

# Exploring Azure compute services

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



Florin Angelescu  
Azure Architect

# Azure compute services

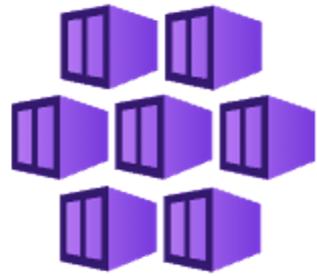


- Resources and services that enable processing and app execution and workloads in Azure
- Provide the computing power to run apps, process data, and perform various tasks

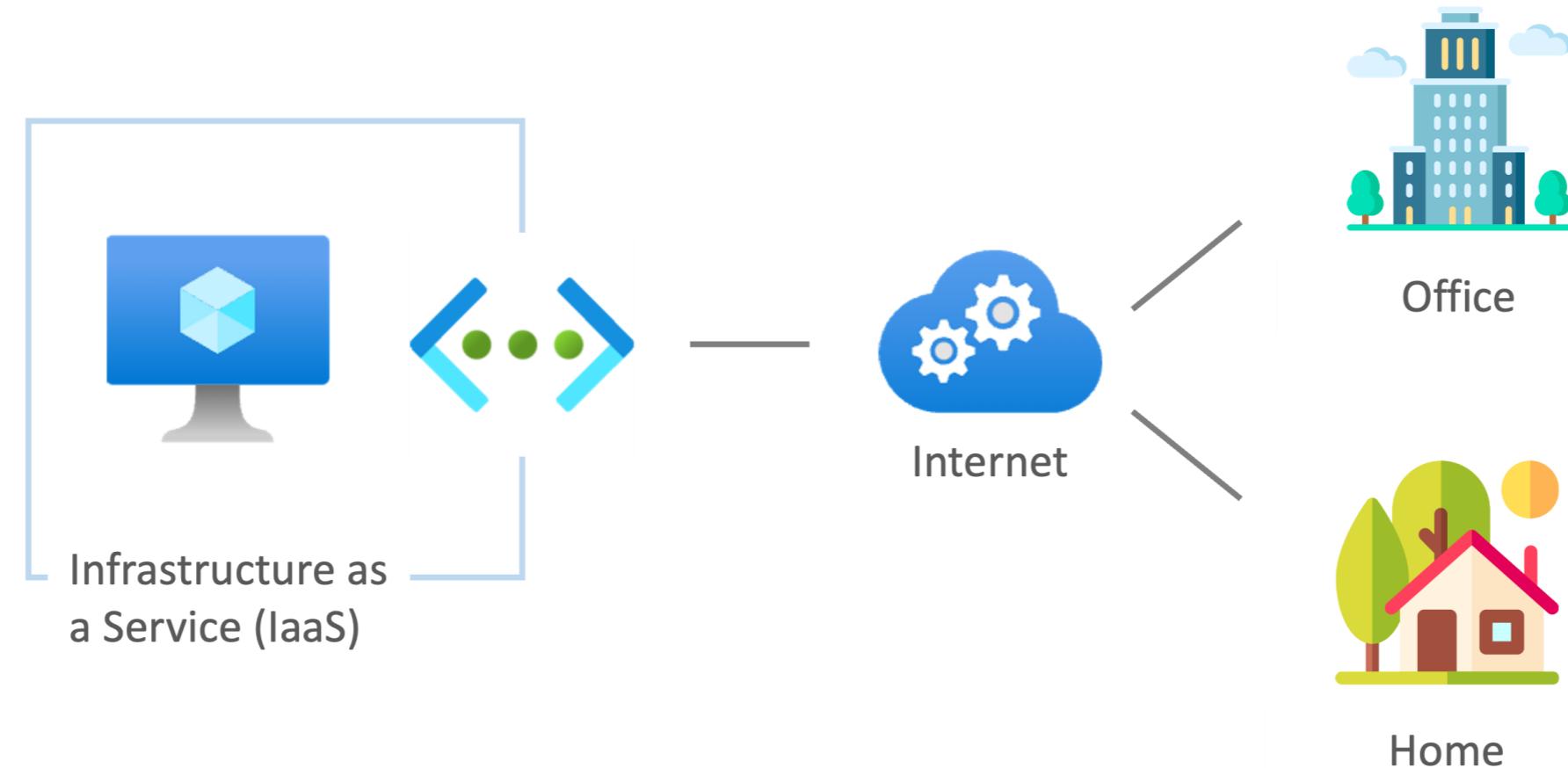
# Azure compute services



- Infrastructure as a Service
- Platform as a Service
- Serverless

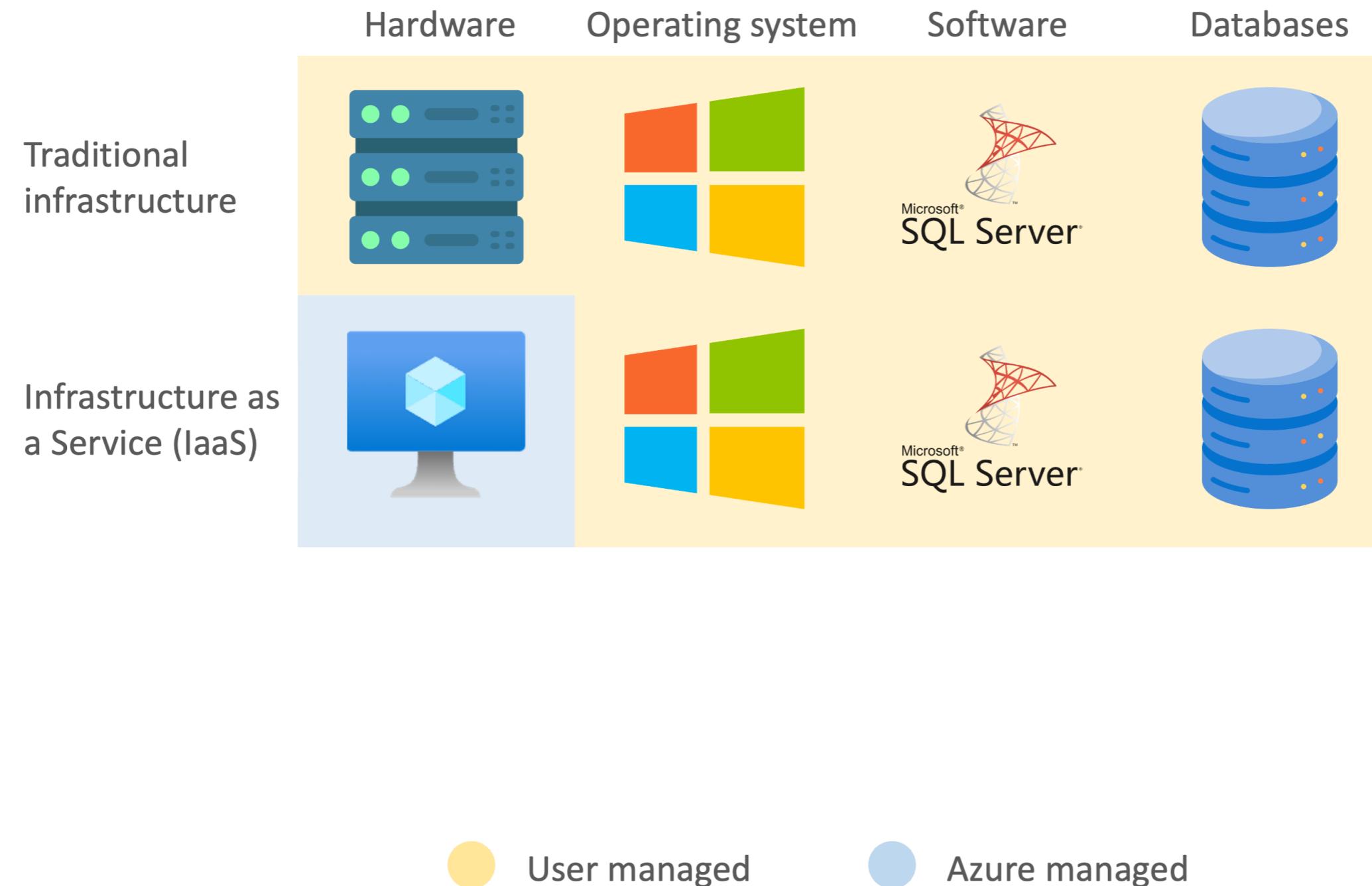


# Infrastructure as a Service (IaaS)

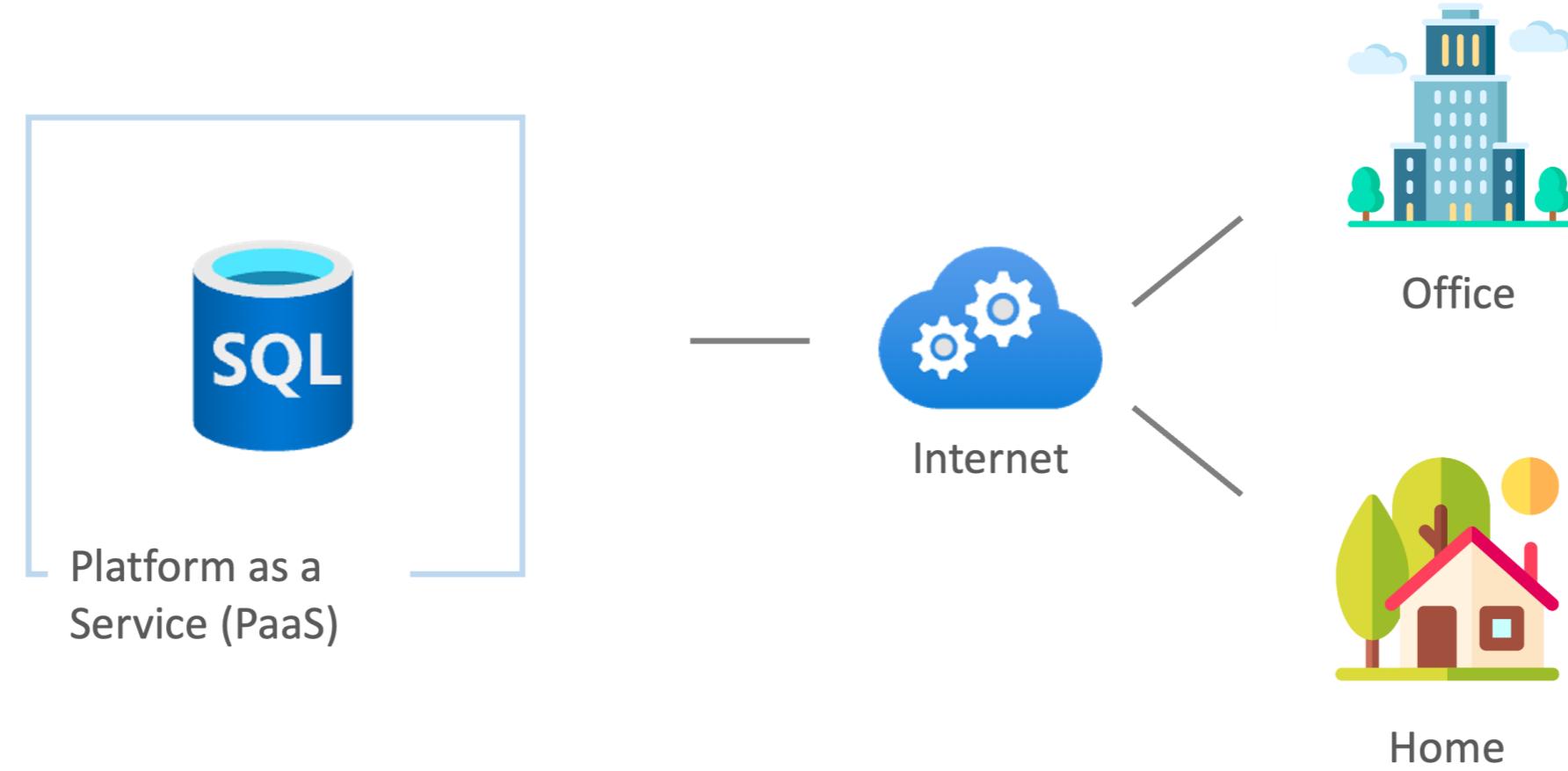


- Provides virtualized computing resources over the Internet
- Alternative to traditional on-premises infrastructure
- Includes virtual machines and networking

# IaaS in practice

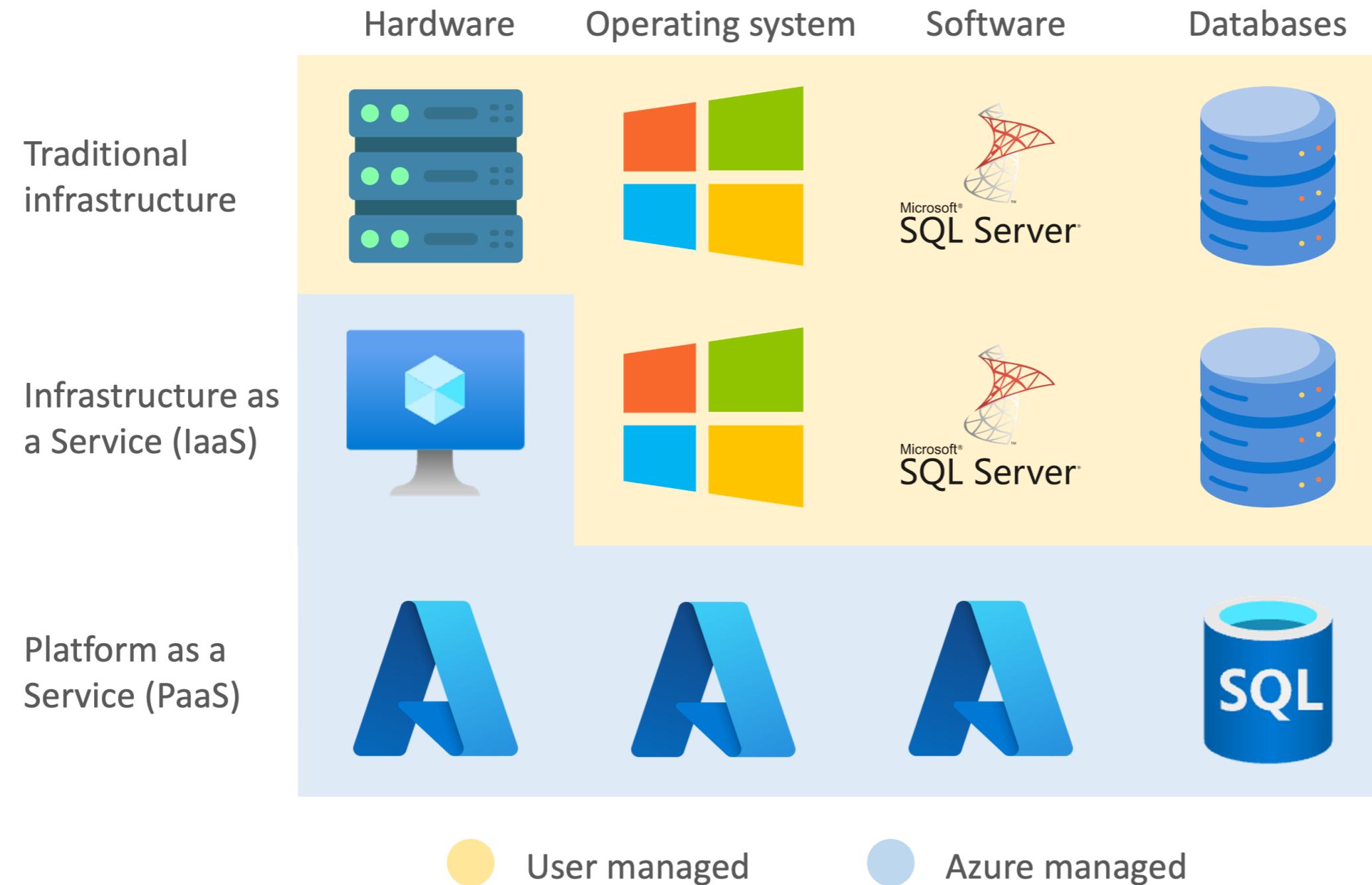


# Platform as a Service (PaaS)



- Forget about the operating system and software components
- Provides a ready-made platform to use

# PaaS in practice

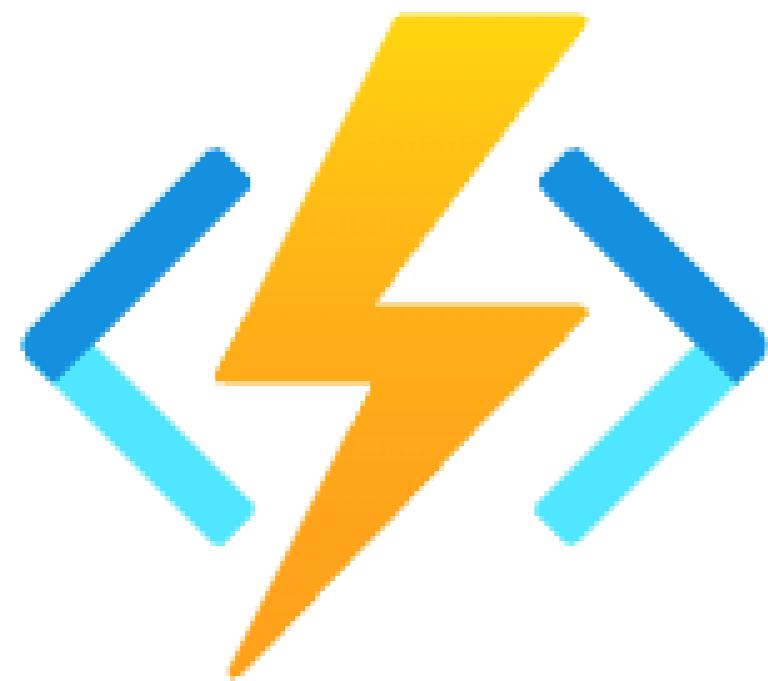


# Serverless computing



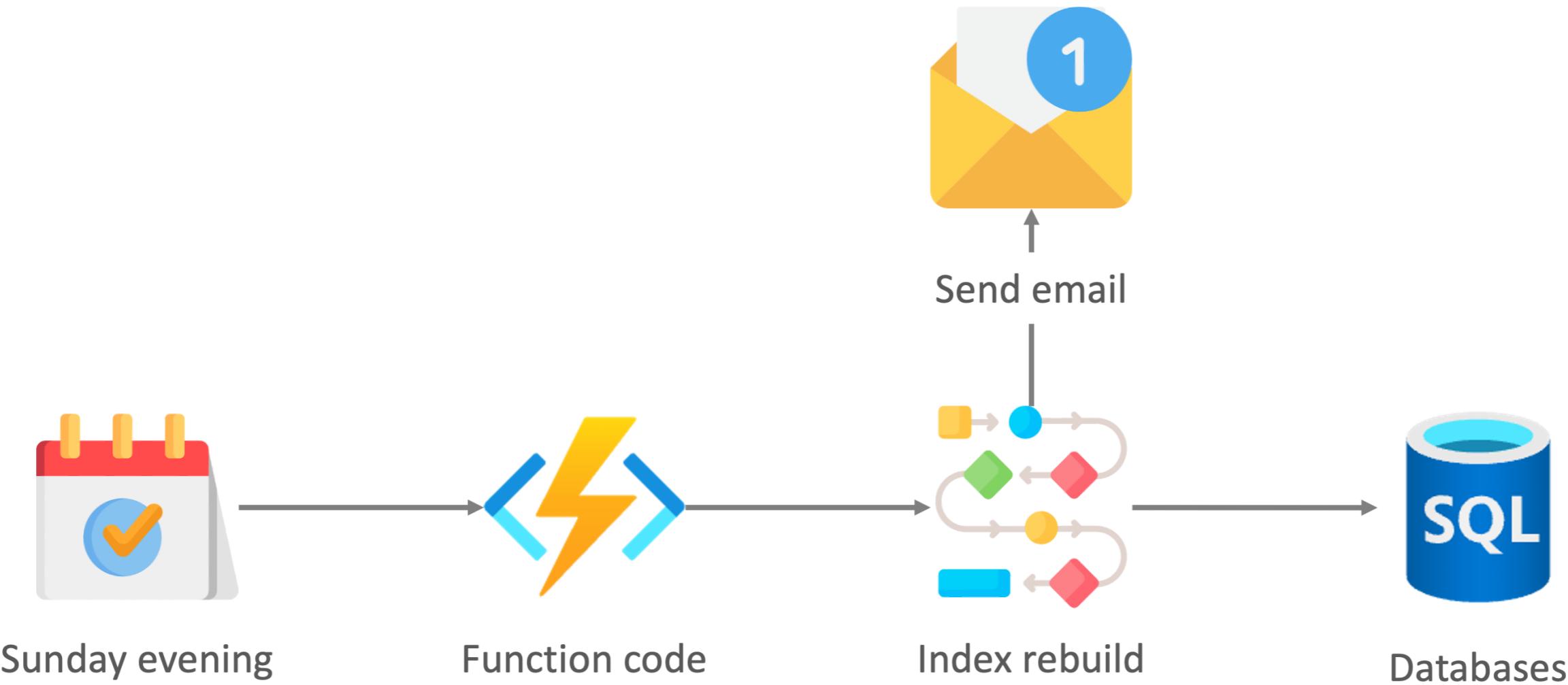
- Shifts more responsibility to the cloud provider
- Users focusing mainly on writing code
- Applications are broken down into smaller, standalone components
- They get executed in response to events

# Azure functions

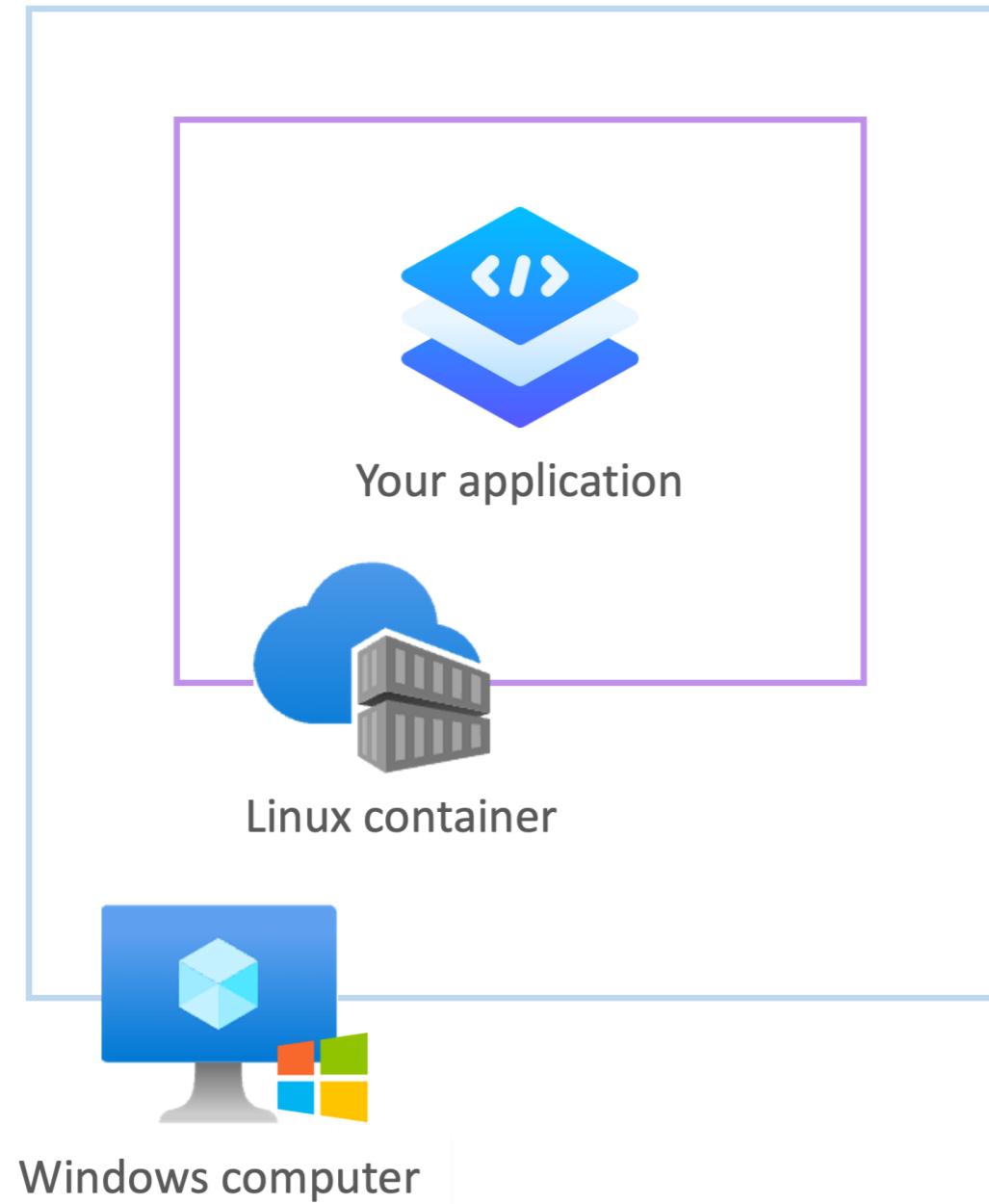


- Allow to run code in response to events
- No need to manage infrastructure
- Characterized by low complexity
- Used to address specific requirements

# Azure functions in practice

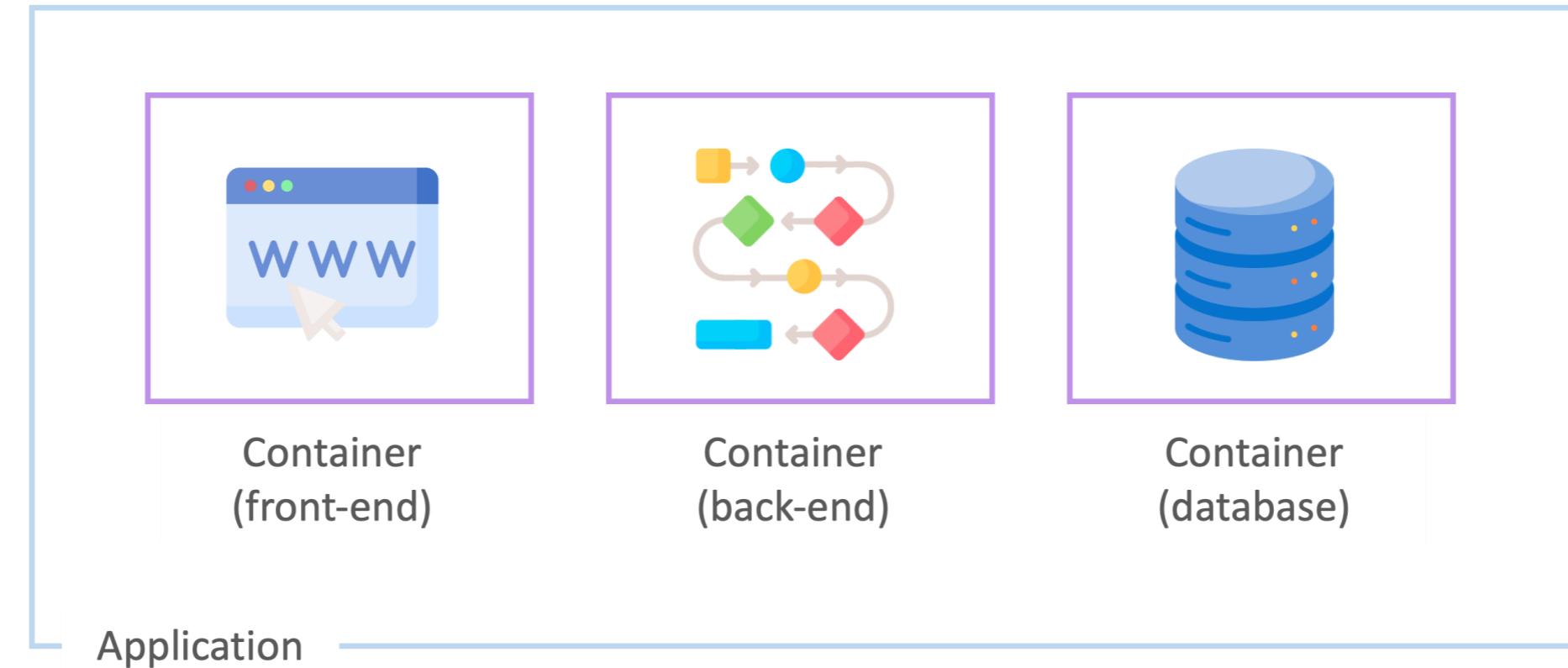


# Containers



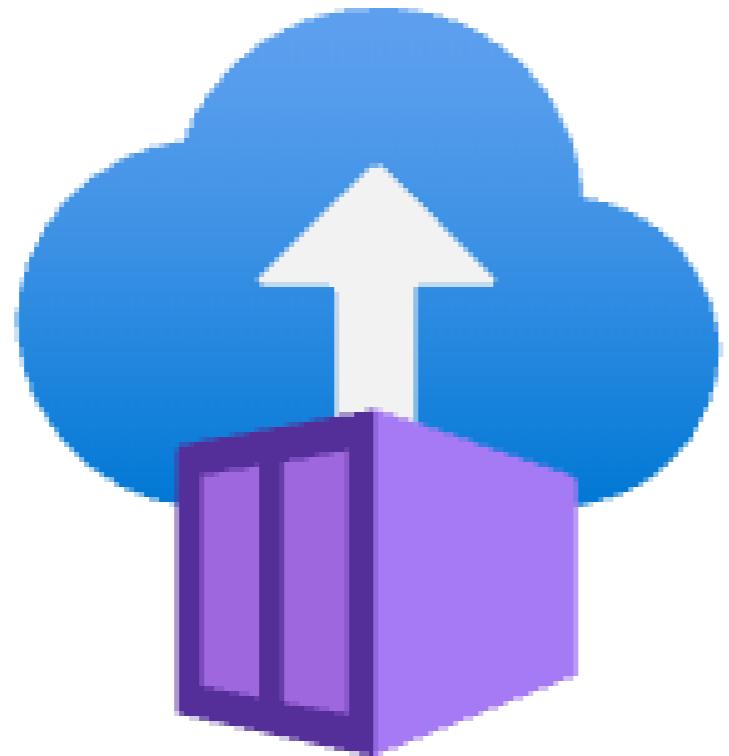
- Lightweight, standalone, and executable software package
- Includes everything required to run a piece of software
- Forget about all software pre-requisites

# When to use containers?



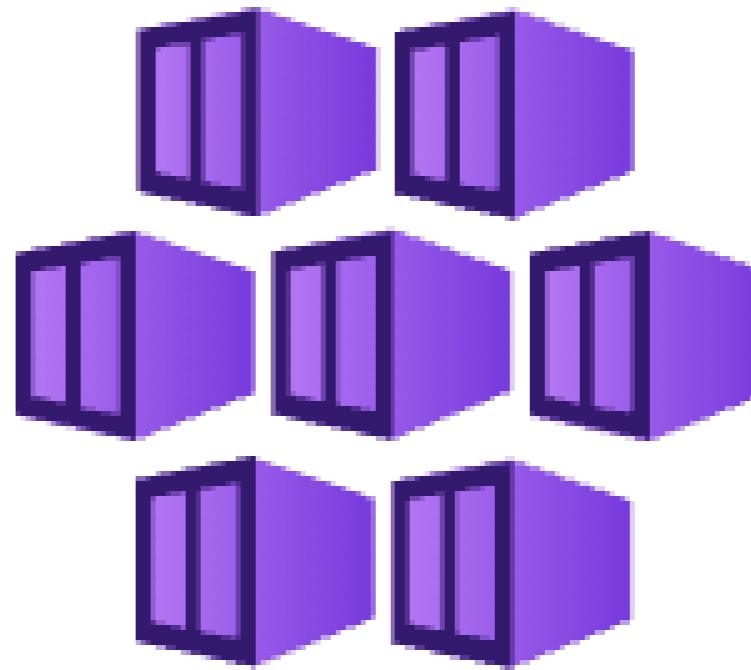
- Build solutions through a microservice architecture
- Breaking down complex applications into smaller, independent components
- Enables independent maintenance, scaling, or updating

# Azure container services



## Azure container instances

- Quickly run containers
- Test or run applications
- Different operating systems



## Azure Kubernetes

- Container orchestrator
- Deployment, management, and scaling of containerized applications

# **Let's practice!**

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# Azure networking overview

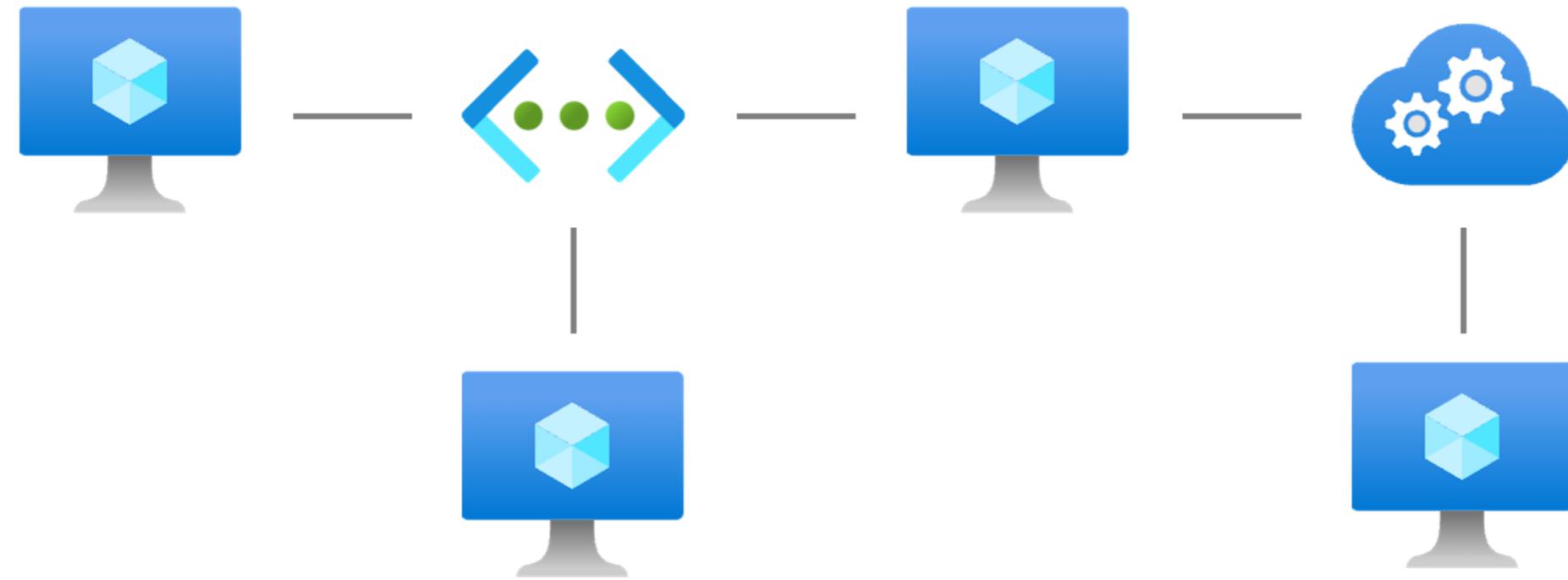
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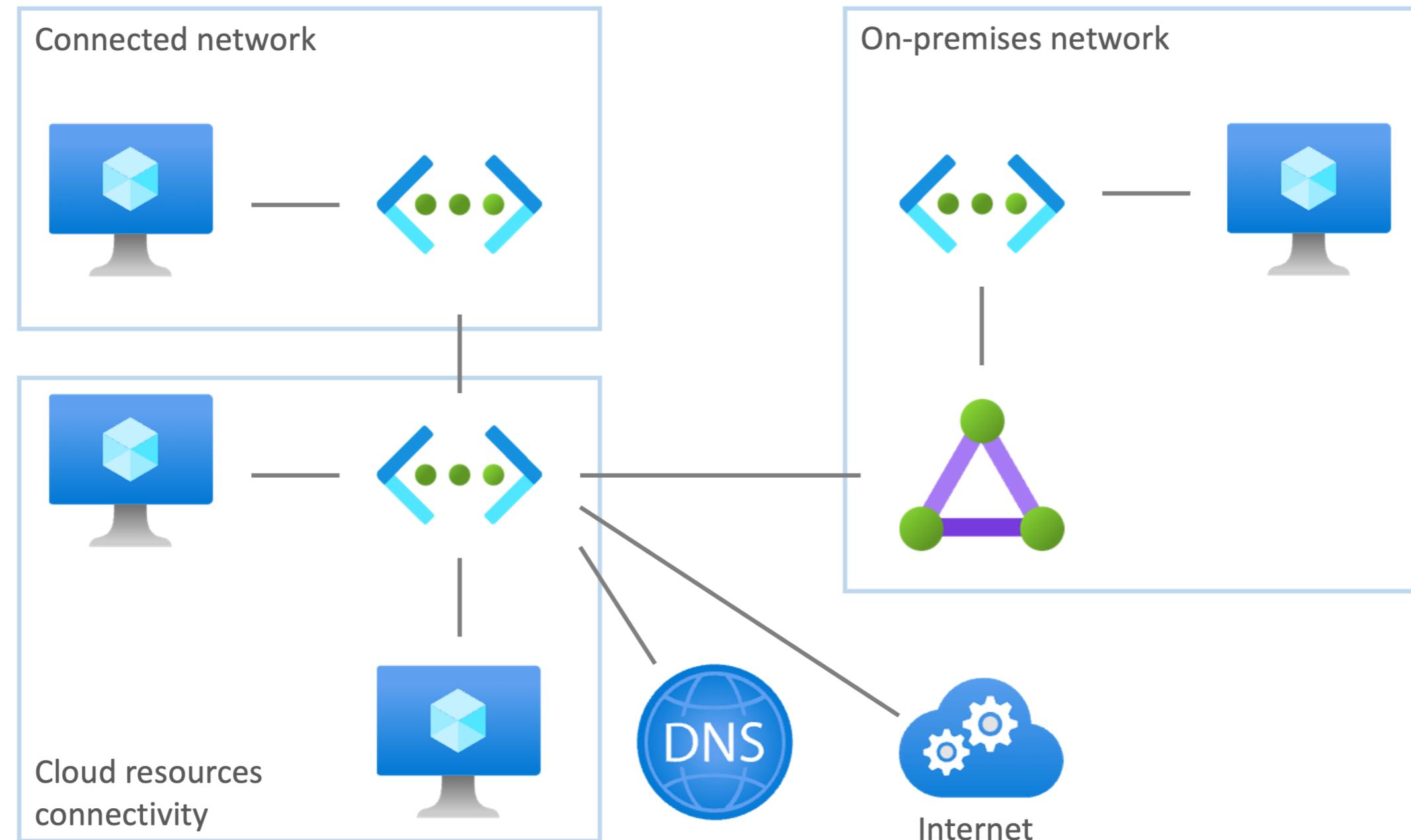
Azure Architect

# What is networking?



- Connecting computers and devices
- Share data and resources
- Enables communication and collaboration
- Includes hardware and communication protocols

# Azure network services overview



# What is an IP address?

IP address



14.15.90.1

House address

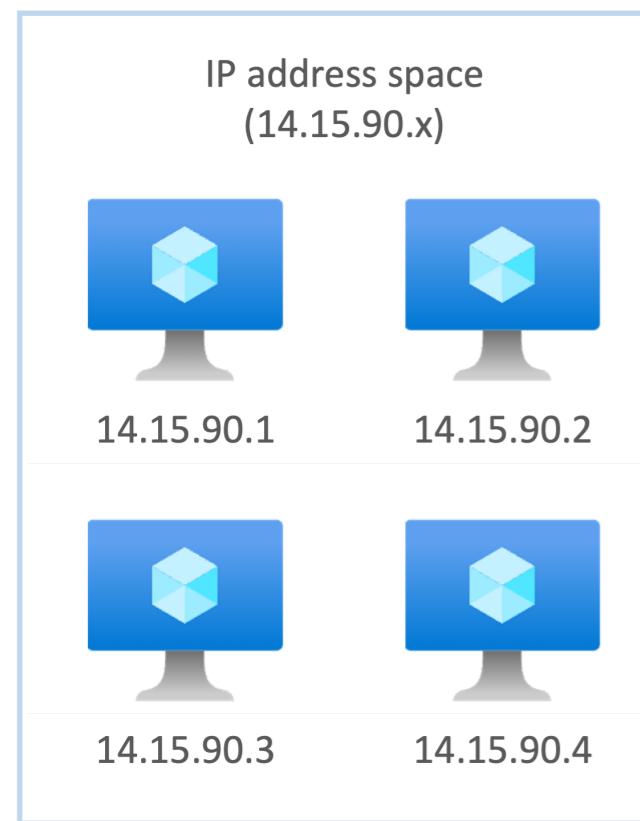


Street, number,  
city, country

- Unique identification number for a device
- Helps information find its way to the right device

<sup>1</sup> Learn more about IP addresses: <https://tinyurl.com/datacamp-ipaddressing>

# What is an IP address space?



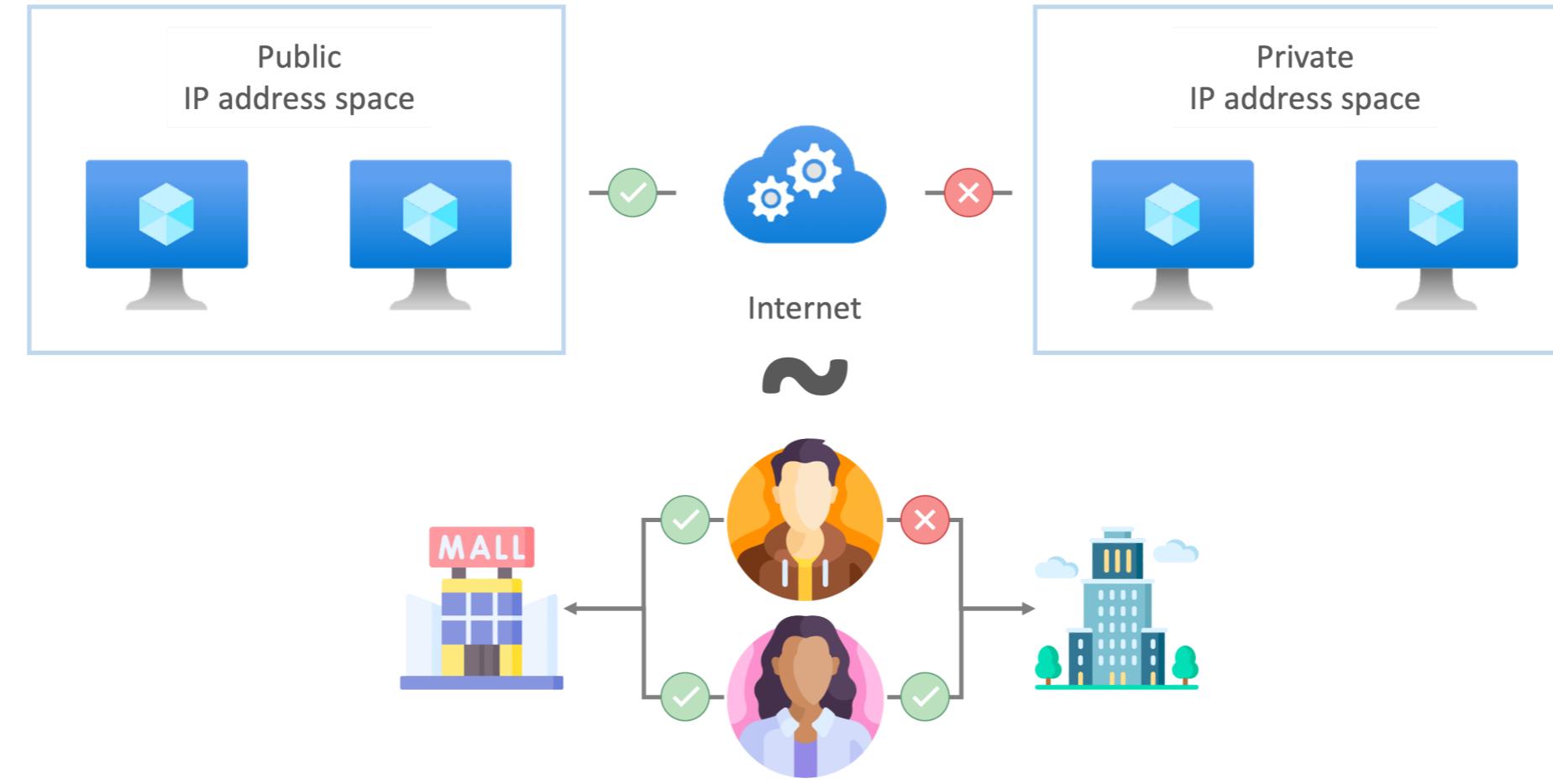
- Neighborhood where devices are located
- Devices share a common part of the address (14.15.90.x)
- Have a unique portion that sets them apart

<sup>1</sup> Learn more about IP addresses: <https://tinyurl.com/datacamp-ipaddressing>

# Subnets

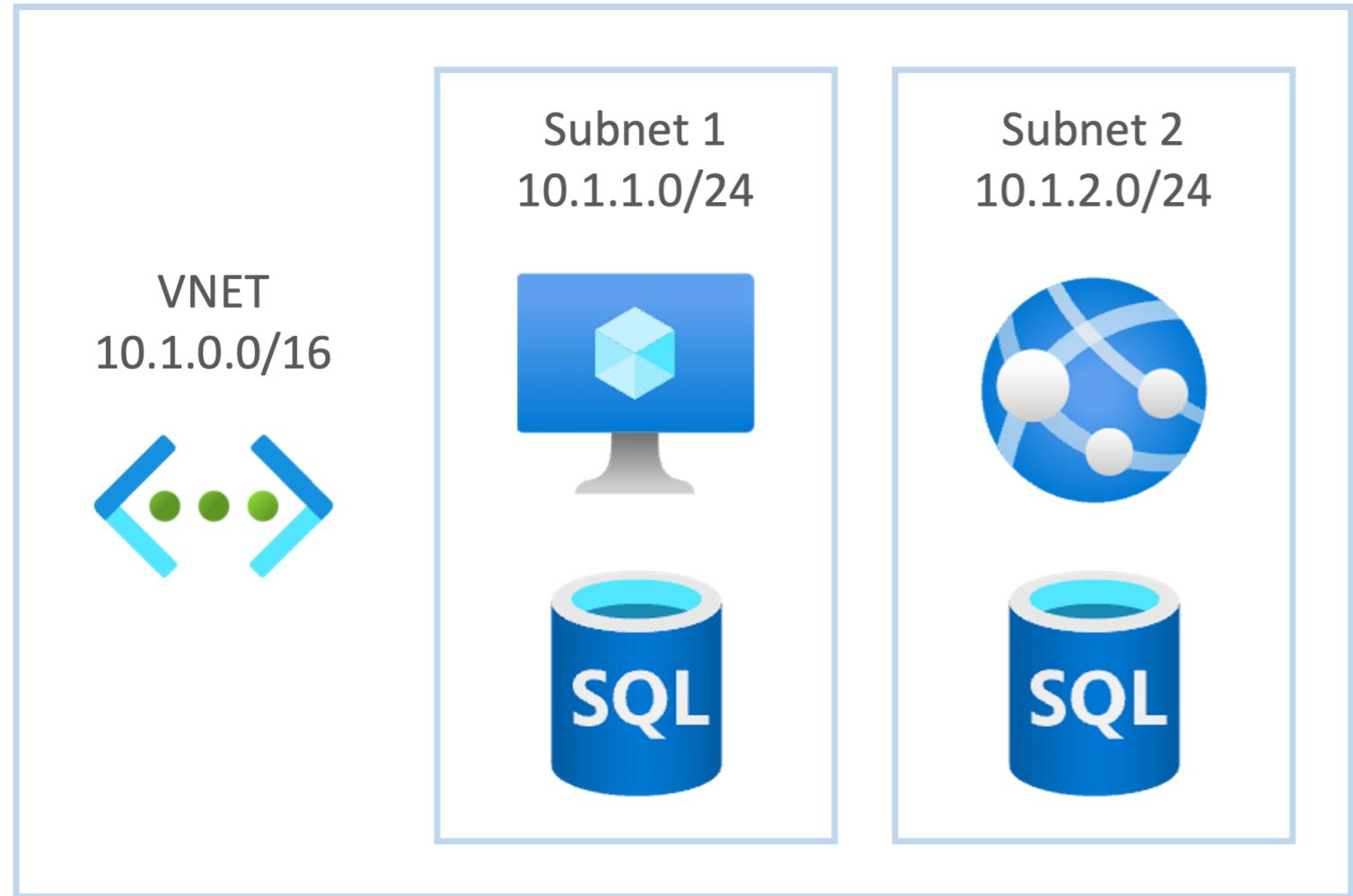


# Public vs. private



- IP addresses can be public or private
- Public IP addresses are accessible from the Internet
- Private IP addresses can only connect devices within same IP address space

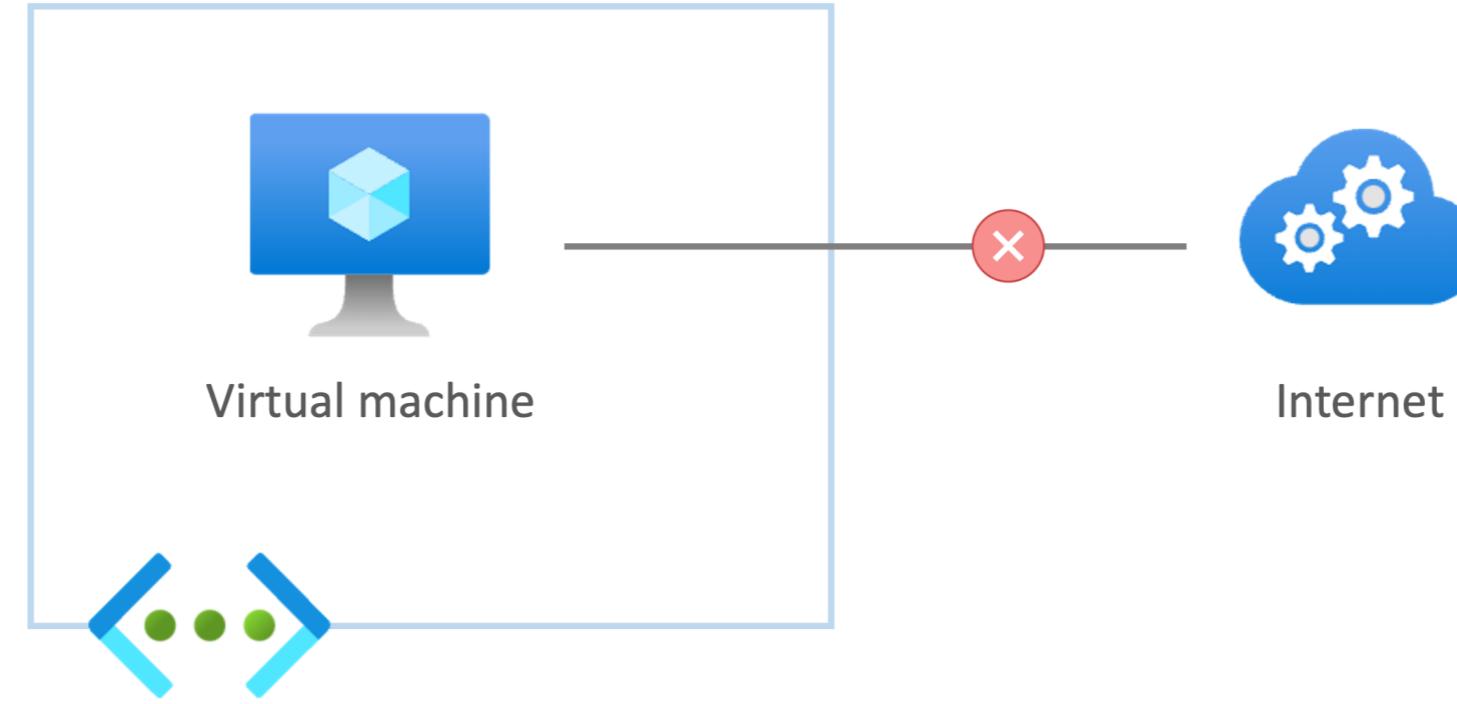
# Cloud resources connectivity



## Azure virtual network (VNET)

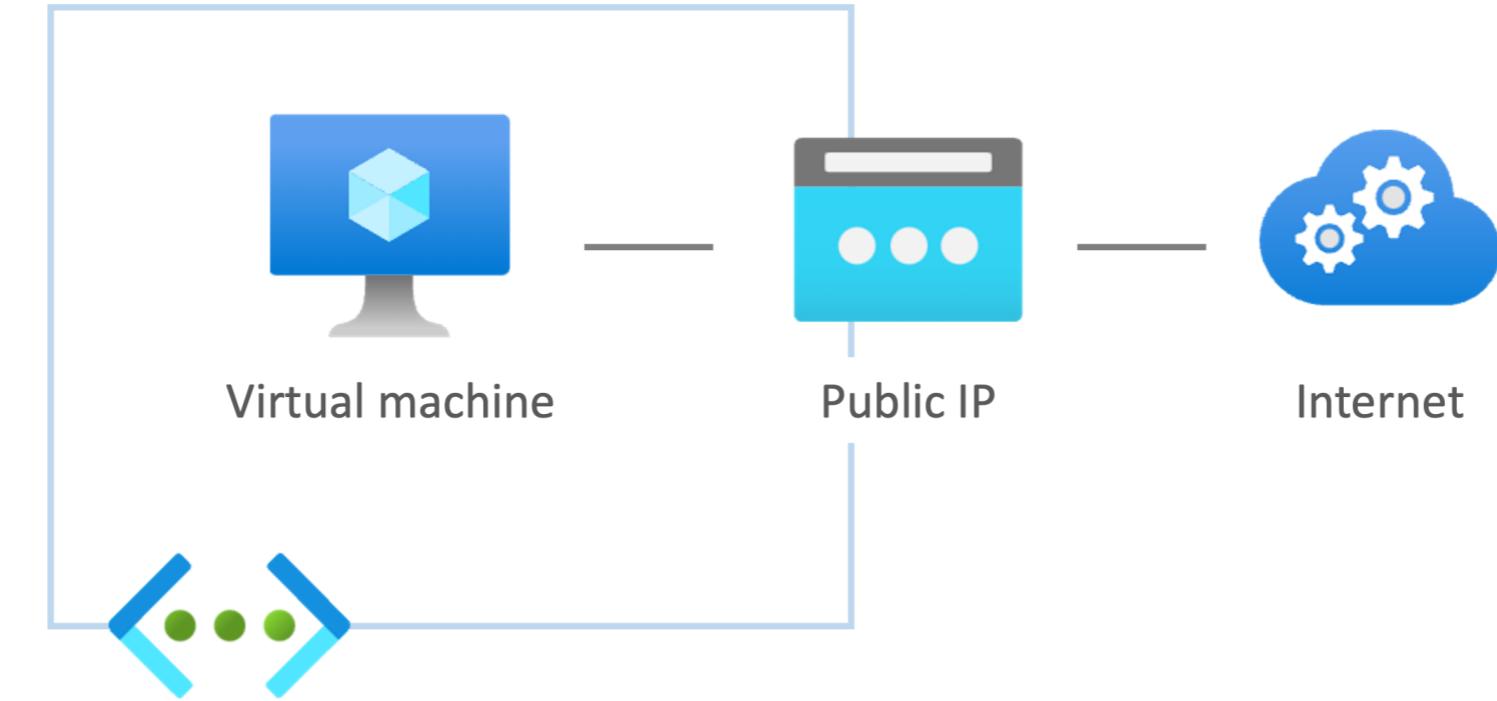
- Enables communication between cloud resources
- Conceptual connections, not physical
- Has a private IP space divided in subnets
- Resources are directly connected to subnets

# Private endpoints



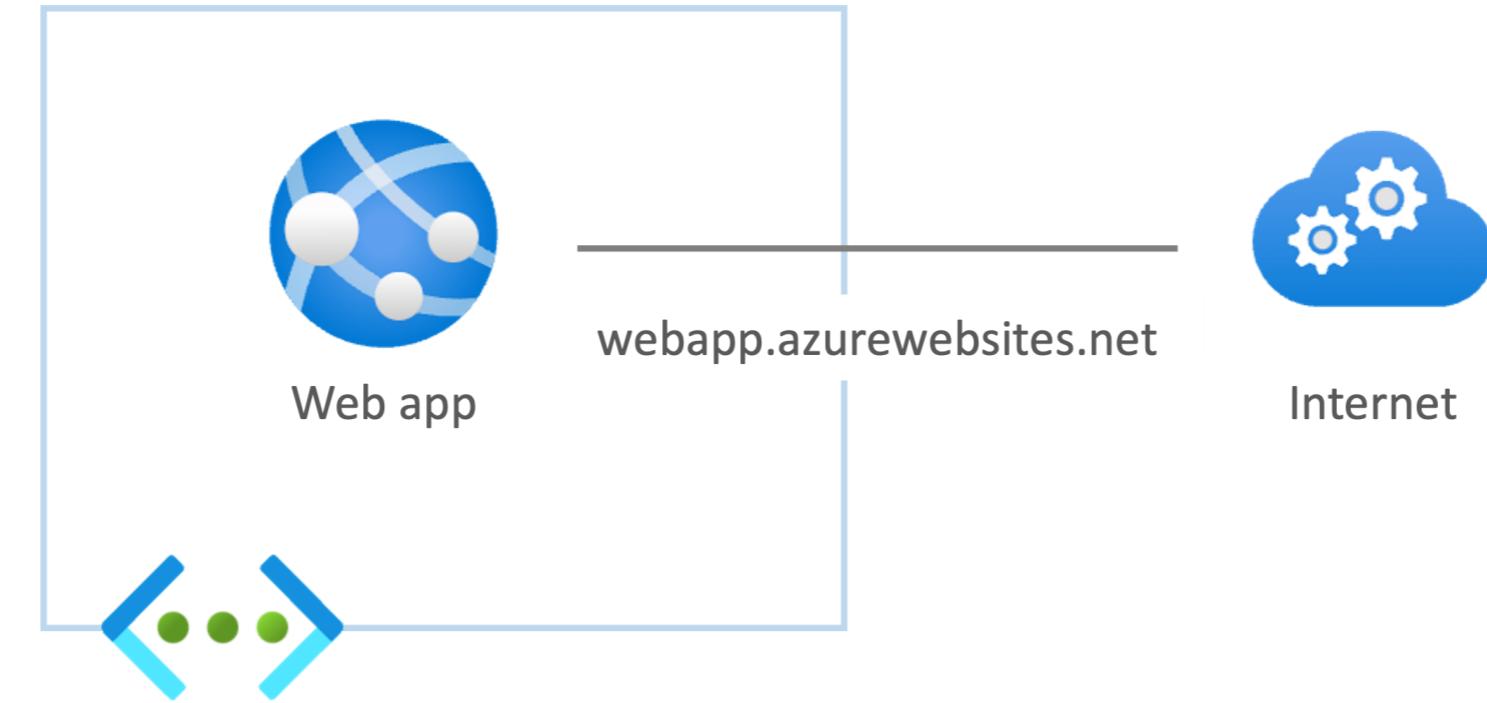
- VNETs use private IP addresses (endpoints)
- Resources within a VNET can communicate with each other
- Resources within a VNET are not reachable from the Internet

# Public endpoints - public IP



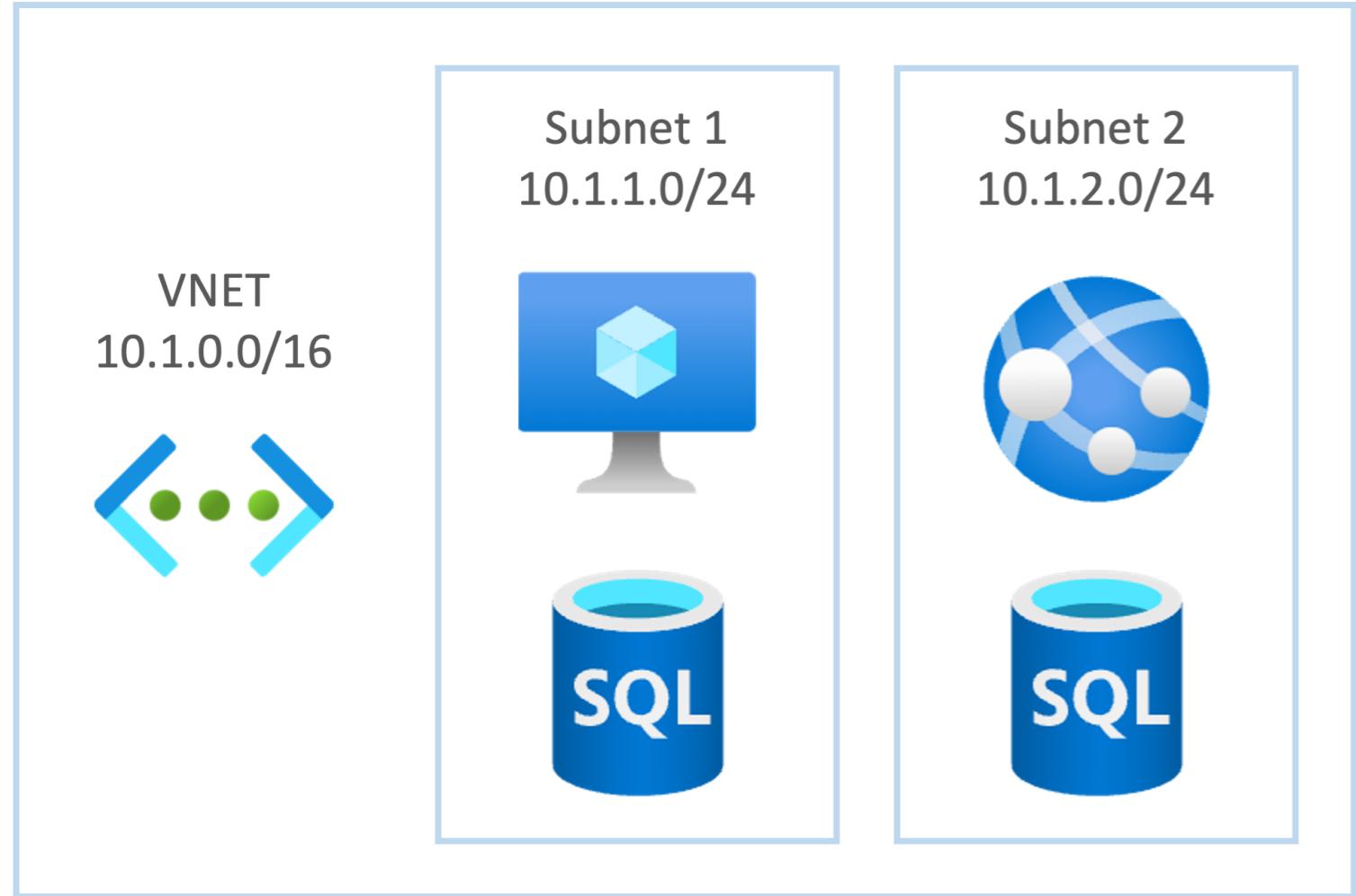
- To have Internet access, resources must have a public endpoint
- One solution is to assign a public IP addresses to resources

# Public endpoints - Azure-provided URL



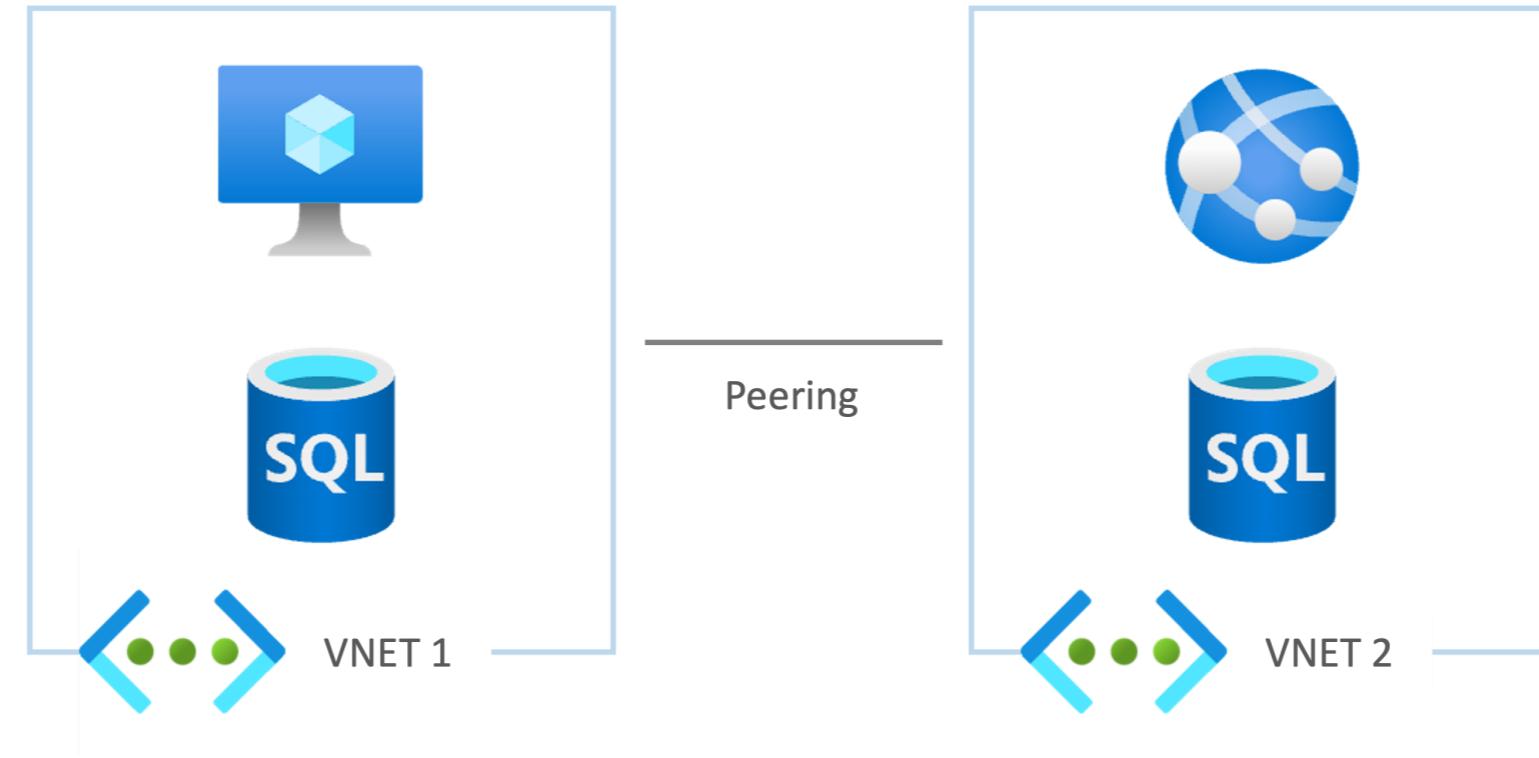
- Some type of resources don't require public IP
- They come with an Azure-provided URL to allow Internet connectivity

# VNETs summary



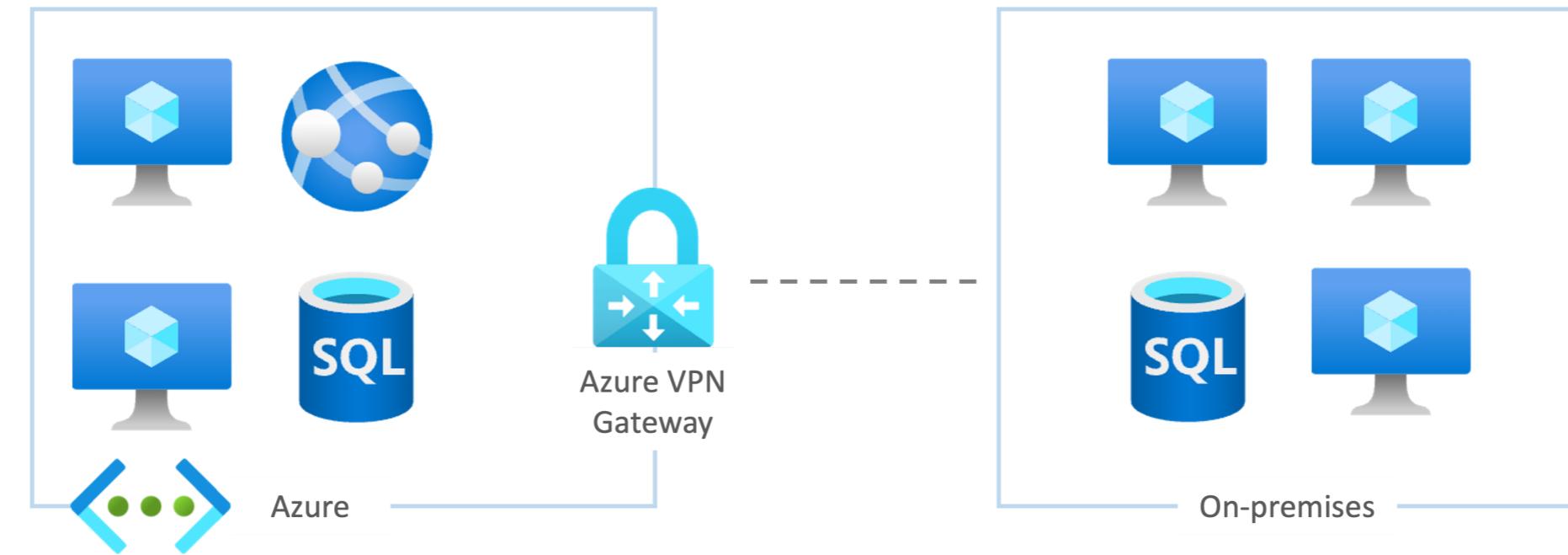
- Has a private IP space
- Space can be divided in subnets
- Resources connect to subnets
- Resources exchange data using private endpoints
- Resources use public endpoints for Internet access

# Connecting virtual networks



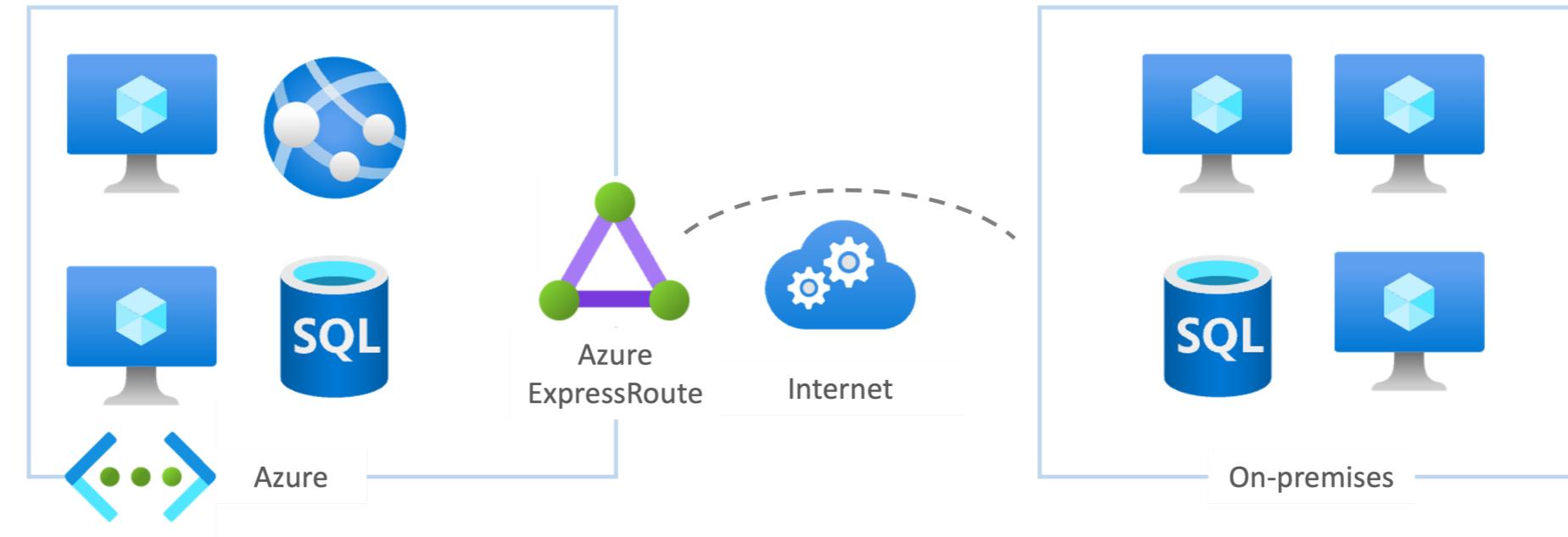
- Network peering enables communication between VNETs
- Bypasses public Internet
- Uses Microsoft's network
- Traffic is private

# On-premises connectivity



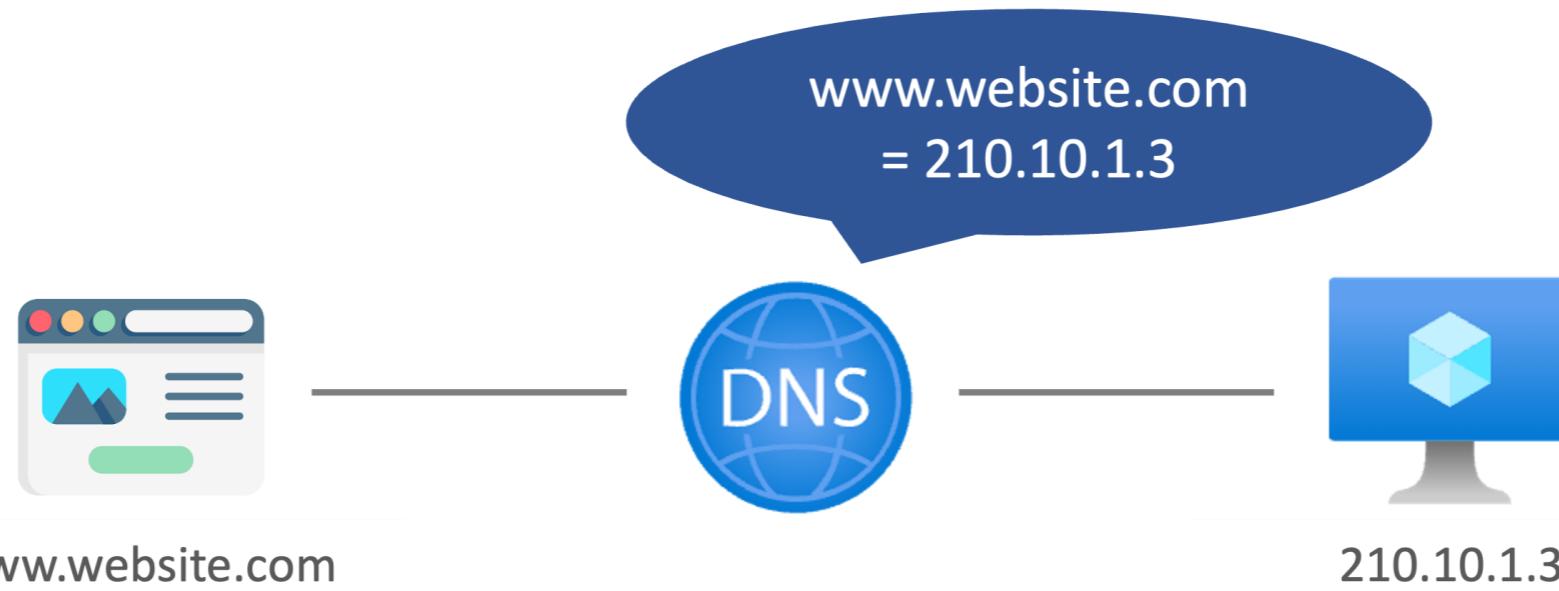
- Connectivity between on-premises environment and the cloud
- Achieved using Azure VPN Gateway
- Allows access to Azure networks and resources
- Data is encrypted and secure

# Azure ExpressRoute



- Extends on-premises network into Azure cloud
- Dedicated private connection
- Bypasses the public Internet
- Offers enhanced reliability, speed and security

# Azure DNS



- DNS translates website names into computer-friendly addresses
- Azure offers its own DNS service using cloud infrastructure
- Enables management of DNS records
- Offers scalability, security and integration with Azure resources

# **Let's practice!**

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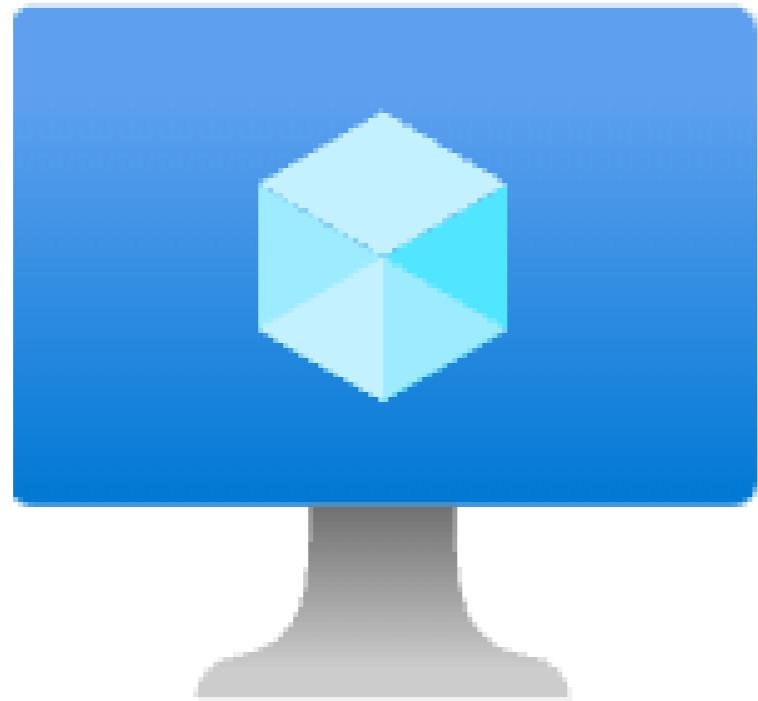
# Azure virtual machines

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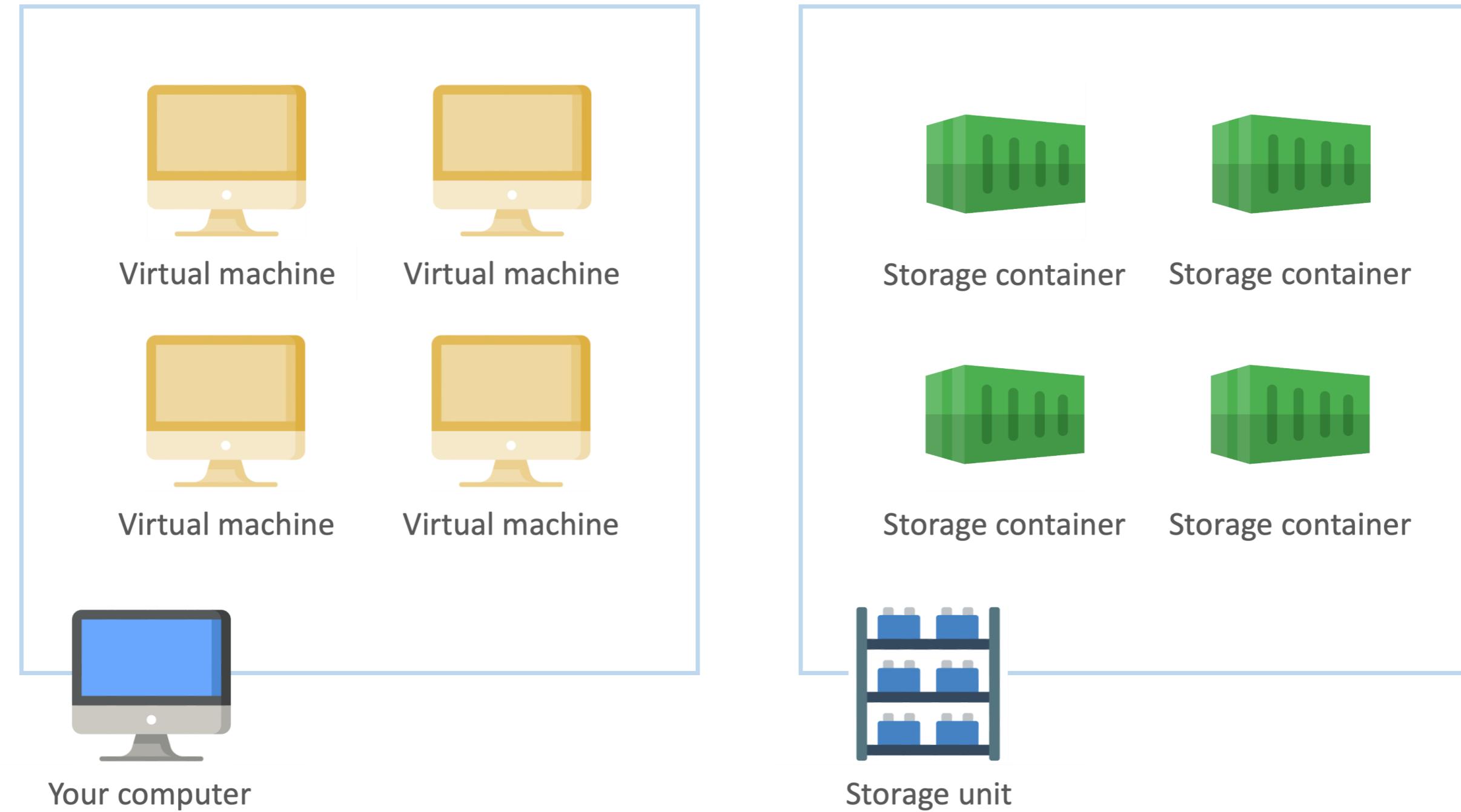
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# What is a virtual machine (VM)?

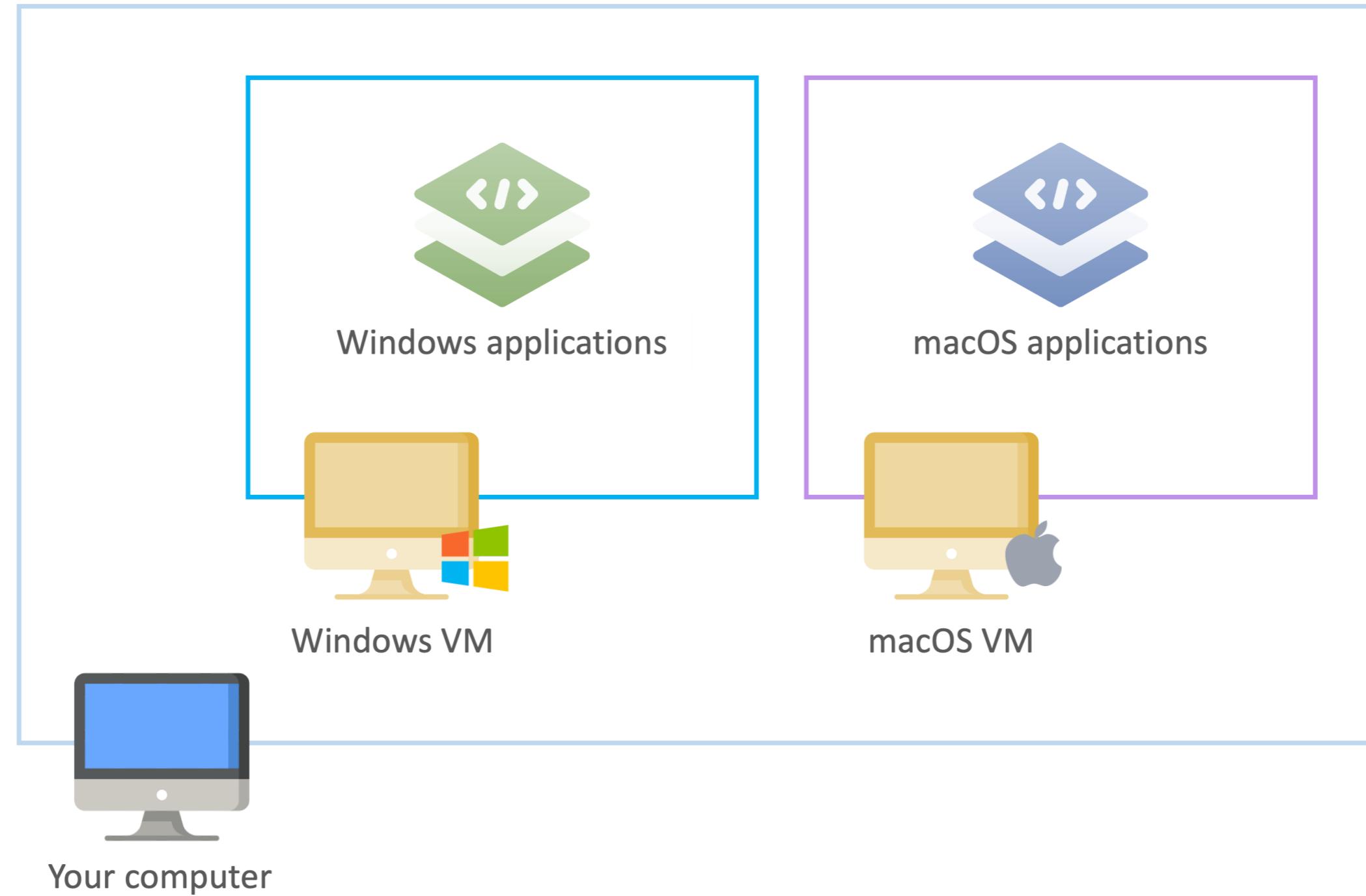


- Computer within your computer
- Allows running different operating systems and applications
- No need for a separate physical device

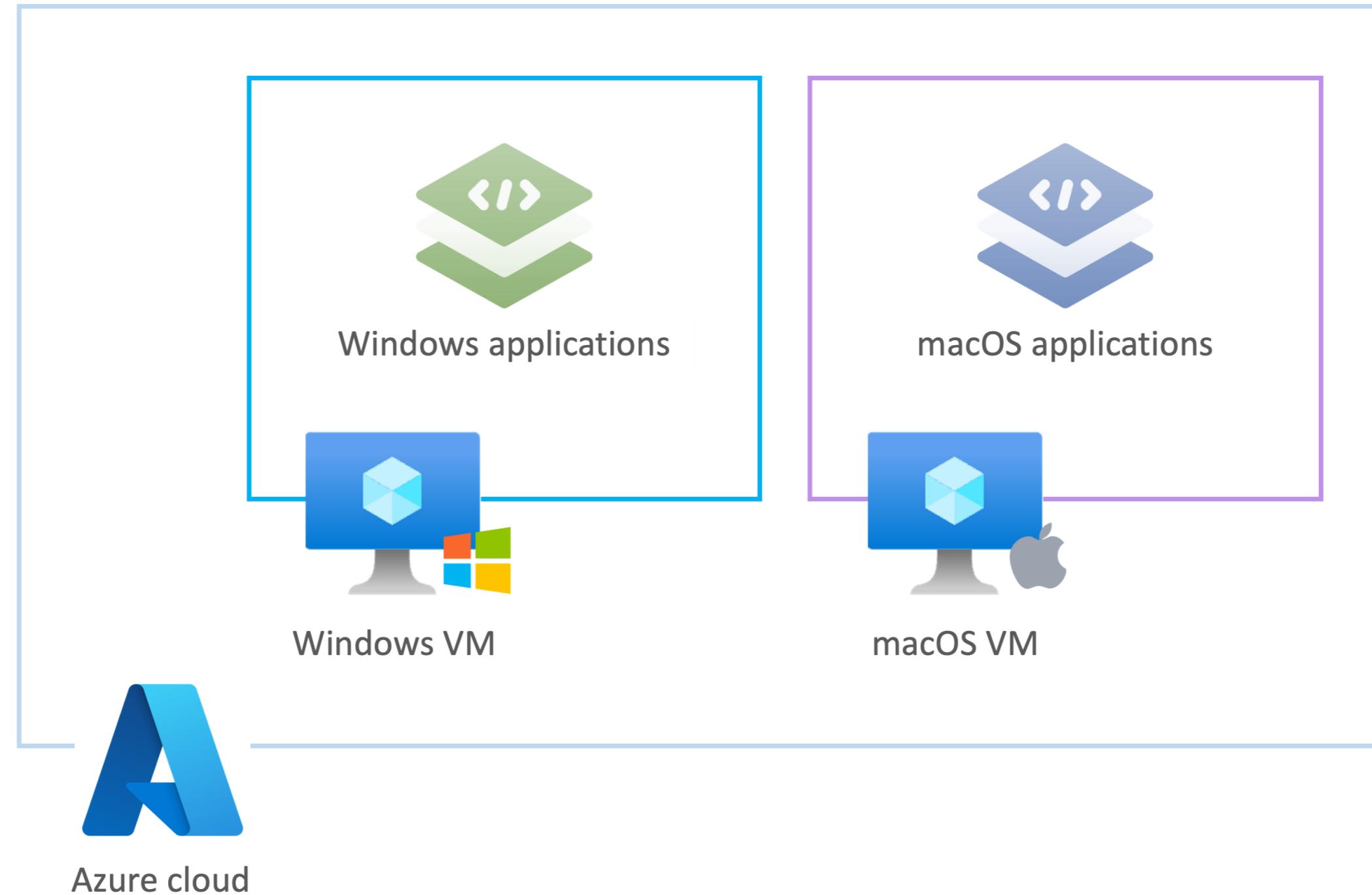
# What is a virtual machine (VM)?



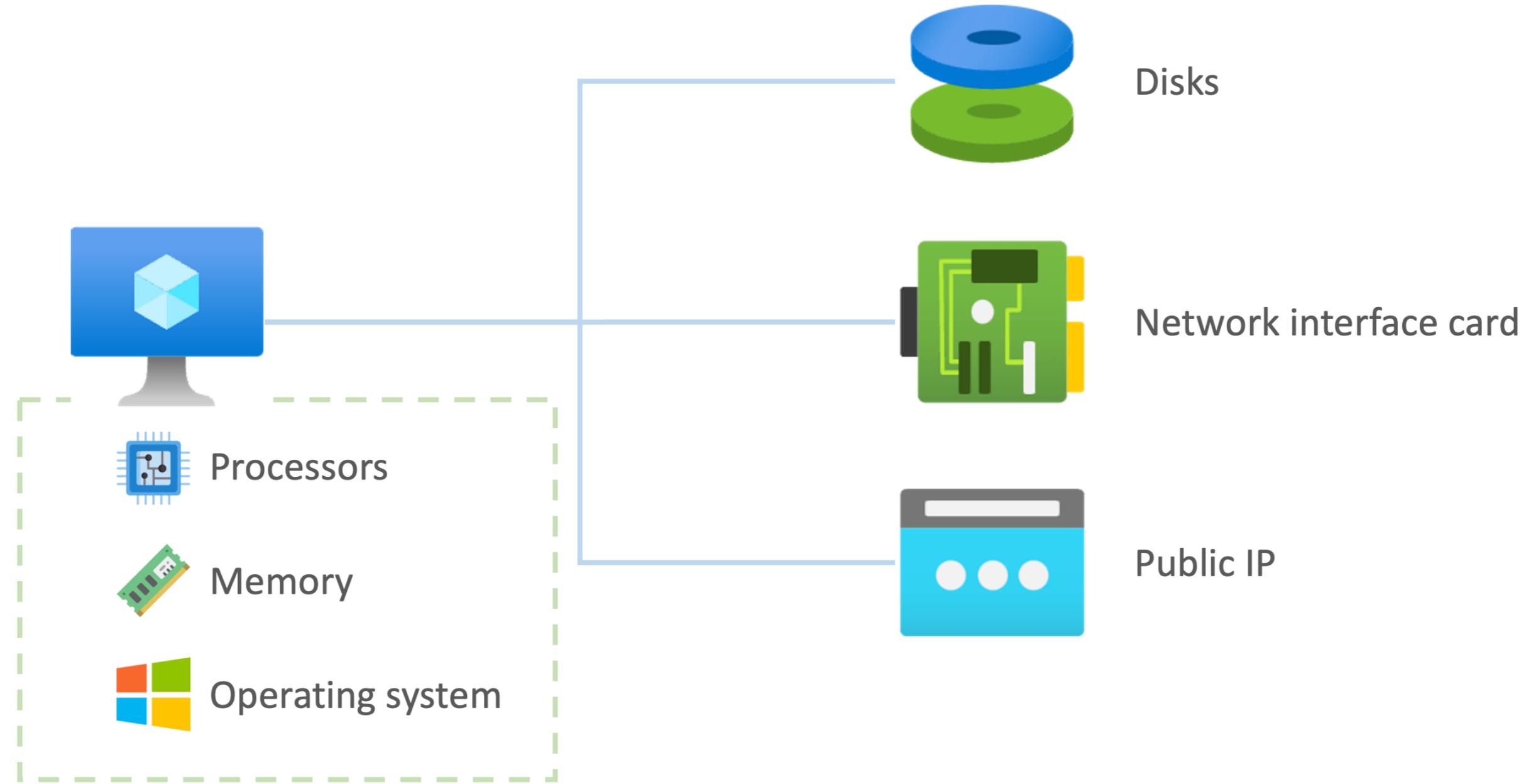
# Traditional virtual machines



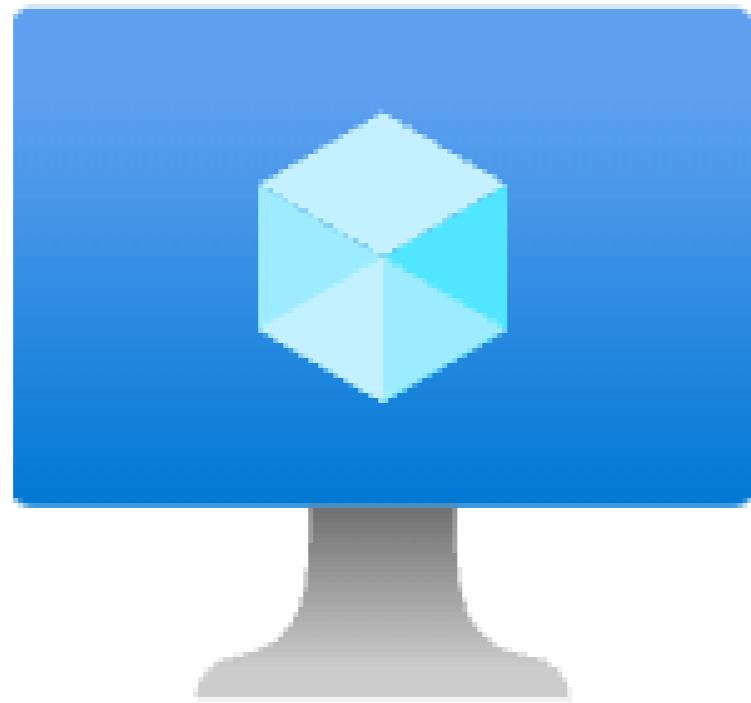
# Azure virtual machines



# Virtual machine components



# Virtual machines use cases



- Hosting applications
- Conducting analytics
- Handling data-related tasks
- Running legacy applications

# Scaling



- Individual VMs
  - Testing
  - Development
  - Smaller tasks
- Group VMs
  - High availability
  - Scalability
  - Redundancy

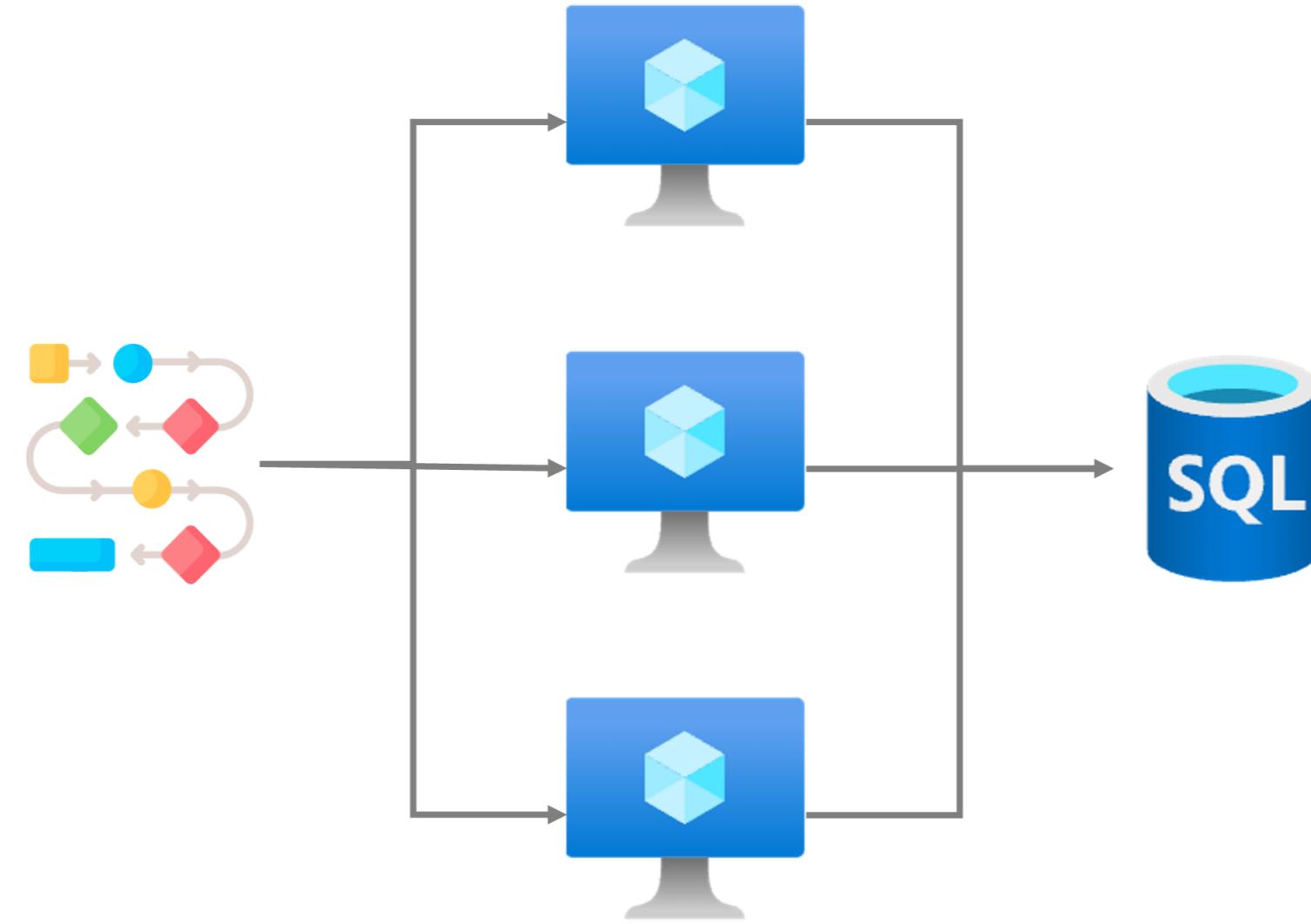


# Scale sets



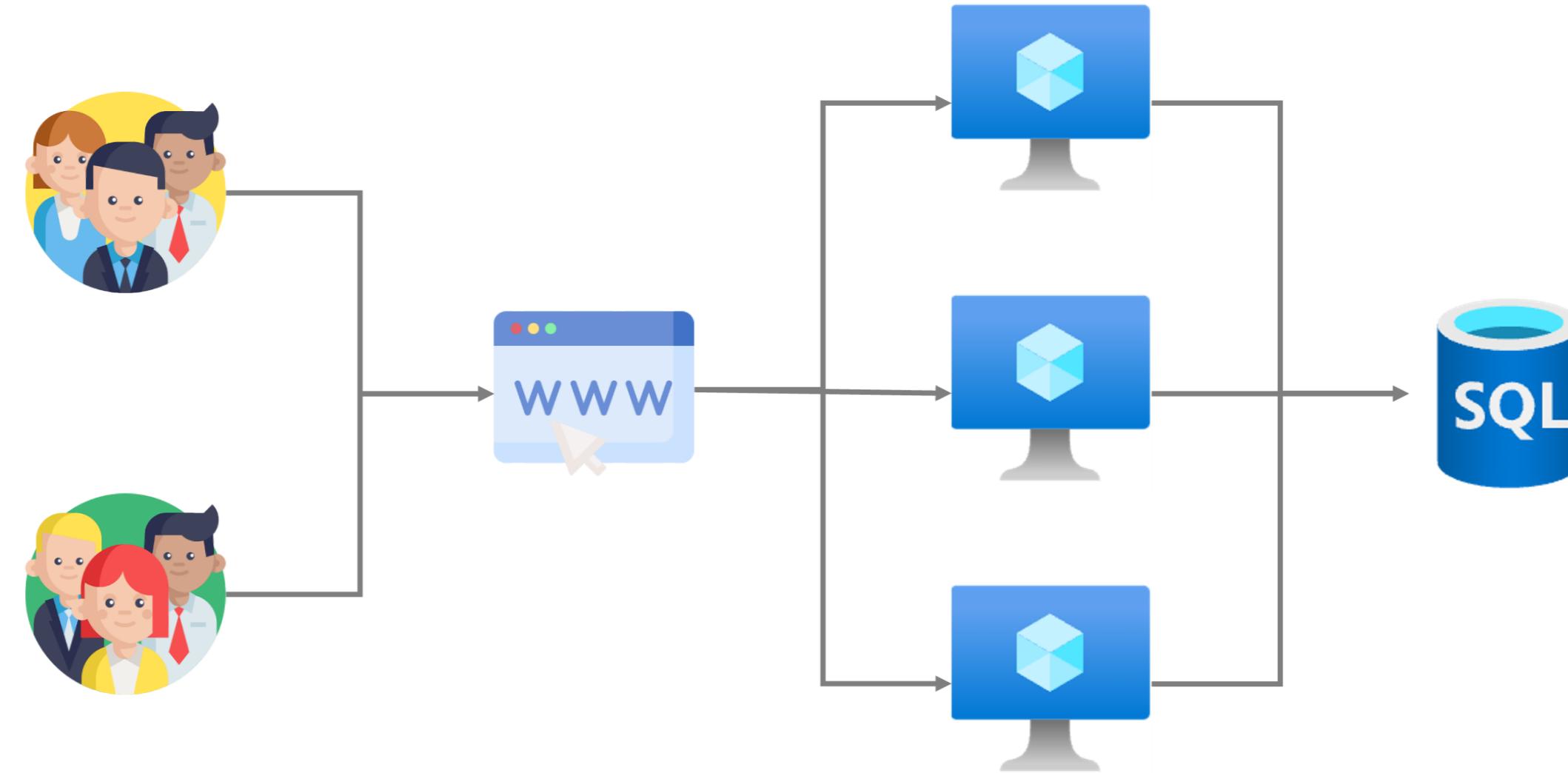
- Deploy and manage a set of identical virtual machines
- Number of virtual machines can be automatically adjusted
- Top performance and efficient resource utilization
- Minimal cost

# Scale sets use cases



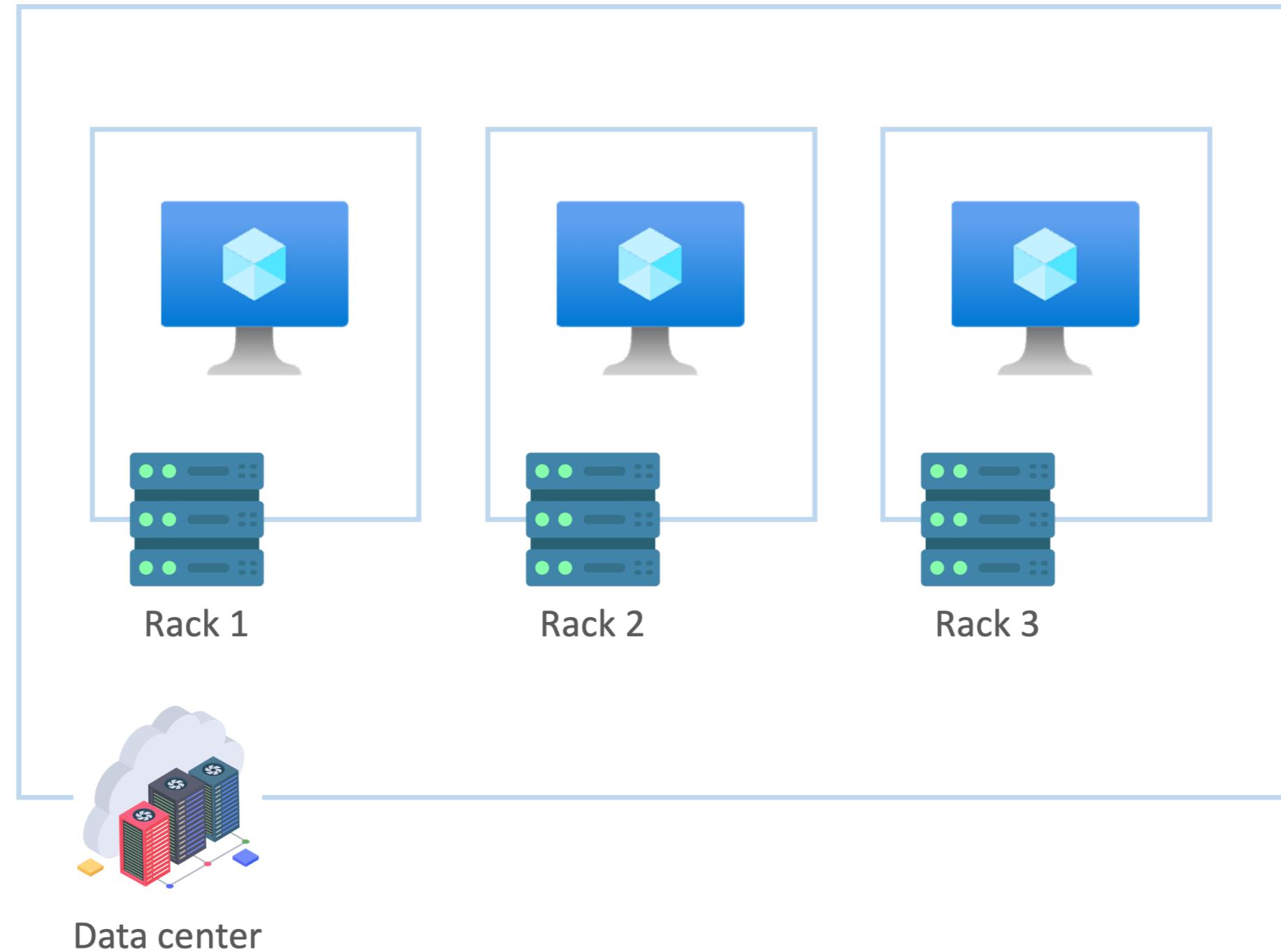
- Datawarehouse load

# Scale sets use cases

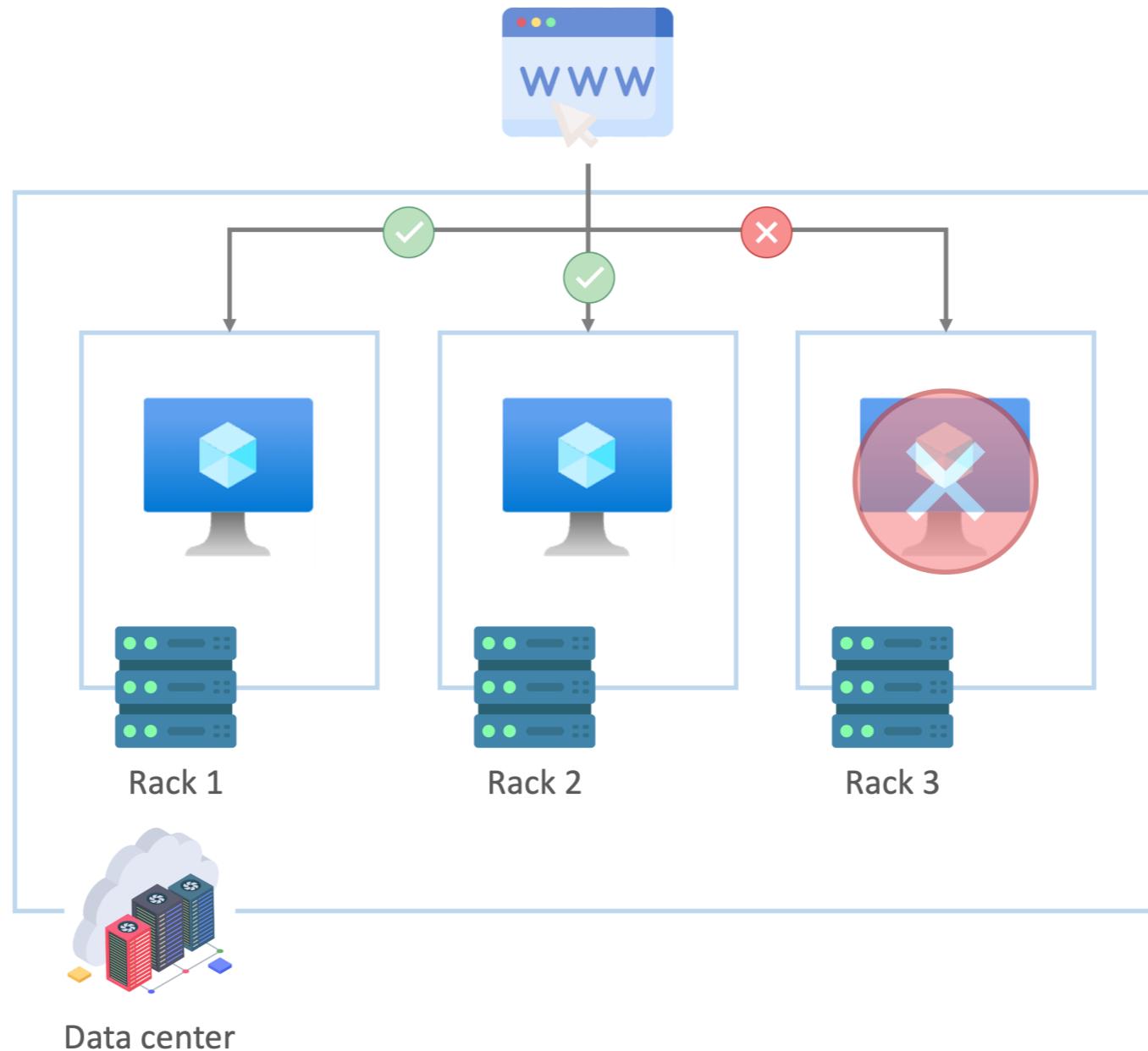


- Website scaling

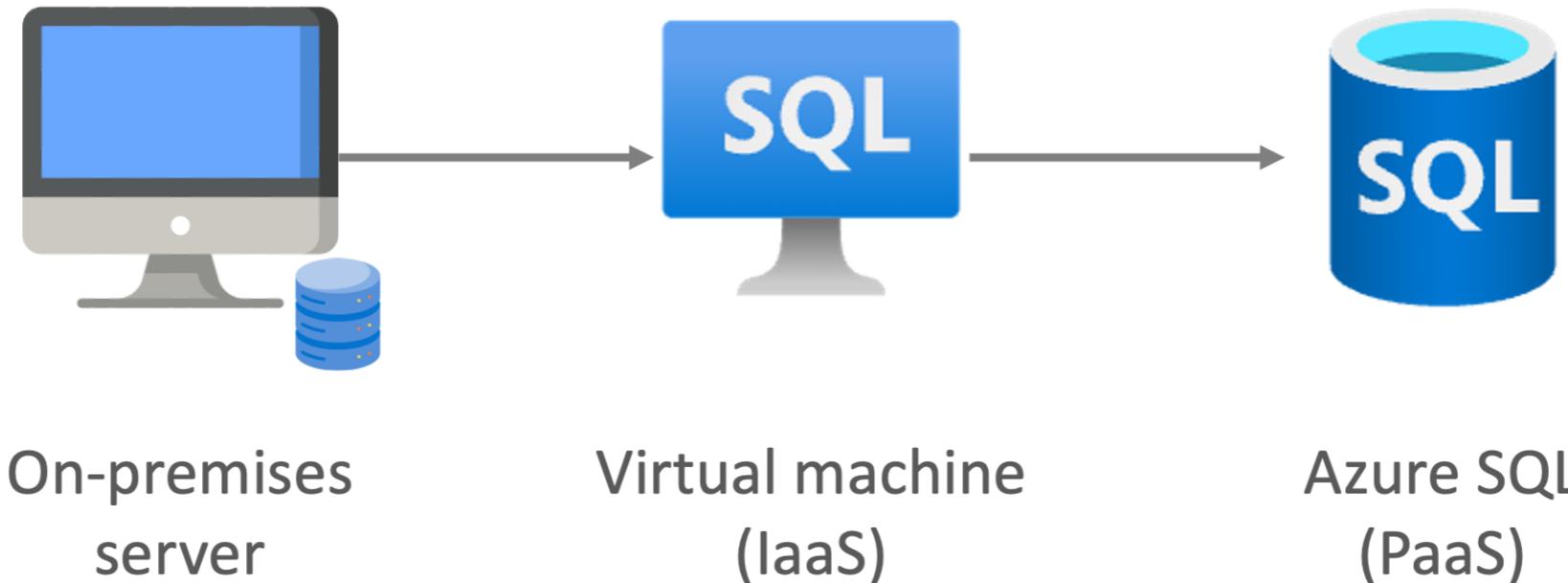
# Availability sets



# Availability sets use cases

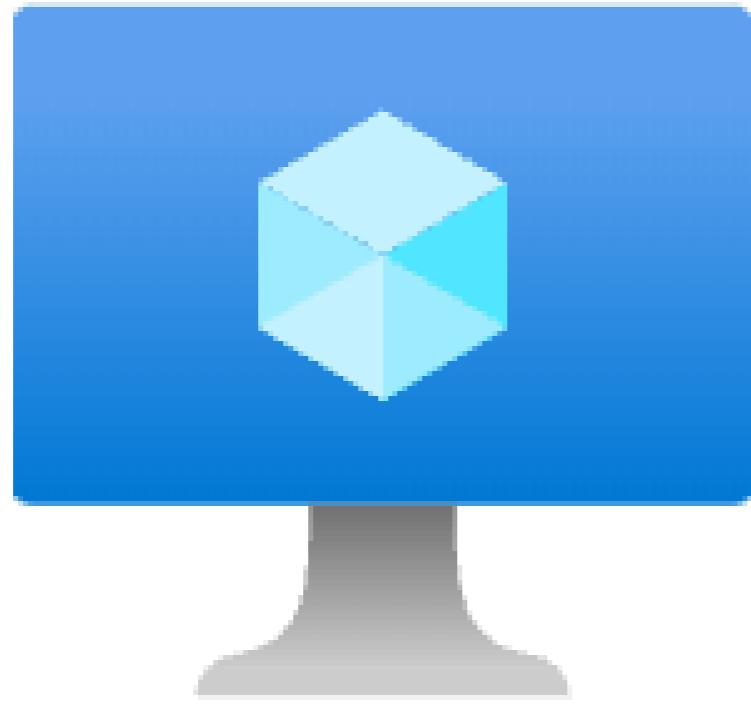


# Migration from on-premises



- Initial phase migrate to the Azure cloud
- Substitute for traditional hardware
- First step towards PaaS

# Future considerations



- PaaS solutions are replacing virtual machines
- Eliminates the need for managing underlying infrastructure
- Enable developers to focus on coding and application functionality

# **Let's practice!**

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# Create and configure virtual machines

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# **Let's practice!**

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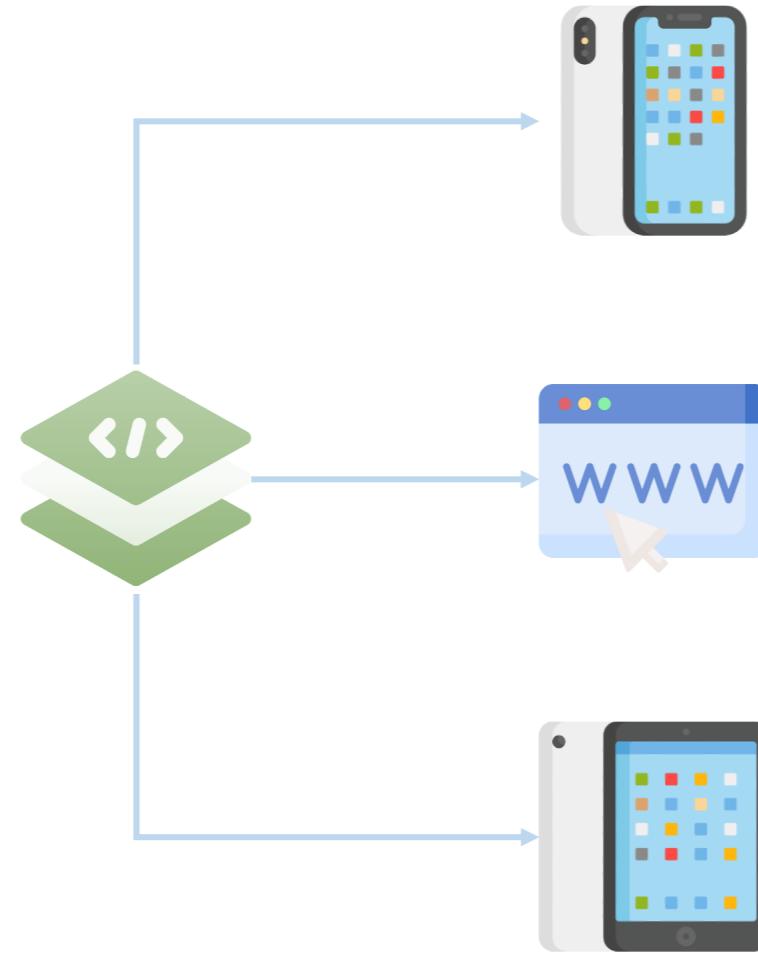
# Options for hosting applications

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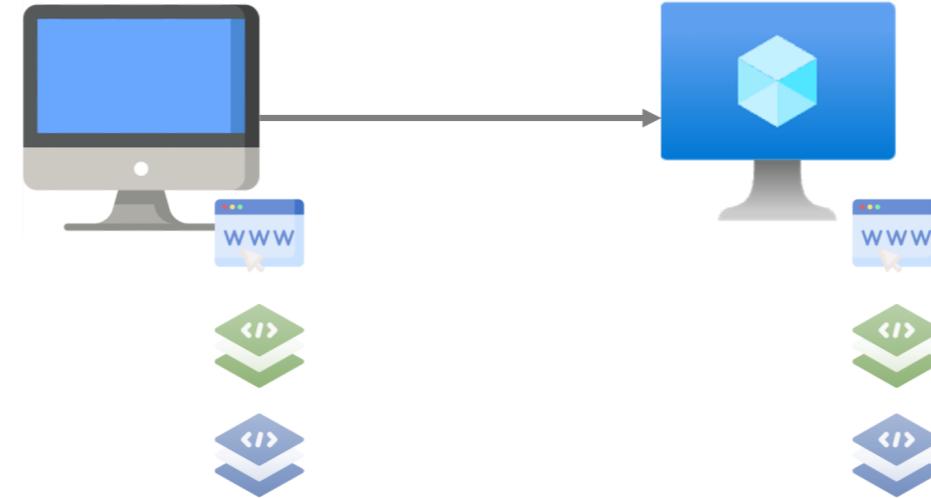
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# Modern applications



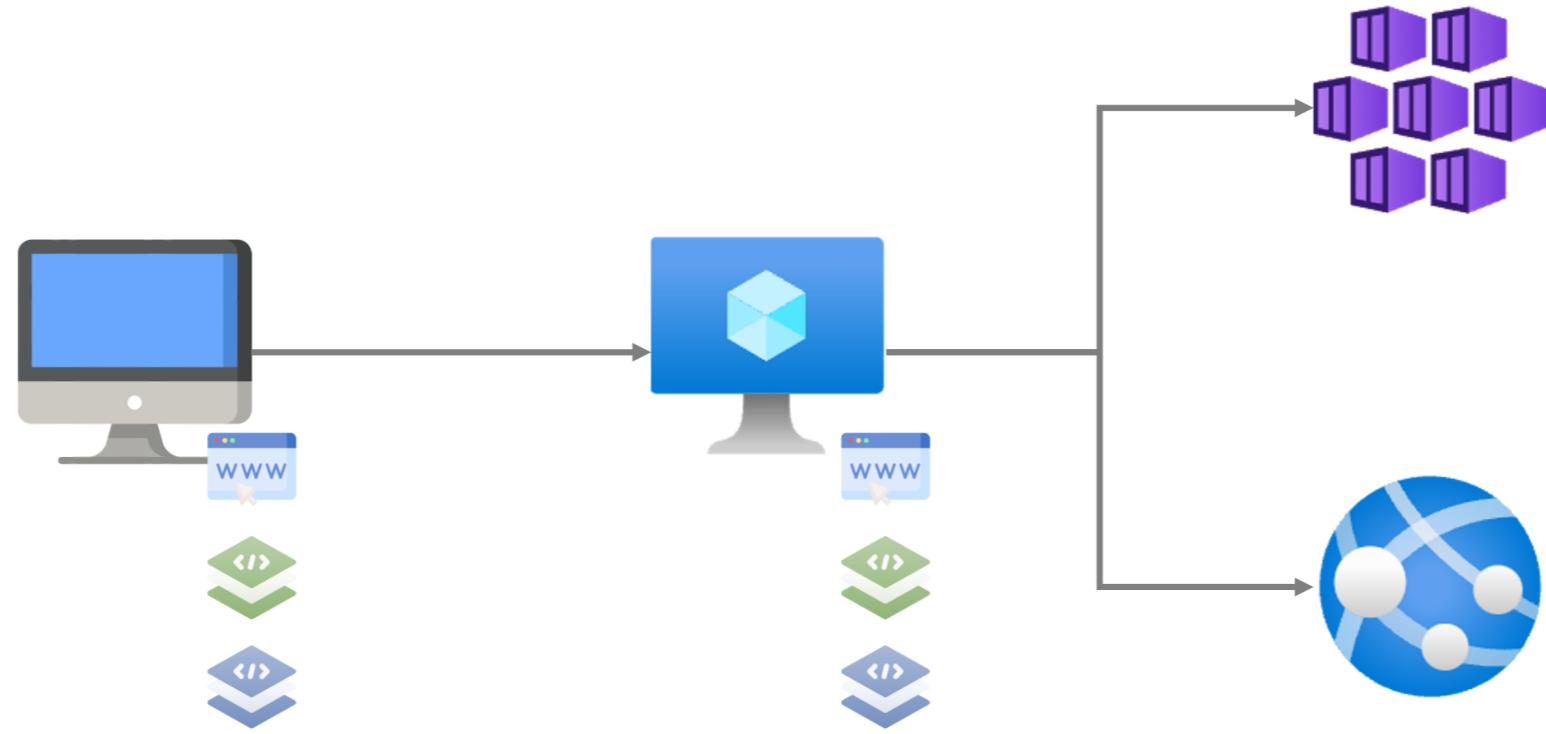
- Online versions of applications
  - Web
  - Mobile
  - Tablet

# Migrate from on-premises



- Move website and legacy applications from on-premises to virtual machines
- First step in having critical software in a secure and highly available cloud environment

# Migrate to modern services



- Refactor existing applications to use native Azure services
  - Container services
  - App services

# Azure app service



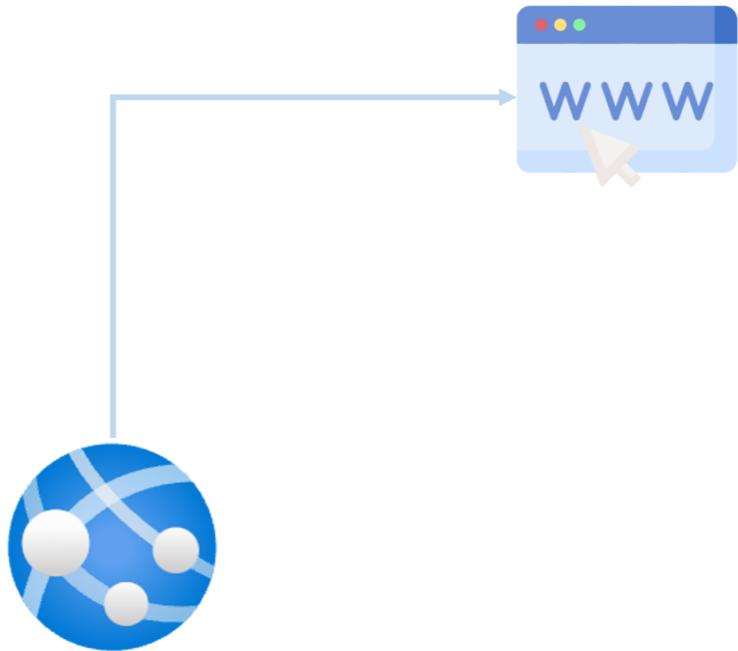
- Fully managed platform for building, deploying, and scaling web apps
- Supports multiple programming languages
- Provides automatic scaling
- Offers web apps, API apps, web jobs and mobile apps

# Web apps



- Allow to build, host, and scale web applications in the cloud
- Provide automatic scaling, continuous integration and deployment
- Include support for multiple programming languages

# Web apps use cases

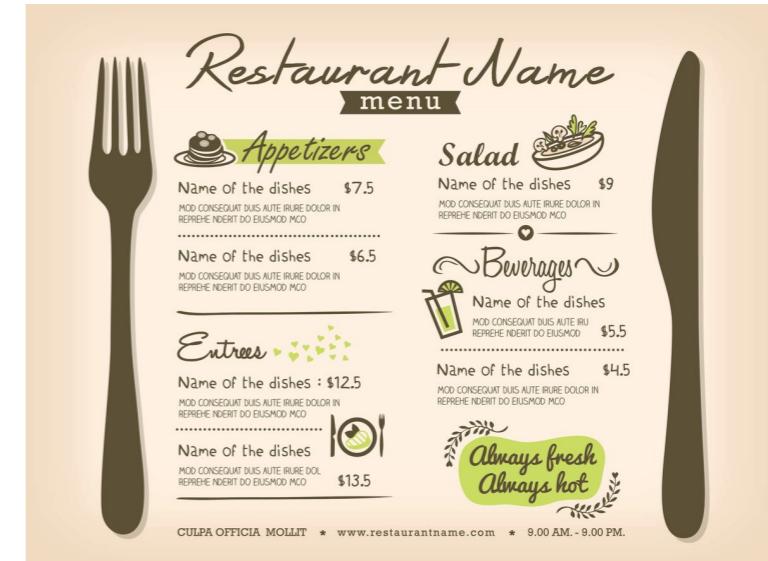


- Suited for hosting a variety of websites (simple and complex)
- Capability to migrate traditional websites to web apps

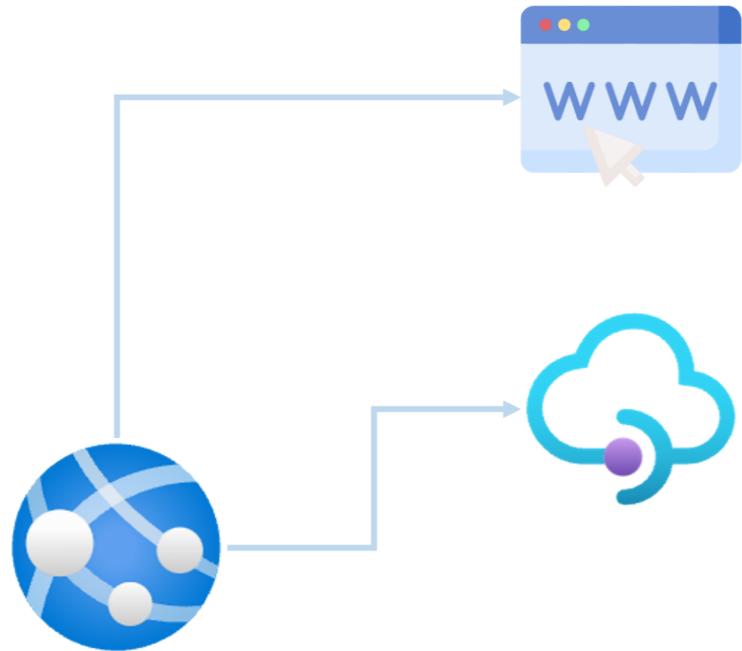
# What is an API?



- Application Programming Interface
- Allows different software applications to communicate with each other
- Using standardized instructions

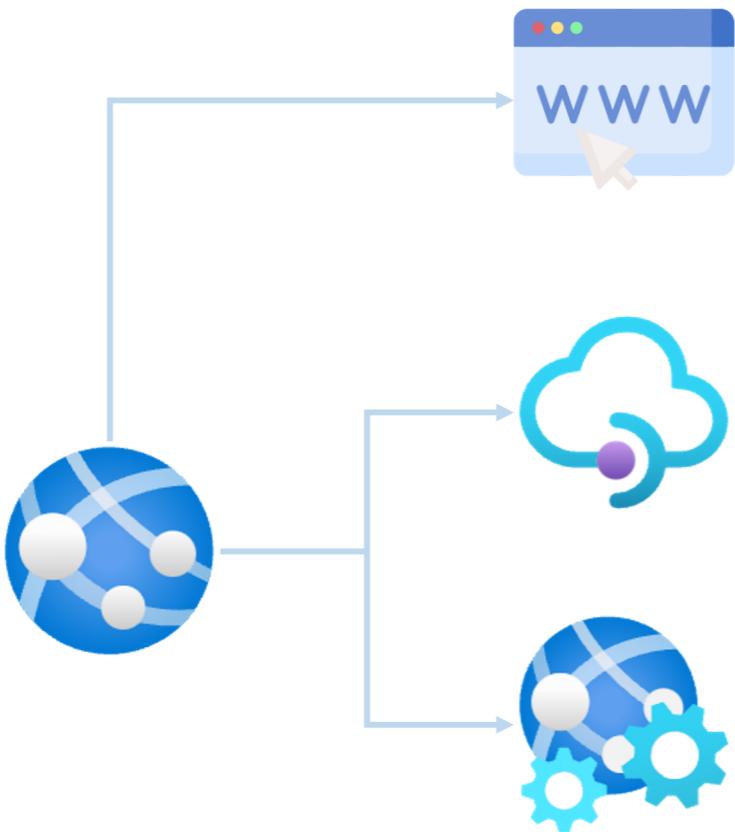


# API apps



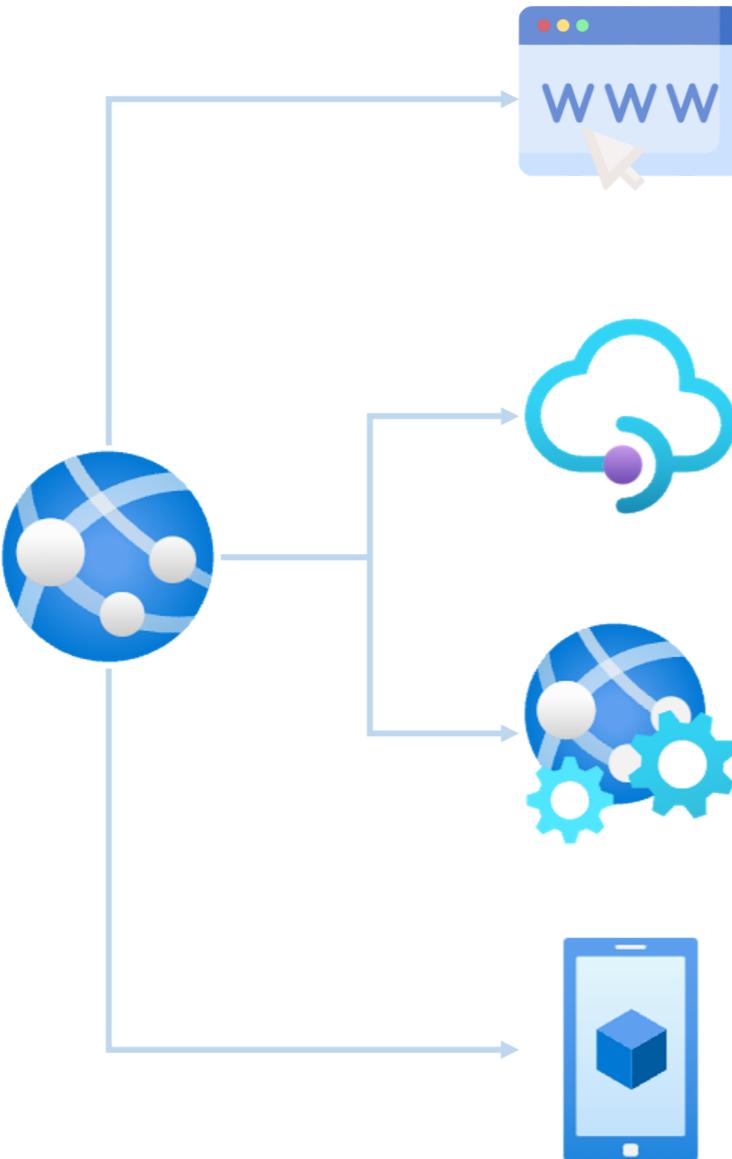
- Dedicated environment for the creation of APIs
- Expose application functionality for consumption by other services

# Web jobs



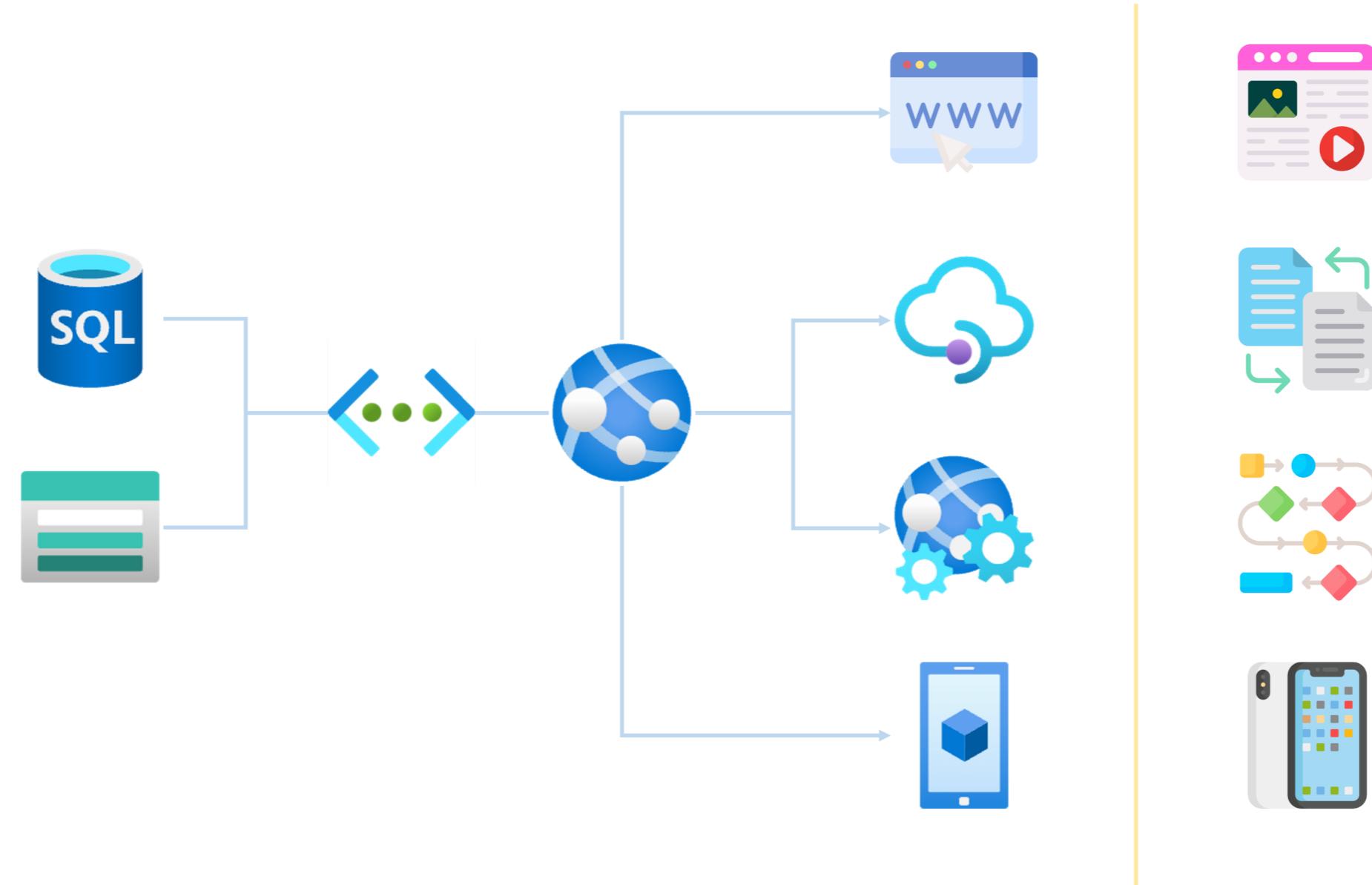
- Serve as background tasks or scripts
- Perform a variety of automated functions
- Execute code in the background

# Mobile apps



- Back-end services for mobile applications
- Provides authentication, offline data sync, push notifications
- Ability to connect to on-premises systems

# App service advantages



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