

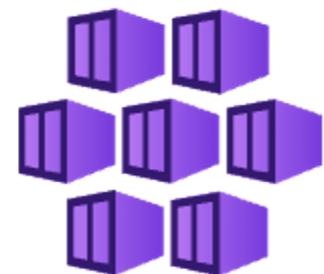
Exploring Azure compute services

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



Florin Angelescu
Azure Architect

Azure compute services

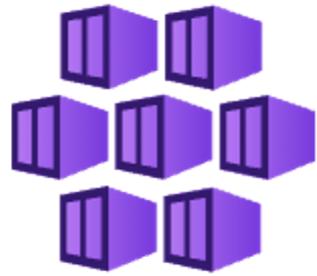


- Resources and services that enable processing and app execution and workloads in Azure
- Provide the computing power to run apps, process data, and perform various tasks

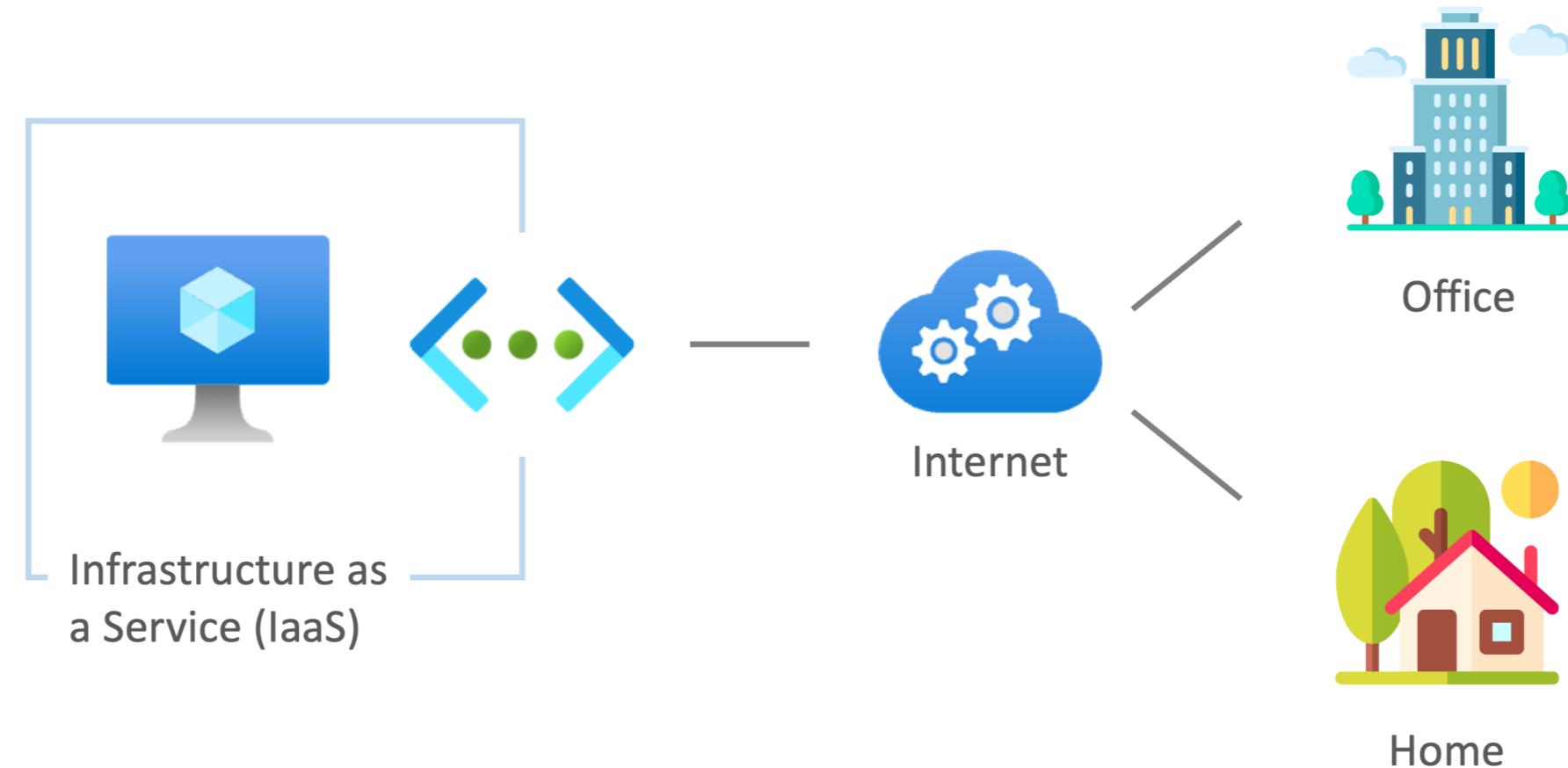
Azure compute services



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

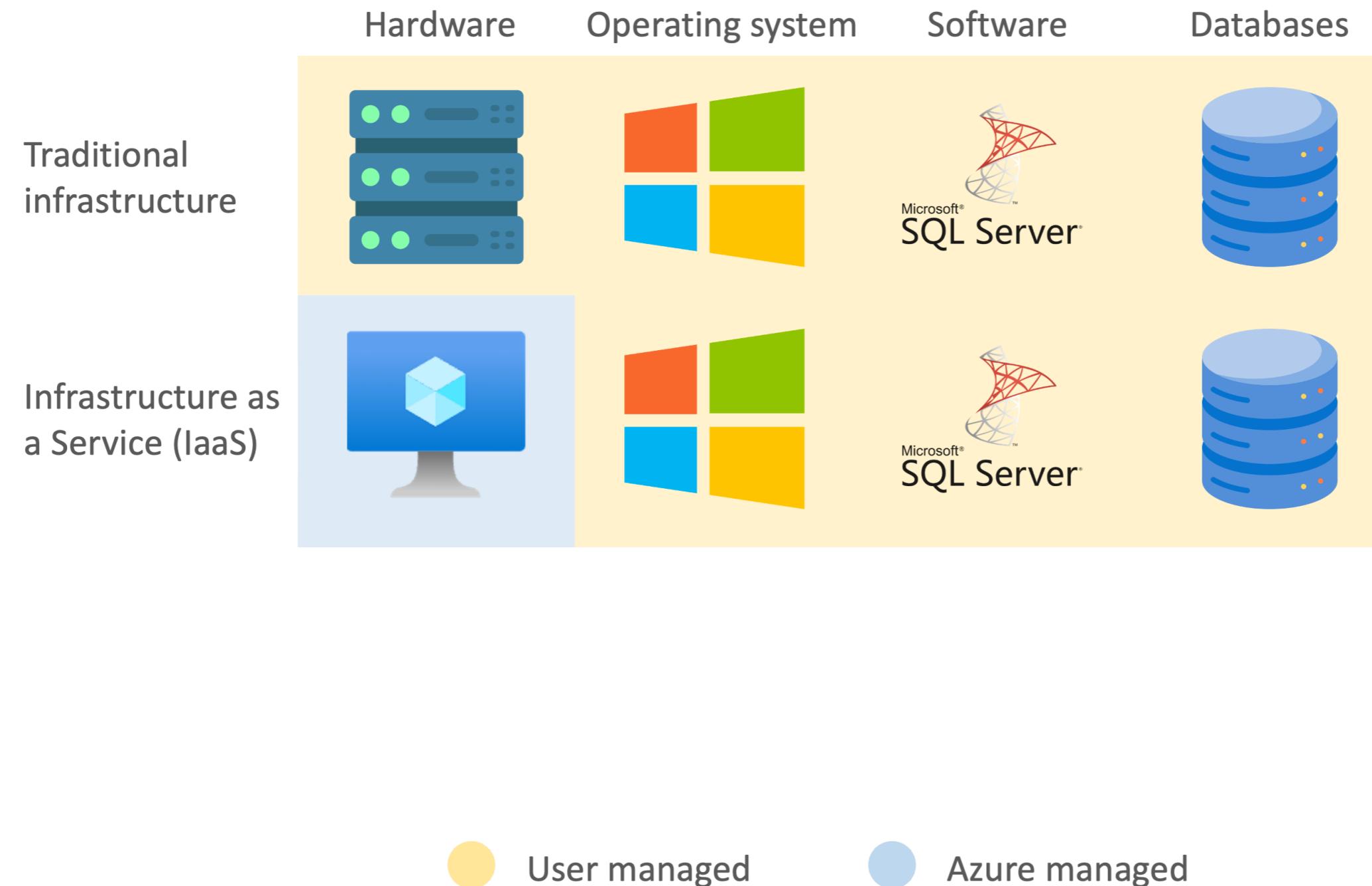


Infrastructure as a Service (IaaS)

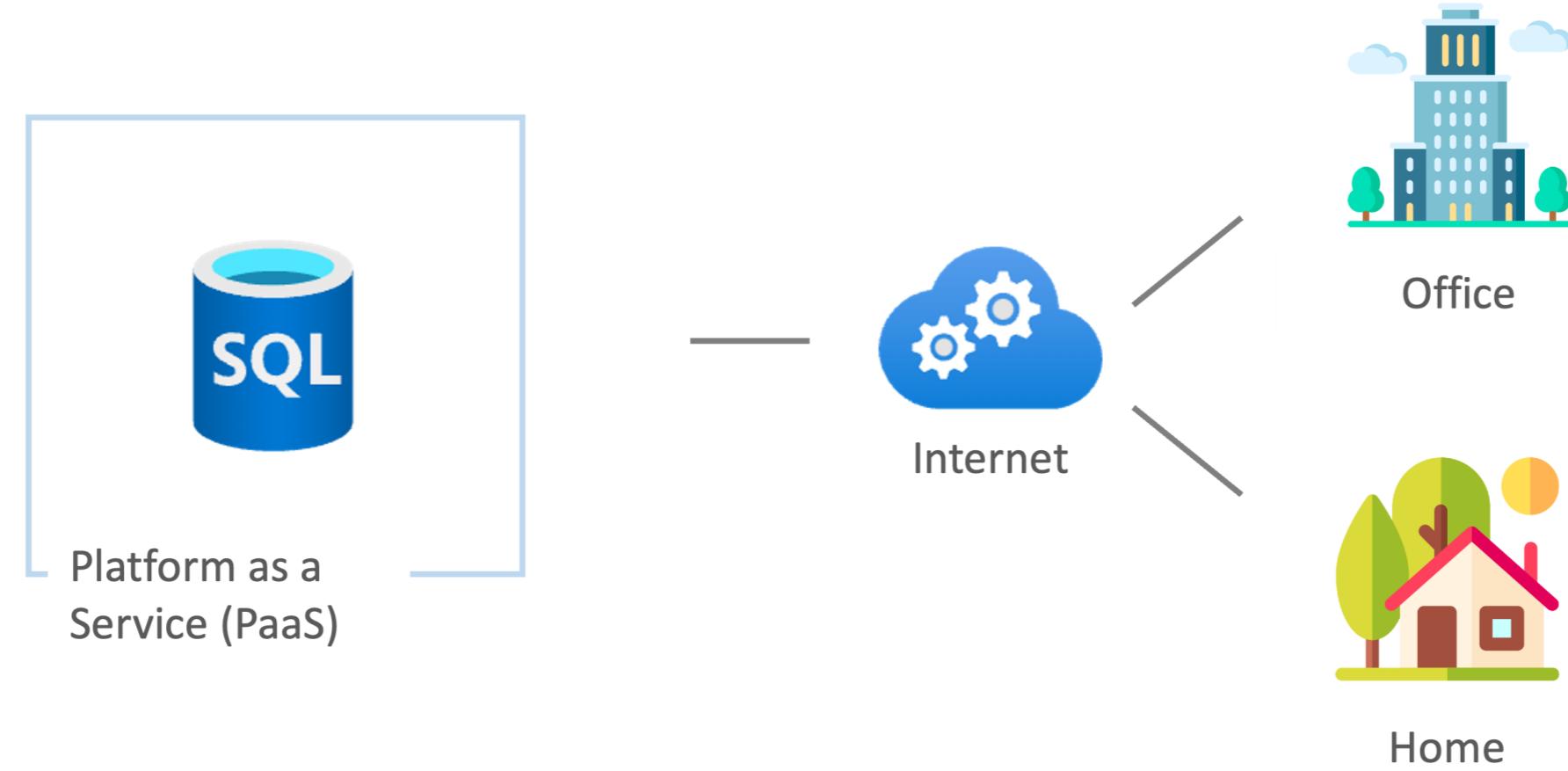


- Provides virtualized computing resources over the Internet
- Alternative to traditional on-premises infrastructure
- Includes virtual machines and networking

IaaS in practice

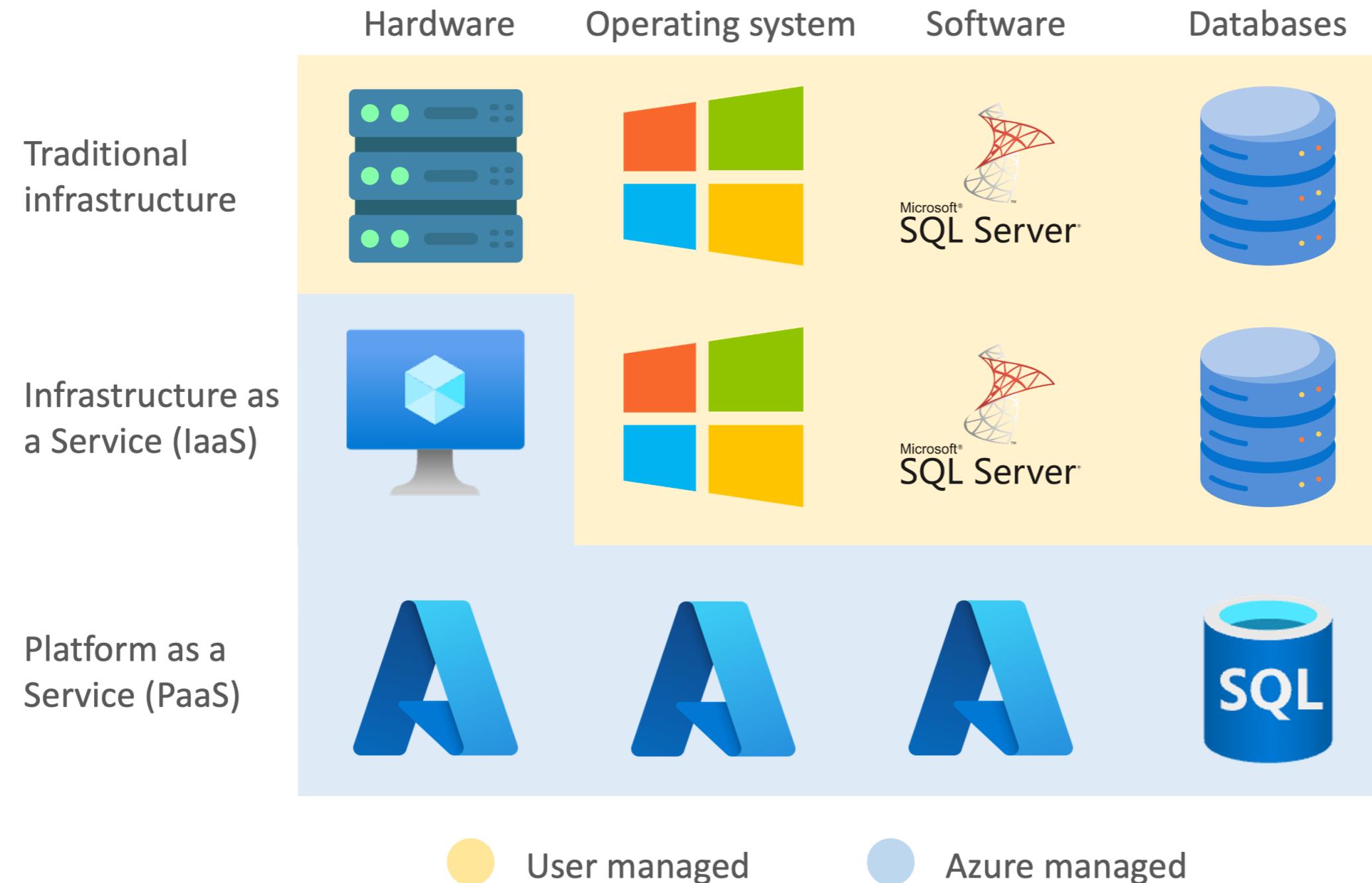


Platform as a Service (PaaS)



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

PaaS in practice

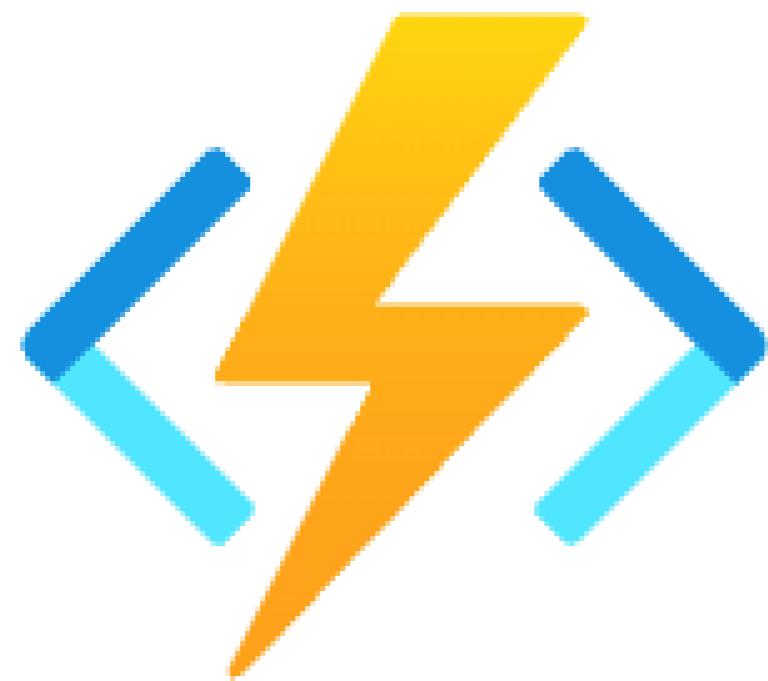


Serverless computing



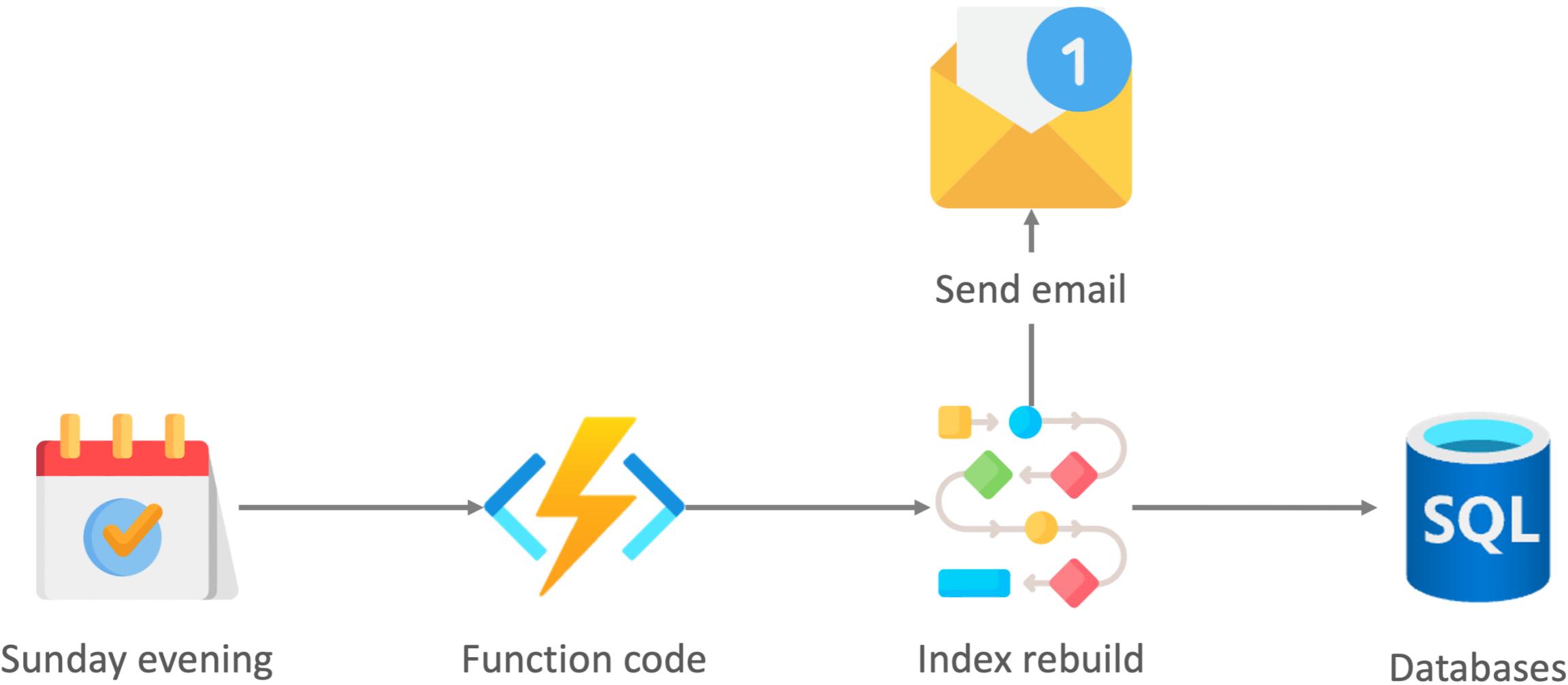
- Shifts more responsibility to the cloud provider
- Users focusing mainly on writing code
- Applications are broken down into smaller, standalone components
- They get executed in response to events

Azure functions

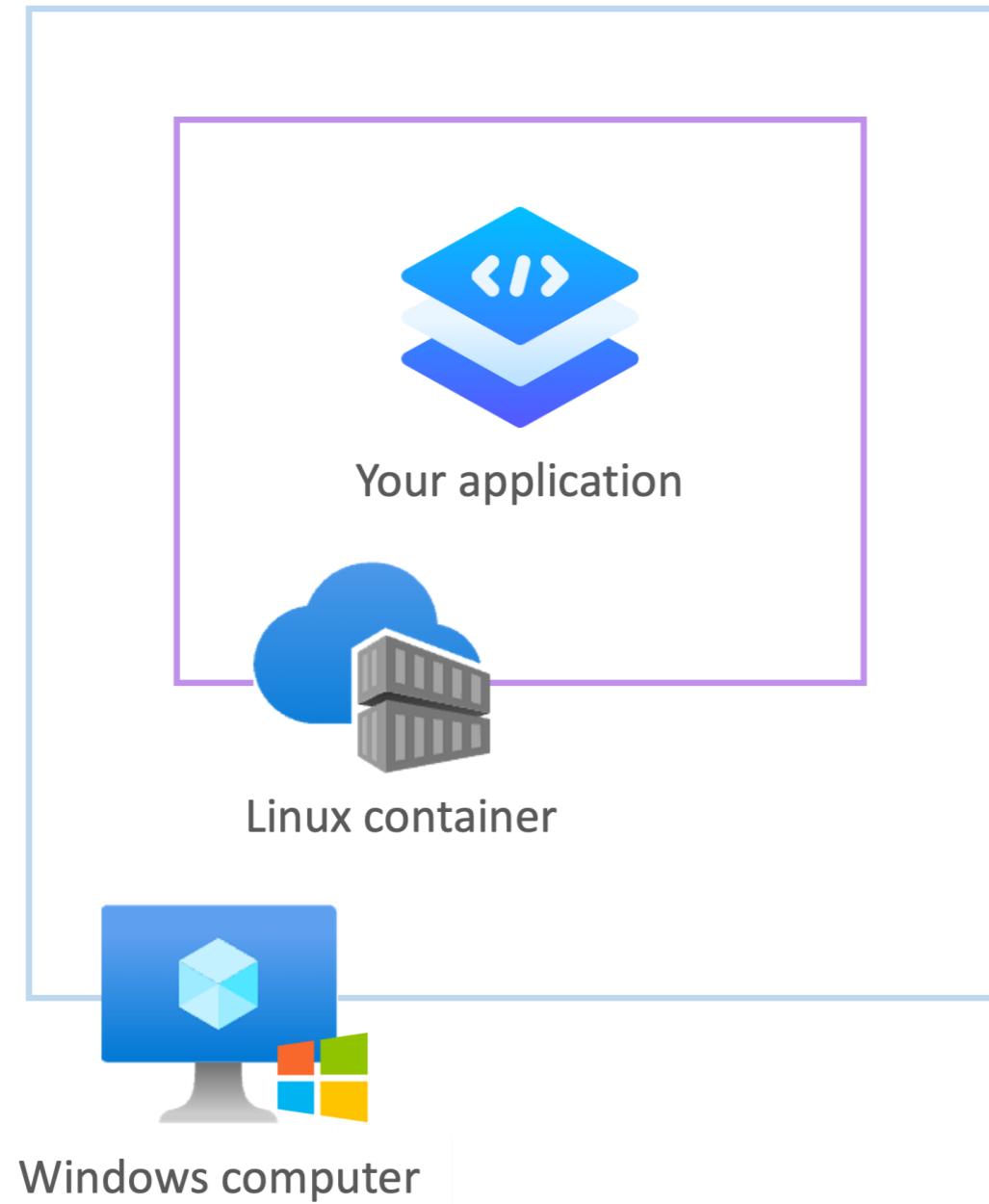


- Allow to run code in response to events
- No need to manage infrastructure
- Characterized by low complexity
- Used to address specific requirements

Azure functions in practice

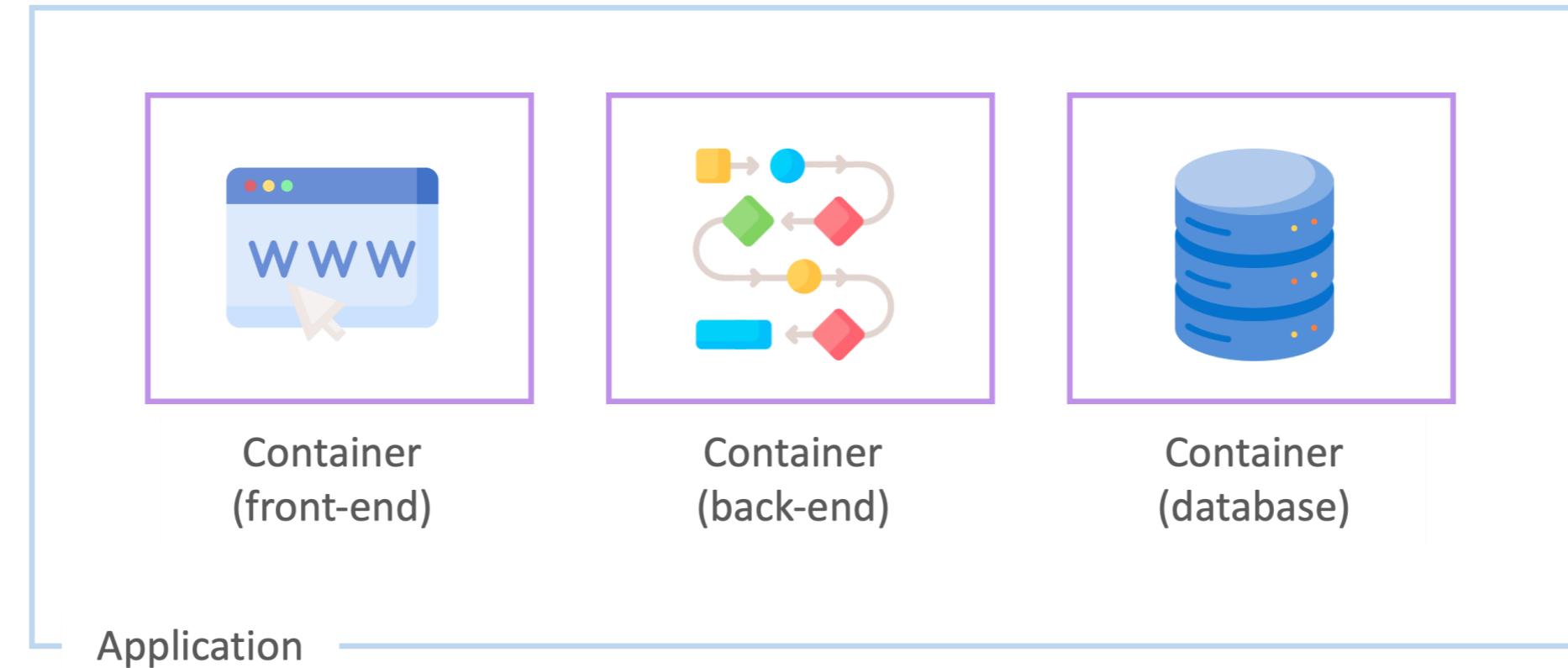


Containers



- 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?



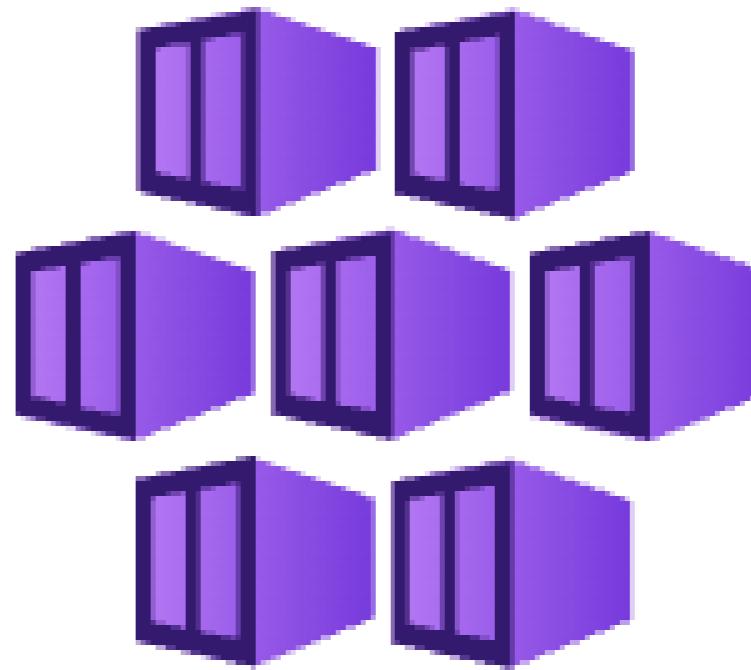
- Build solutions through a microservice architecture
- Breaking down complex applications into smaller, independent components
- Enables independent maintenance, scaling, or updating

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!

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES

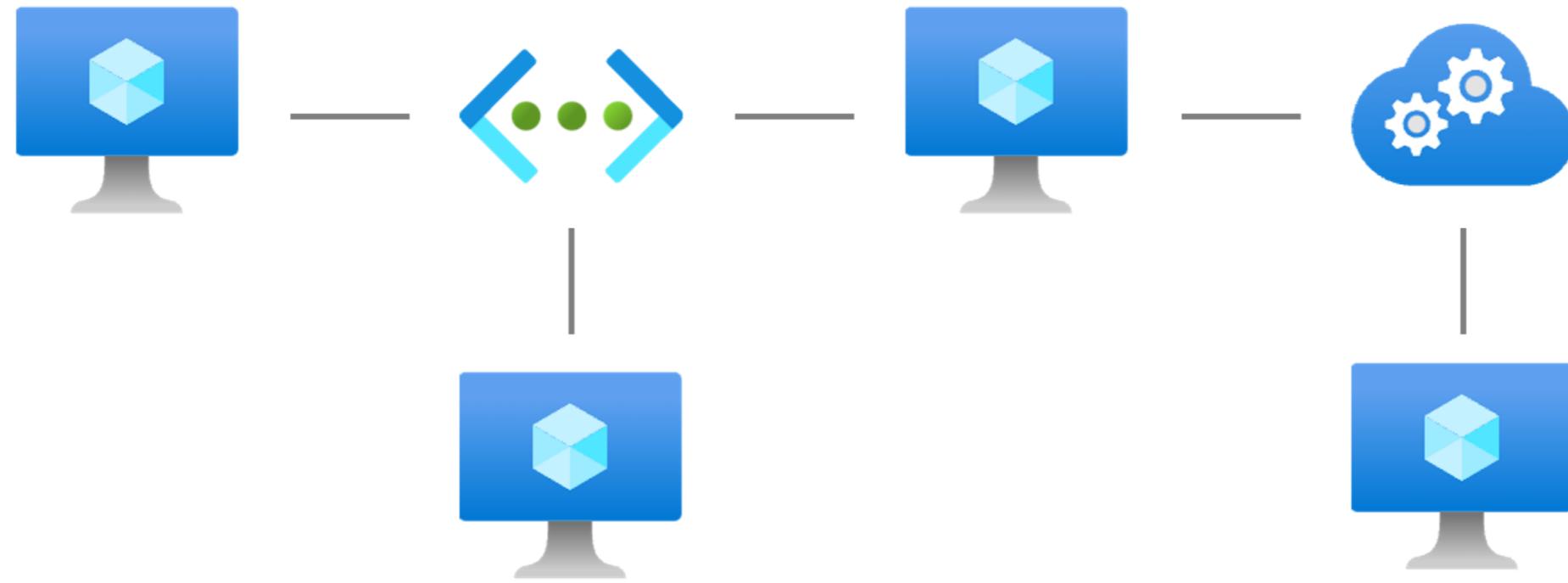
Azure networking overview

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



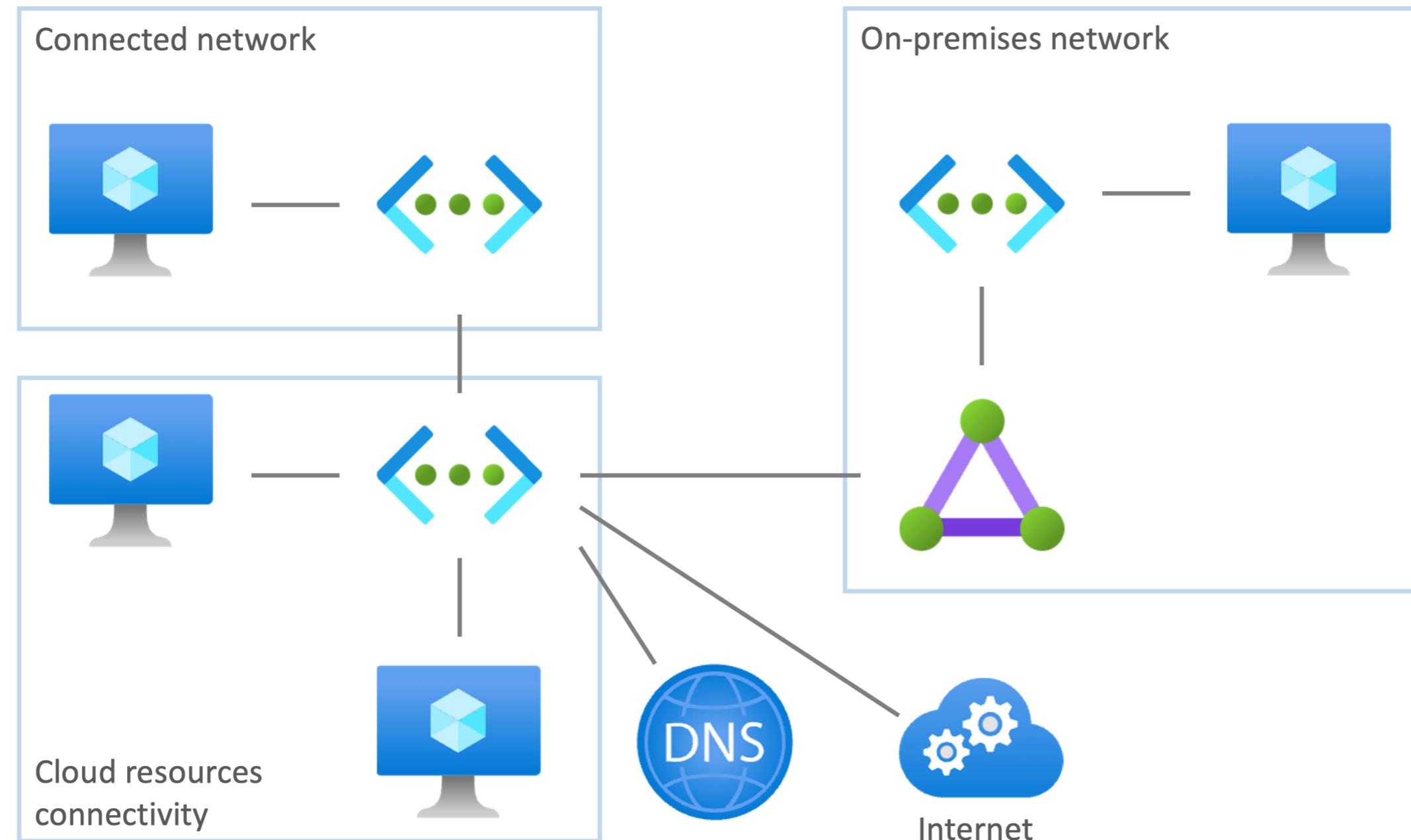
Florin Angelescu
Azure Architect

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

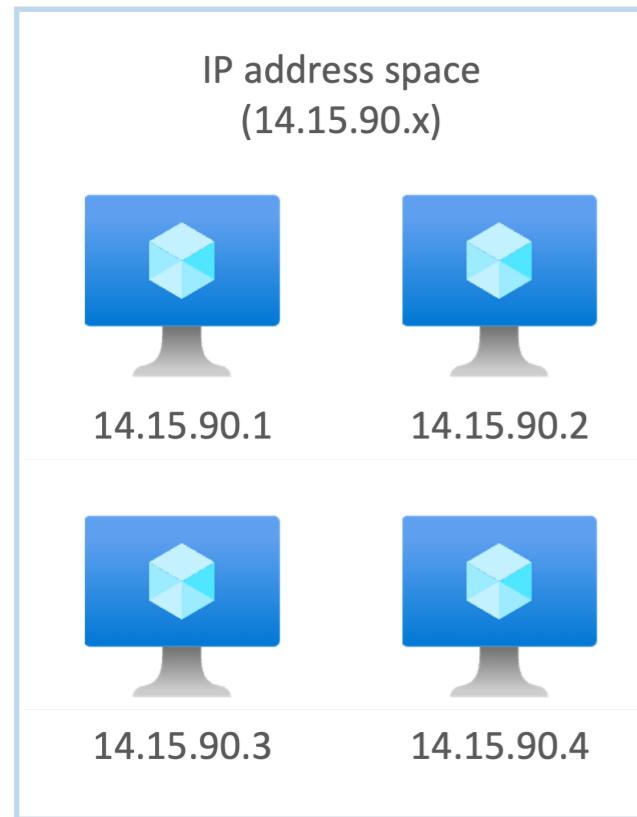


Street, number,
city, country

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

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

What is an IP address space?



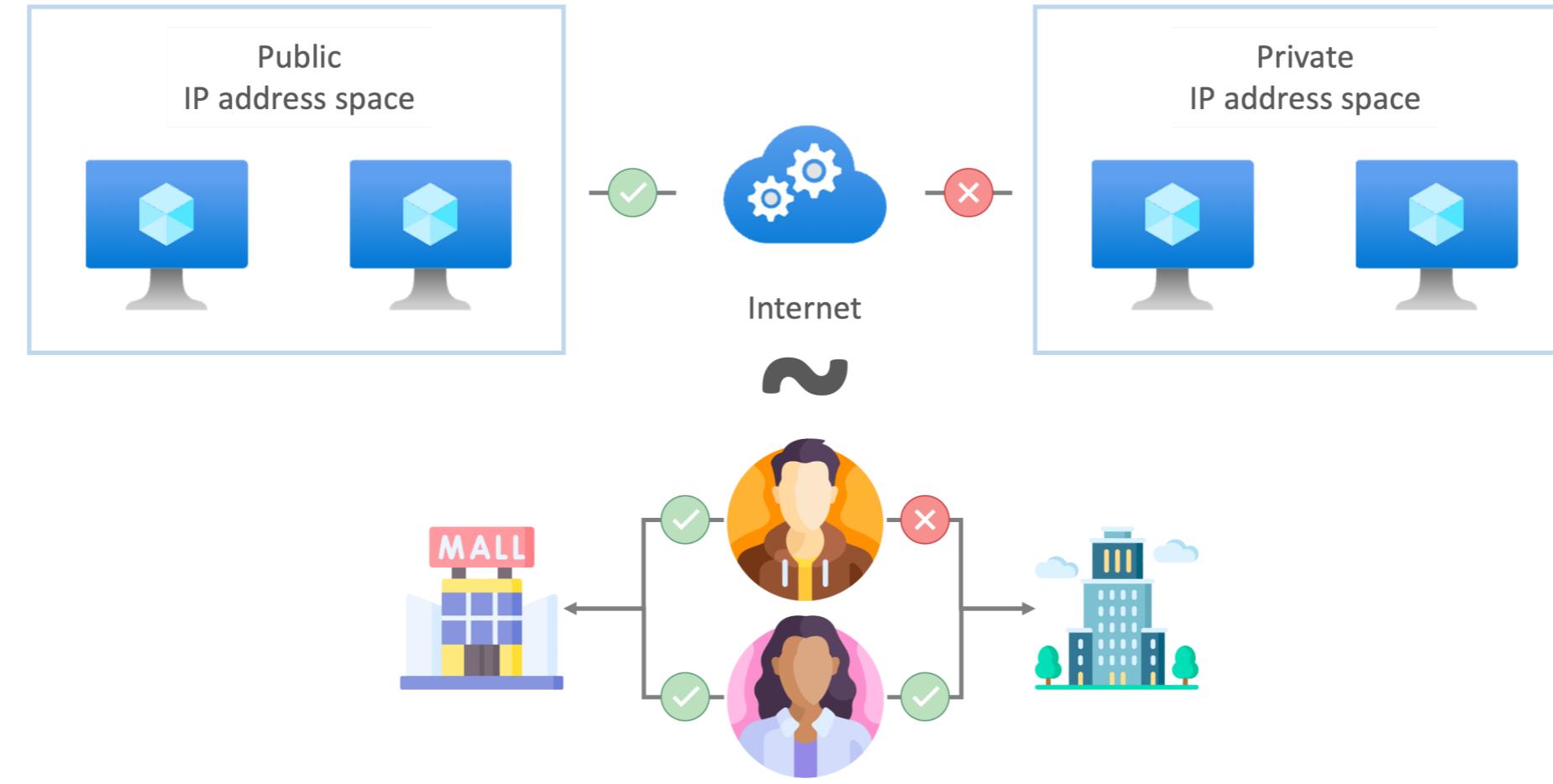
- Neighborhood where devices are located
- Devices share a common part of the address (14.15.90.x)
- Have a unique portion that sets them apart

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

Subnets

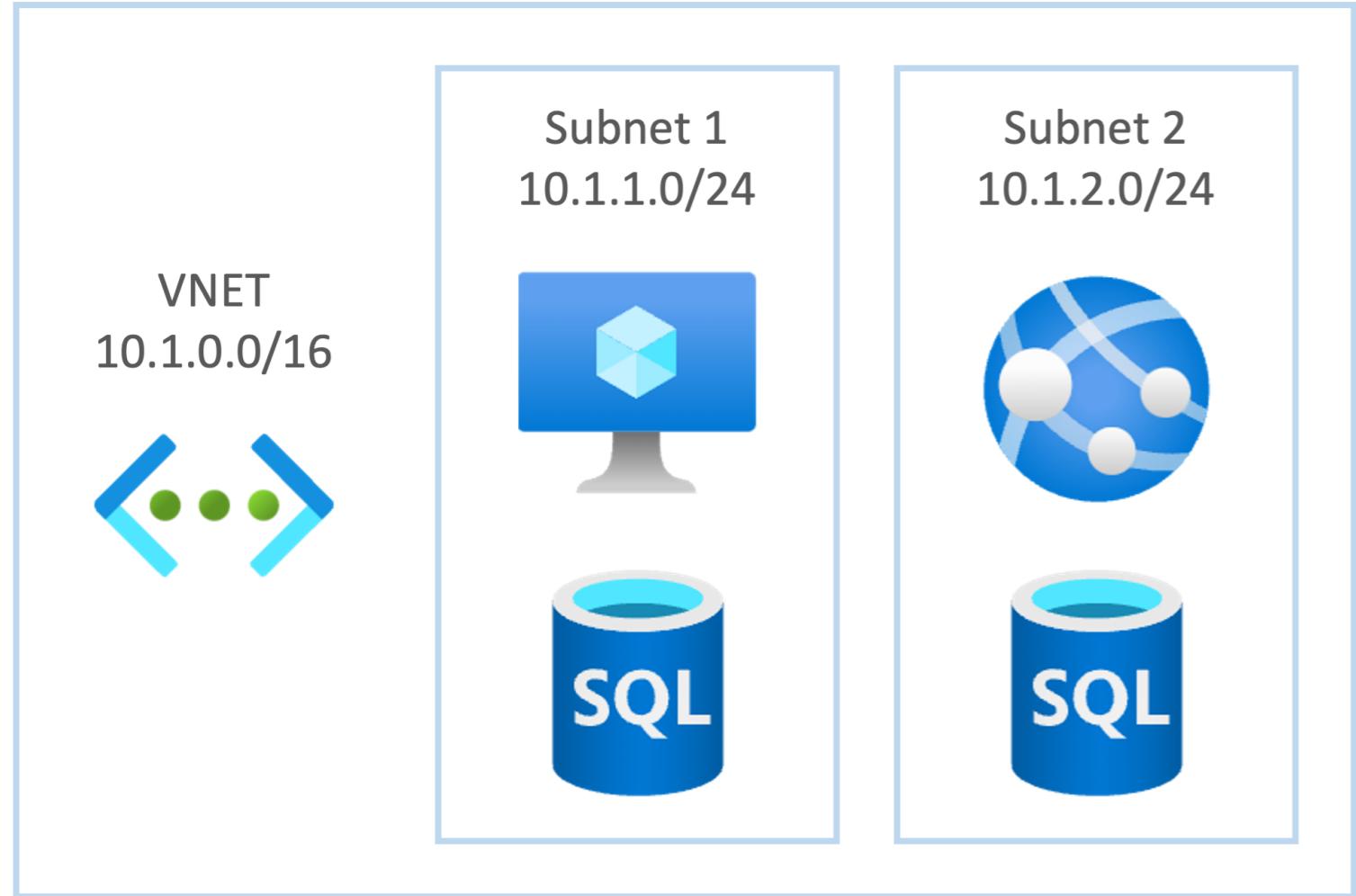


Public vs. private



- 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

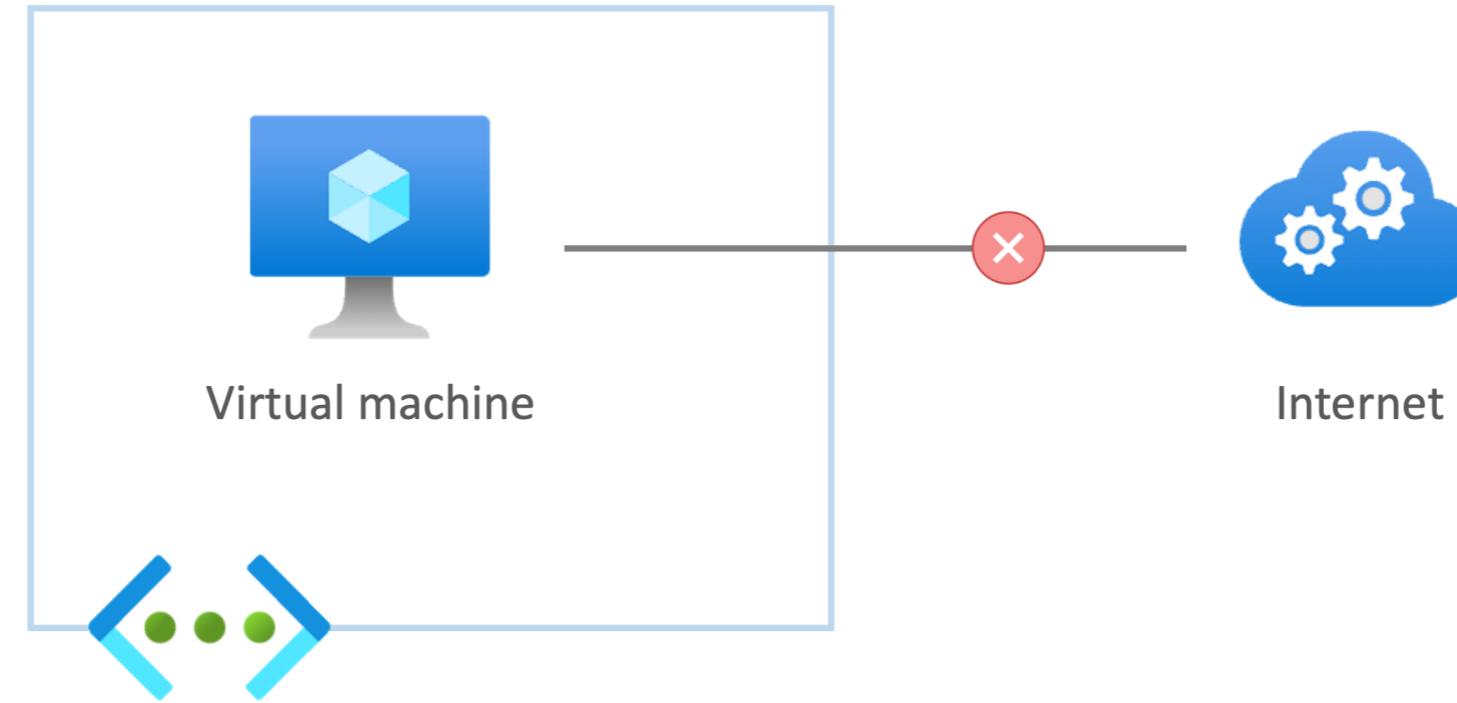
Cloud resources connectivity



Azure virtual network (VNET)

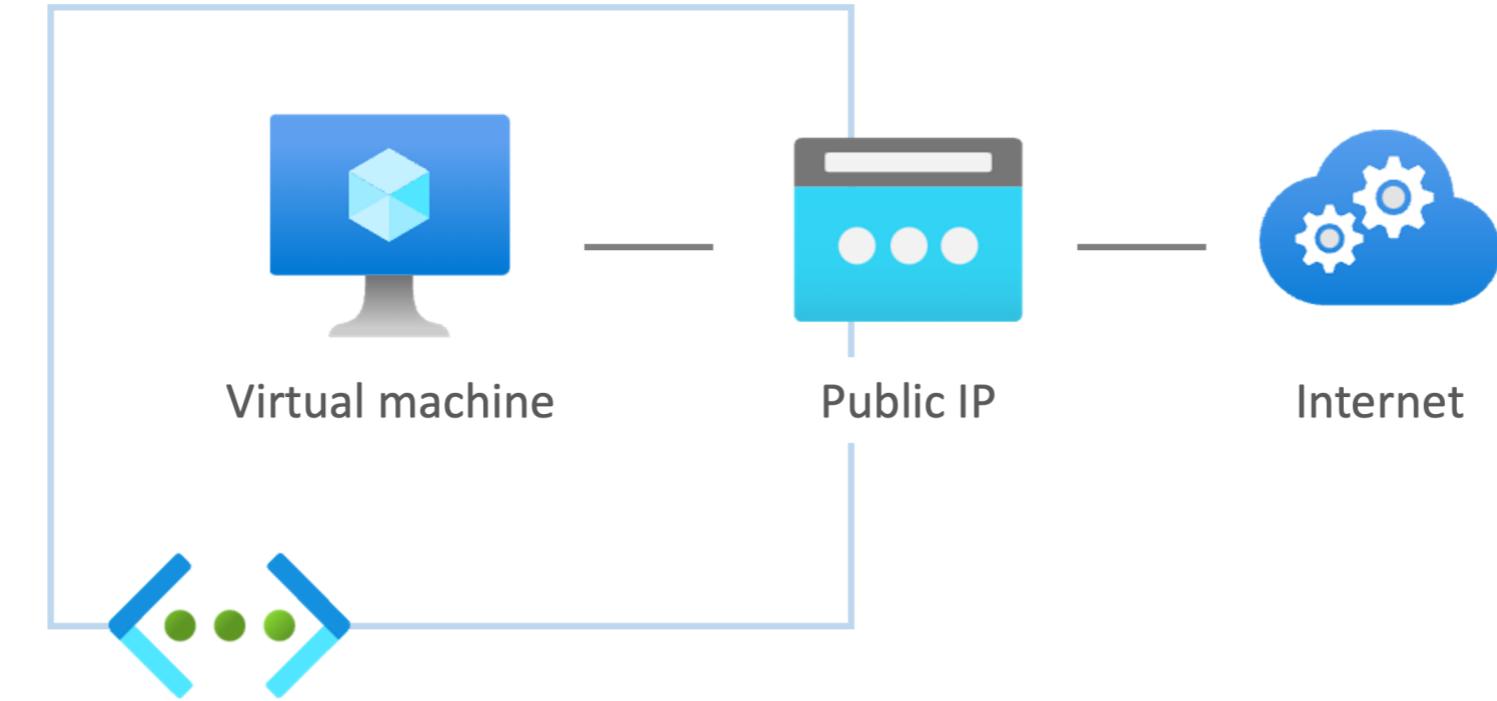
- Enables communication between cloud resources
- Conceptual connections, not physical
- Has a private IP space divided in subnets
- Resources are directly connected to subnets

Private endpoints



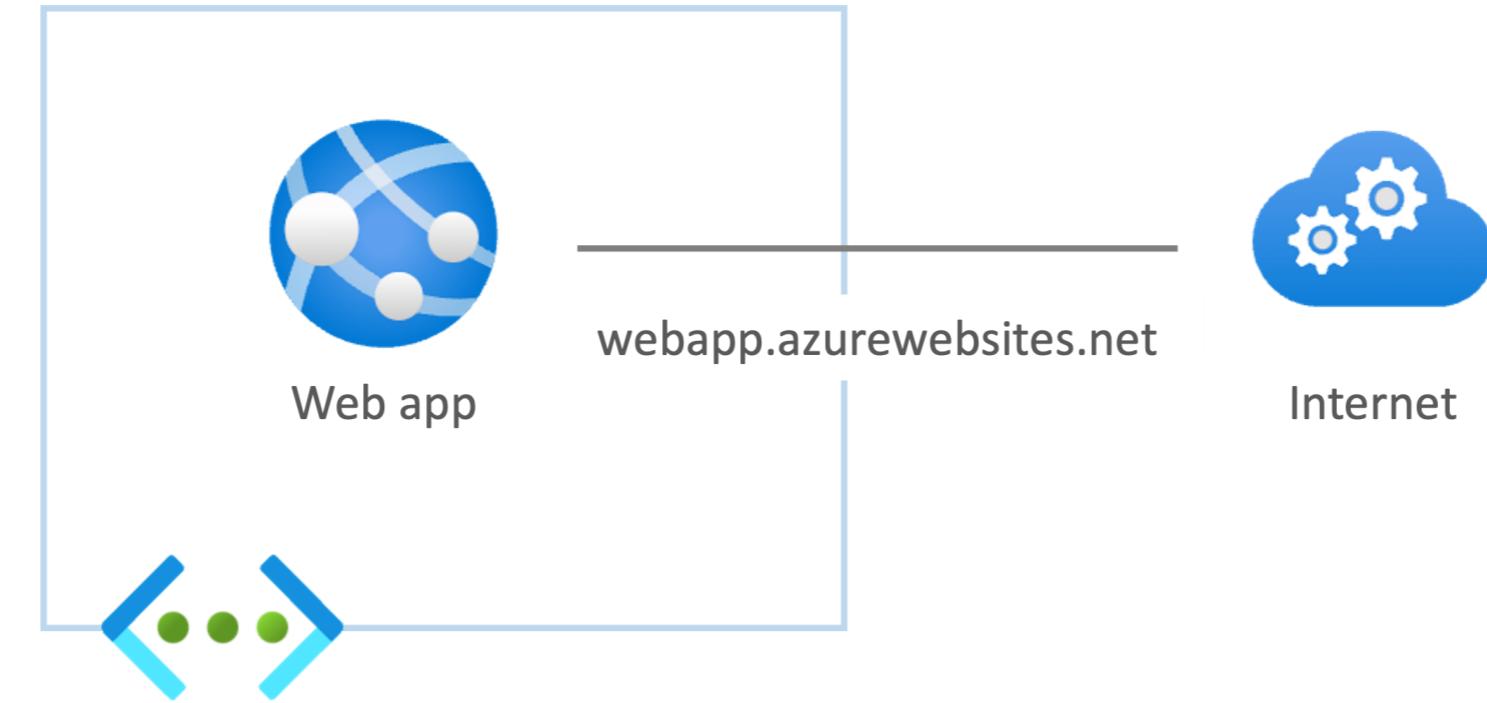
- VNETs use private IP addresses (endpoints)
- Resources within a VNET can communicate with each other
- Resources within a VNET are not reachable from the Internet

Public endpoints - public IP



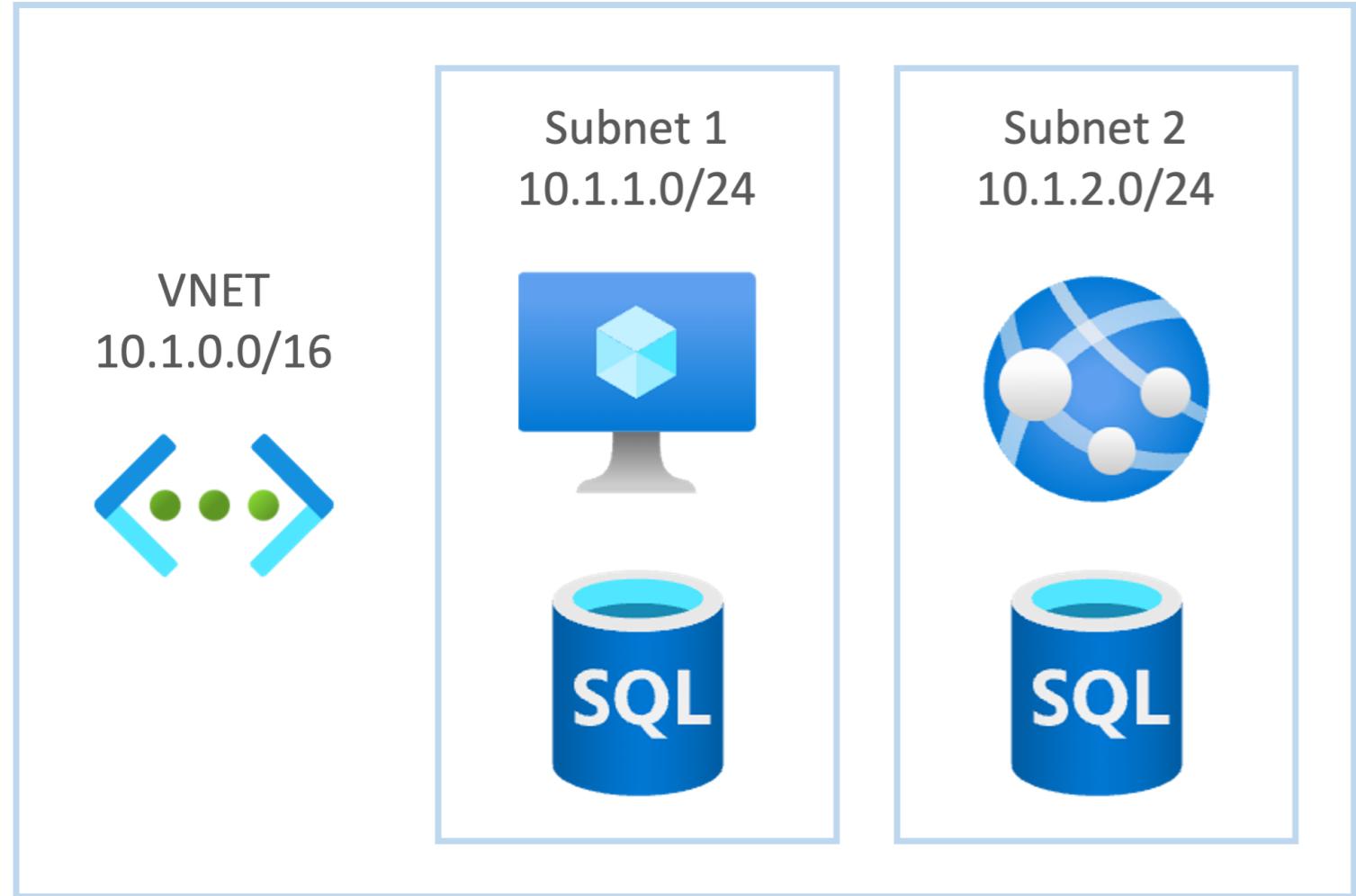
- To have Internet access, resources must have a public endpoint
- One solution is to assign a public IP addresses to resources

Public endpoints - Azure-provided URL



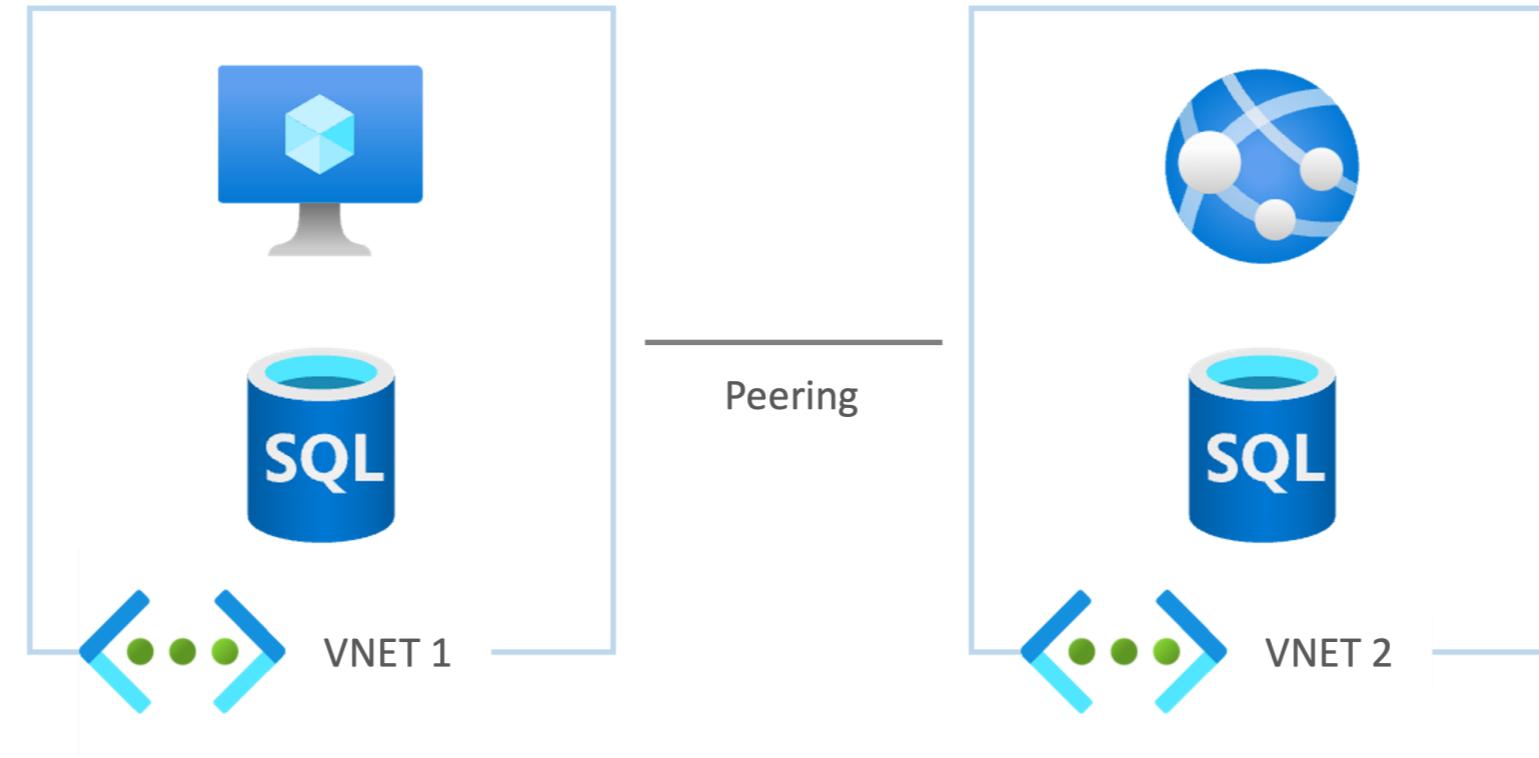
- Some type of resources don't require public IP
- They come with an Azure-provided URL to allow Internet connectivity

VNETs summary



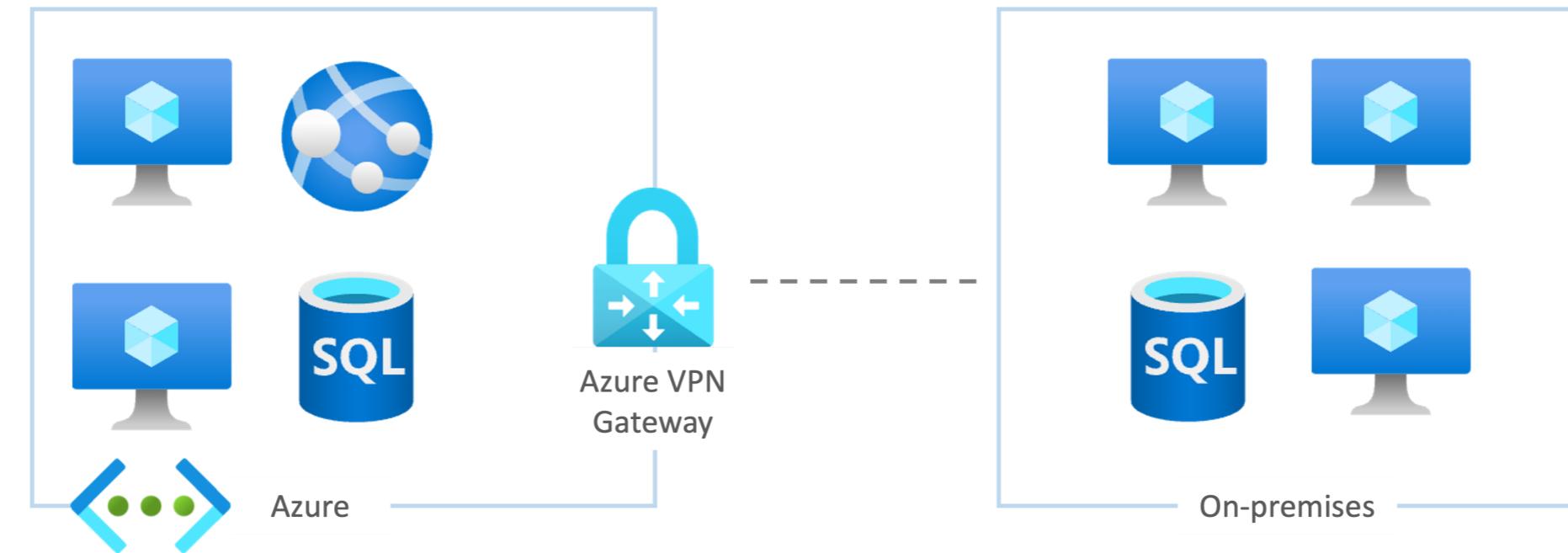
- Has a private IP space
- Space can be divided in subnets
- Resources connect to subnets
- Resources exchange data using private endpoints
- Resources use public endpoints for Internet access

Connecting virtual networks



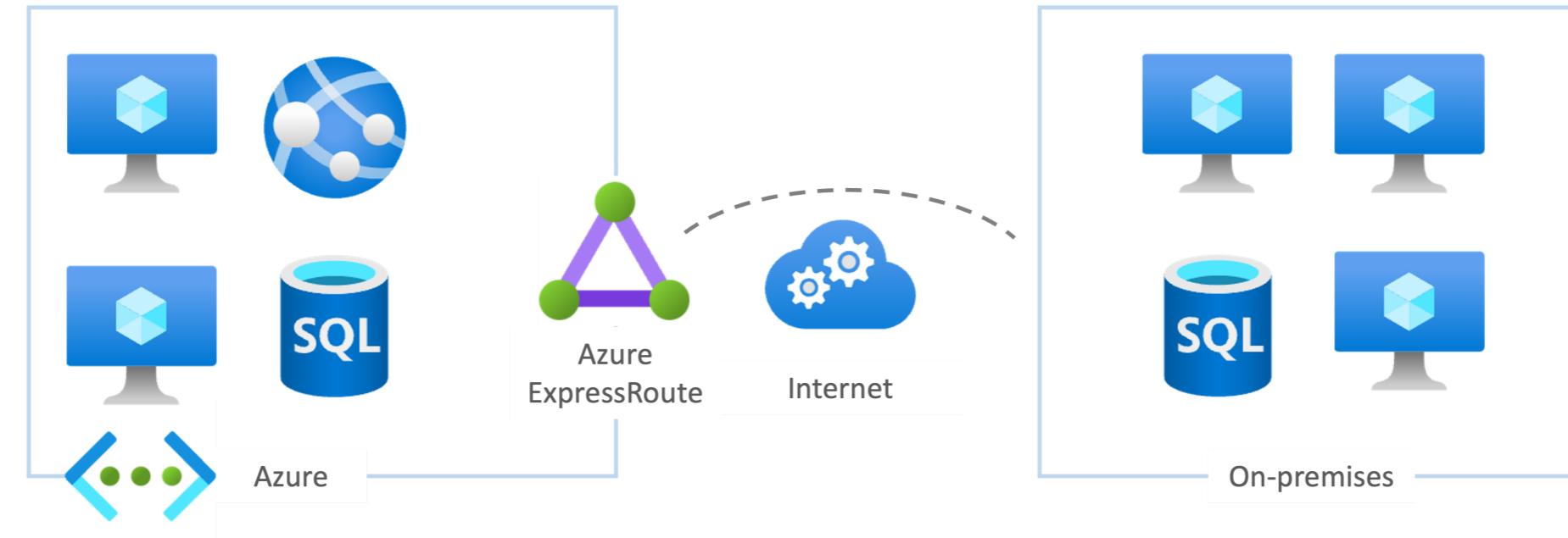
- Network peering enables communication between VNETs
- Bypasses public Internet
- Uses Microsoft's network
- Traffic is private

On-premises connectivity



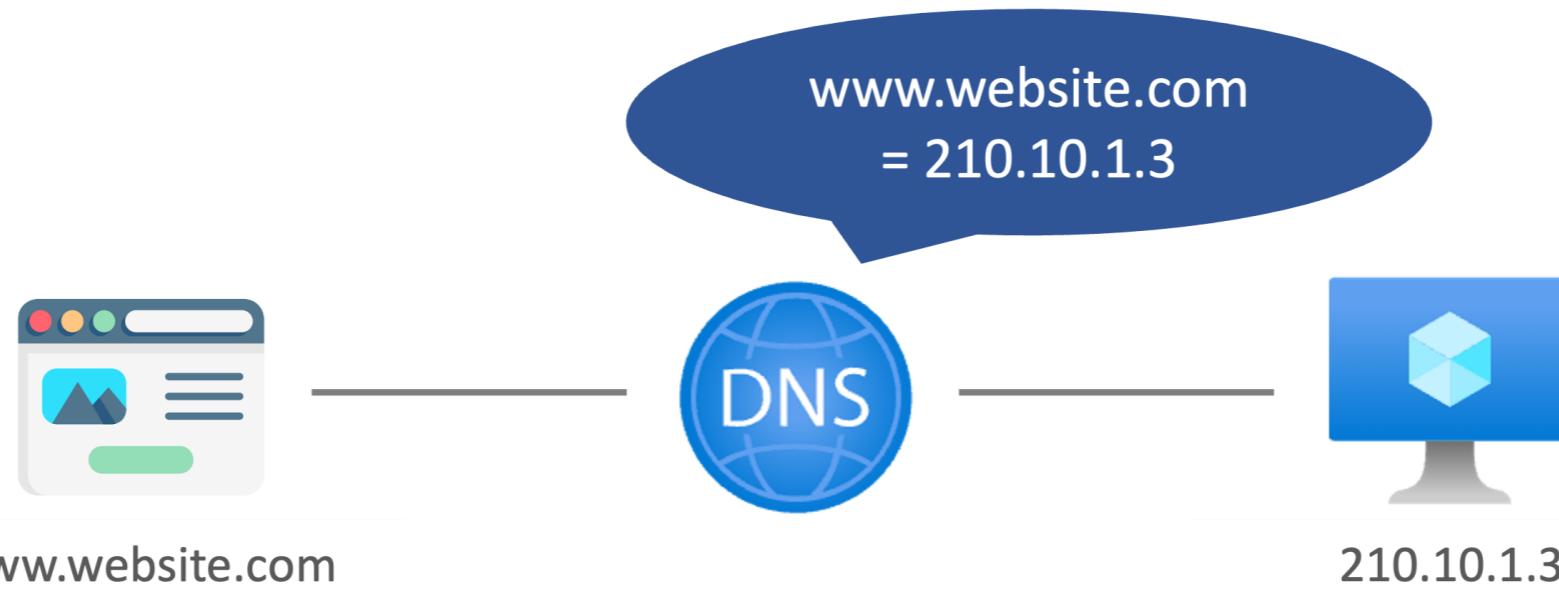
- Connectivity between on-premises environment and the cloud
- Achieved using Azure VPN Gateway
- Allows access to Azure networks and resources
- Data is encrypted and secure

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!

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES

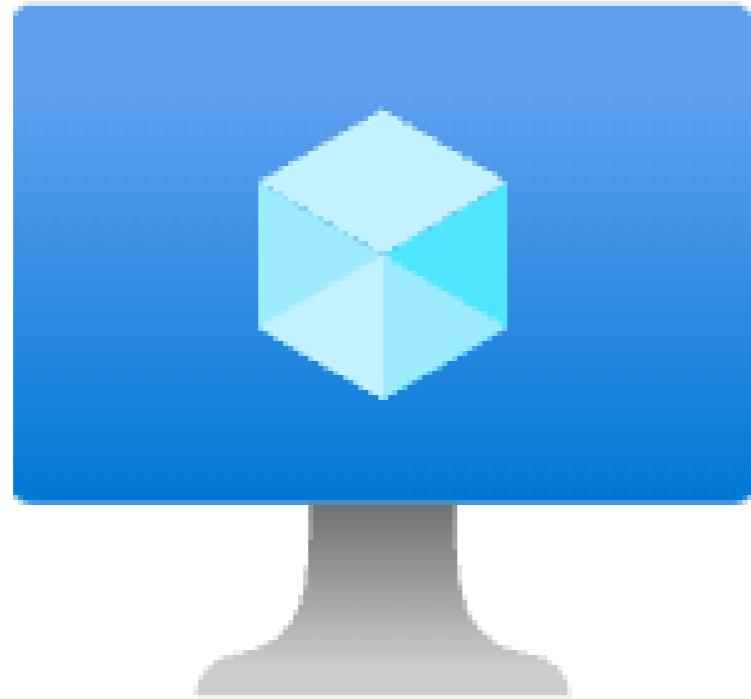
Azure virtual machines

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



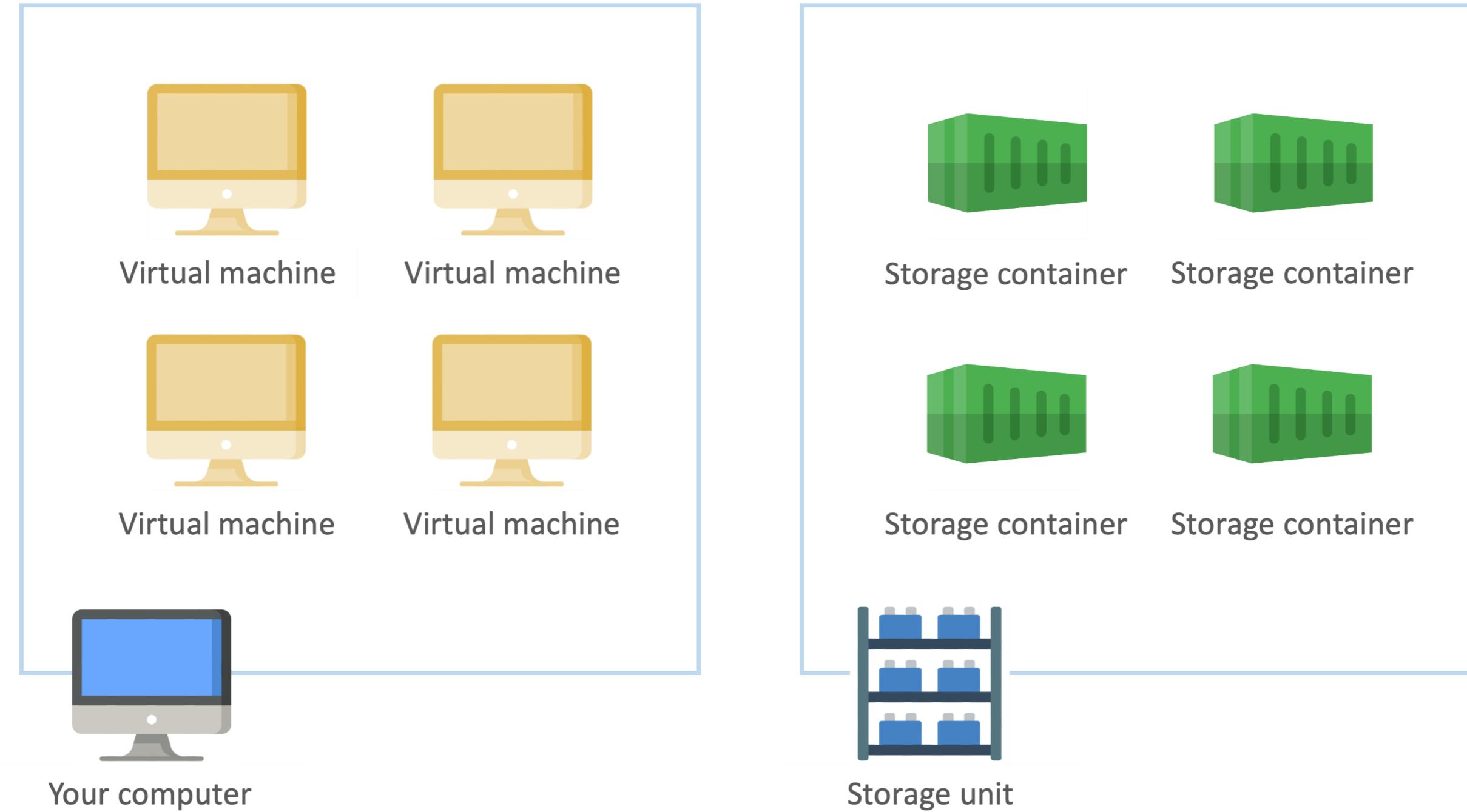
Florin Angelescu
Azure Architect

What is a virtual machine (VM)?

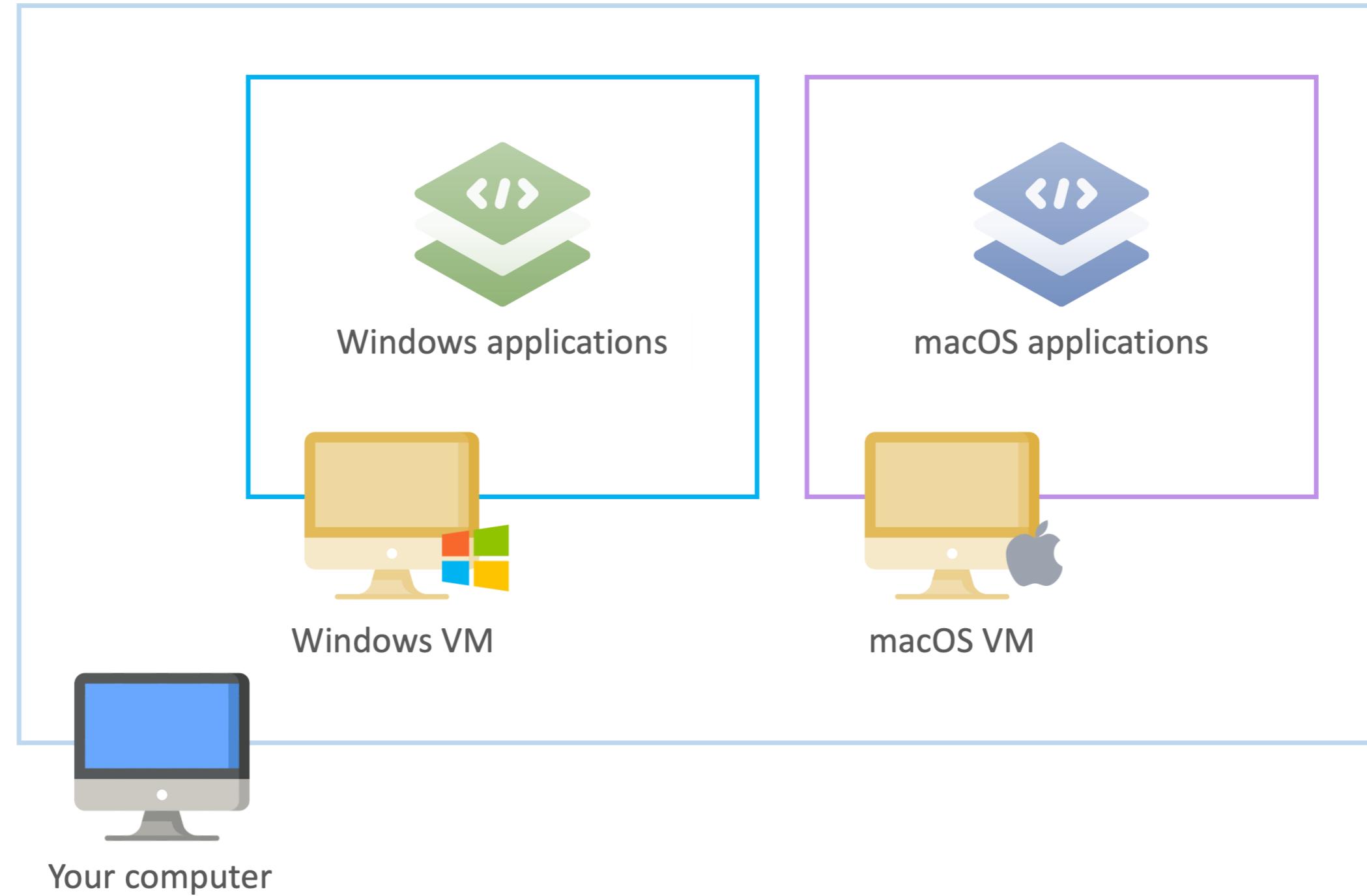


- Computer within your computer
- Allows running different operating systems and applications
- No need for a separate physical device

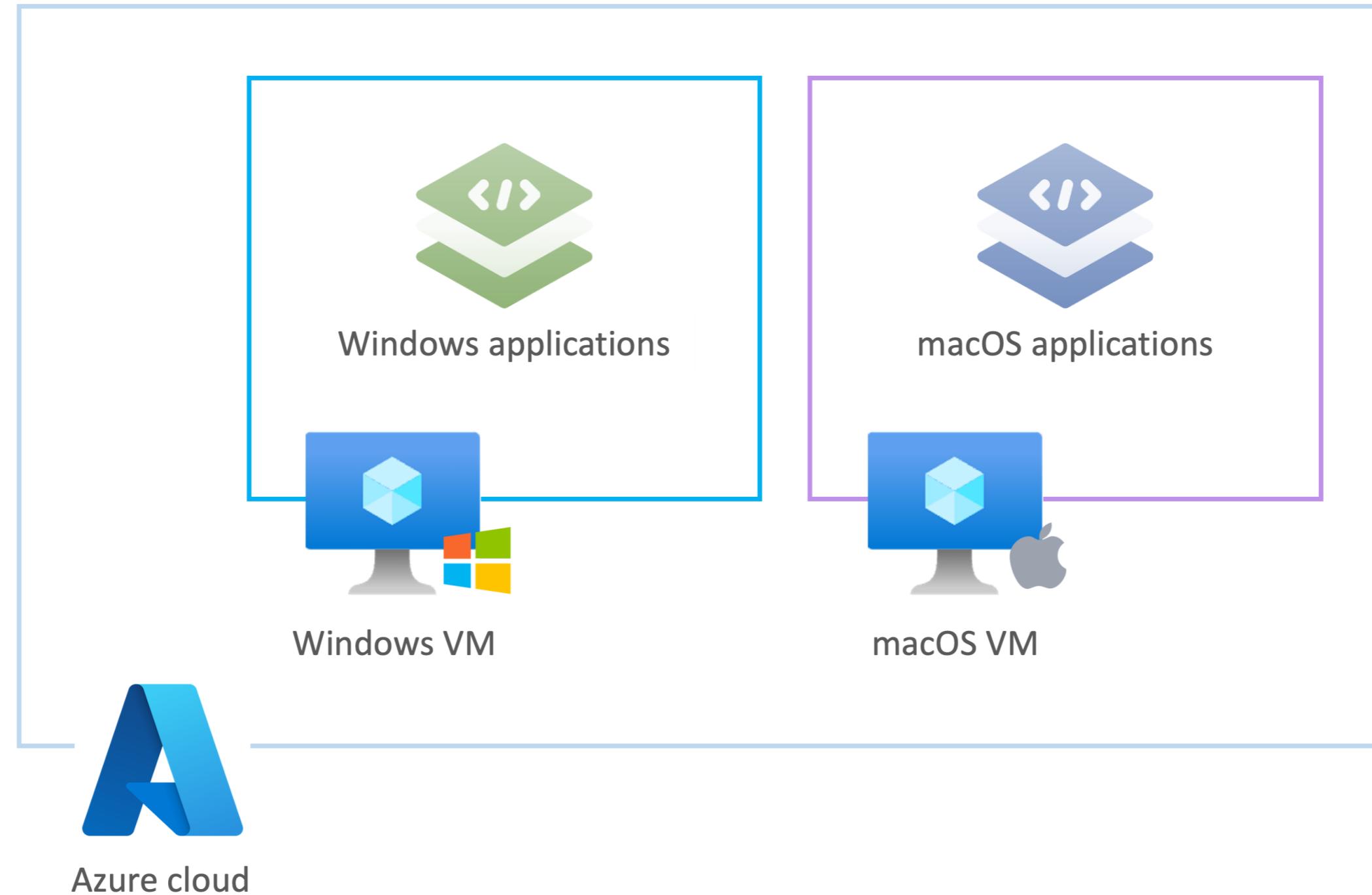
What is a virtual machine (VM)?



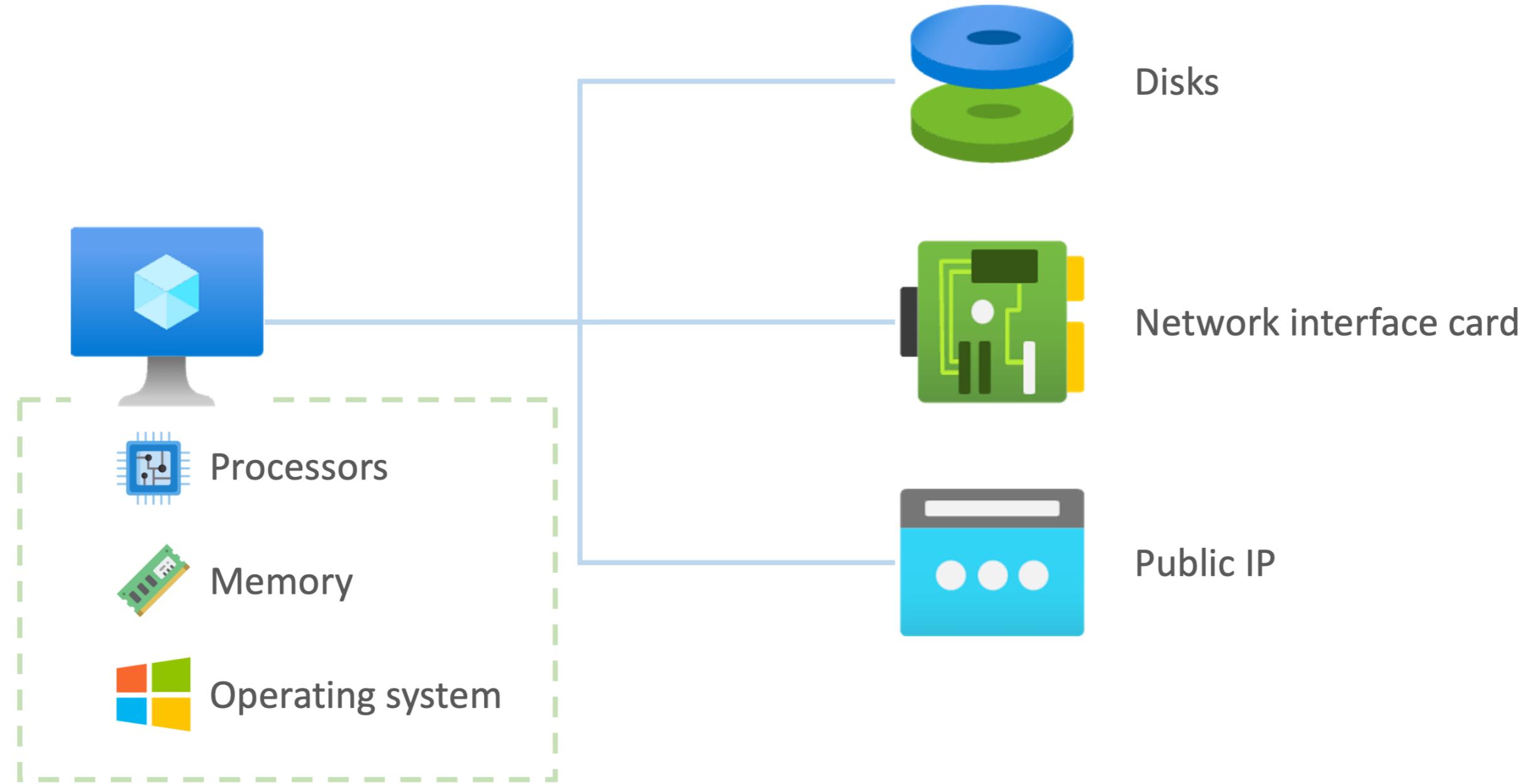
Traditional virtual machines



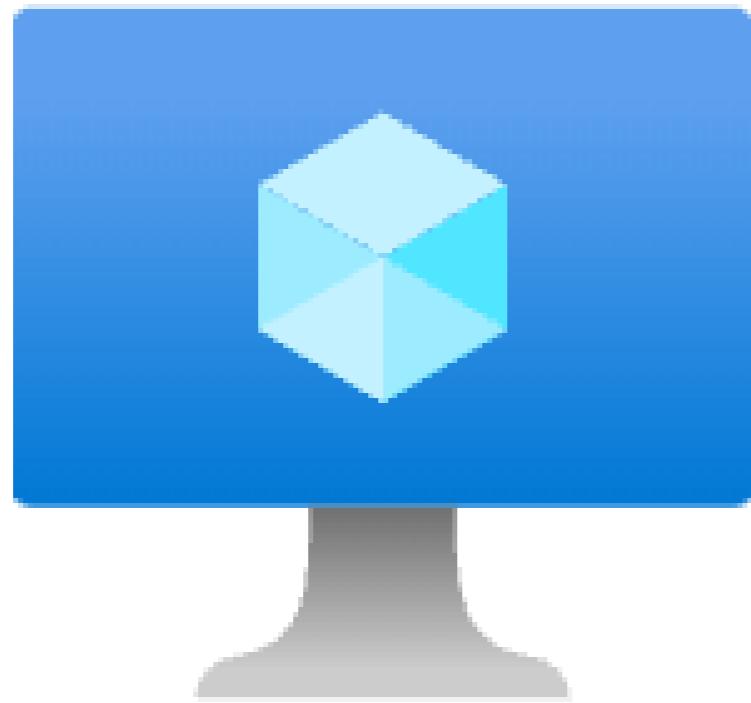
Azure virtual machines



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

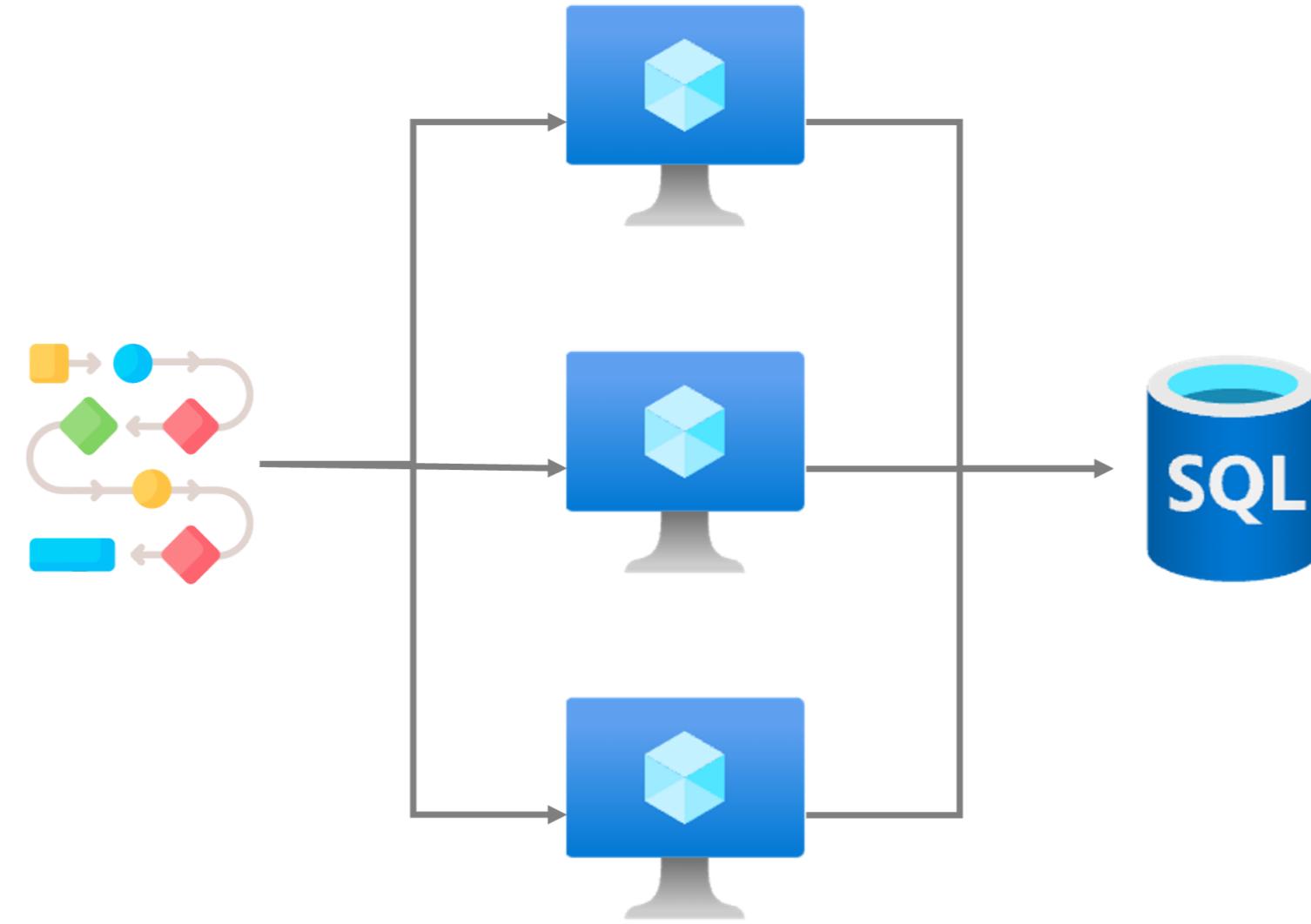


Scale sets



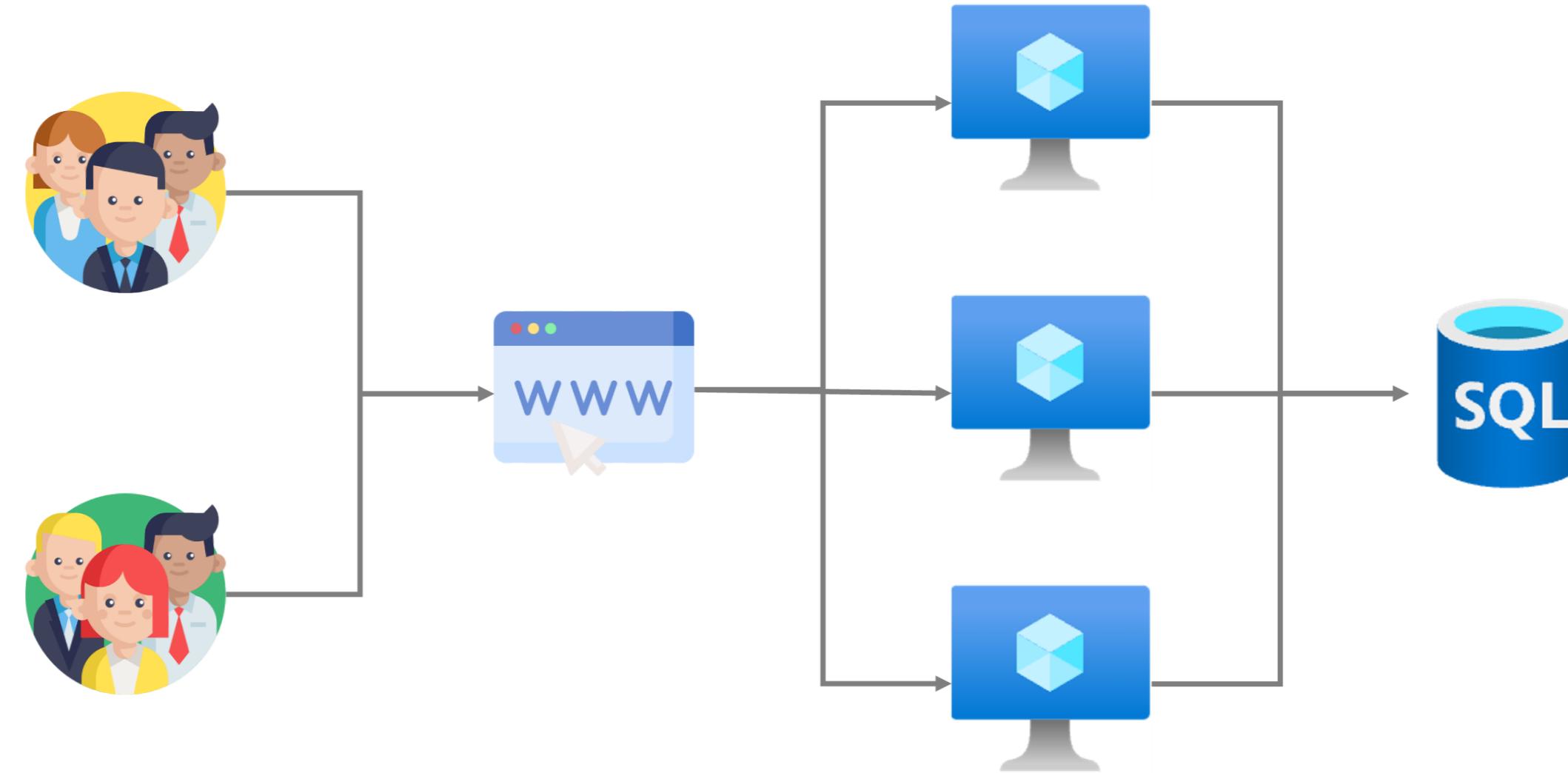
- Deploy and manage a set of identical virtual machines
- Number of virtual machines can be automatically adjusted
- Top performance and efficient resource utilization
- Minimal cost

Scale sets use cases



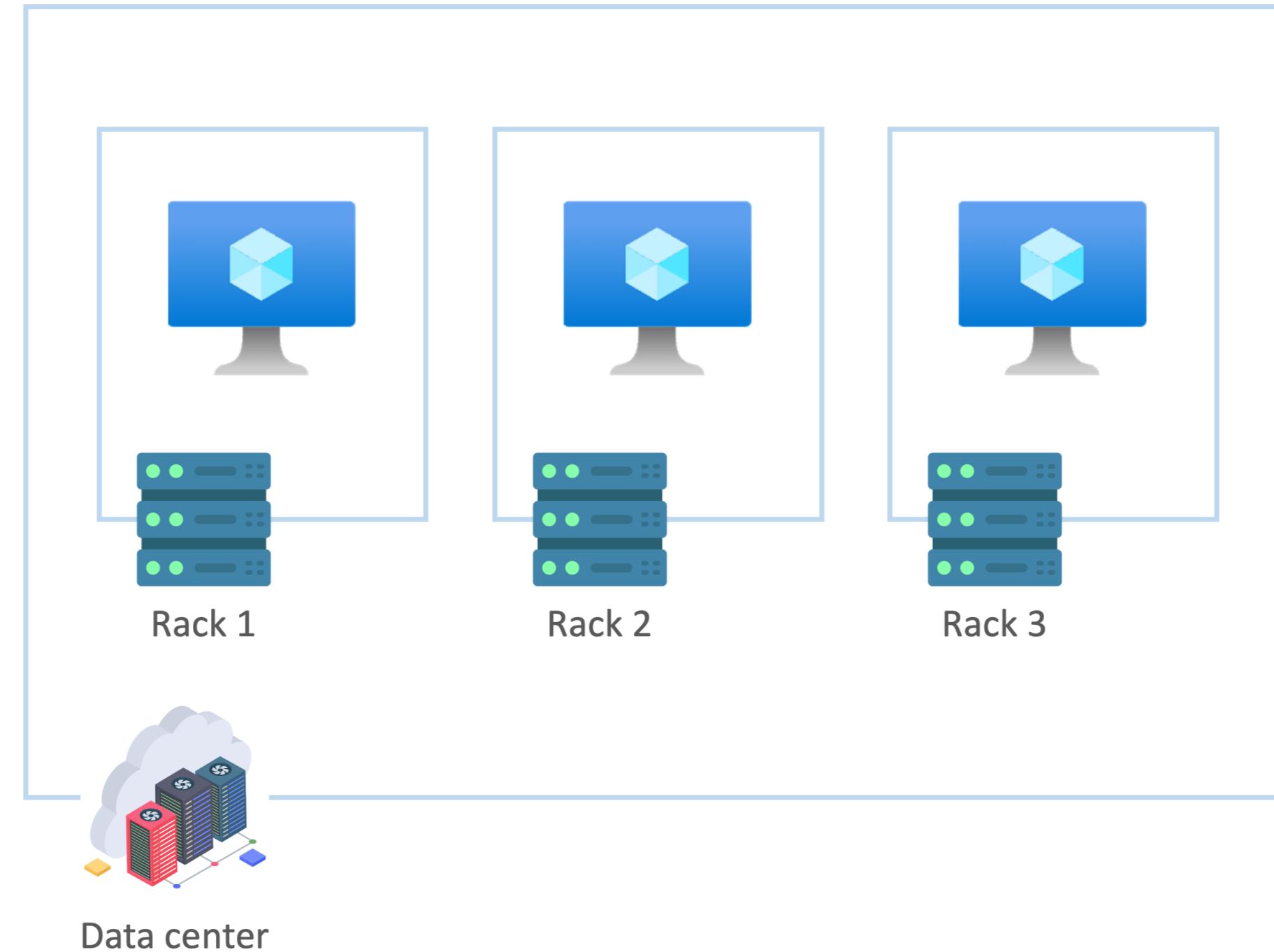
- Datawarehouse load

Scale sets use cases

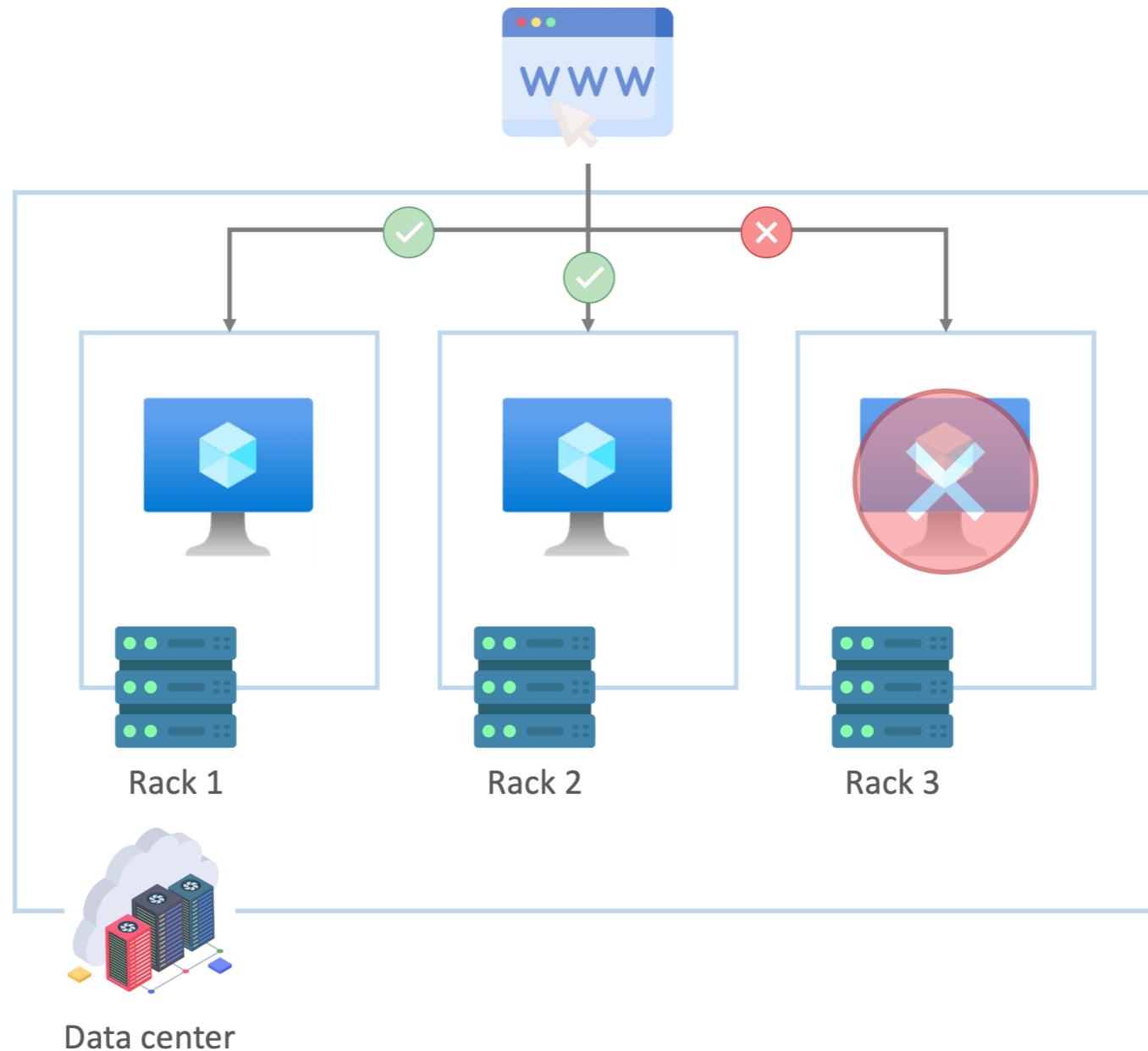


- Website scaling

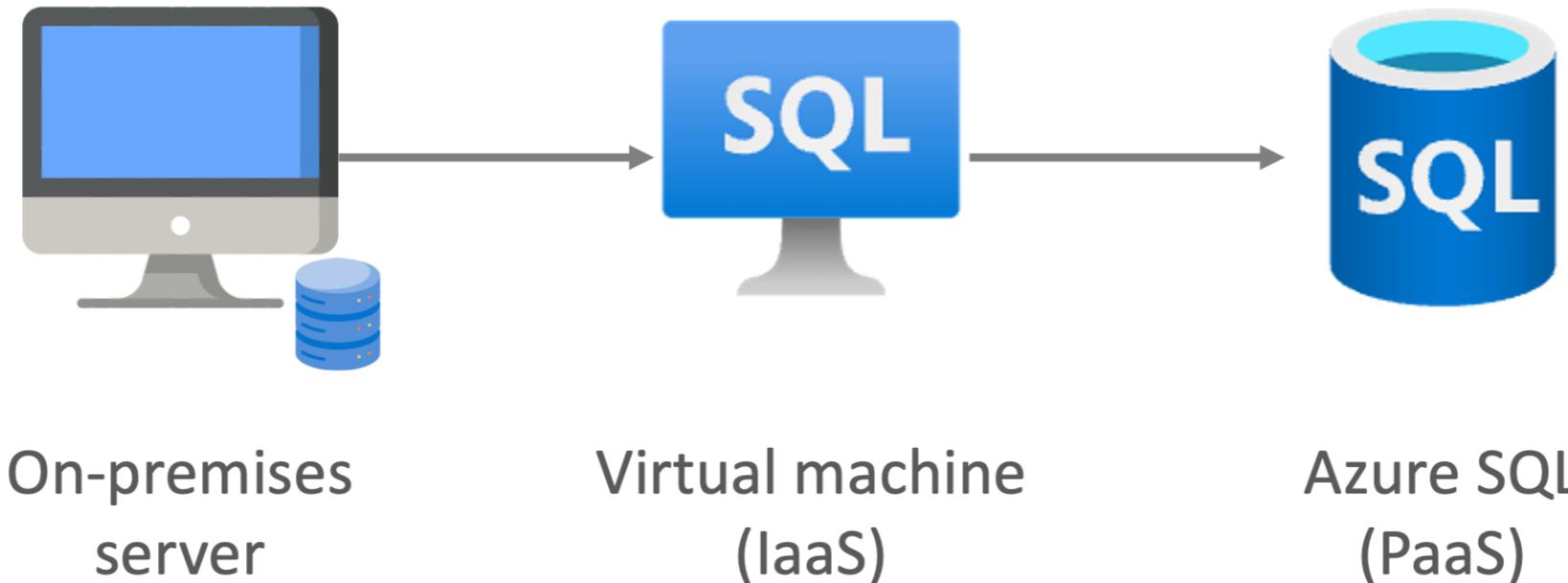
Availability sets



Availability sets use cases

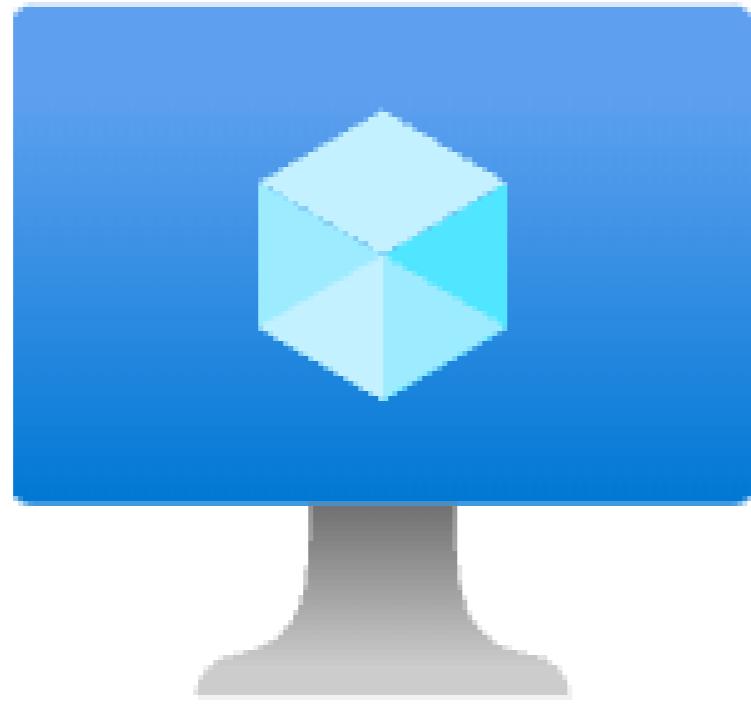


Migration from on-premises



- 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!

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES

Create and configure virtual machines

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



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Azure Architect

Let's practice!

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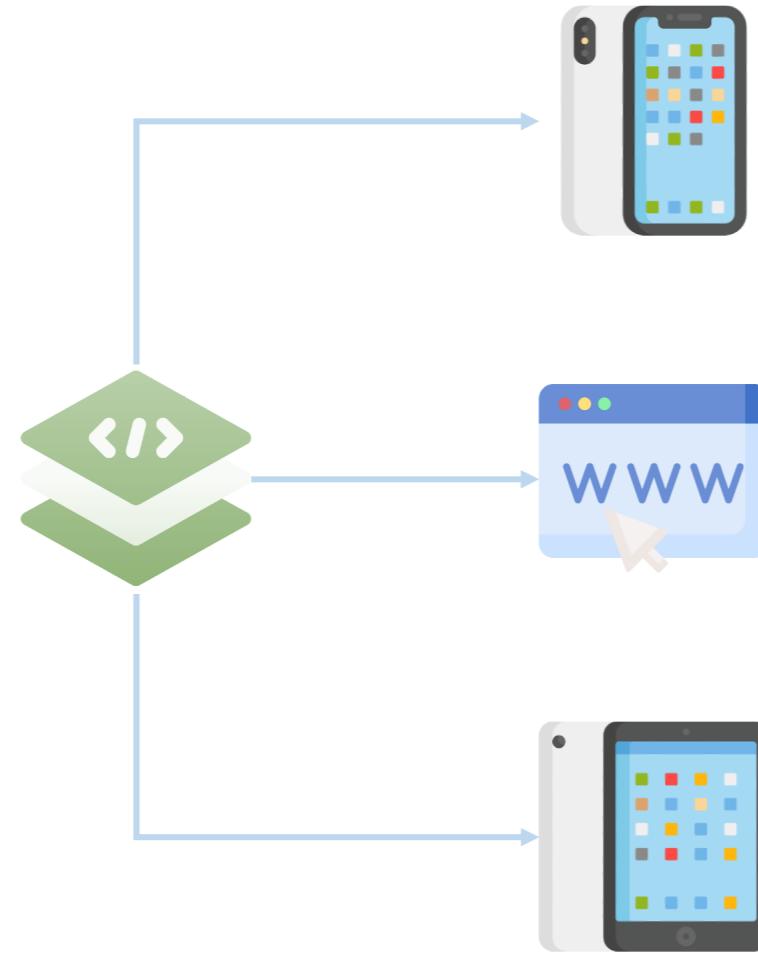
Options for hosting applications

UNDERSTANDING MICROSOFT AZURE ARCHITECTURE AND SERVICES



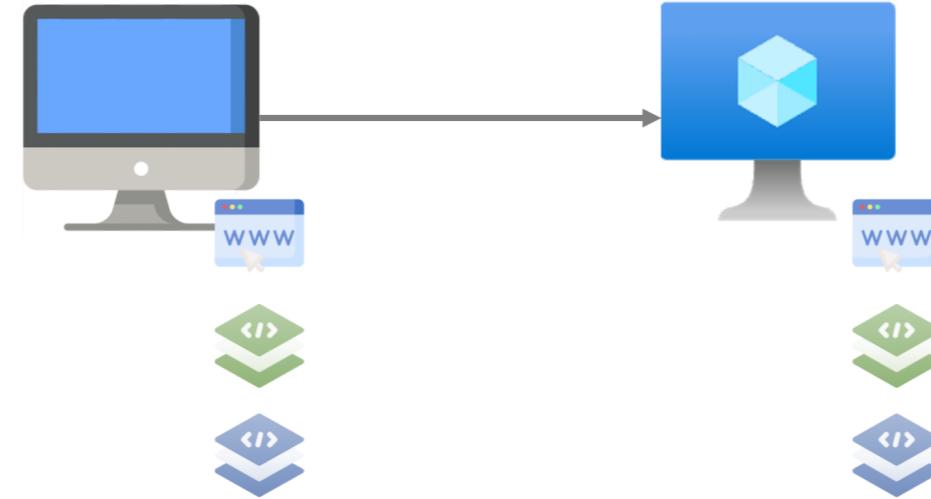
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Azure Architect

Modern applications



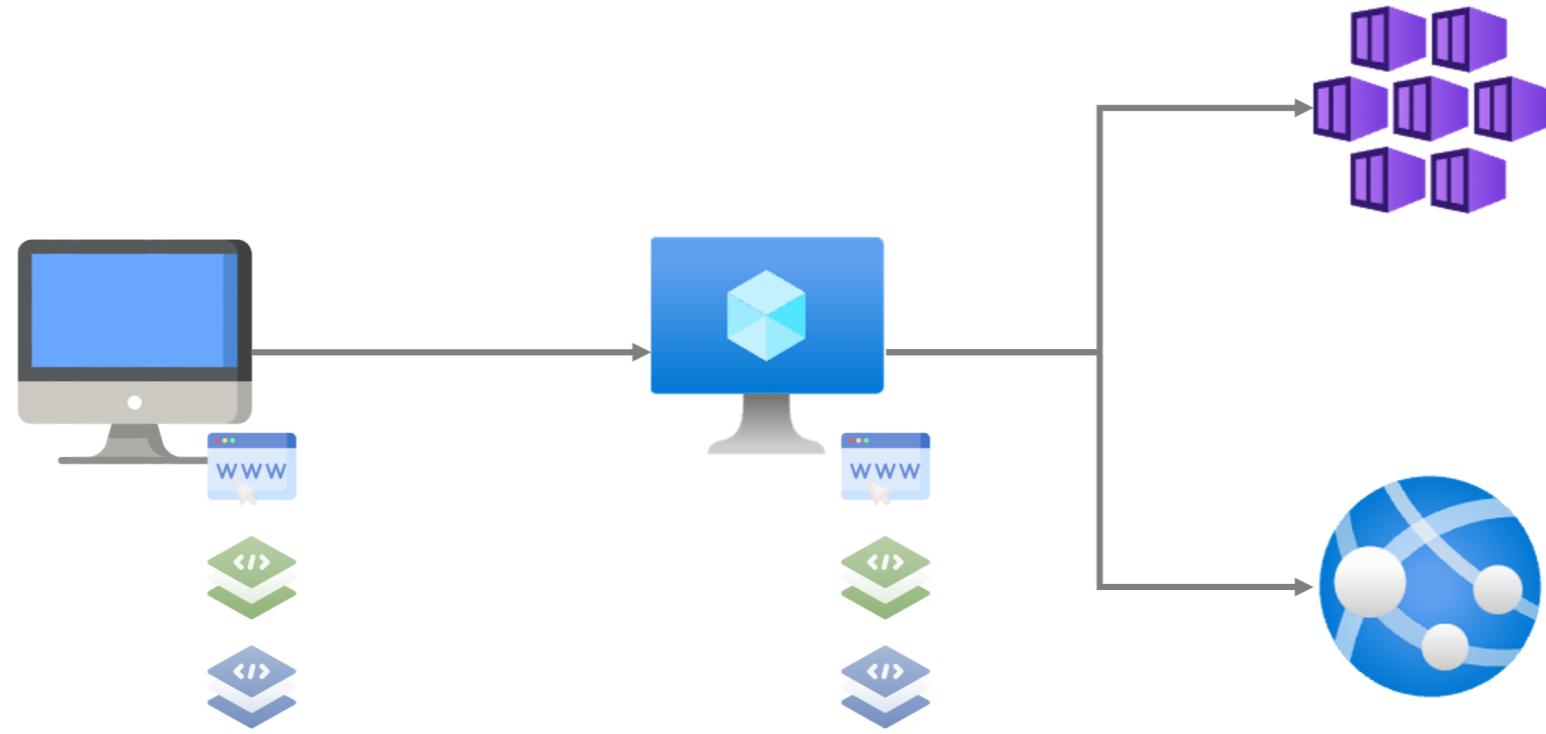
- Online versions of applications
 - Web
 - Mobile
 - Tablet

Migrate from on-premises



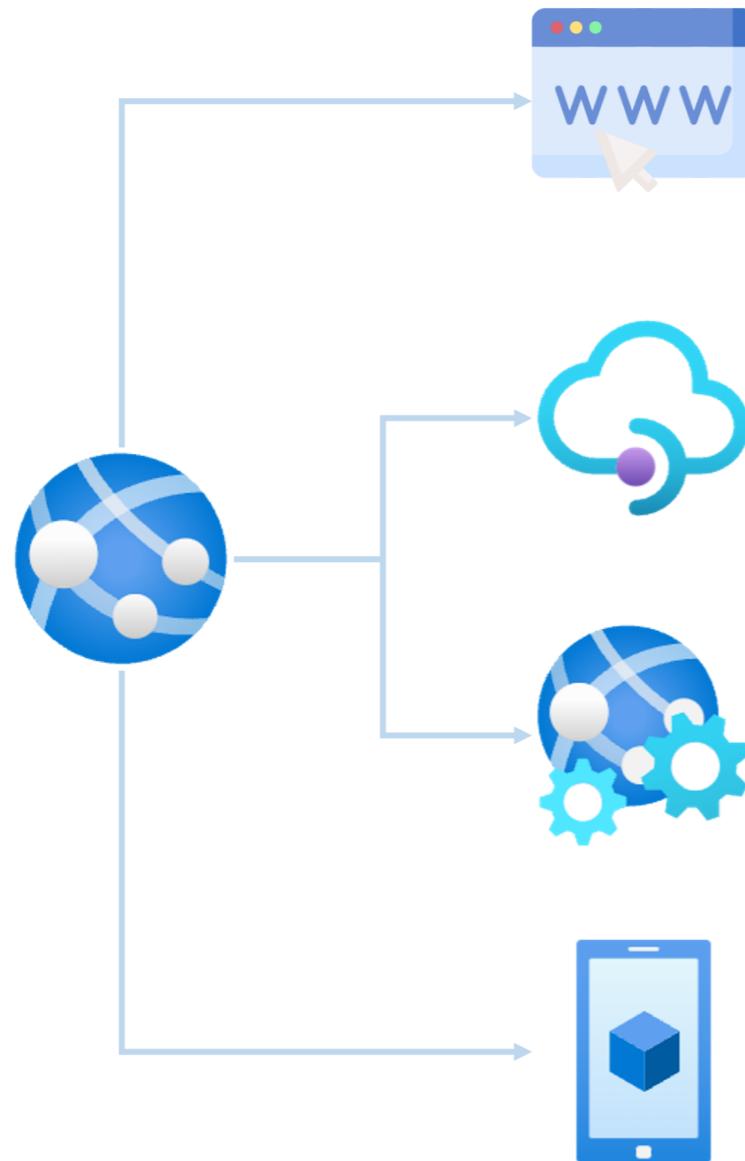
- Move website and legacy applications from on-premises to virtual machines
- First step in having critical software in a secure and highly available cloud environment

Migrate to modern services



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

Azure app service



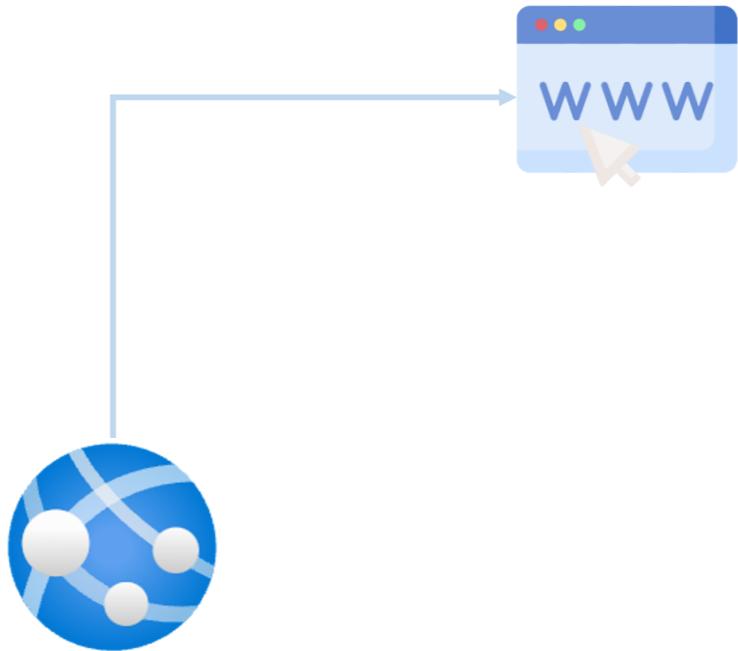
- Fully managed platform for building, deploying, and scaling web apps
- Supports multiple programming languages
- Provides automatic scaling
- Offers web apps, API apps, web jobs and mobile apps

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

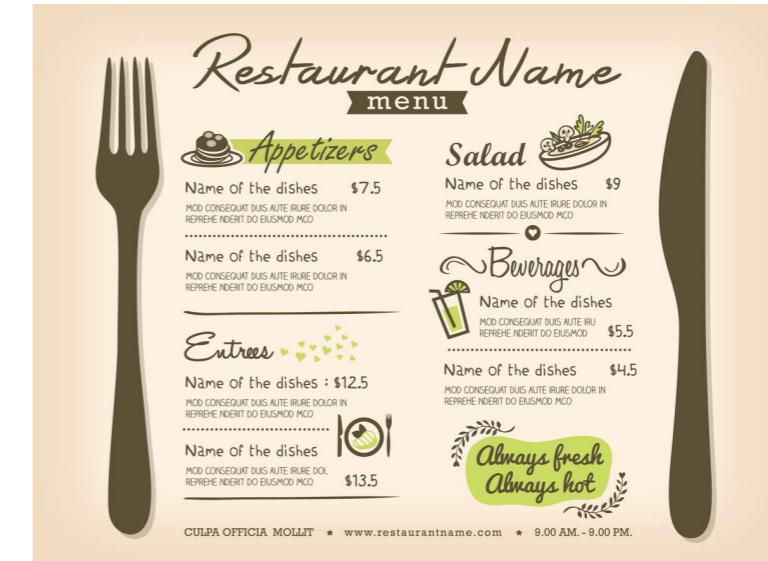


- Suited for hosting a variety of websites (simple and complex)
- Capability to migrate traditional websites to web apps

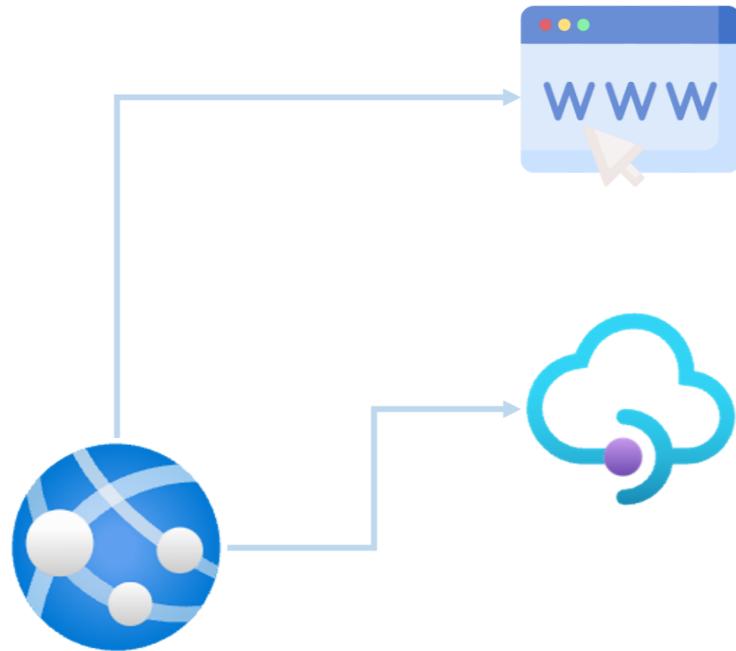
What is an API?



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

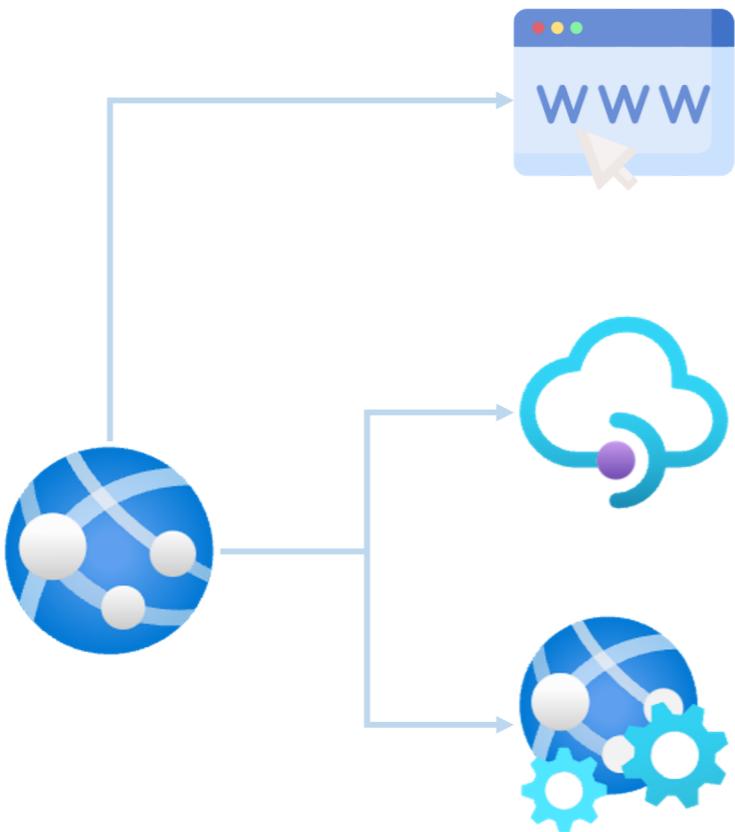


API apps



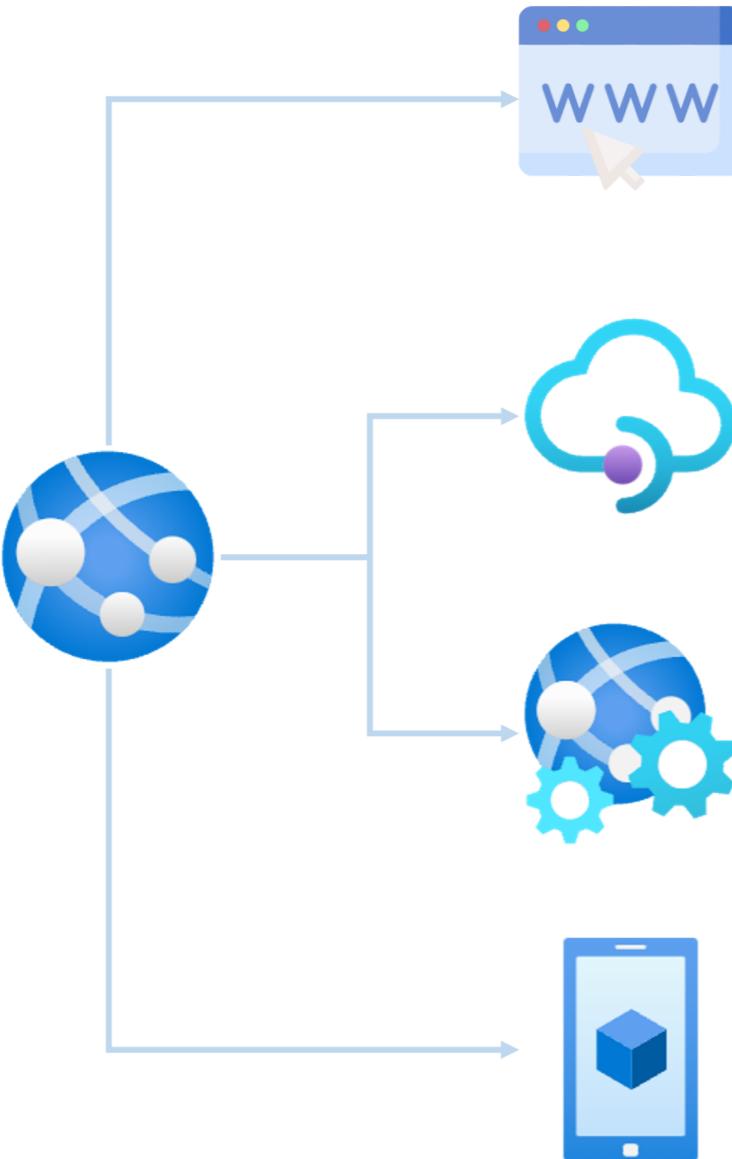
- Dedicated environment for the creation of APIs
- Expose application functionality for consumption by other services

Web jobs



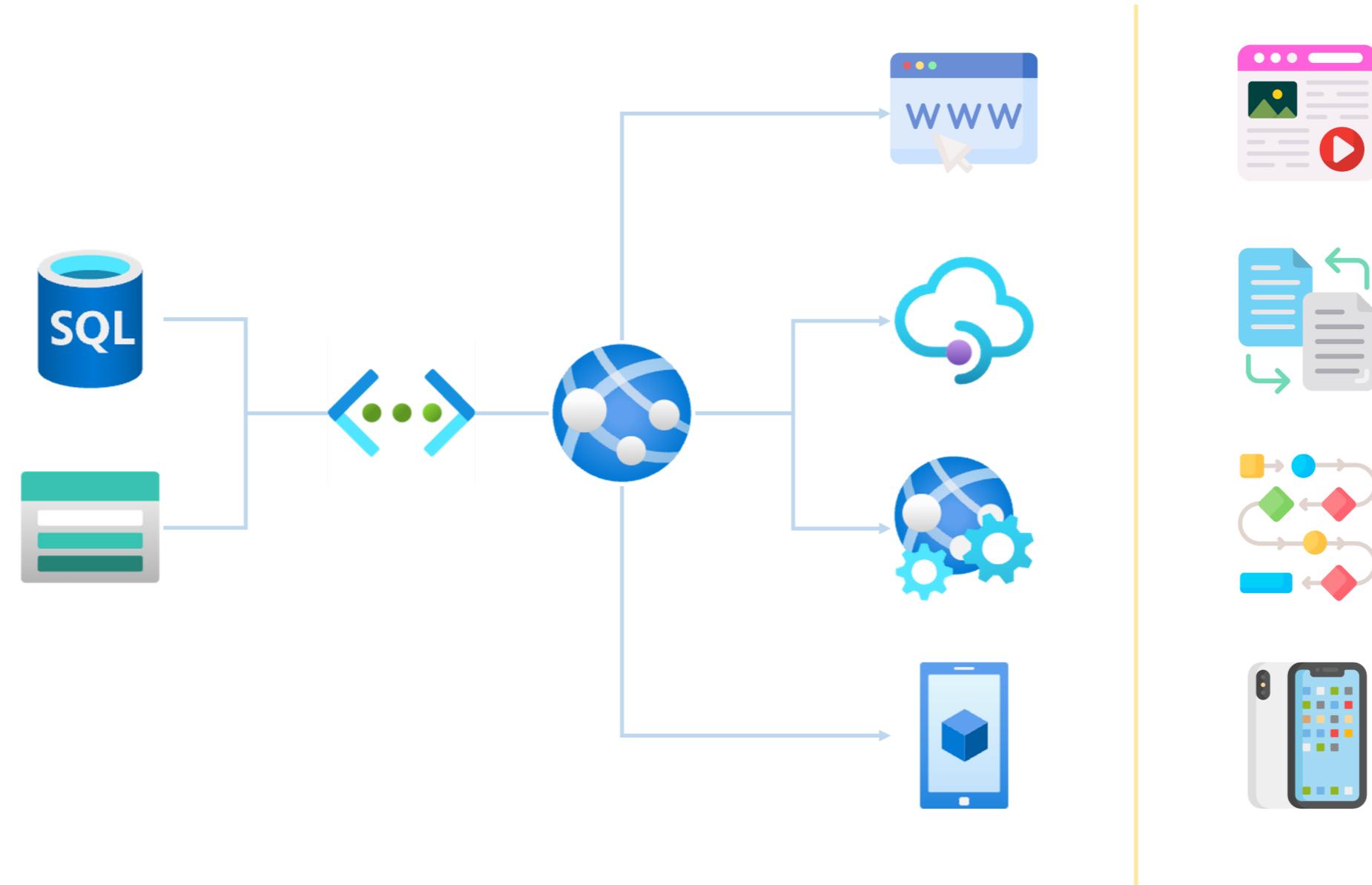
- Serve as background tasks or scripts
- Perform a variety of automated functions
- Execute code in the background

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



Let's practice!

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