O'REILLY®

Azure Application Development

Creating Applications for the Microsoft Cloud

November/2022

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Cloud Consultant

 @zaalion

Questions & Resources

- Please port questions in the Q&A widget

- Course repository

  - https://github.com/zaalion/oreilly-application-dev-azure

- Reach out:

  - Twitter: @zaalion

Azure Application Development

- Azure Storage and Data platforms

- Azure Application platforms

- Application and Data Security

- Implement Communications

- Azure VMs and Containers

- Logging and Monitoring
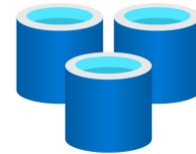
AZ-204

- Exam AZ-204:

  https://docs.microsoft.com/en-us/learn/certifications/exams/az-204

- Skills measured :

  https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4oZ7B

Azure Storage and Data Services

- Azure Storage Accounts

- Azure Cosmos DB

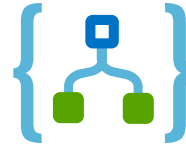- Azure SQL Database

- Azure Cache for Redis

Azure VMs and Containers (IaaS)

- Azure VMs

- Running containers in Azure (ACR, ACI, AKS, Azure Container Apps)

Azure Application Platforms

- Azure App Services
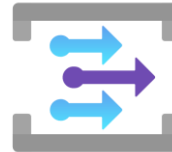
- Function Apps

- Logic Apps

Application and Data Security

- Azure Active Directory (AAD)

- RBAC and Managed Identity (MSI)

- Azure Key Vault

Implement Communications

- Azure Storage Queues

- Azure Service Bus Queues and Topics

- Azure Event Hubs

- Azure IoT Hub

- Azure Event Grid

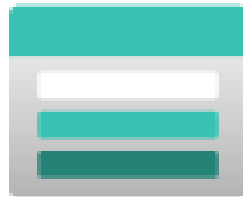# Logging and Monitoring

- Alerts and Metrics

- Application Insights

- Azure Log Analytics Workspace

Azure Storage and Data Services

Azure Storage Account

Contains all Azure Storage data objects, including blobs, file shares, queues, and tables.
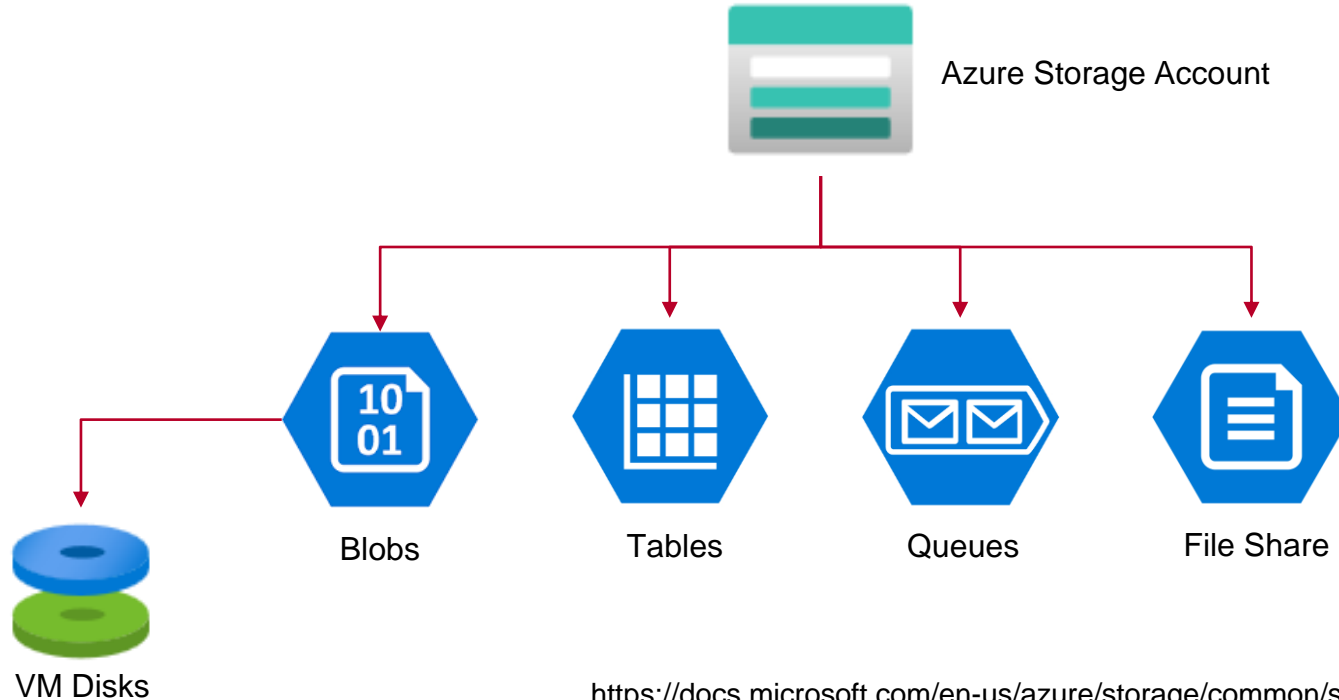
Azure Storage Account

- Accessible from around the globe over HTTP(S)

- Store blobs, tables, queues, and file shares

- Access via public and private endpoints

- Financially-backed SLA

- Security-in-depth (firewall, in transit, at rest)

https://docs.microsoft.com/en-us/azure/storage/common/storage-account-overview

Azure Storage Services

Azure Storage Account

VM Disks Blobs Tables Queues File Share

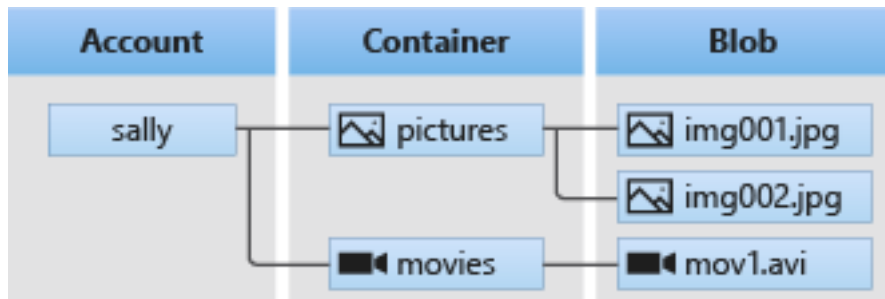https://docs.microsoft.com/en-us/azure/storage/common/storage-introduction
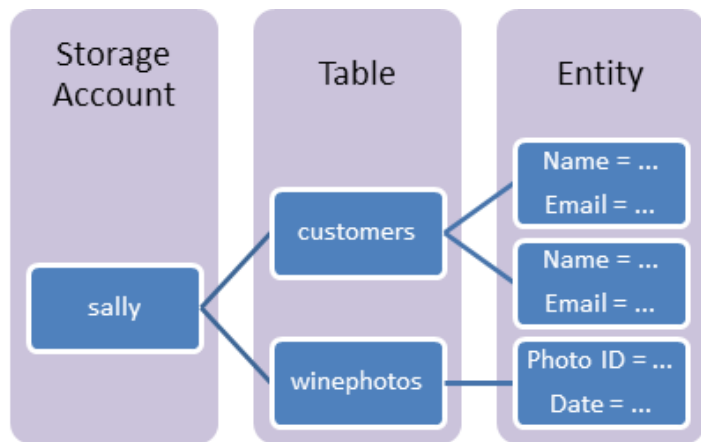
Azure Storage Account: Blobs

A scalable object store for text/binary files (unstructured data). Also includes support for big data analytics through Data Lake Storage Gen2

Azure Storage Account: Tables

Stores non-relational structured data (structured NoSQL) in the cloud, providing a key/attribute store with a schema-less design
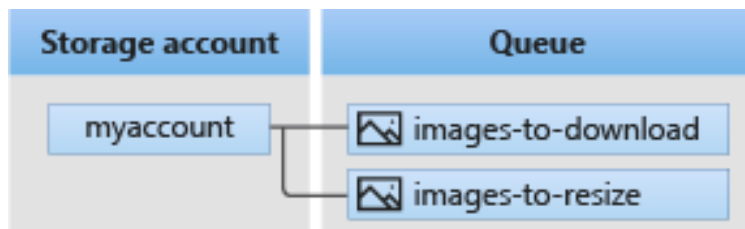
Azure Storage Account: Queues

- Stores a large number of messages in a queue data structure

- A queue message can be up to 64 KB in size (use Service Bus for bigger messages)

- Create a backlog of work to process asynchronously

Azure Storage Account: Files

- File shares in the cloud that are accessible via the industry standard Server Message Block (SMB) protocol, Network File System (NFS) protocol, and Azure Files REST API

https://docs.microsoft.com/en-us/azure/storage/files/storage-files-introduction

Storage Account Redundancy Option

- Locally redundant storage

- Zone-redundant storage

- Geo-redundant storage

- Geo-zone-redundant storage

https://docs.microsoft.com/en-us/azure/storage/common/storage-redundancy
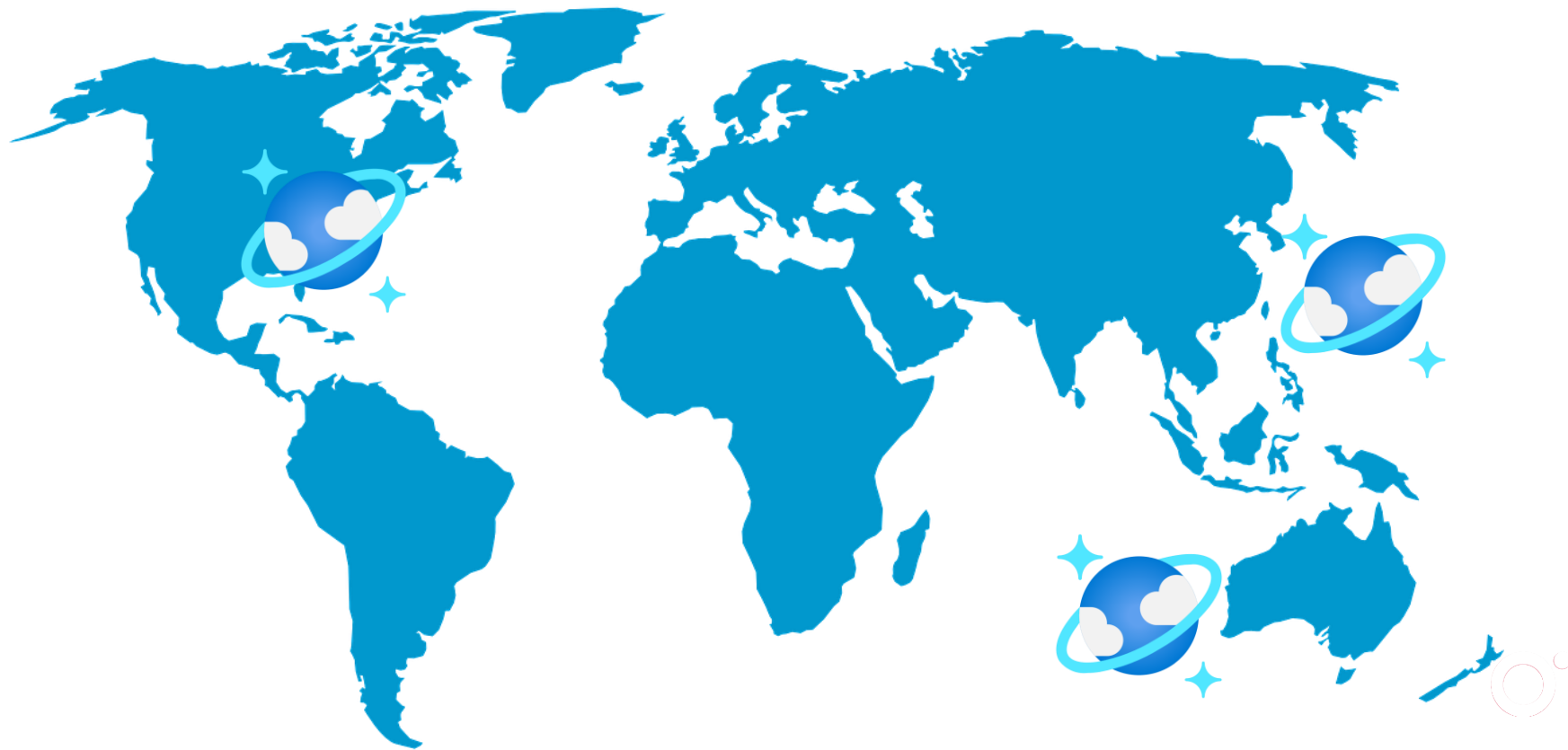
Azure Cosmos DB

- A fully-managed NoSQL database for modern app development

  - Azure Cosmos DB for NoSQL

  - Azure Cosmos DB for MongoDB

  - Azure Cosmos DB for Apache Cassandra

  - Azure Cosmos DB for Apache Gremlin

  - Azure Cosmos DB for Table

  - Azure Cosmos DB for PostgreSQL

Azure Cosmos DB Consistency

Strong	Bounded Staleness	Session	Consistent Prefix	Eventual

Stronger Consistency → **Weaker Consistency**

Higher availability, lower latency, higher throughput →

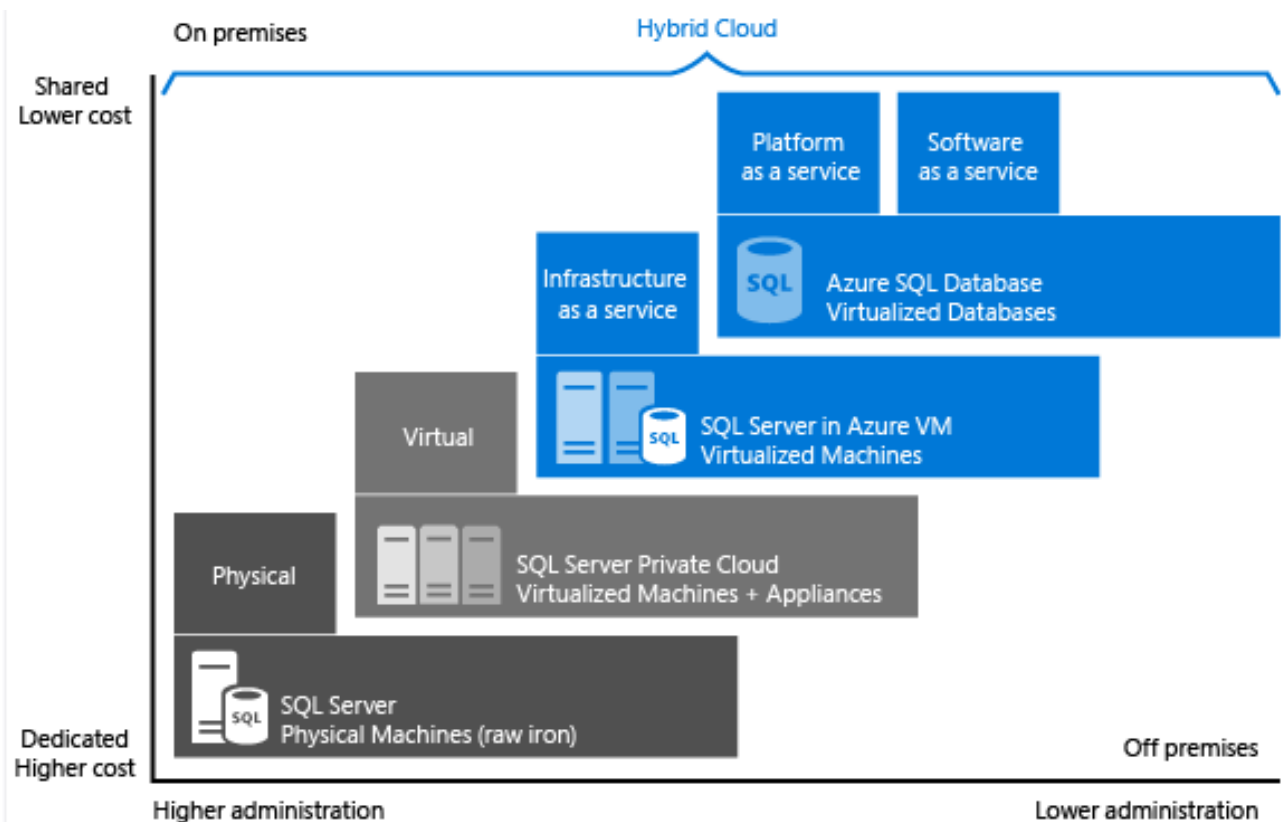# Azure Cosmos DB Multi-region Writes

Azure SQL

- Azure SQL is a family of managed, secure, and intelligent products that

  use the SQL Server database engine in the Azure cloud
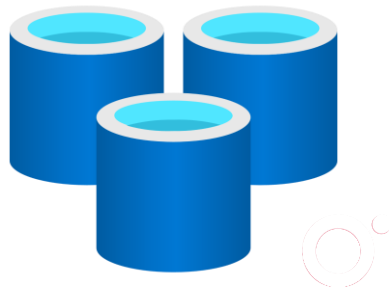
Azure SQL

Azure SQL (Database)

- Azure SQL Database offers the following deployment options:

- Single database

- Elastic pool

Azure Cache for Redis

- Azure Cache for Redis provides an in-memory data store based on the Redis cache engine.

- Basic

- Standard

- Premium

- Enterprise

- Enterprise Flash
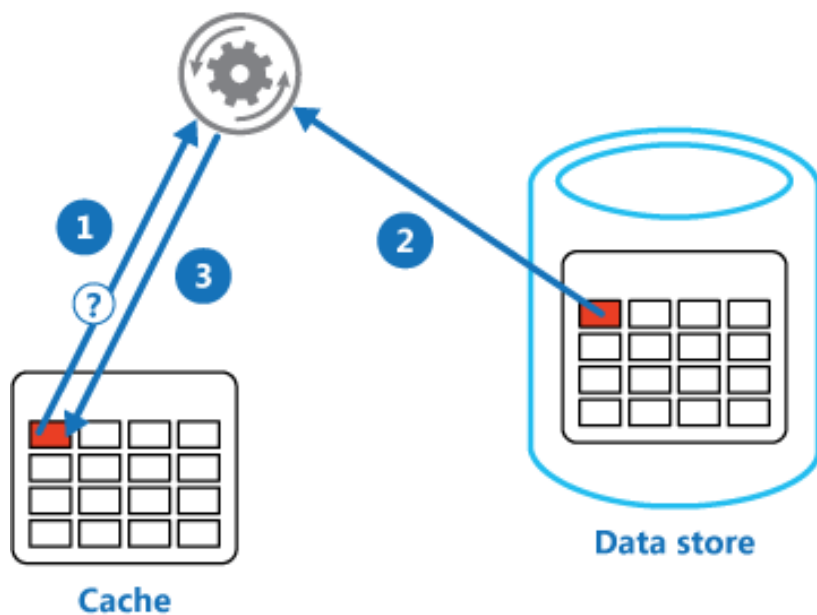
Cache

Data store

1: Determine whether the item is currently held in the cache.
2: If the item is not currently in the cache, read the item from the data store.
3: Store a copy of the item in the cache.

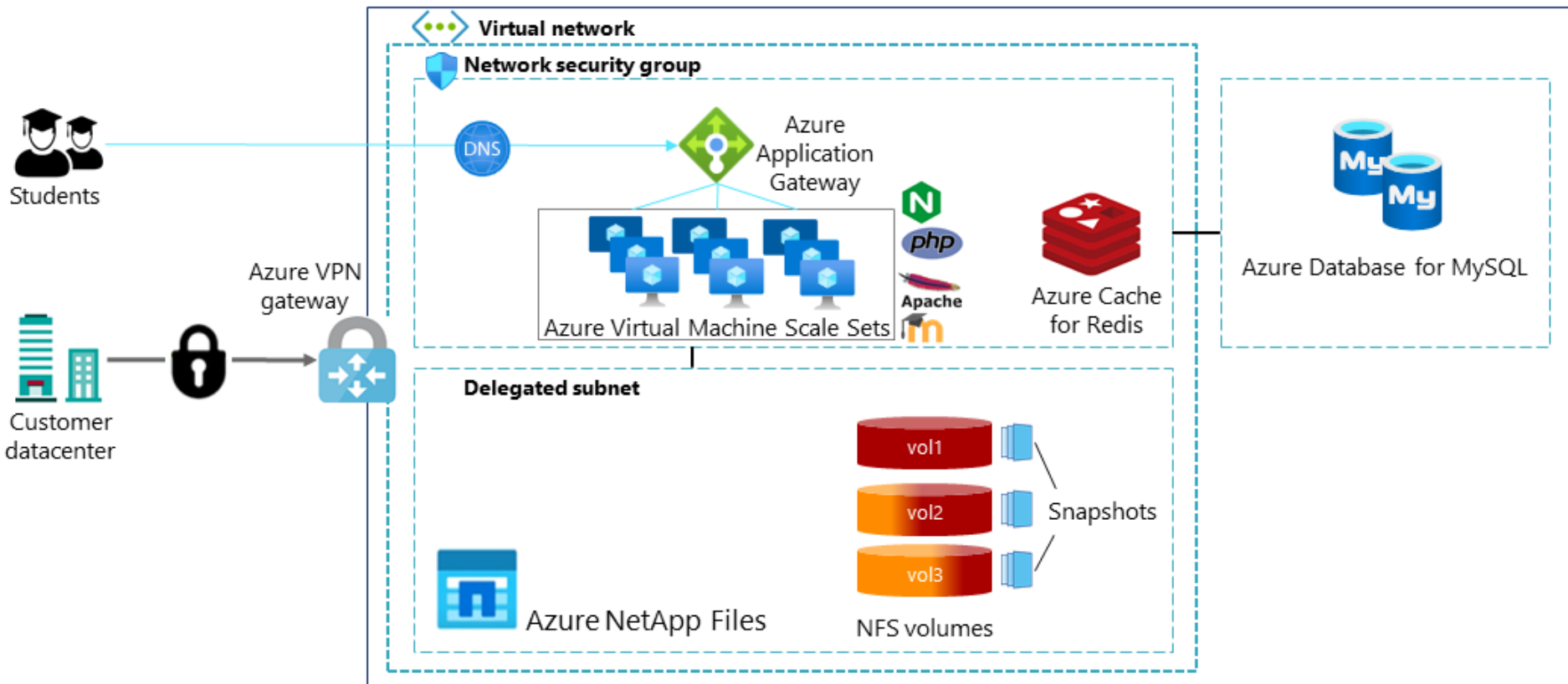# Hosting Azure Applications

App Services

- Azure App Service is an HTTP-based service for hosting web applications,

  REST APIs, and mobile back ends

- Windows and Linux

- Shared , dedicated and isolated compute
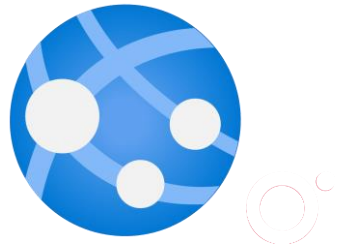
Azure Functions

- Azure Functions is a serverless solution that allows you to host your

  applications in Azure

- Triggers, Input & output bindings

- Durable Functions is an extension of Azure Functions that lets you write

  stateful functions in a serverless compute environment.

Azure Logic Apps

- A cloud service that helps you schedule, automate, and orchestrate tasks,

  business processes, and workflows when you need to integrate apps, data,

  systems, and services across enterprises or organizations.

- Has a visual designer, also use ARM-like syntax to develop
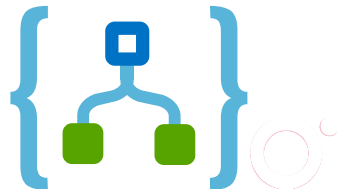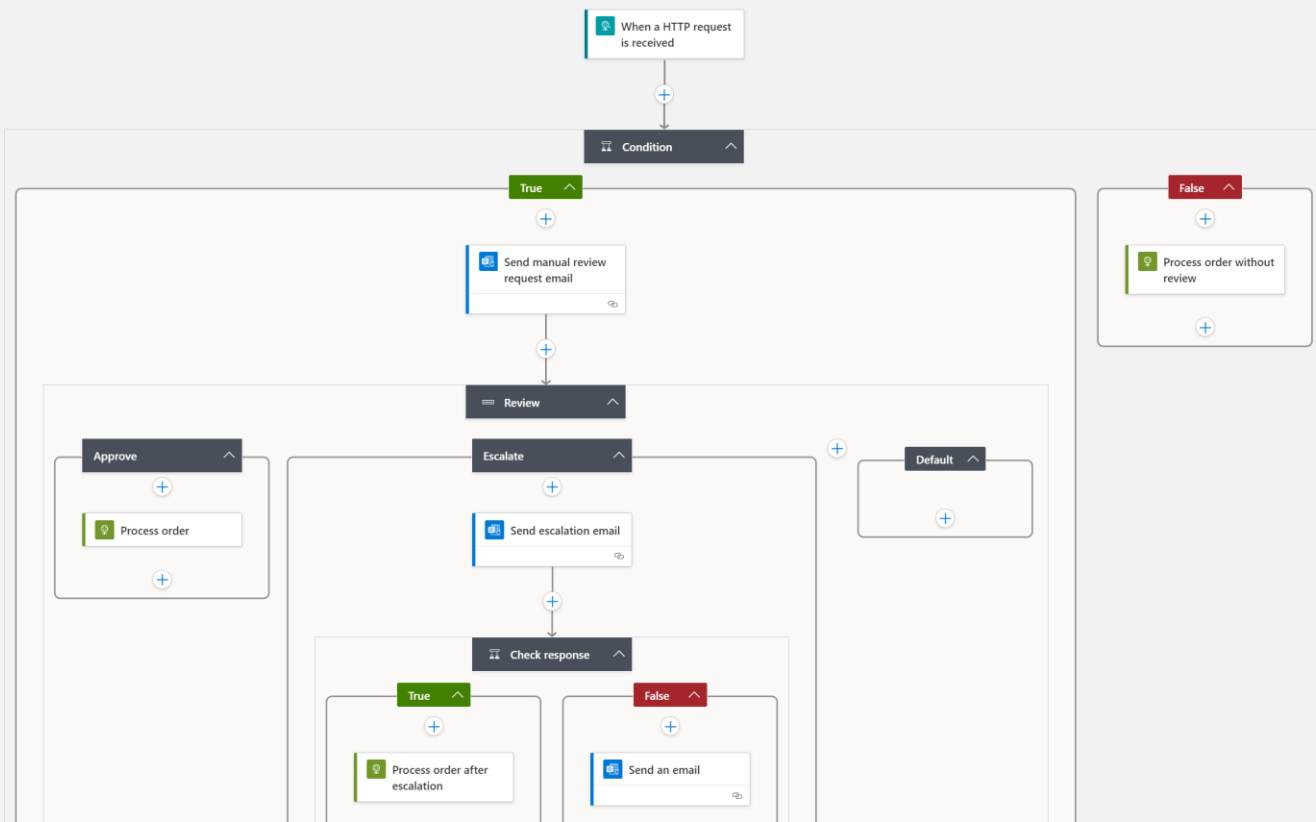
Application and Data Security

Azure Active Directory

- Azure Active Directory (Azure AD) is Microsoft's cloud-based identity and

  access management service.

Azure Active Directory

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- Define identities for humans and processes

- Grant access over resources/application to the above identities using RBAC/Access Policies
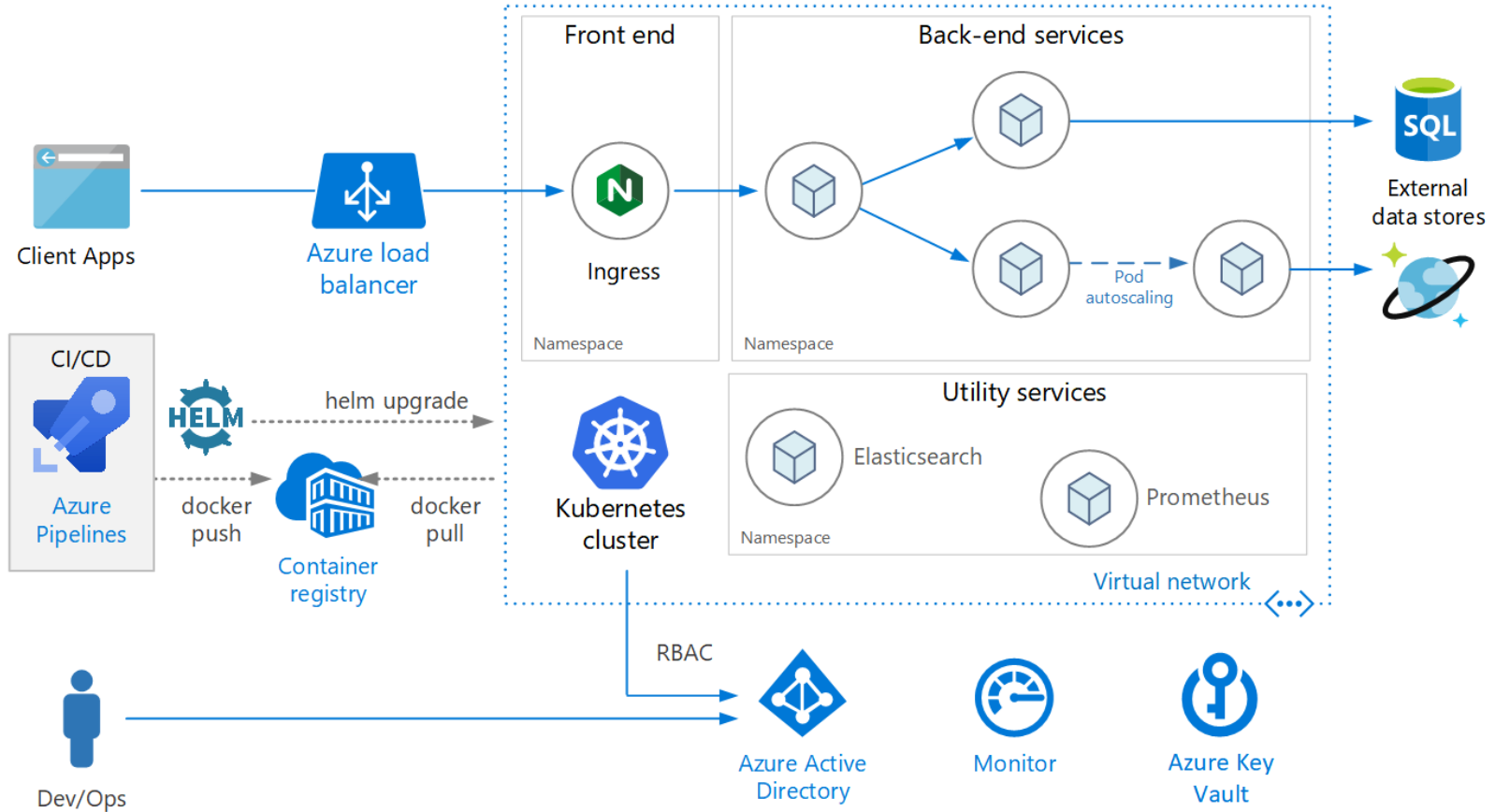
Managed Identity

- Is an Azure Active Directory (Azure AD) service

- Eliminates the need to manage credentials. (App id, secrets, tenant ids, etc.)

- Provide an identity for applications and services to use when connecting to

  resources that support Azure Active Directory (Azure AD) authentication

Azure Key Vault

- Helps securely store secrets, keys and certificates in Azure

- Secrets Management (tokens, passwords, API keys, etc.)

- Key Management (encryption keys used to encrypt your data)

- Certificate Management (private TLS/SSL certificates)
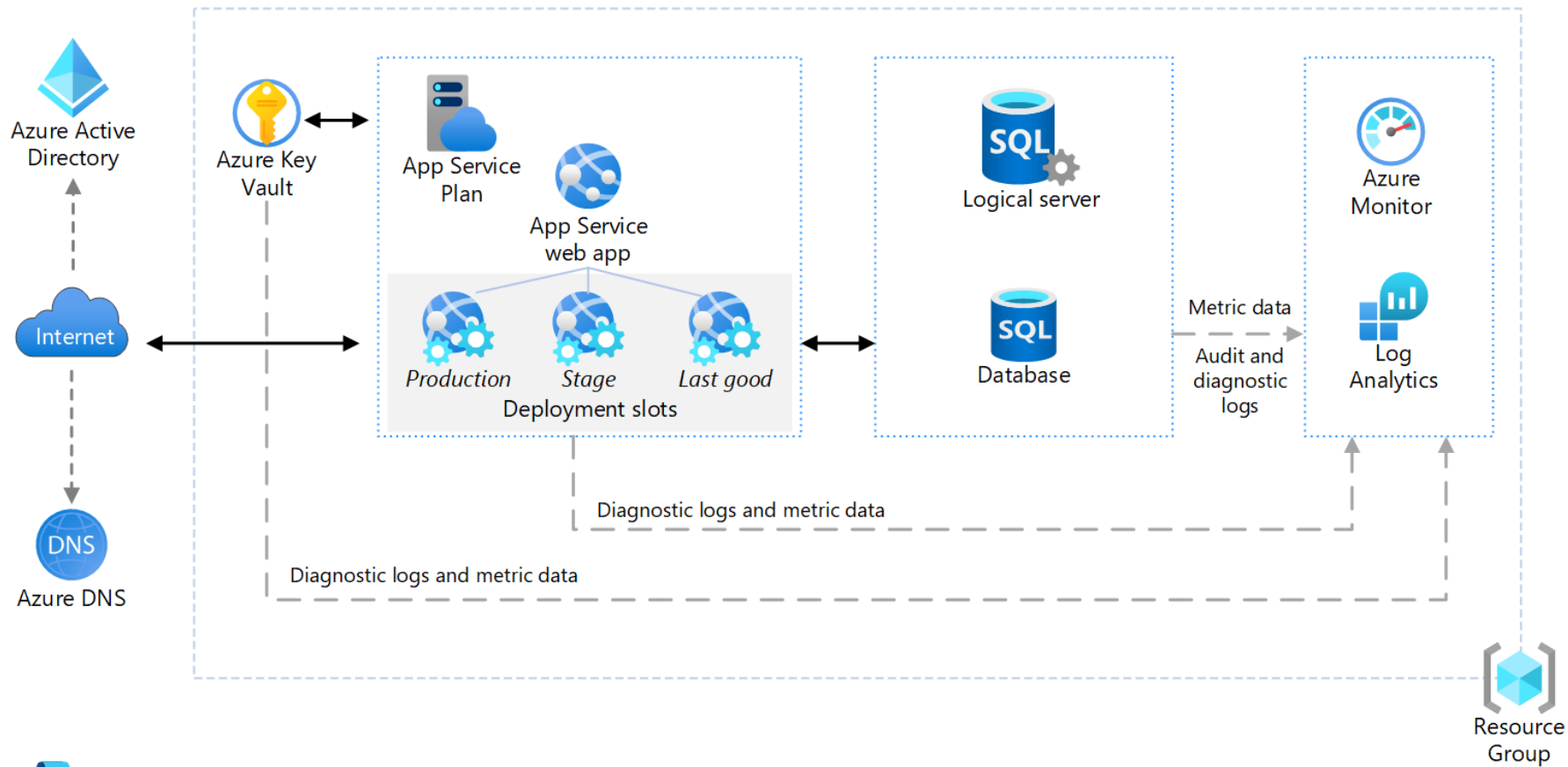
Azure Active Directory

Azure Key Vault

App Service Plan

App Service web app

Production

Stage

Last good

Deployment slots

Internet

Logical server

SQL

Database

Metric data

Audit and diagnostic logs

Azure Monitor

Log Analytics

DNS

Azure DNS

Diagnostic logs and metric data

Diagnostic logs and metric data

Resource Group

Microsoft Azure

Implement Communications

Azure Storage Queues

- A service for storing large numbers of messages

- A queue message can be up to 64 KB in size

- FIFO is intended but not guaranteed

- More affordable comparing to Azure Service Bus queues.

Azure Storage Queues

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- FIFO is intended but not guaranteed

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Service Bus Queues and Topics

- Azure Service Bus supports a set of cloud-based,

  message-oriented middleware technologies including

  reliable message queuing and durable

  publish/subscribe messaging.

- Queues (single receiver)

- Topics (multiple subscribers)

Tasks

Message queue

Service

Requests received at a variable rate

Messages processed at a more consistent rate
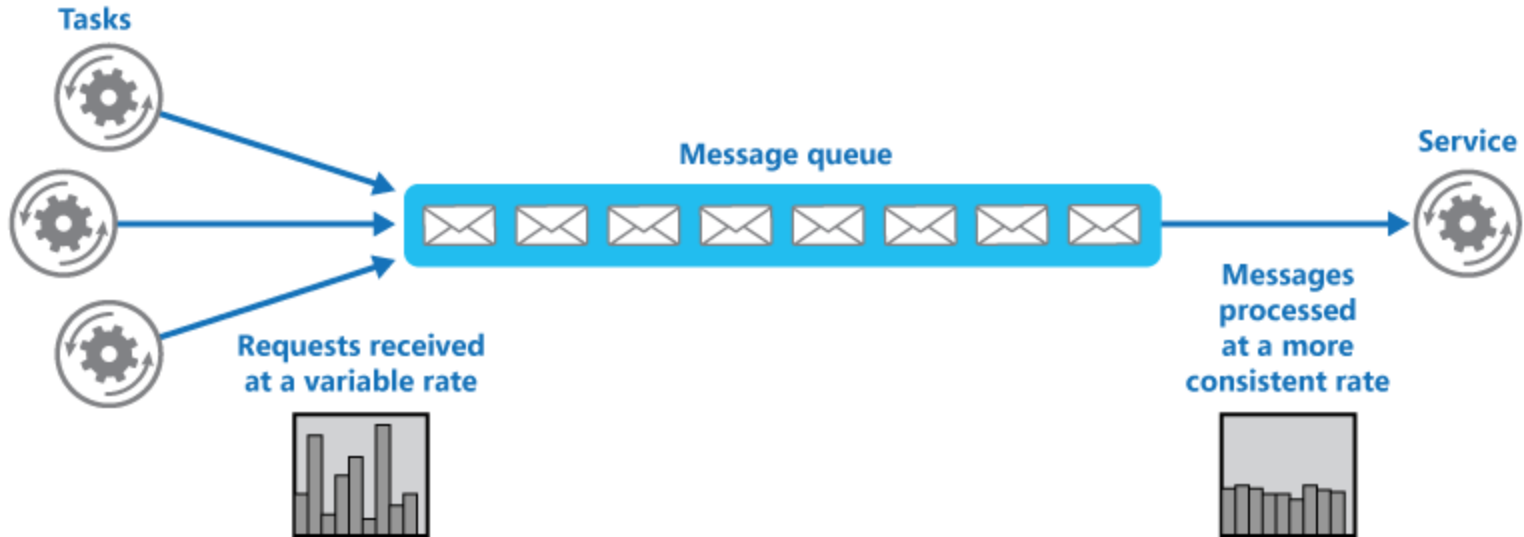
Azure Event Hubs

- Azure Event Hubs is a big data streaming platform and event ingestion service.

- Anomaly detection (fraud/outliers)

- Application logging

- Transaction processing

- User telemetry processing

- Device telemetry streaming

Azure Event Hubs

All mobile-phone call metadata → **1** → Event Hubs → **2** → Stream Analytics (**3**) → **4** → Fraudulent call metadata (Blob Storage)

Microsoft Azure
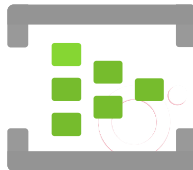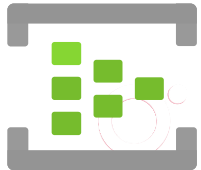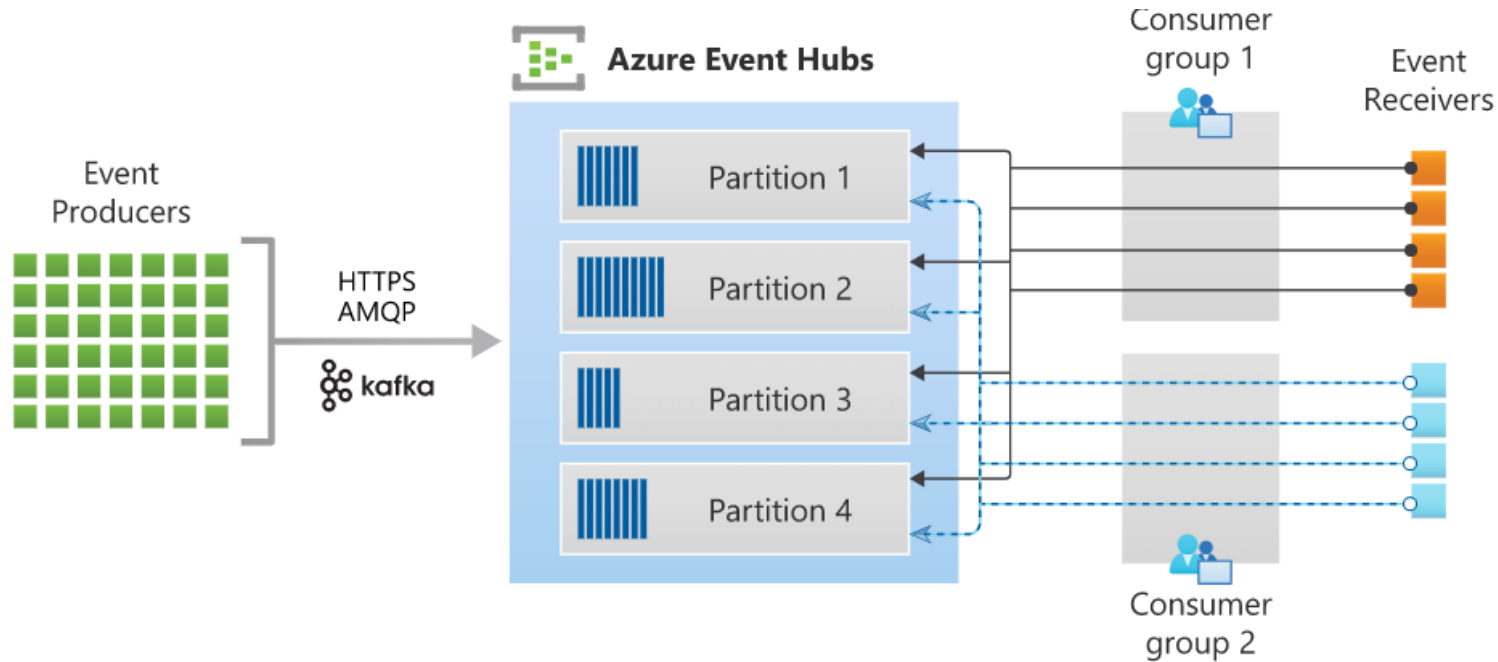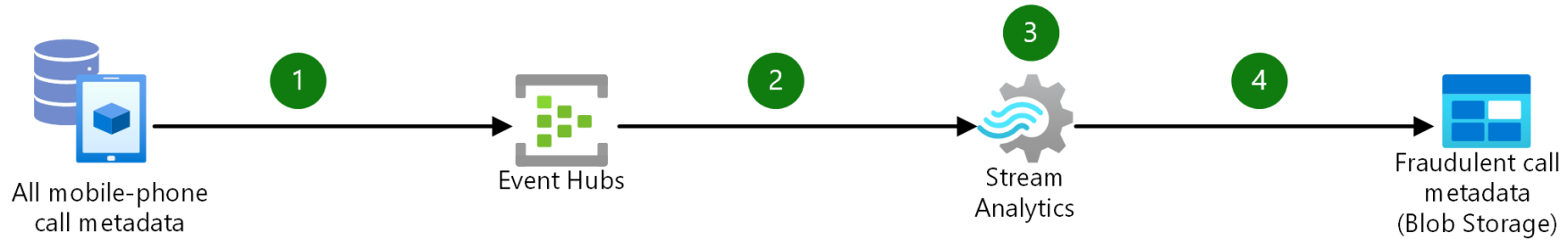
Azure IoT Hub

- A <u>managed service</u> that acts as a central message hub for communication between an IoT application and its attached devices.

- Device-to-cloud (d2c) messaging

- Cloud-to-device (c2d) messaging

- Ingesting millions of messages per minute
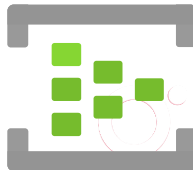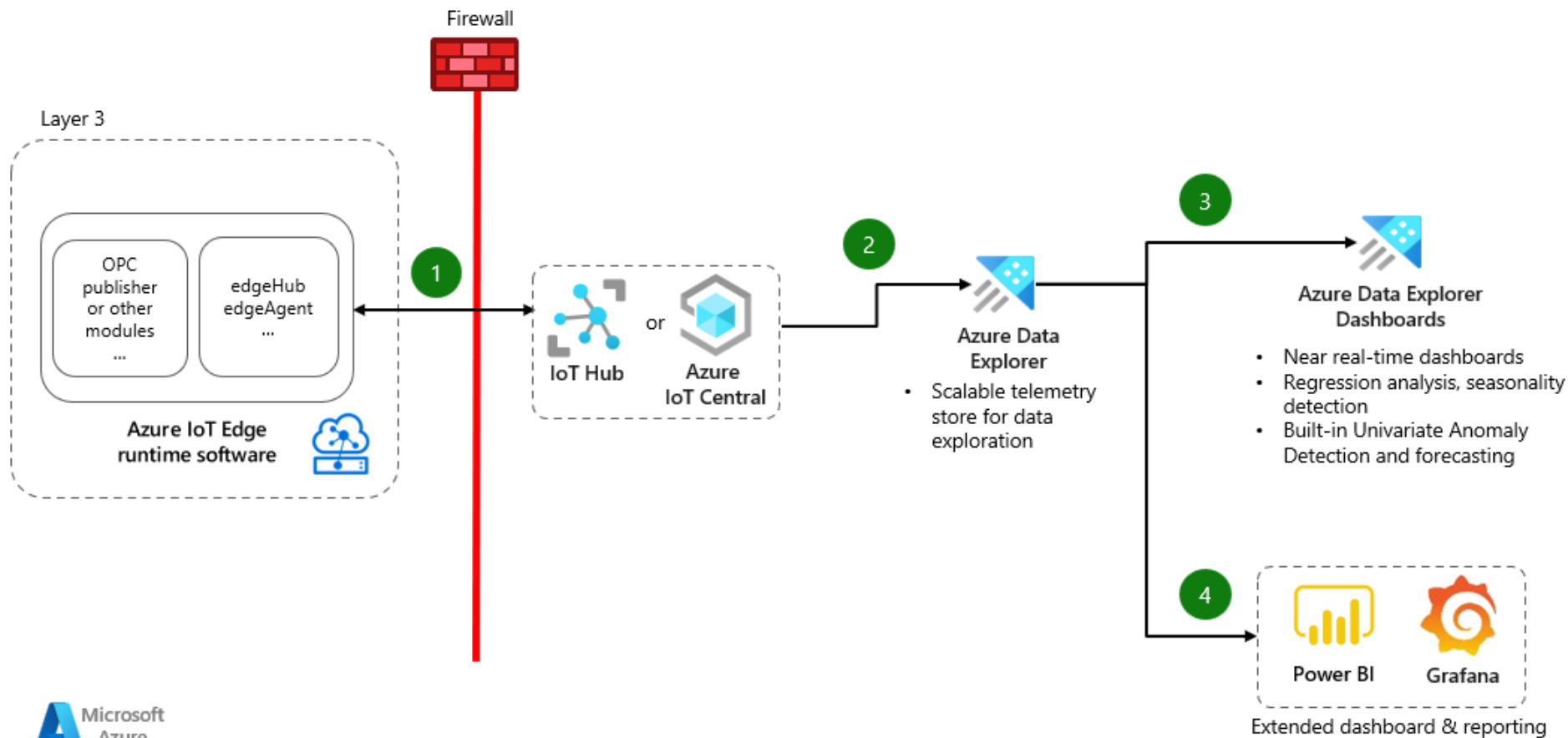
Azure Event Grid

- Azure Event Grid allows you to easily build applications with event-based architectures.

- Event sources (Azure App Configuration, Azure Blob Storage, Azure Communication Services, …)

- Event handlers (Azure Functions, Event Hubs, etc.)

Azure Event Grid

Image uploads

Storage account

Azure Blob Storage

Event trigger

1

Azure Event Grid

API / event processor

2

Azure Functions

3

Computer Vision API

Data storage

4

Azure Cosmos DB

Web or mobile front-end

5

Microsoft Azure
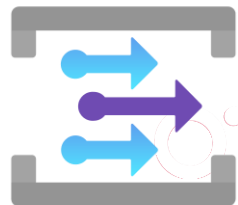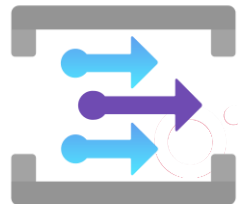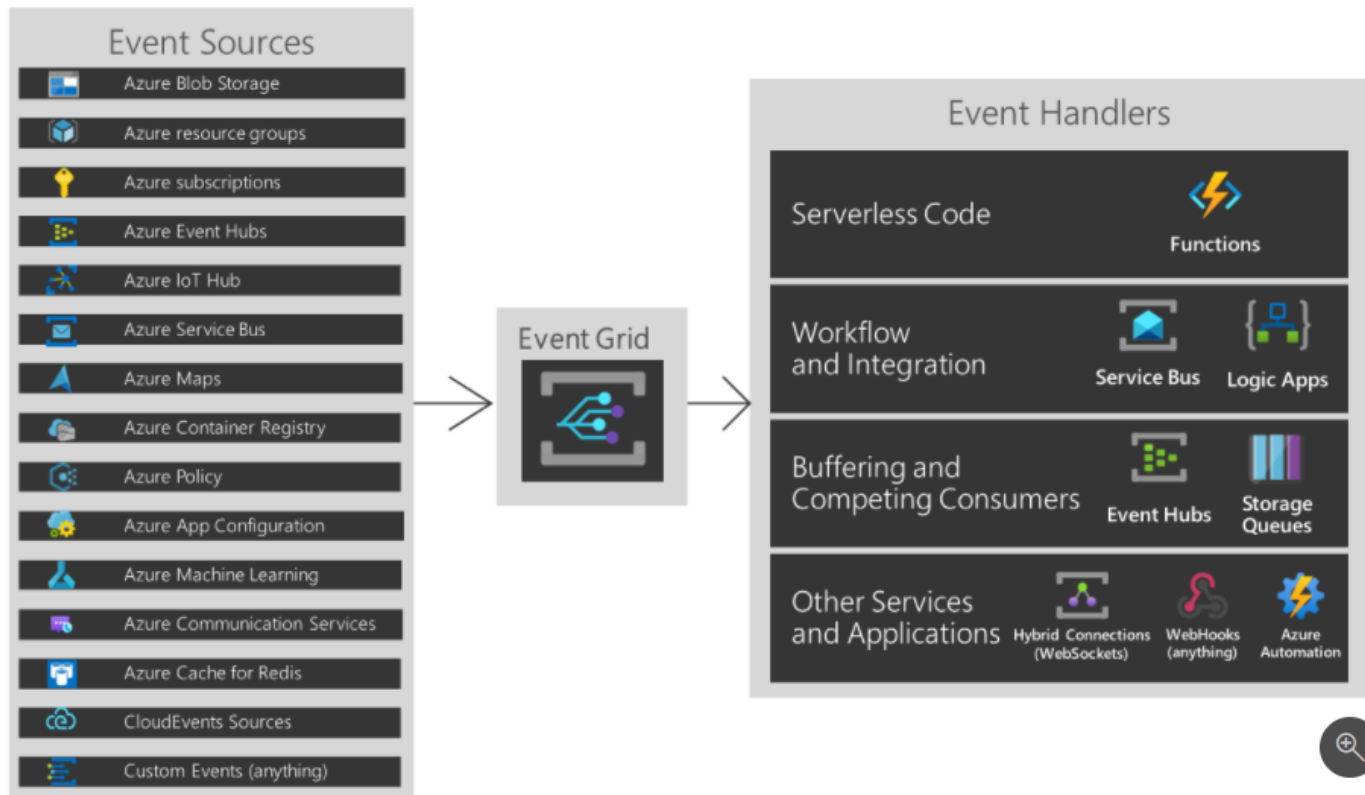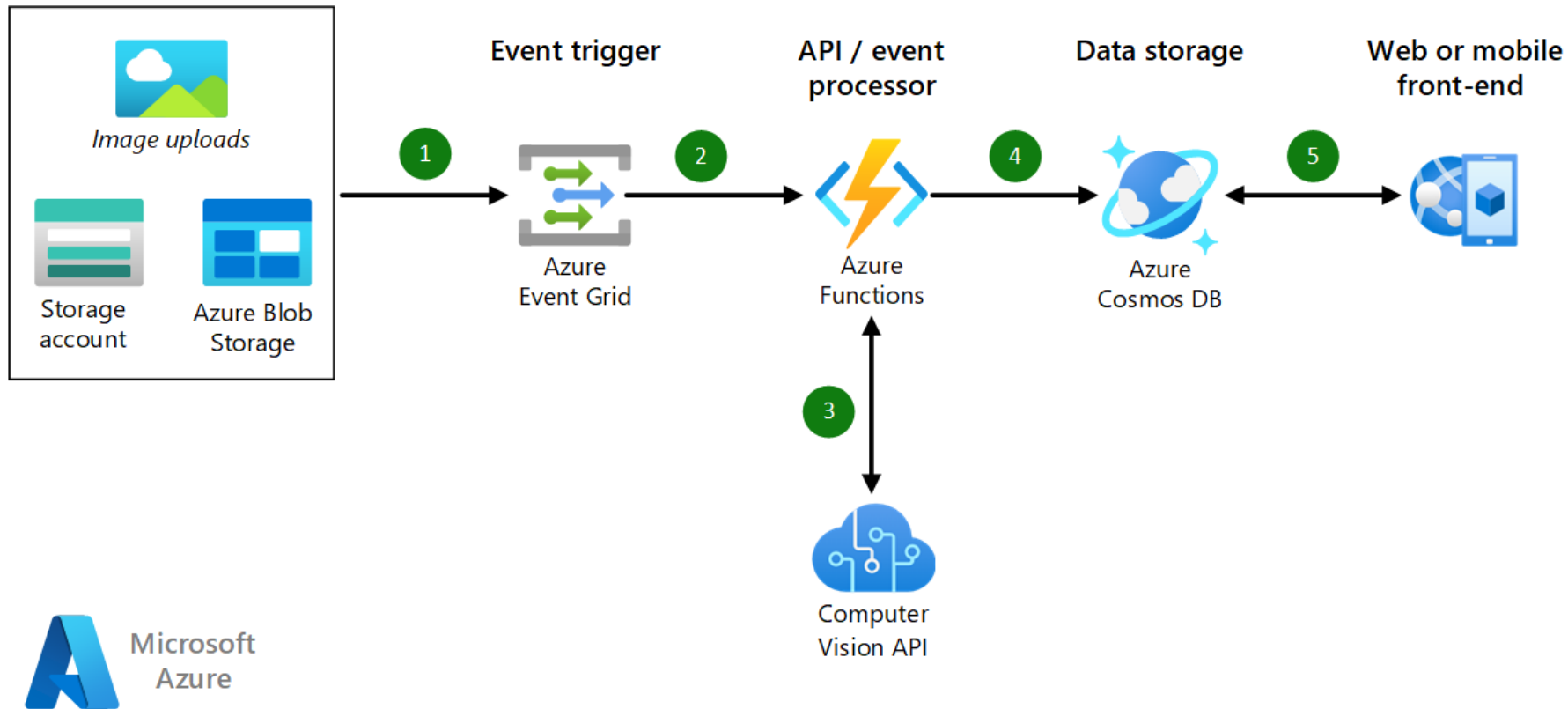
Azure VMs and Containers

Azure VMs

- An <u>Azure VM </u>gives you the flexibility of virtualization without having to

    buy and maintain the physical hardware that runs it.

- Host VMs in Azure
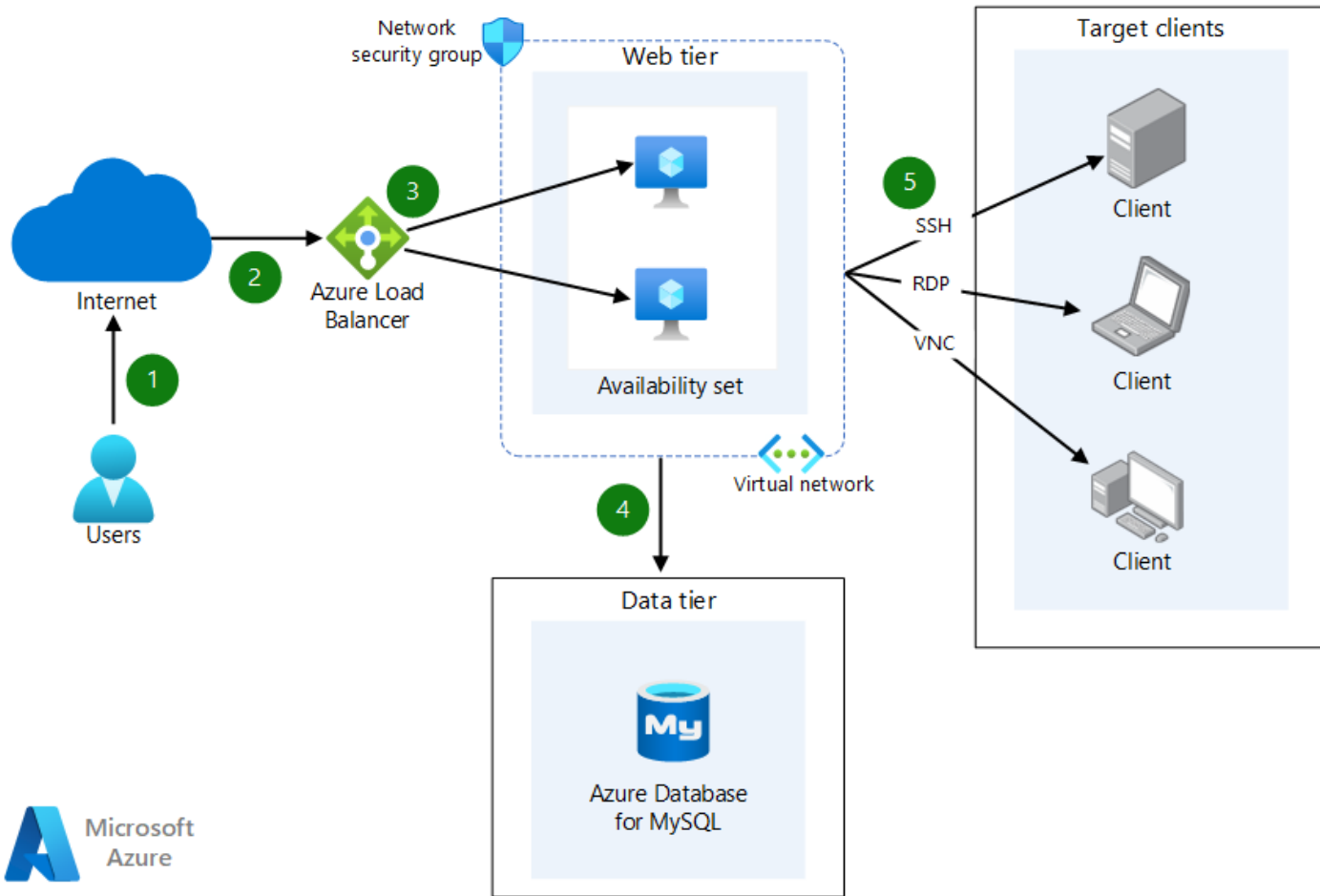
Hosting Containers in Azure

- Azure Container Registry (ACR) : build, store, and manage container images and artifacts in a private registry

- Azure Container Instances (ACI): host isolated containers

- Azure Kubernetes Service (AKS): simplifies deploying a managed Kubernetes cluster in Azure

- Azure Container Apps (ACA): Run microservices and containerized applications on a serverless platform.

jmeter-docker-build → Docker push → Azure Container Registry

jmeter-load-test → Provision → JMX file → JMeter controller → JMeter worker 1 / JMeter worker N → Target web service

Get results

Virtual network

Microsoft Azure
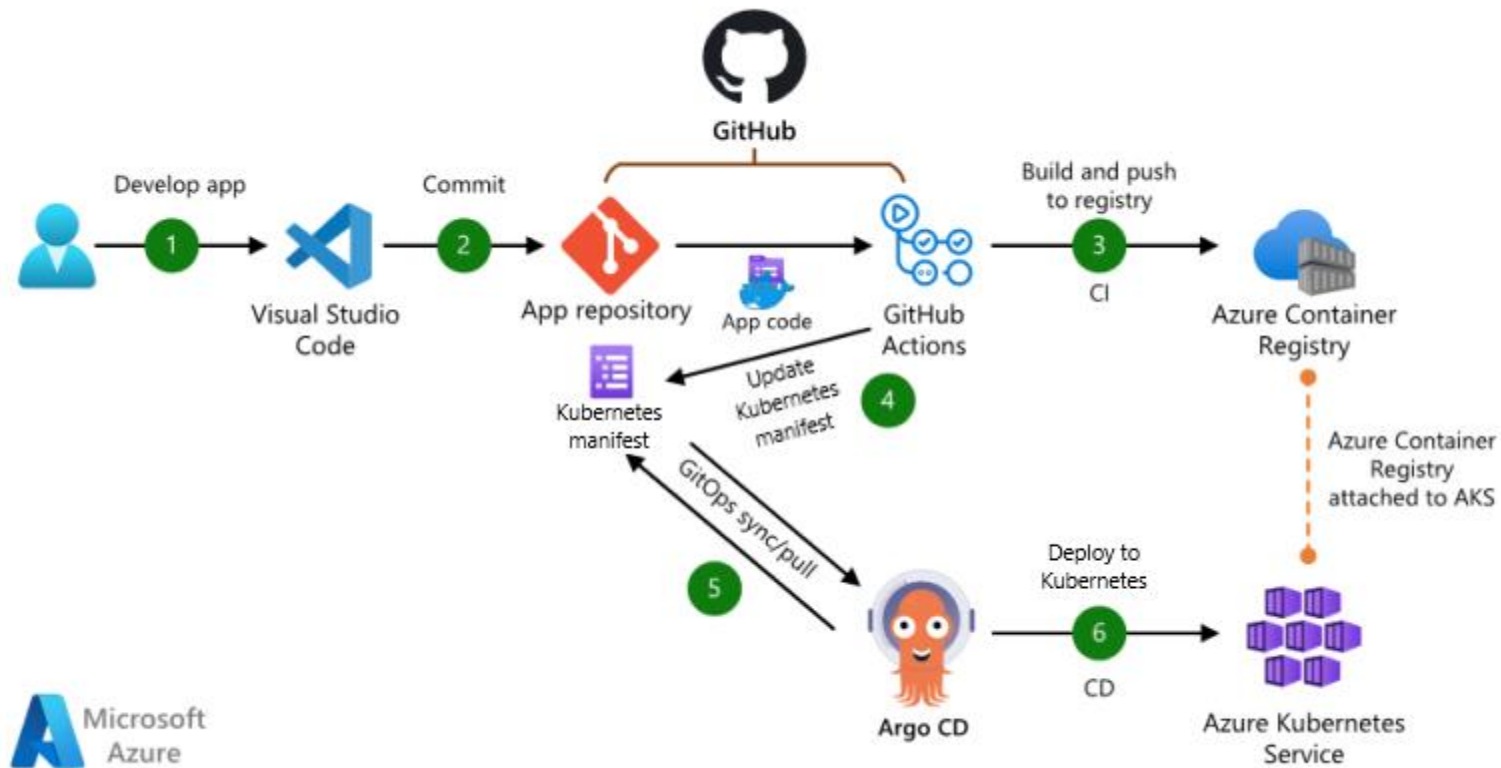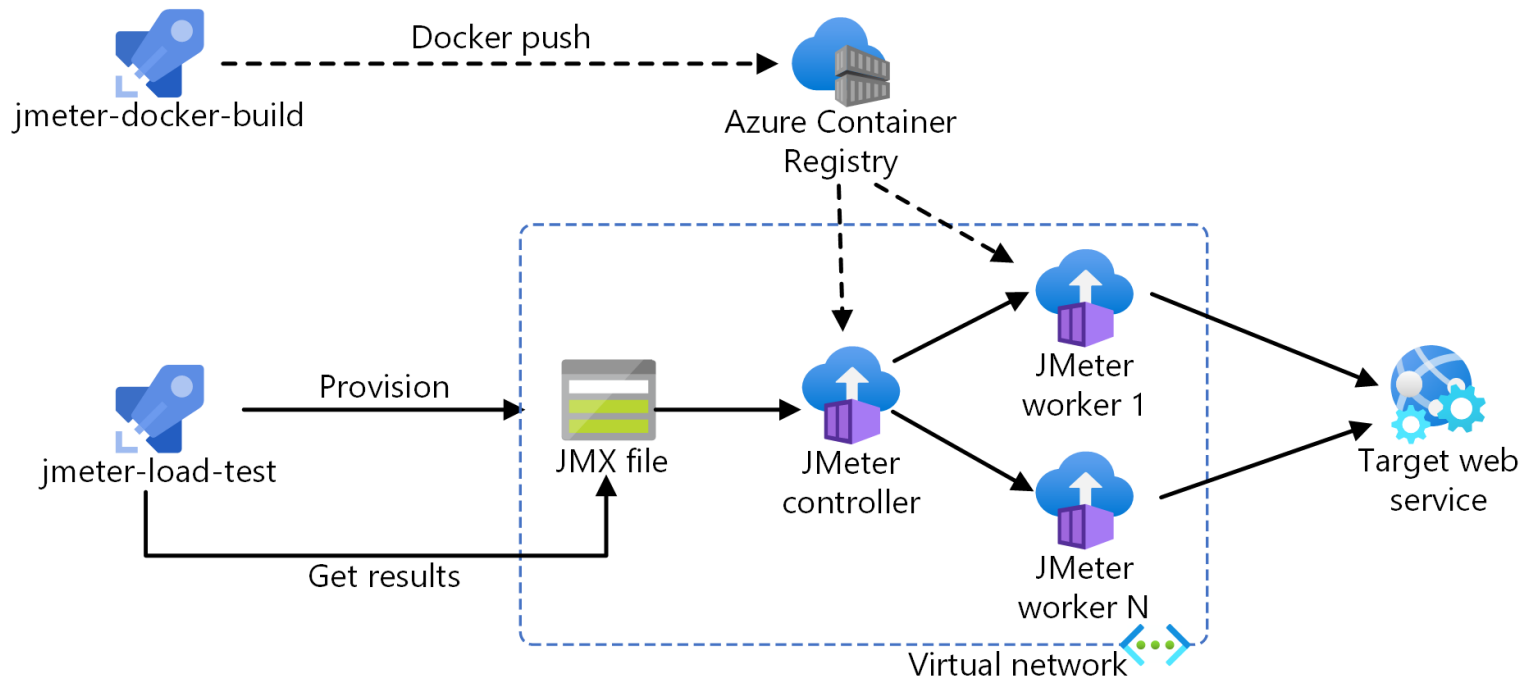
Logging and Monitoring

Azure Monitor

Helps you collect, analyze, and act on telemetry from your cloud and on-premises environments.

Azure Monitor

- Detect and diagnose issues across applications and their dependencies using **Application Insights**.

- Detect and correlate infrastructure issues with **VM insights** and **Container insights**.

- Drill into your monitoring data with **Log Analytics**

- Collect resource performance data using **Azure Monitor Metrics**.

https://docs.microsoft.com/en-us/azure/azure-monitor/overview

Azure Monitor

Data Platform
- Metrics
- Logs
- Traces

Workloads
Infrastructure
Azure Platform
Custom Sources

Experiences
Application • Container • VM • Network • • • •

Visualize
Workbooks • Dashboards • PowerBI • Grafana

Analyze
Metric Explorer • Log Analytics

Respond
Alerts & Actions • Autoscale

Integrate
Event Hubs • Logic Apps • Import / Export APIs

https://learn.microsoft.com/en-us/azure/azure-monitor/overview

Azure Monitor Alerts and Actions

- Alerts notify you of possible problems with your resources or infrastructure.

- Actions help you address the issues

Azure Monitor Alert Types

- Metric alerts

- Log alerts

- Activity log alerts

- Smart detection alerts (Web application - Application Insights)

Azure Monitor Application Insights

Application Insights is a feature of Azure Monitor that provides extensible application performance management and monitoring for **live web apps**

Azure Monitor Application Insights

- Automatically detect performance anomalies

- Help diagnose issues by using analytics tools

- See what users do with apps

- Help to improve app performance and usability

- Supports many platforms, including .NET, Node.js, Java, and Python

https://docs.microsoft.com/en-us/azure/azure-monitor/app/app-insights-overview
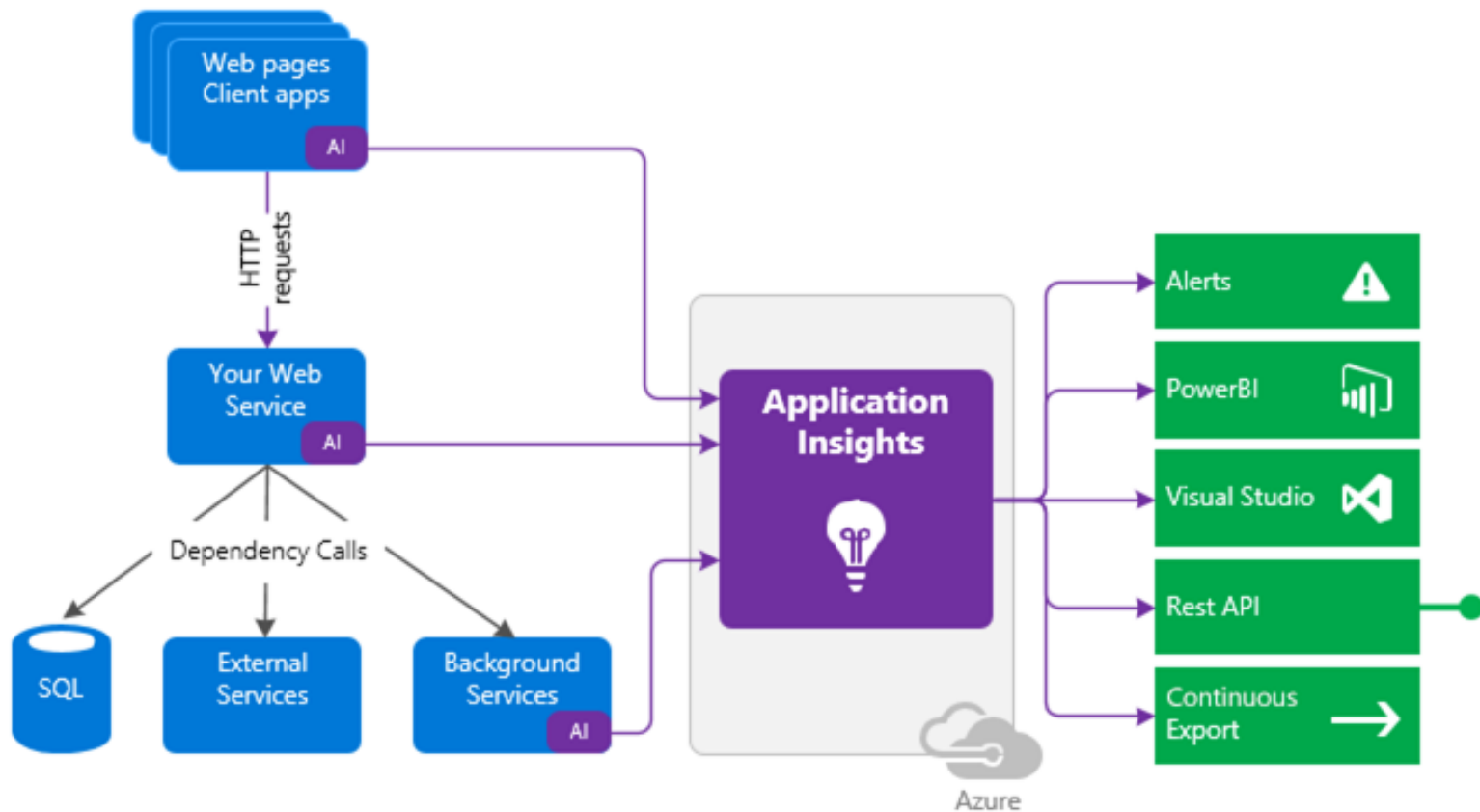
Insights

- Azure Monitor Application Insights
- Azure Data Explorer insights
- Azure Container Insights
- Azure Cosmos DB Insights
- Azure Service Bus Insights
- Azure Storage Insights
- Azure Network Insights
- Azure VM Insights
- Azure Virtual Desktop Insights
- …

Insights
- Applications
- Virtual Machines
- Storage accounts
- Containers
- Networks
- SQL (preview)
- Azure Cosmos DB
- Key Vaults
- Azure Cache for Redis
- Azure Data Explorer Clusters
- Log Analytics workspaces
- Azure Stack HCI (preview)
- Service Bus (preview)
- ··· Insights Hub

https://docs.microsoft.com/en-us/azure/azure-monitor/monitor-reference#insights-and-curated-visualizations

Azure Log Analytics

- Log Analytics is a tool in the Azure portal used to edit

  and run log queries with data in Azure Monitor Logs.

The Exam

AZ-204

- Exam AZ-204:

  https://docs.microsoft.com/en-us/learn/certifications/exams/az-204

- Skills measured :

  https://query.prod.cms.rt.microsoft.com/cms/api/am/binary/RE4oZ7B

Questions in AZ-204

- Multiple choice

- Drag and drop

- Scenario based

- There will be hands-on labs

Questions in AZ-204

> 💡 Tip
>
> - Watch **AZ-204 Exam Prep videos** on Learn
> - Download the **AZ-204 study guide** ↗ to help you prepare for the exam
> - Demo the exam experience by visiting our **Exam Sandbox** ↗

Part of the requirements for: Microsoft Certified: Azure Developer Associate
Related exams: none
Important: See details
Go to Certification Dashboard ↗

Schedule exam

Exam AZ-204: Developing Solutions for Microsoft Azure

United States	⌄

Languages: English, Japanese, Chinese (Simplified), Korean, French, German, Spanish, Portuguese (Brazil), Russian, Chinese (Traditional), Italian, Indonesian (Indonesia), Arabic (Saudi Arabia)
Retirement date: none

$165 USD*

Price based on the country or region in which the exam is proctored.

This exam measures your ability to accomplish the following technical tasks: develop Azure compute solutions; develop for Azure storage; implement Azure security; monitor, troubleshoot, and optimize Azure solutions; and connect to and consume Azure services and third-party services. You will be able to select the code language (C# or Python) that's included in the questions when you launch the exam.

Schedule exam >

Official practice test for Developing Solutions for Microsoft Azure
All objectives of the exam are covered in depth so you'll be ready for any question on the exam.

⊕ Save

Select exam options

AZ-104: Microsoft Azure Administrator

Where do you want to take your exam?

At a test center	OnVUE Online at my home or office	I have a Private Access Code

Where do you want to take your exam?

At a test center	OnVUE Online at my home or office	I have a Private Access Code

Prepare for your online exam at your home or office

Your computer

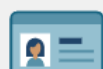Use a personal computer that has a reliable webcam and internet connection.

Run system test.

Your testing space

The room should be a distraction-free, private place.

See acceptable spaces and view permitted comfort aid list.

Your photo ID

We'll verify your government-issued identification (ID) when you arrive for your exam.

Review admission & ID policies

What to expect

Check in for your OnVUE exam 30 minutes before your appointment time.

Watch our short video to get familiar with the process.

Questions?

Check out the OnVUE FAQs and minimum technical requirements.

Cart

Description	Details	Price	Actions
		165.00	Remove

Available Products

In addition to scheduling your exam, you might be interested in the following products.

Microsoft Official Practice Test powered by MeasureUp - 30 day online access
Get a discount on available Microsoft Official Practice Test for Microsoft certification exams (Fundamentals, Role-based, or Specialty) 30-day online access.

USD 80.00

Special offer: Regularly priced at USD 99.00! Click here for details

Add to Order

More Details

It's time to test your system

Order #: 0064-8802-7606

Your appointment is confirmed! An order confirmation containing important exam day information has been sent to: zaalion@gmail.com

What's next?

Run a system test

We need to verify that the computer and internet connection you plan to use on exam day meet the minimum requirements for online testing. It'll just take 5 minutes to run:

- Equipment and internet connection checks
- Exam simulation

Description	Details	Order Information	Price
			165.00

OnVUE

System Test

☐ I confirm that on my exam day I will be using this same testing space, computer, and internet connection.

Alert! Work computers generally have more restrictions that may prevent a successful test. Ensure you are not behind a corporate firewall, and shut down any **Virtual Private Networks** (VPNs) or **Virtual Machines**.

1. Copy Access Code

Click **'Copy Access Code'**.

This code will authorize you to perform a system test.

690-635-235

Copy Access Code

2. Download OnVUE

Click **'Download'**.

Download

3. Run OnVUE

Run the OnVUE application from your Downloads folder.

Course Repository

https://github.com/zaalion/oreilly-application-dev-azure

https://github.com/zaalion/oreilly-az-204

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Thank you!

Reza Salehi

@zaalion