
Manage & Monitor

Edge Computing Benefits

Reduce bandwidth usage

Lower latency

Distribute compute load

Comply with Security and Privacy regulations

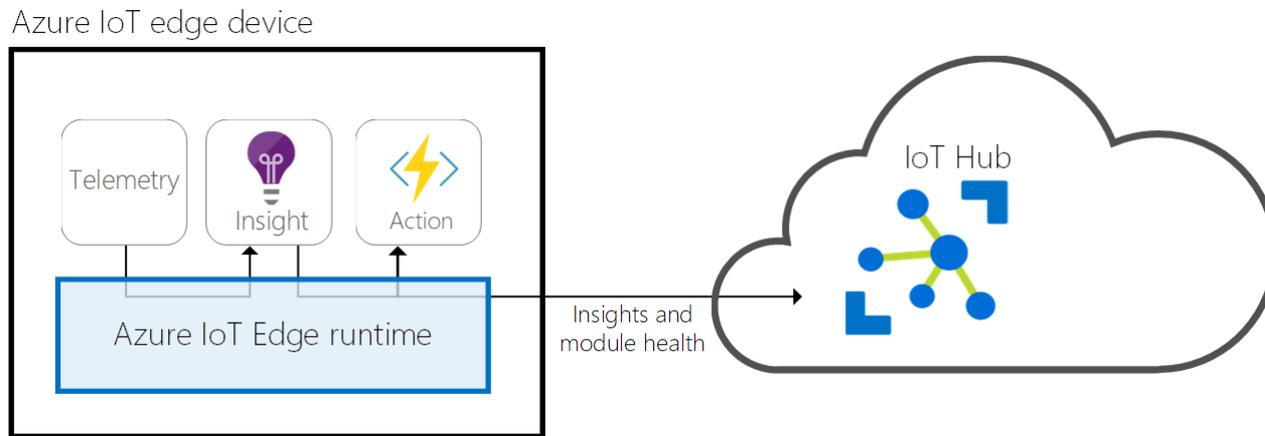
Solution for Occasionally-connected devices

How does it work?

Code modules as Docker images

Configure modules on the IoT Hub

The Azure IoT Hub does the rest



Azure IoT Edge Runtime

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

Installs/updates workloads

Maintains security standards

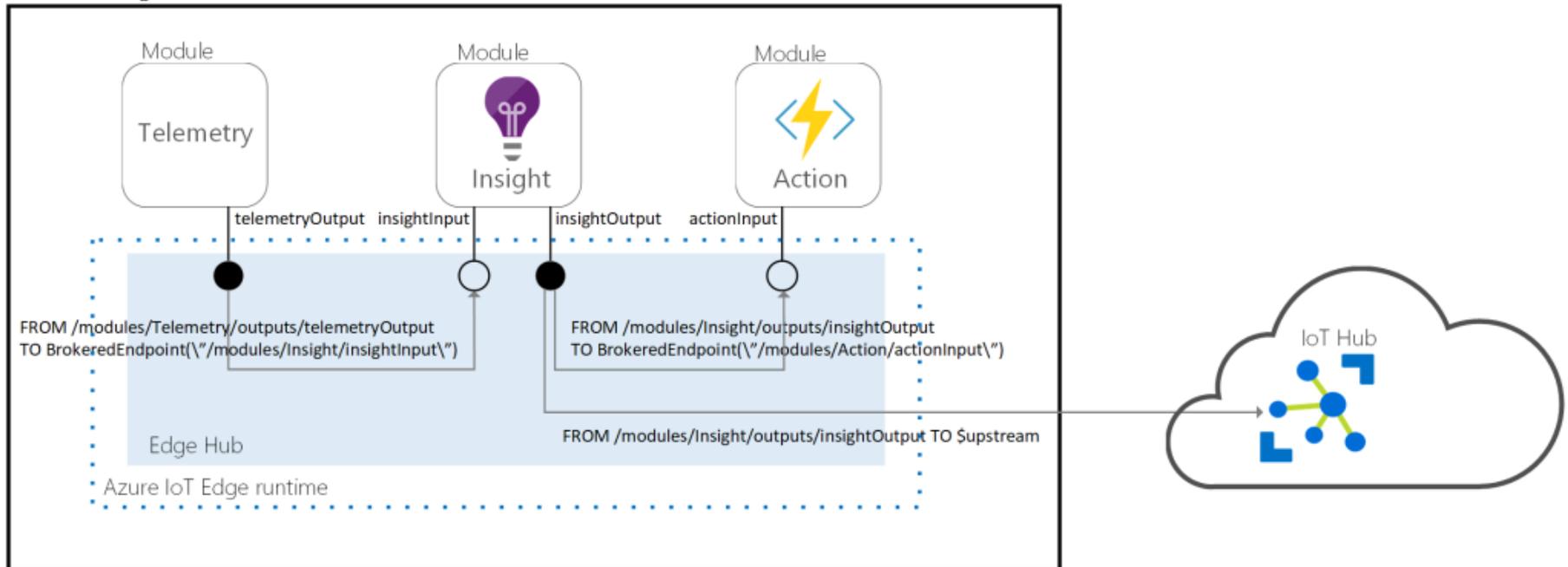
Manage Operations and Monitoring

Facilitates communications with the IoT Hub

Facilitates communication between modules

IoT Edge Hub

Azure IoT Edge device



IoT Edge Hub

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

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

Modules are pieces of code wrapped in a Docker container.

Other types of module might appear in the future.

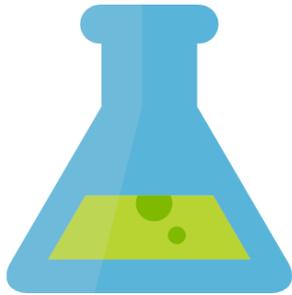
In Preview, modules can only be coded in C#/Python

Composition happens in the deployment manifest file

Each Module has the following:

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

Azure-built Modules



Configuration & Monitoring

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

In the Cloud

Remote monitoring & management

Merging multiple datasets

Larger compute & storage to train and develop advanced ML models

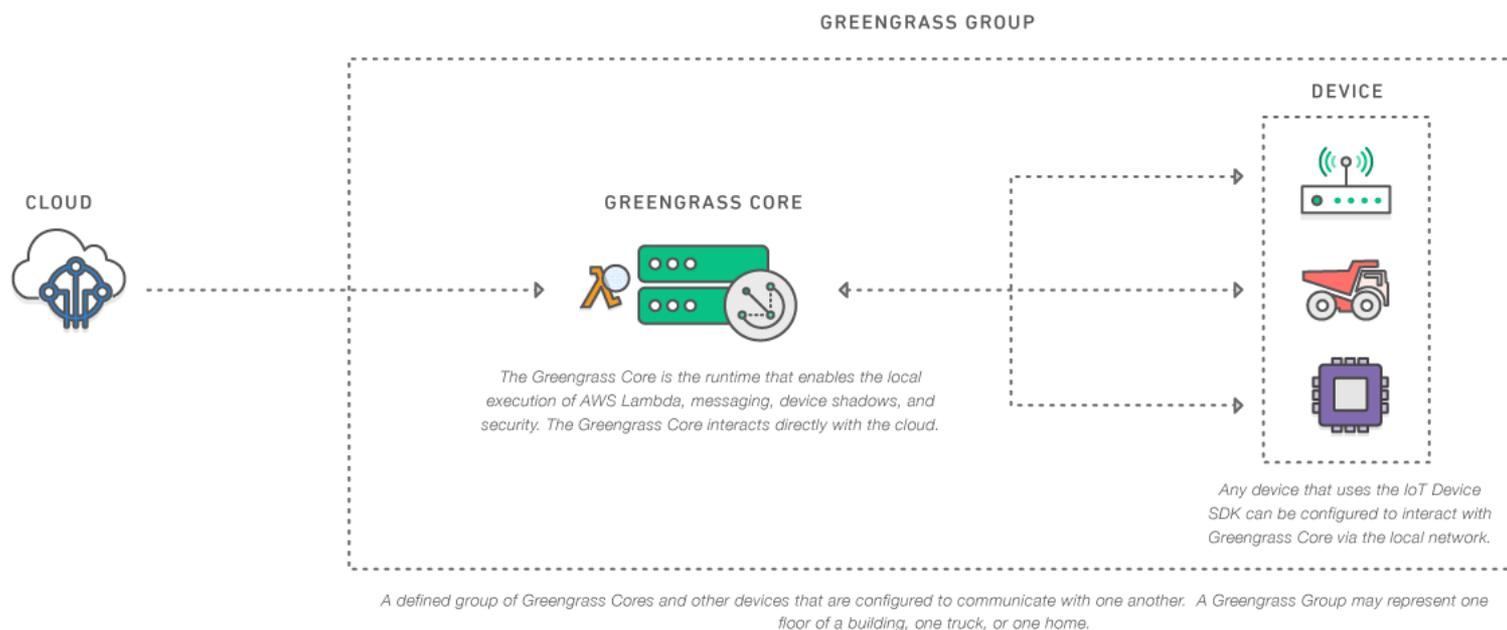
On the Edge

Low latency for near real-time scenarios

Protocol translation & data normalisation

Privacy & security of data.

Similar Offerings – AWS Greengrass



Demo 1

Create an Azure IoT Edge device

Demo 2

Create a custom module

Demo 3

Create an Azure Stream Analytics module

Conclusions

- 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,

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



Any Questions?