AI & IoT Integration on the Edge

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Global **Integration** Bootcamp, so why **AI** and **IoT**?

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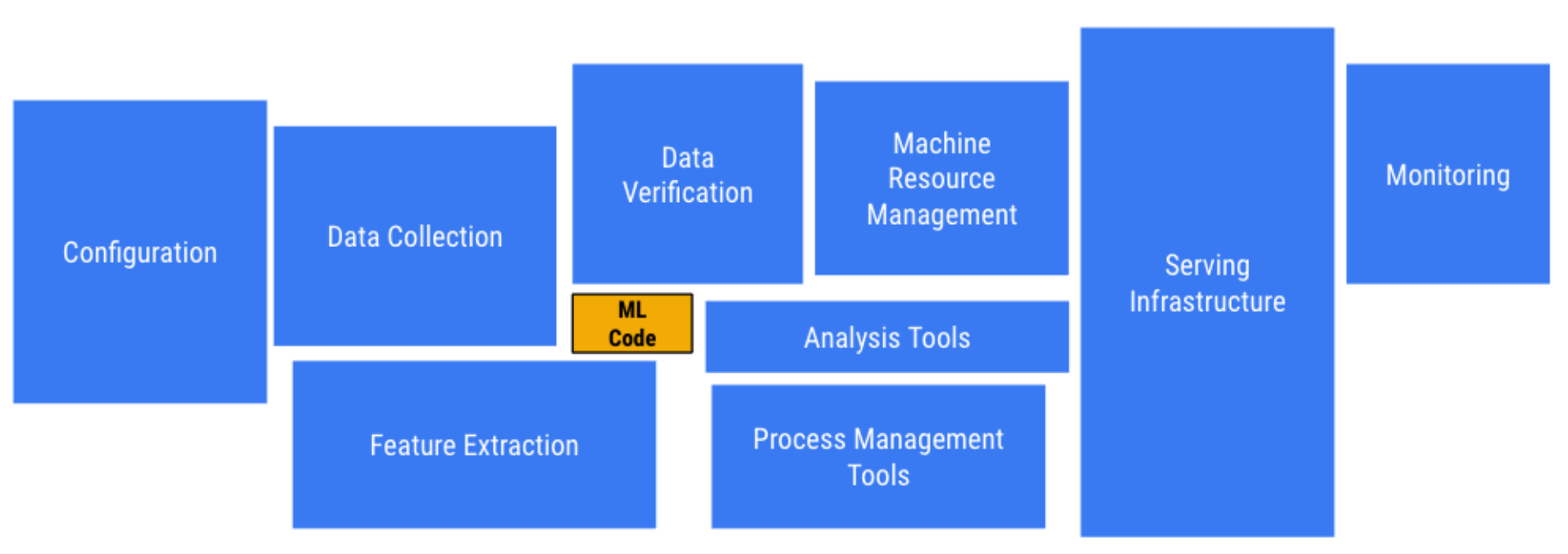


What's IoT?

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**.

IoT is Integration with a twist

What's Edge Computing?

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

Azure IoT Edge moves computing and custom business logic from the cloud **to devices** on the network to improve privacy, security, and improve performance.

Why Edge Computing?

Latency

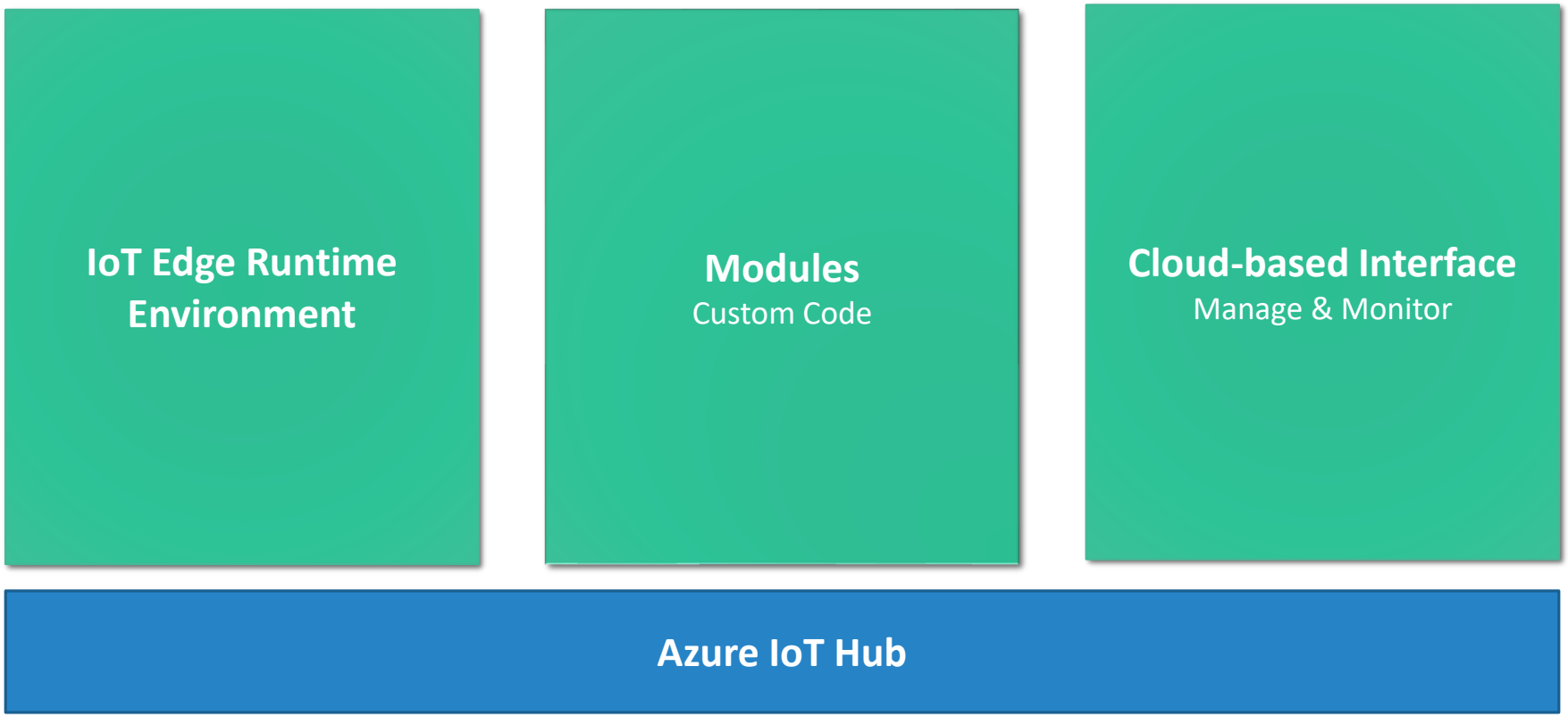
Bandwidth

Distribute compute load

Security and Privacy

Occasionally-connected

Azure IoT Edge



IoT Hub vs Event Hub?

IoT Hub is Event hub+

Device Management

Device Authentication

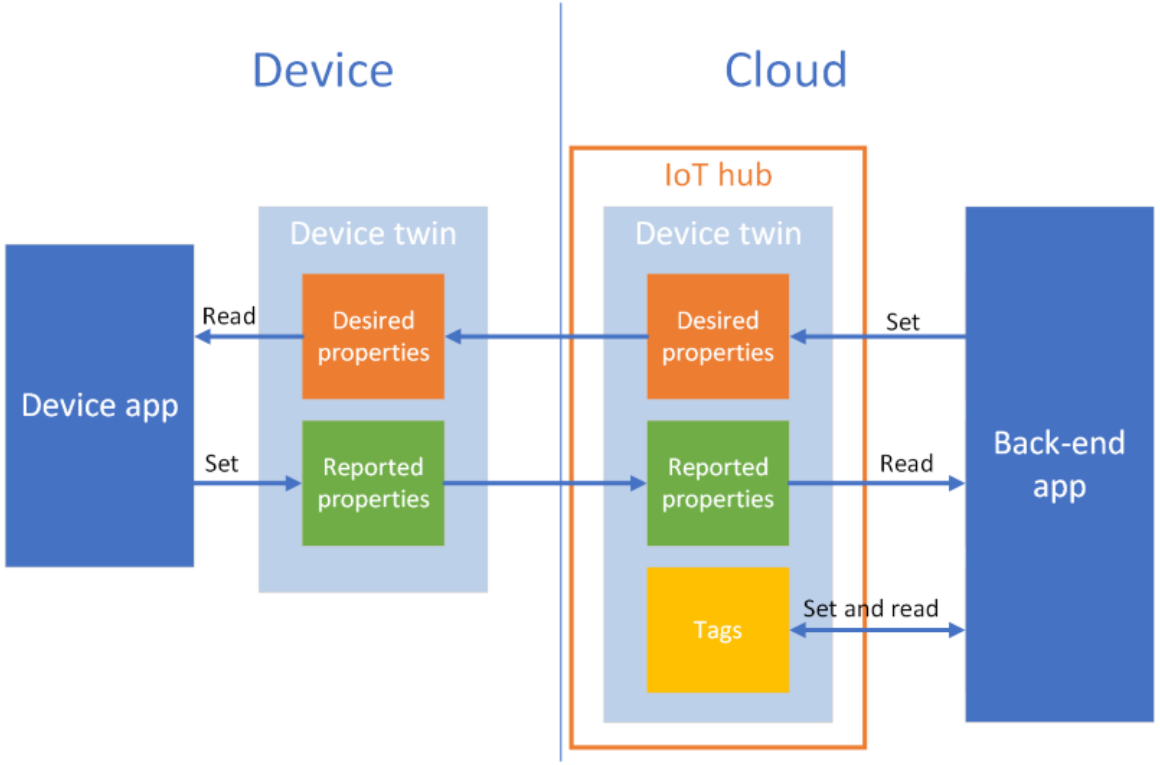
Complex Message Routing

Edge Connectivity & Deployment

Device and Module Twin

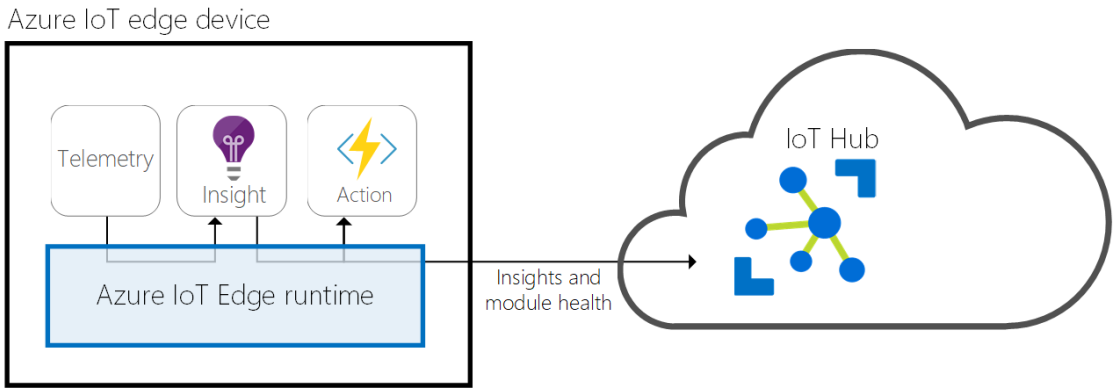
Device Twin & Module Twin

- JSON Document
- Store tags, Desired/ Reported properties, and identity
- Sync device/module attributes between backend services and devices
- Up to 8KB per category (tags, desired properties)



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

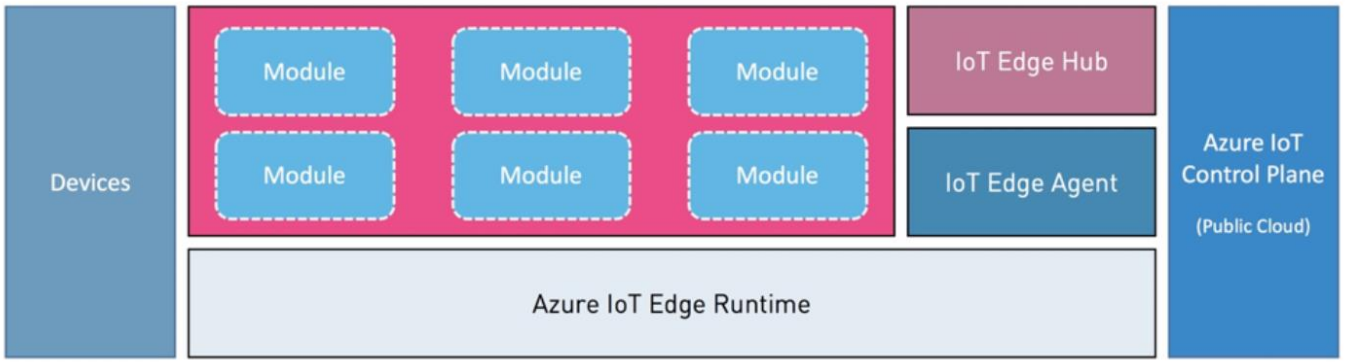
Portable on Windows and Linux

Supports Win & Linux Containers

Installed as a local service

Has 2 main parts:

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



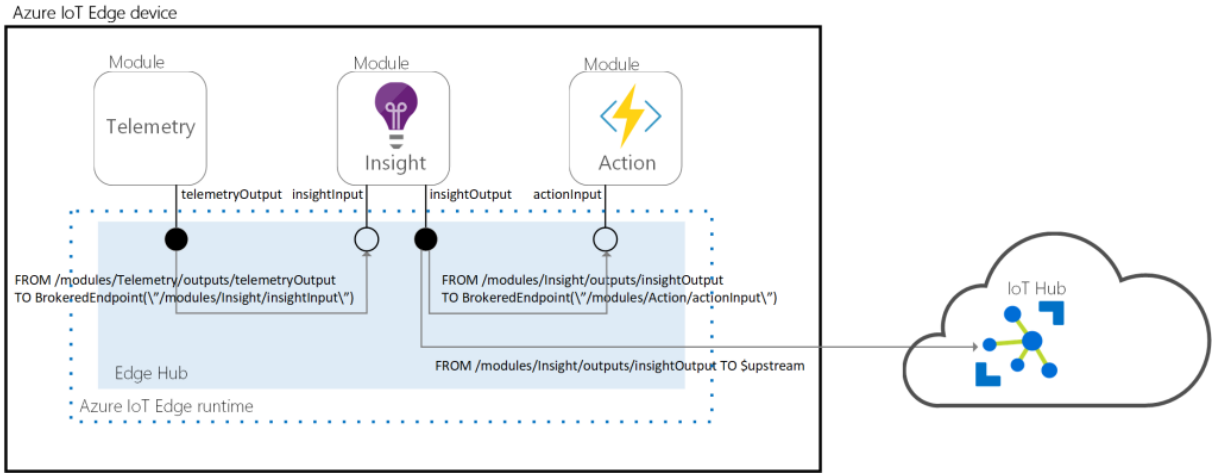
IoT Edge Hub

Acts as a proxy of the Azure IoT Hub

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.

IoT Edge Modules

Pieces of code, containerised.

OCI-Compatible containers.

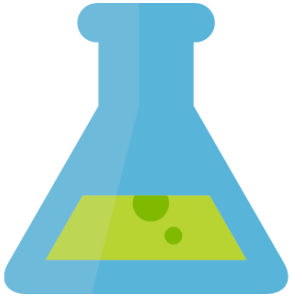
Many languages supported (C, C#, Java, Python, etc)

Composition happens in the deployment manifest file

Each Module has:

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

Azure-built Modules



Configuration & Monitoring

Full control over device lifecycle

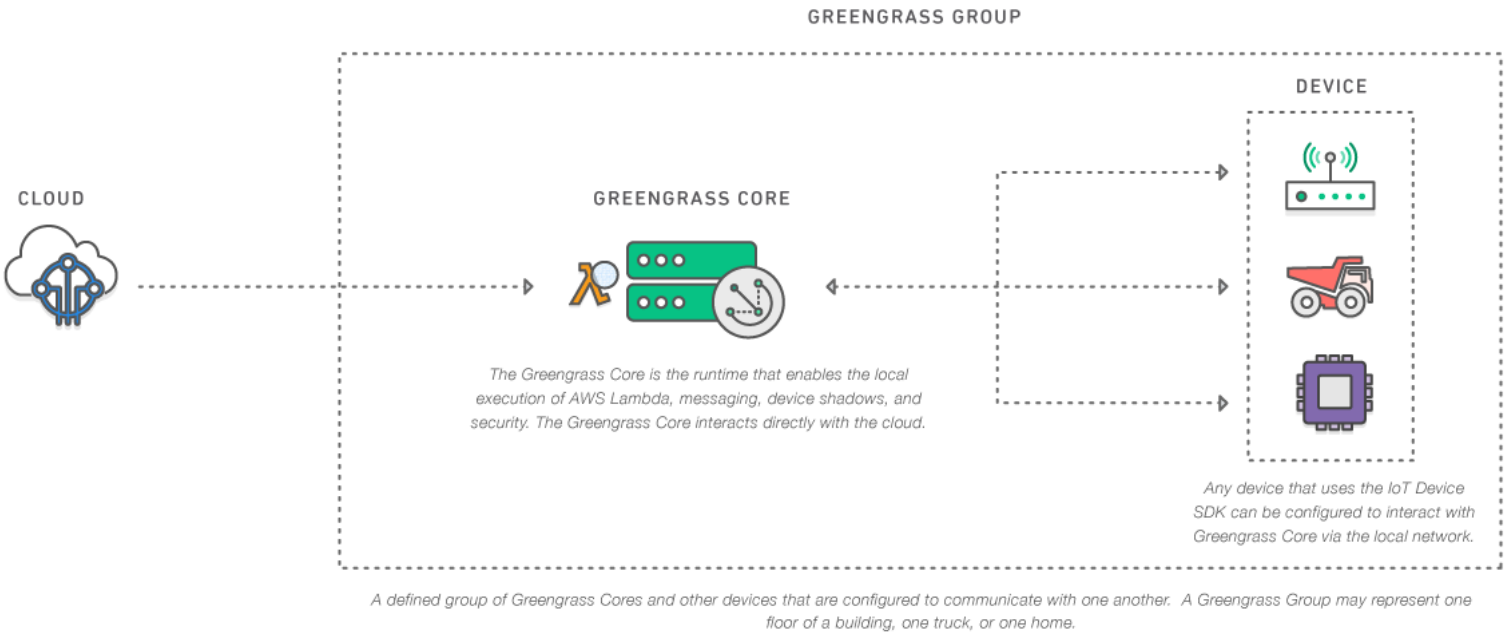
Build a data/integration pipeline

Target one device or a group of devices

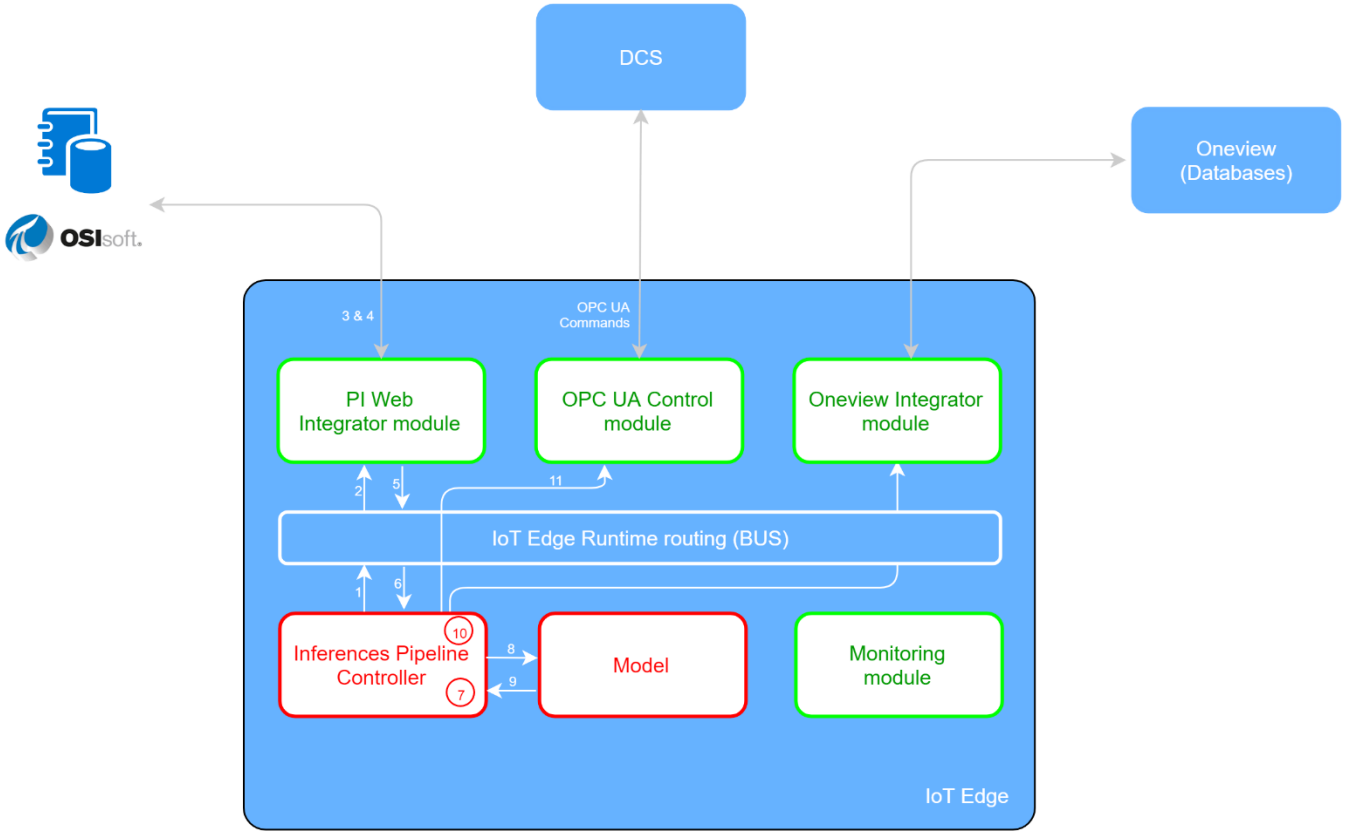
IoT Hub manages the deployments

Integration with App Insight & Log Analytics

Similar Offerings – AWS Greengrass

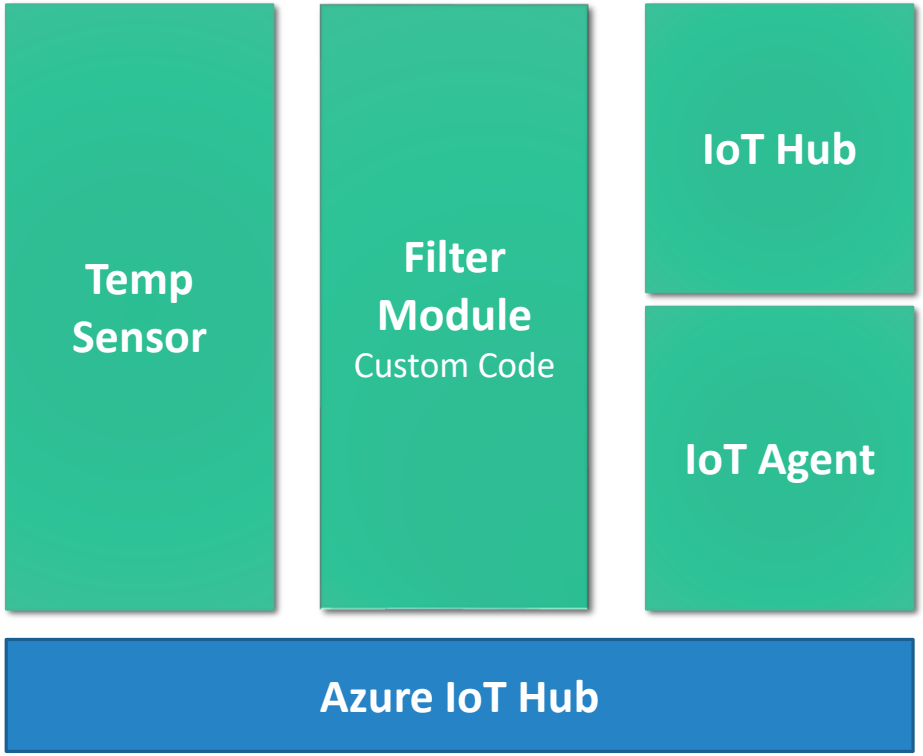


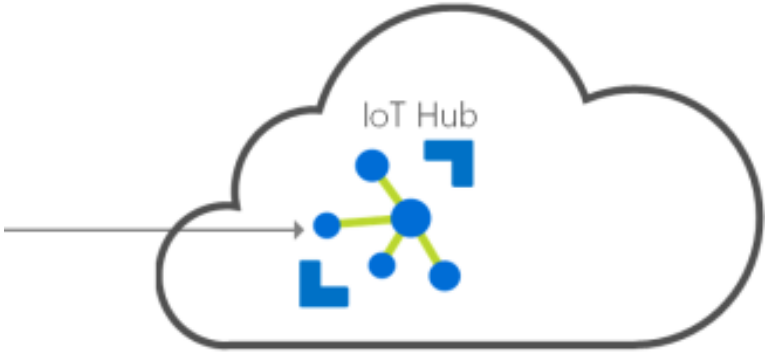
Real-world AI Solutions on the Edge



Demo

Show me the money ☺





Key Takeaways

Edge computing can be great model for solving complex issues with Latency, data throughput, Security, Privacy standards.

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.

Any Questions?