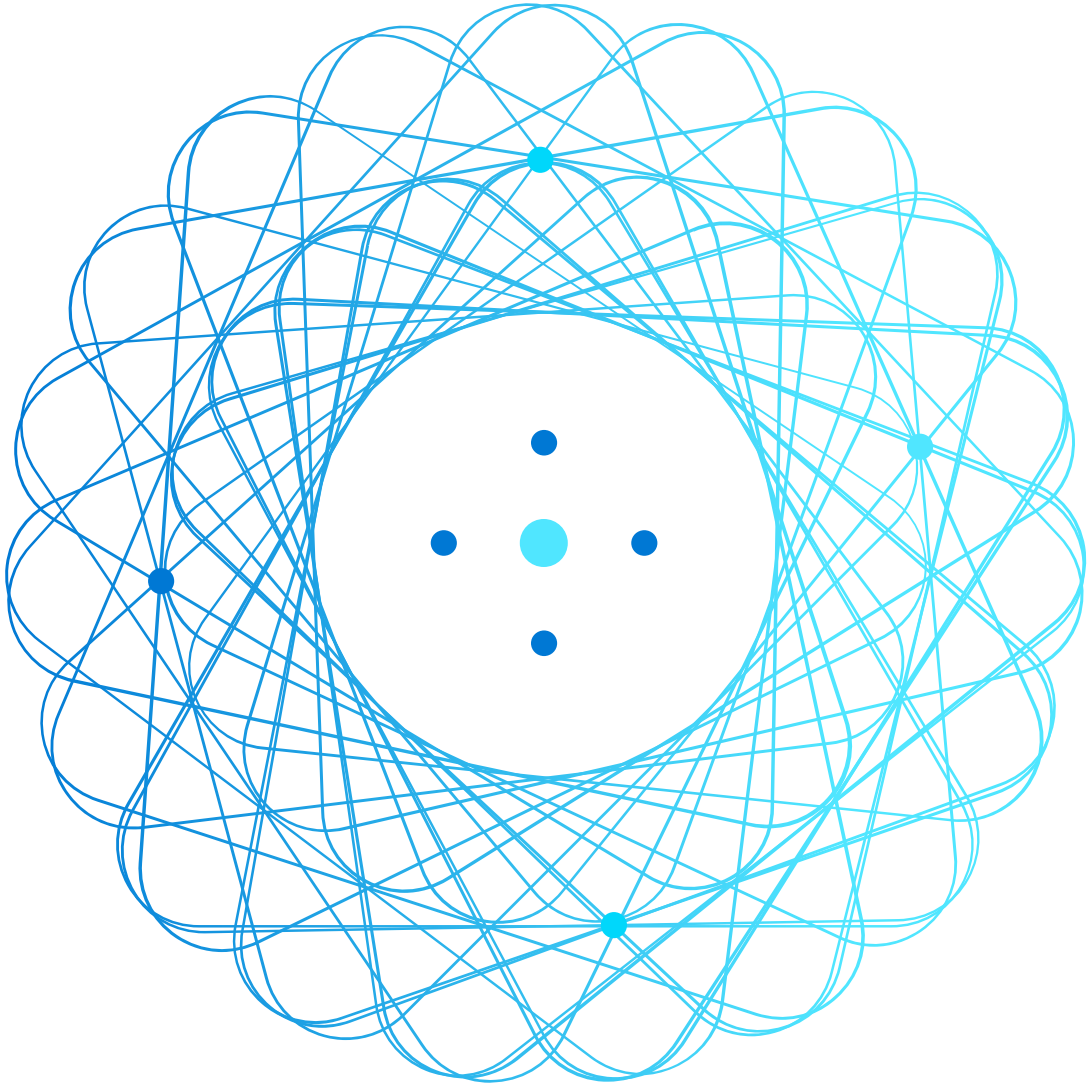
Microsoft Azure

AZ-220T01
Module 1: Introduction to IoT and Azure IoT services

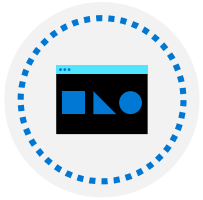


Lesson 1: Learning objectives

Module 1 – Learning objectives

Describe the core components of an Azure IoT solution architecture

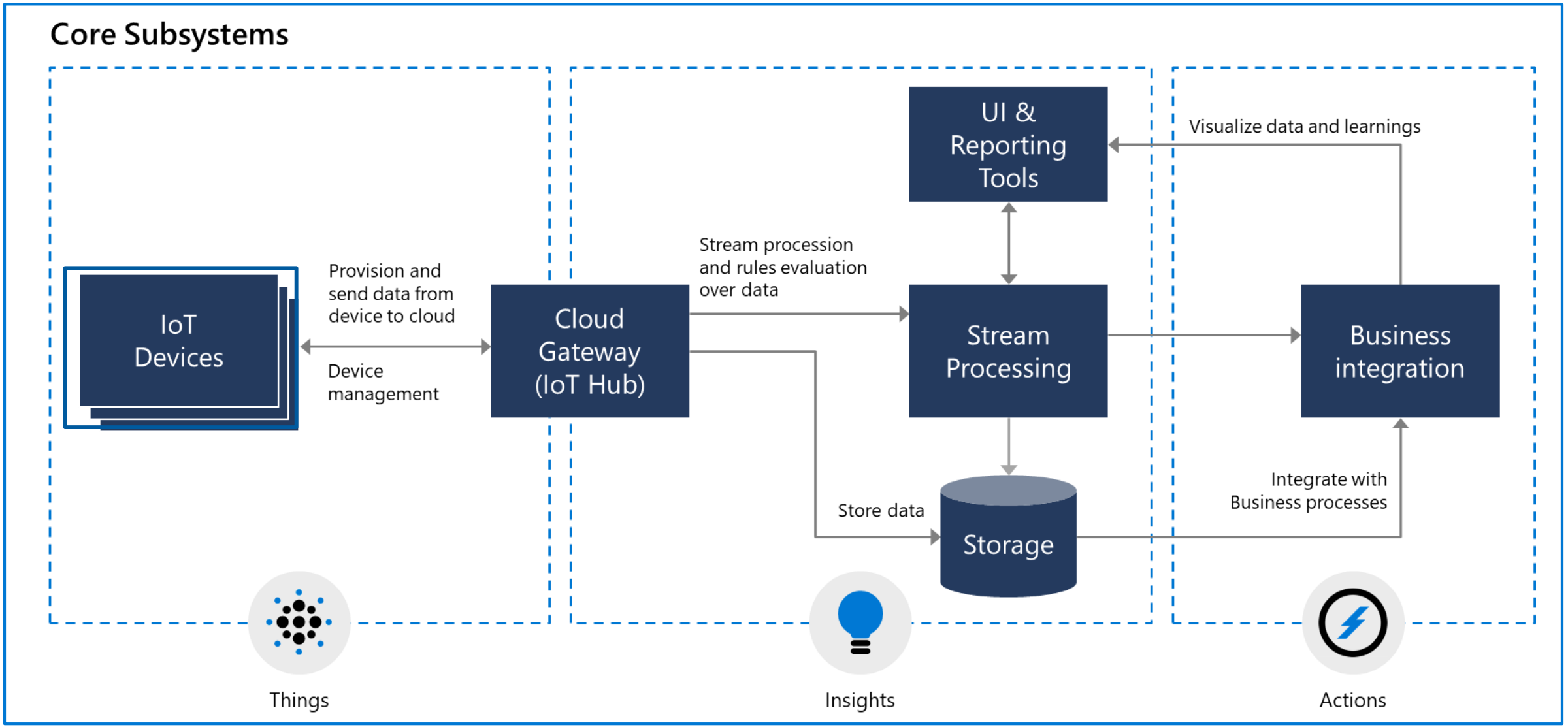
Describe the Azure IoT services and how they contribute to an IoT solution



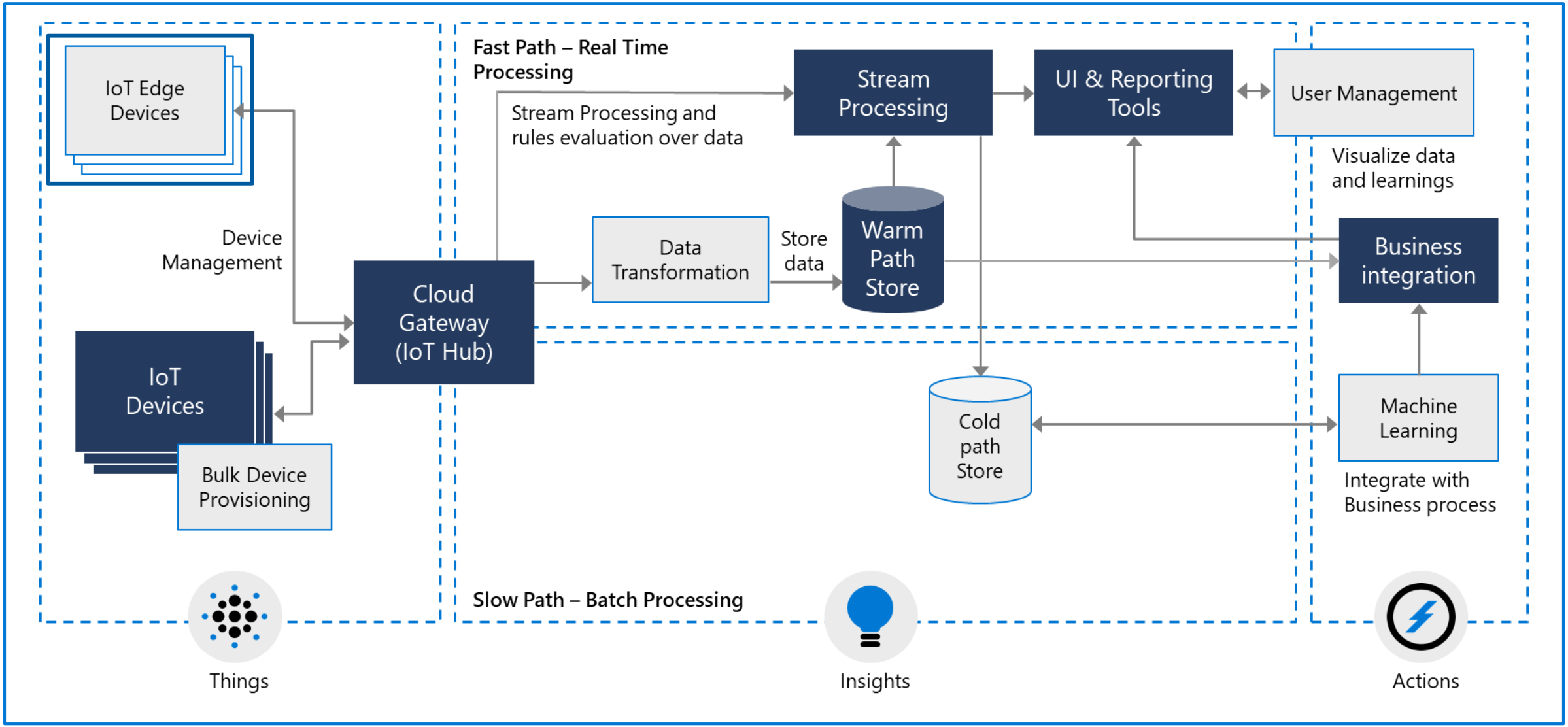
Create an azure account and use the Azure portal to create an IoT hub and device provisioning service

Lesson 2: Introduction to IoT solution architecture

Core subsystems of an IoT architecture

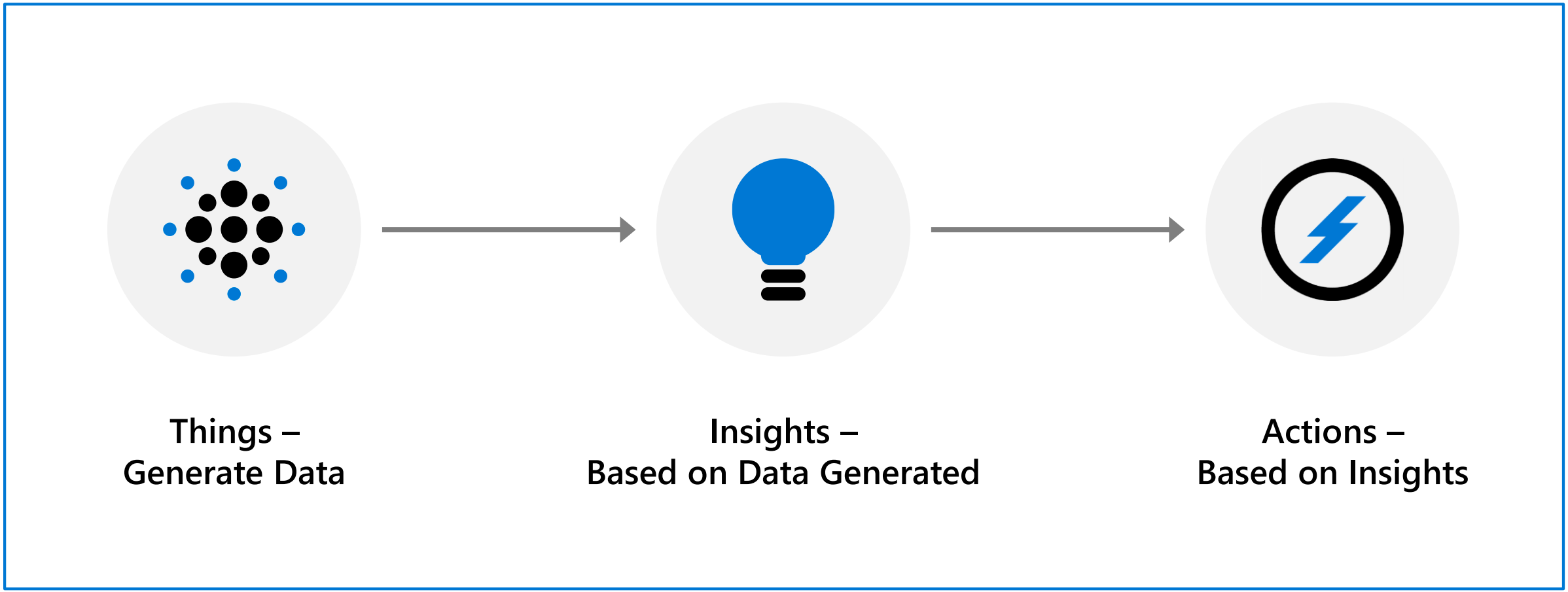


Optional subsystems of an IoT architecture



Data flow and processing

An IoT solution is all about the data… Data is generated by things, is processed and analyzed to generate insights, and these insights lead to actions…



Data flow and processing

An IoT solution is all about the data… Data workflows include routing, storage, analysis, and eventually actions or reports…

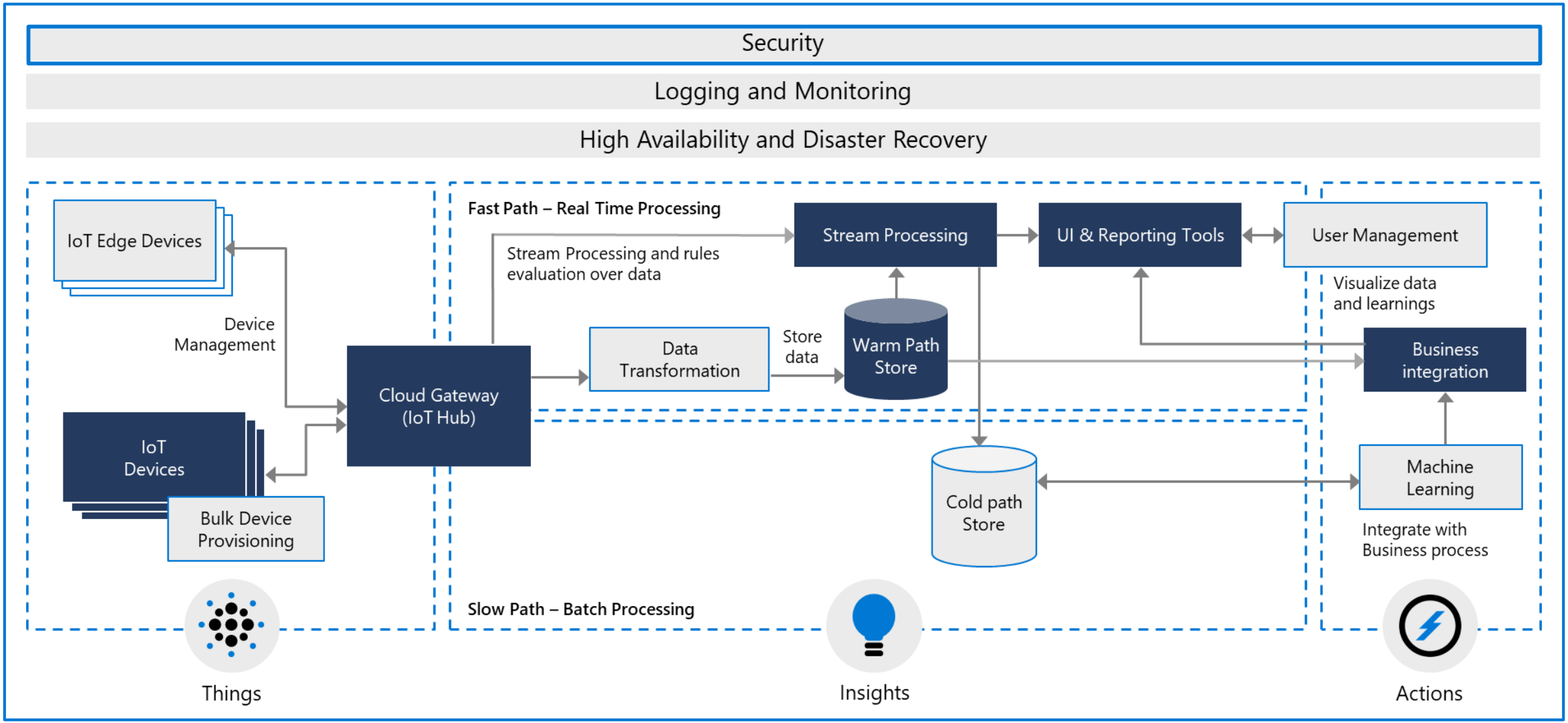
Routing makes decisions on what data should go to which target and when

Storage includes different locations for different needs

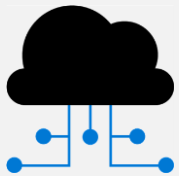
Analysis transforms inputs to outputs to produce *insights* while maintaining the original data

Actions/Displays report on the data and trigger *actions* (tasks) based on the data, either pre-analysis or post-analysis

Cross-cutting architectural needs



Lesson 3: IoT hardware and cloud services



IoT hardware components

IoT devices:

IP-enabled devices

Non-IP enabled devices

IoT edge devices

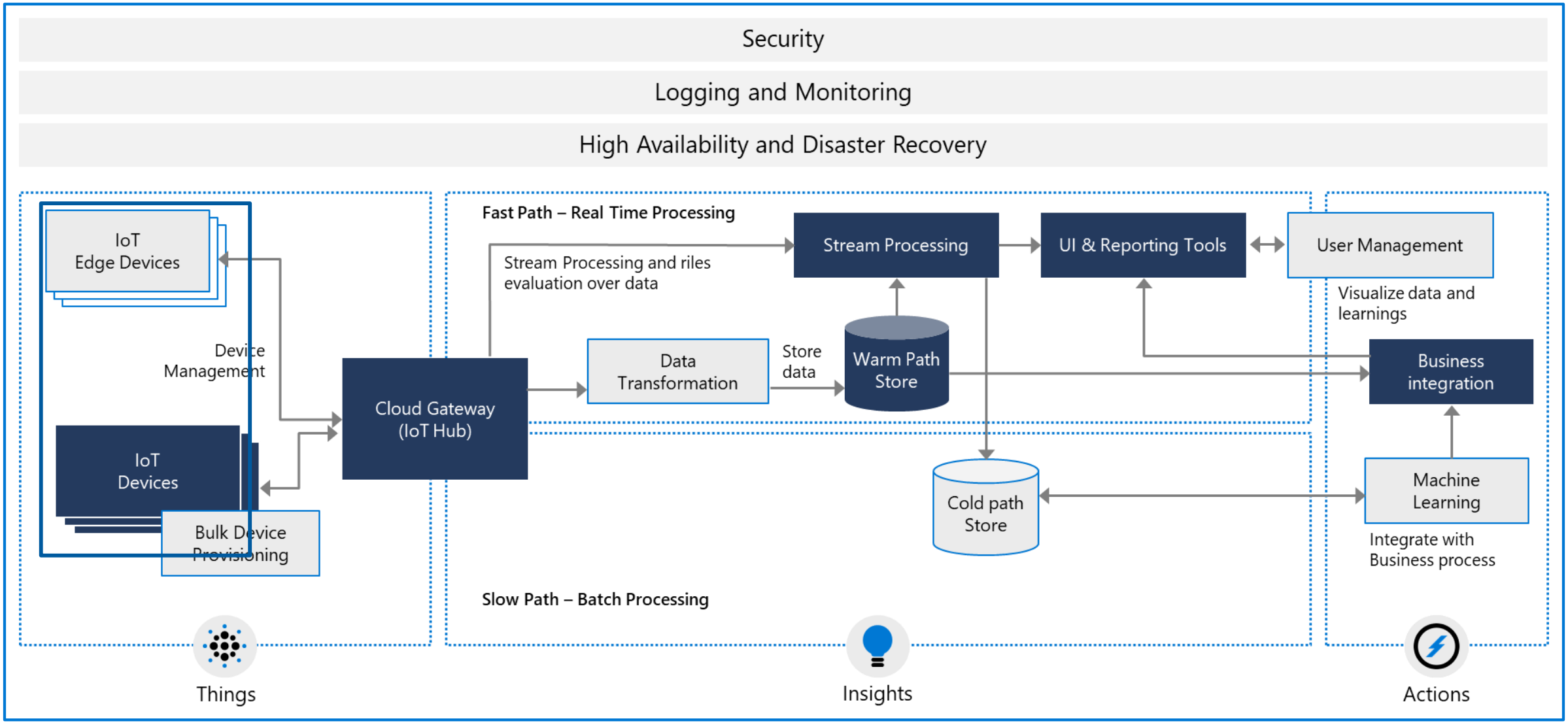
Other IoT hardware

Azure IoT technologies, services, and solutions

Azure Defender for IoT

IoT Central application templates	Retail	Health	Energy	Government
IoT Solutions	Azure IoT Central – managed application platform	Reference Architecture and Accelerators (PaaS)		Dynamics Connected Field Service (SaaS)
Azure Services for IoT	Azure IoT Hub Device Provisioning Service Azure Digital Twins Azure Time series Insights Azure Maps	Azure Stream Analytics Azure Cosmos DB Azure AI Azure Cognitive Services Azure ML Azure Logic Apps		Azure Active Directory Azure Monitor Azure DevOps Power BI Azure Data Share Azure Spatial Anchors
IoT and Edge Device Support	Azure Sphere Azure IoT Device SDK Azure IoT Edge Azure Data Box Edge	Windows IoT Azure Certified for IoT – Device Catalog Azure Stream Analytics Azure Storage		Azure ML Azure SQL Azure Functions Azure Cognitive Services

Microsoft offerings



Introduction to IoT device software

OS Support:

Windows 10 IoT	Ubuntu Core
Riot	QNX
Android Automotive	etc.

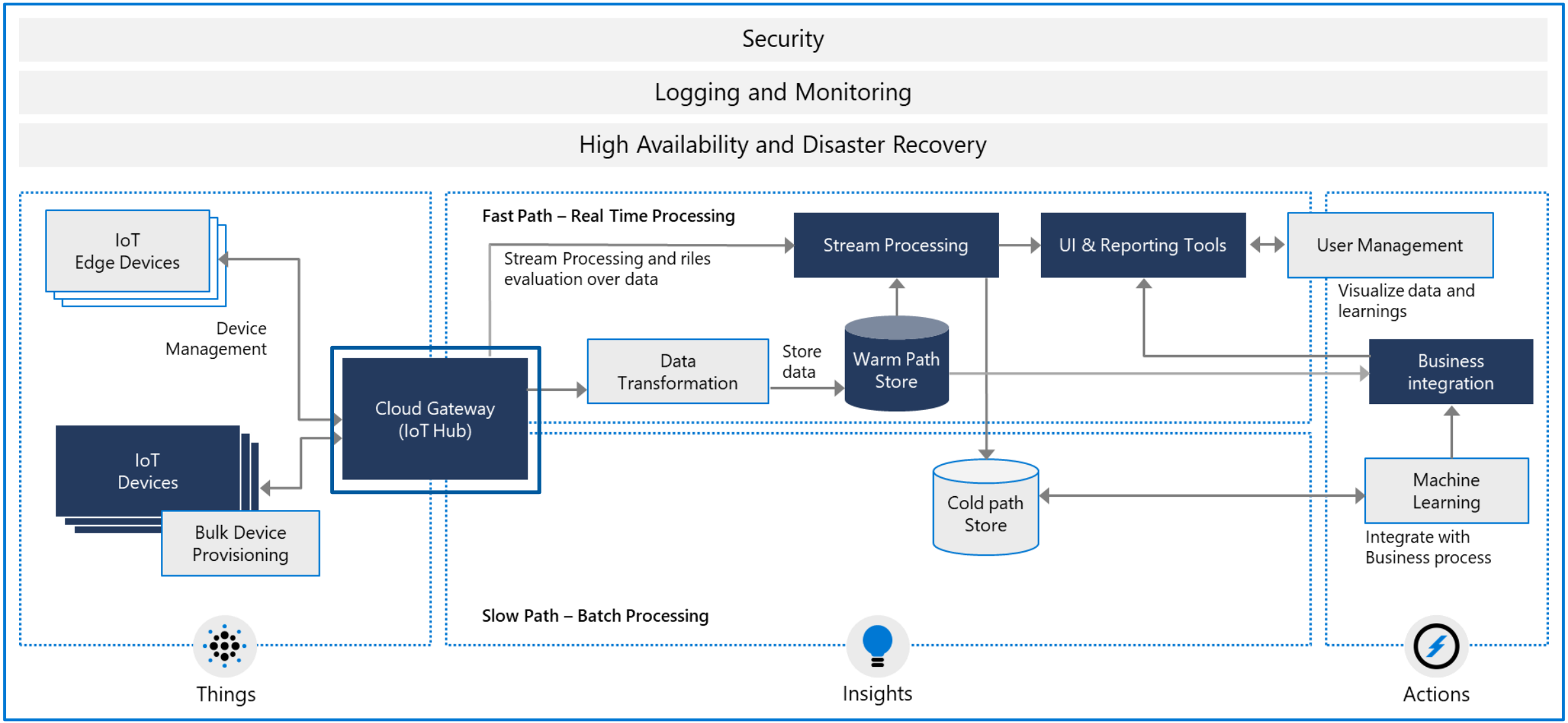
Programming Language Support:

C/C++	Java
C#	Python
etc.	

Software Development Kits:

Device SDKs	Service SDKs	Device Provisioning SDKs

Microsoft offerings

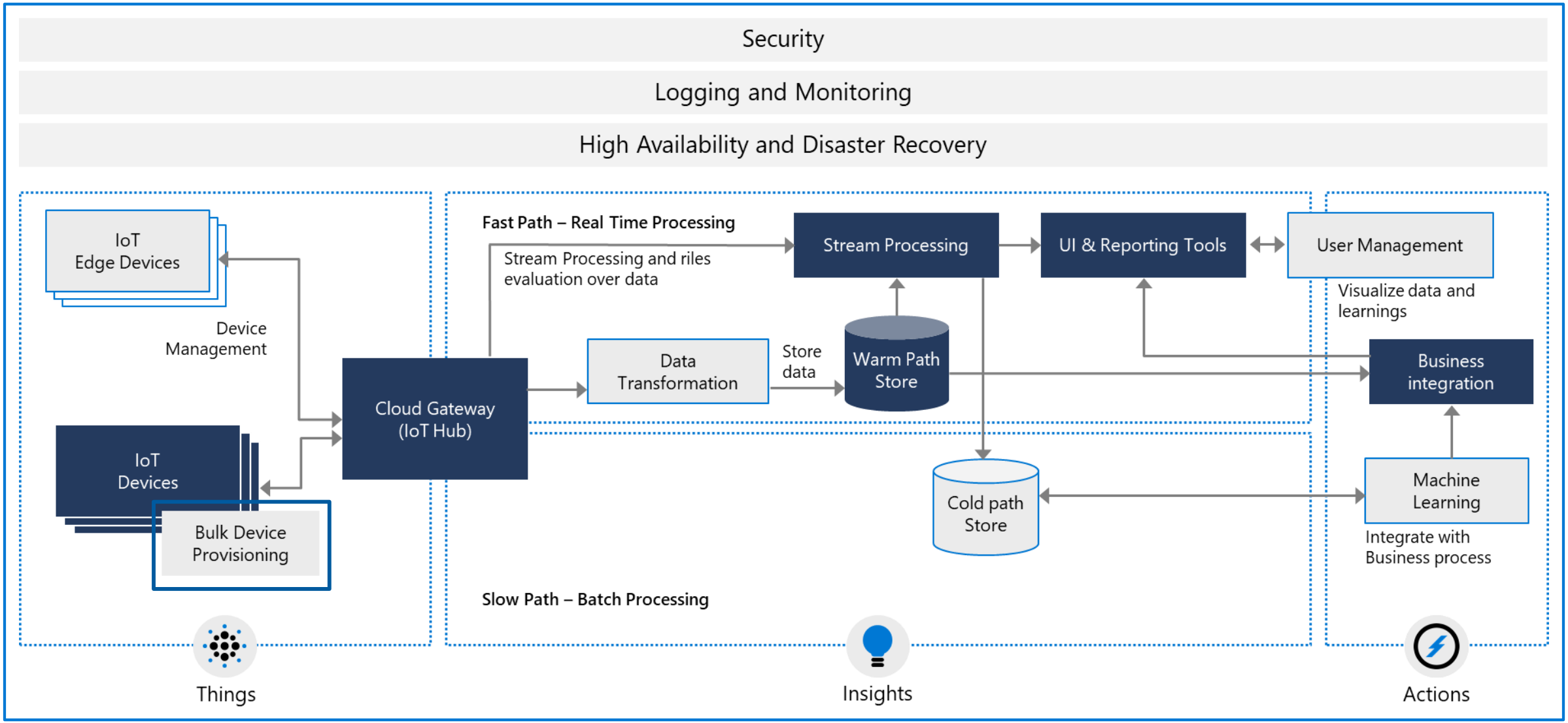


Features of Azure IoT Hub

Azure IoT Hub provides feature support in the following areas:

Security	Scalability	Routing
Service Integration	Device management	Monitoring

Microsoft offerings

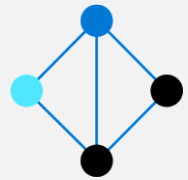


Features of Azure IoT Hub Device Provisioning Service

Features of the Device Provisioning Service include:

- Secure attestation
- Enrollment list
- Allocation policies
- Monitoring
- Multi-hub support

Lesson 4: Course lab scenario



Scenario overview

Contoso – cheese manufacturing and shipping:

Monitor product temperature and humidity in the factory and warehouses

Monitor vehicles during shipping

Support factory equipment

Your role as an Azure IoT developer:

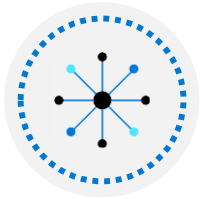
Device configuration and lifecycle management

Support data analytics and architect roles

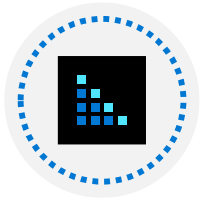
Implement Azure IoT Edge scenarios

Lab naming and region

Resource group name is specific and given in the lab

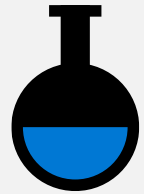


Azure resources (IoT Hub, DPS, etc.) will be assigned unique names when required by applying a Unique ID ***{your-id}*** composed of your initials plus **YYMMDD**, e. g. "**iot-az220-training-cah191216**"



Everything should be in the same region

Lesson 5: Module 1 labs

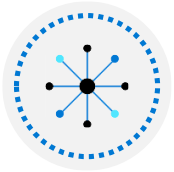


Module 1 labs

Lab 1: Getting started with Azure:

You will explore the Azure portal and examine some ways that you can customize the UI

You will create a custom dashboard that you can use during this course and populate it with a resource group tile



Lab 2: Getting started with Azure IoT services:

You will use the Azure portal to create an IoT Hub resource

You will use the Azure portal to explore the features and capabilities of your new IoT Hub

You will use the Azure portal to create an instance of the IoT Hub Device Provisioning Service

You will link your IoT Hub and Device Provisioning Service

You will use the Azure portal to explore the features and capabilities of your new Device Provisioning Service

Lesson 6: Module review questions

Module review: Question 1.1

Security is an important consideration and should be included on the architecture diagram for an IoT solution.

Where should security be referenced on the architecture diagram?

Answer A:
Security is associated primarily with communication between the Cloud Gateway and the other services/devices and should appear next to Cloud Gateway on the diagram.

Answer B:
Security is associated with all subsystems of the solution and should appear across the top of the diagram.

Answer C:
Security is associated primarily with cloud services and should appear on the cloud side of the diagram.

Module review: Question 1.2

Reviewers notice the term “cloud gateway” listed on the architecture diagram for an IoT solution.

What is the primary purpose of the cloud gateway?

Answer A:
It facilitates the execution of actions based on insights garnered from device telemetry data during stream processing.

Answer B:
It provides secure connectivity, telemetry and event ingestion, and device management capabilities.

Answer C:
It provides immediate and long-term access to telemetry data.

Module review: Question 1.3

What type of device can connect to IoT Hub directly without additional hardware?

Answer A:
A sensor device

Answer B:
A non-IP enabled device

Answer C:
An IP-enabled device

Module review: Question 1.4

A small company needs a fully managed IoT solution that can be started quickly and operated with minimal IoT experience.

Which of the following options should they select?

Answer A:
A solution that implements IoT Hub, IoT Hub Device Provisioning Service, Stream Analytics, and Cosmos DB.

Answer B:
A solution that implements IoT Hub and Azure Blob storage.

Answer C:
A solution that implements IoT Central.

Module review: Question 1.5

What is the Azure Dashboard?

Answer A:
The Azure dashboard is the first page presented to a new Azure services subscriber.

Answer B:
The Azure dashboard is a customizable view of the resources in your subscription that matter most to you.

Answer C:
The Azure dashboard is a web-based graphical user interface console that is used to manage your Azure subscription.

Module review: Question 1.6

Which of the following describes the Azure portal?

Answer A:
The Azure portal is a menu that can be docked or displayed as a flyout panel.

Answer B:
The Azure portal is a non-customizable page that compiles resources that help you get the most from your Azure subscription.

Answer C:
The Azure portal is a web-based graphical user interface console that is used to manage your Azure subscription.

Module review: Question 1.7

Which of the following statements about creating an IoT Hub in the Azure portal are correct?

Answer A:
The free scale tier (F1) is selected by default.

Answer B:
The following parameters are marked as required in the UI: Subscription, Resource group, IoT hub name, Region, scale tier.

Answer C:
Defender for IoT is set to Off by default and must be set to On (enabled) in order to create an instance of IoT Hub.

Module review: Question 1.8

Which of the following accurately describes a capability of Azure IoT Hub?

Answer A:
IoT Hub message routing can be configured for multiple endpoints at an additional cost.

Answer B:
IoT Hub enables communication from device-to-cloud only.

Answer C:
IoT Hub scales to millions of simultaneously connected devices.