
Microsoft
CERTIFIED
FUNDAMENTALS

Microsoft Azure Fundamentals

Section: Introduction

Course Structure

Core Azure Identity services

About Az-900 Certificate Exam

Important Tips

Exam AZ-900: Microsoft Azure Fundamentals

- ✓ Designed for candidates looking to demonstrate foundational-level knowledge of cloud services
- ✓ The exam can be taken by both technical and non-technical candidates
- ✓ This exam doesn’t have any prerequisites.
- ✓ This exam measures your ability to understand the following concepts: cloud concepts; core Azure services; security, privacy, compliance, and trust; and Azure pricing and support.

Importance of AZ-900 Exam

Build Team:

Which resource group you want me to deploy the database server?

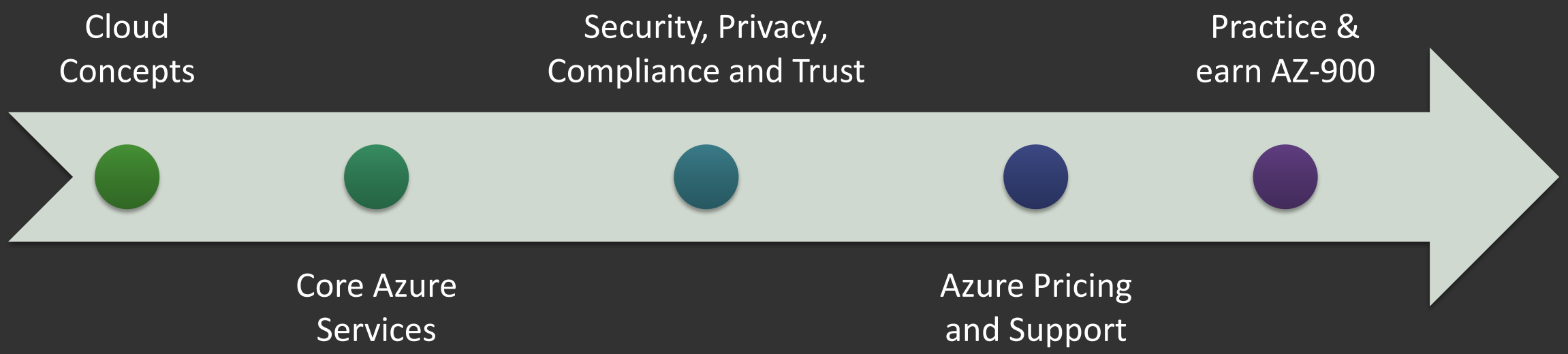
Planning team:

Why Azure resources are not tagged properly? This is impacting their cost calculation for the quarter.

Sales team:

Use the latest version of image and build us an environment for demonstration of our product to customer. Don’t forget to create guest user account for customer in azure AD.

Course Structure



Important

- The Couse structure strictly follows the examination structure
- Don’t Skip Quizzes
- We will cover lot of Azure Services at the introductory level
- More Theory
- Content in the slides
- Please provide your review on the course

Official Documentation

- https://docs.microsoft.com/en-in/azure

Understand Cloud Concepts

Azure Fundamentals

Understand Cloud Concepts

Cloud Key Terminology

What is Cloud

Why Cloud

Cloud Deployment Models

Cloud Service Models

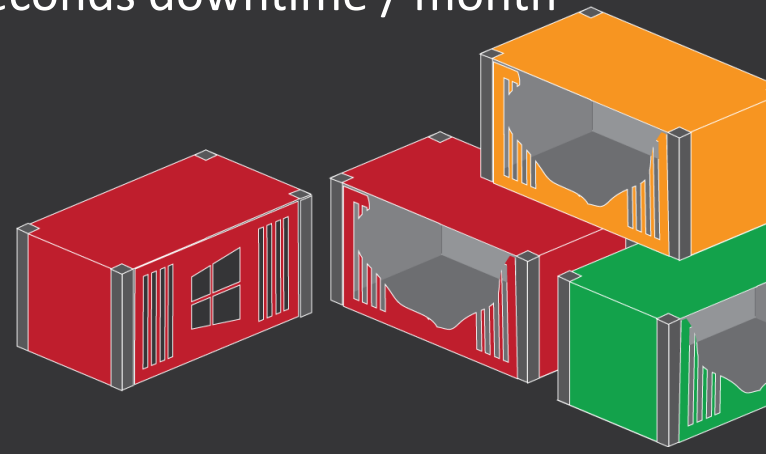
Cloud Key Terminology

High Availability

Ability to keep services up and running for long periods of time, with very little downtime

99.99% (‘four nines’) availability of a service = 4.38 minutes downtime / month

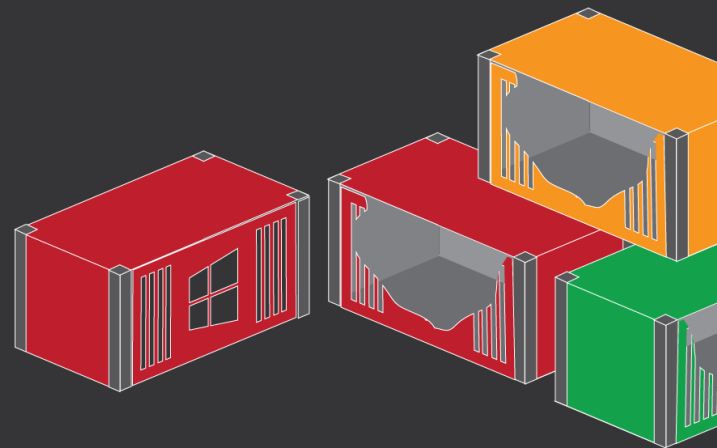
99.999% (‘five nines’) availability of a service = 25.9 seconds downtime / month



Cloud Key Terminology

Fault Tolerance

Ability to continue up and operating properly in the event of the failure of some of application component



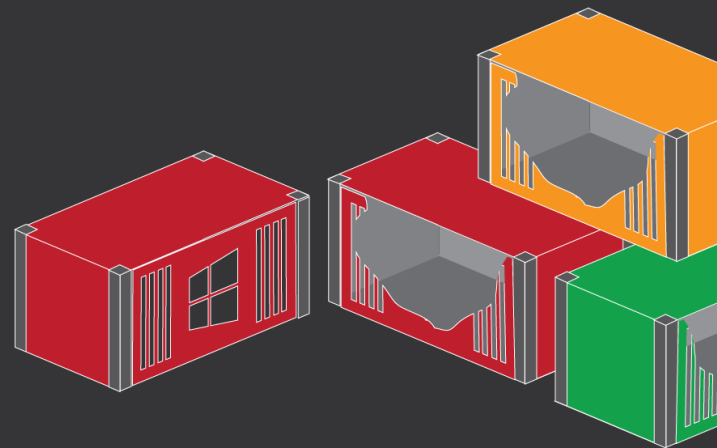
Data Center - Disaster Recovery

Image Source: Google Search

Cloud Key Terminology

Disaster Recovery

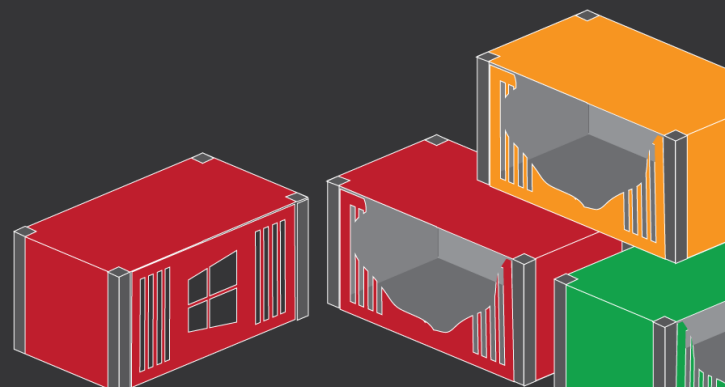
Plan to recover you critical business systems and normal operations in the event of a disaster



Cloud Key Terminology

Agility

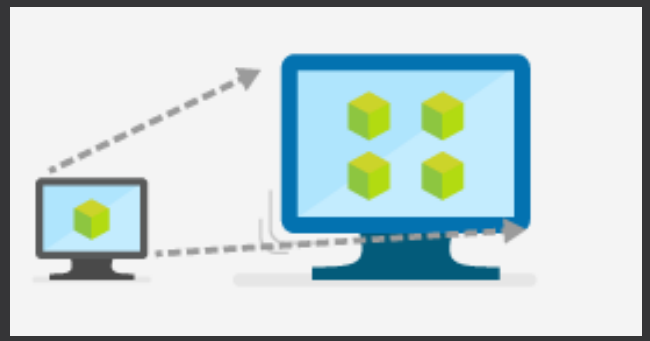
Ability to rapidly develop, test and launch software applications that drive business growth

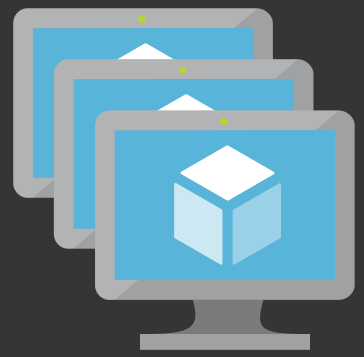


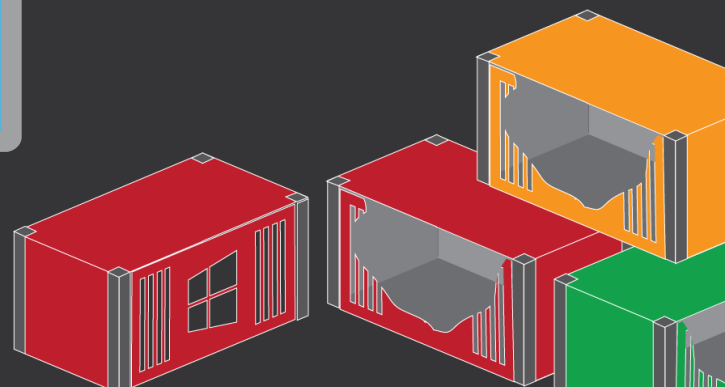
Cloud Key Terminology

Elasticity

Elastic computing is the ability to quickly expand or decrease computing resources to meet changing demand.







Computing & Virtualization

Azure Fundamentals

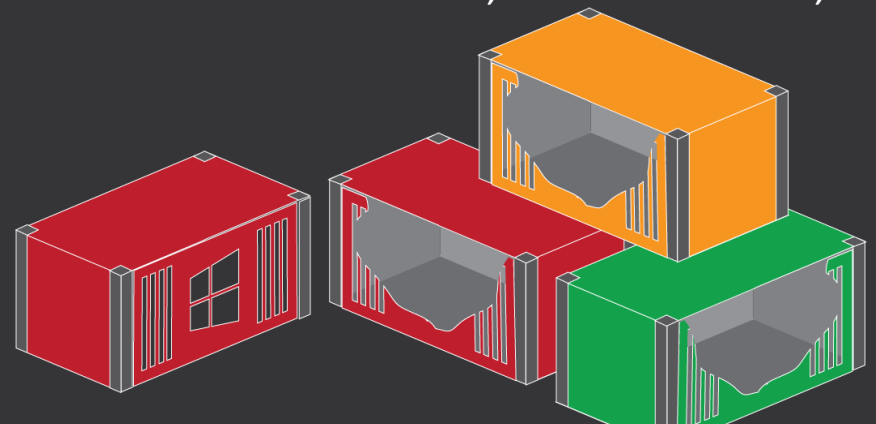
Computing & Virtualization

Computing:

The process of utilizing computer technology to complete a task. Computing may involve computer hardware and/or software, but must involve some form of a computer system.

Virtualization:

In computing, virtualization means to create a virtual version of a device or resource, such as a server, storage device, network or even an operating system.



What is Cloud Computing

Microsoft Says:

Cloud computing is the delivery of computing services including servers, storage, databases, networking, software, analytics, intelligence and more over the Internet (“the cloud”) to offer faster innovation, flexible resources and economies of scale.

AWS says:

Cloud computing is the on-demand delivery of compute power, database storage, applications, and other IT resources through a cloud services platform via the internet with pay-as-you-go pricing.

What is Cloud Computing

NIST Definition:

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

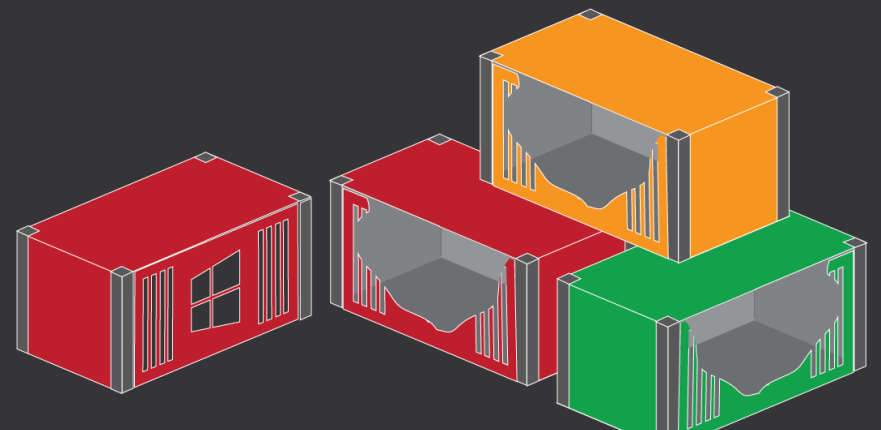
This cloud model is composed of five essential characteristics, three service models, and four deployment models.

Source: https://nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf

Cloud Computing

As per NIST, Essential Characteristics of Cloud Computing:

- On-demand self-service
- Broad network access
- Resource pooling
- Rapid elasticity
- Measured service



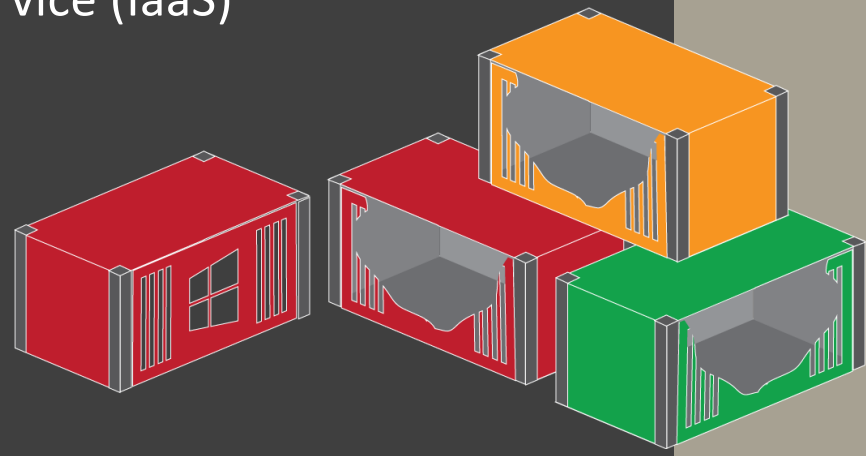
As per NIST, Cloud Computing

Deployment Models:

- ✓ Private cloud
- ✓ Community cloud
- ✓ Public cloud
- ✓ Hybrid cloud

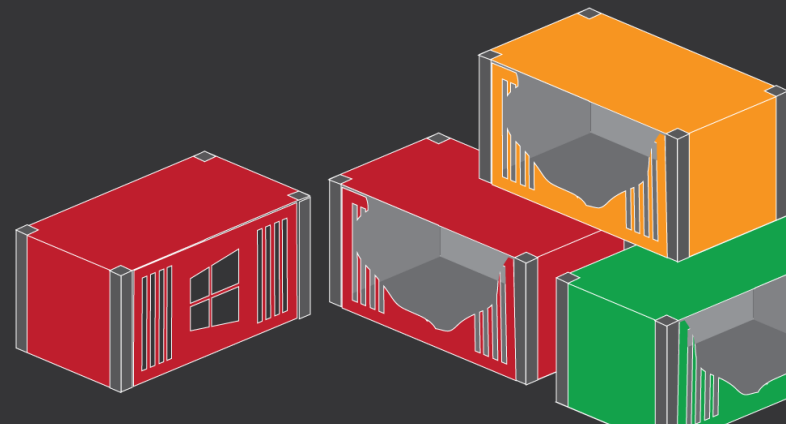
Service Models:

- ✓ Software as a Service (SaaS)
- ✓ Platform as a Service (PaaS)
- ✓ Infrastructure as a Service (IaaS)



Advantages of cloud

- ✓ Cost
- ✓ Agility
- ✓ Service Quality
- ✓ Integration of latest technology – IOT & ML
- ✓ High Availability
- ✓ Reliability with Real time failover
- ✓ Disaster recovery
- ✓ Ease of Management



CapEx vs OpEx

Azure Fundamentals

CapEx vs OpEx

Capital Expense (CapEx)

It is a spending of money on physical infrastructure up front to create a benefit in the long term.

Example: Server costs, Storage costs, Network costs, Backup and archive costs,

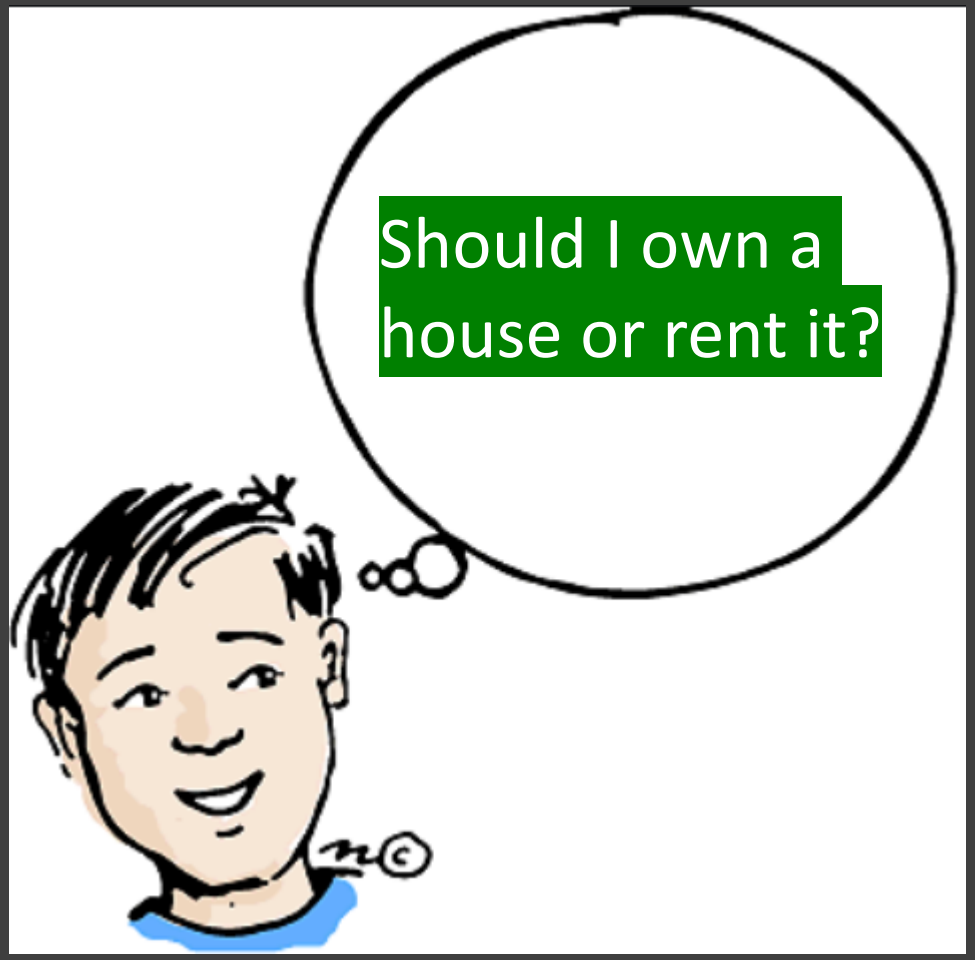
Operating Expense (OpEx)

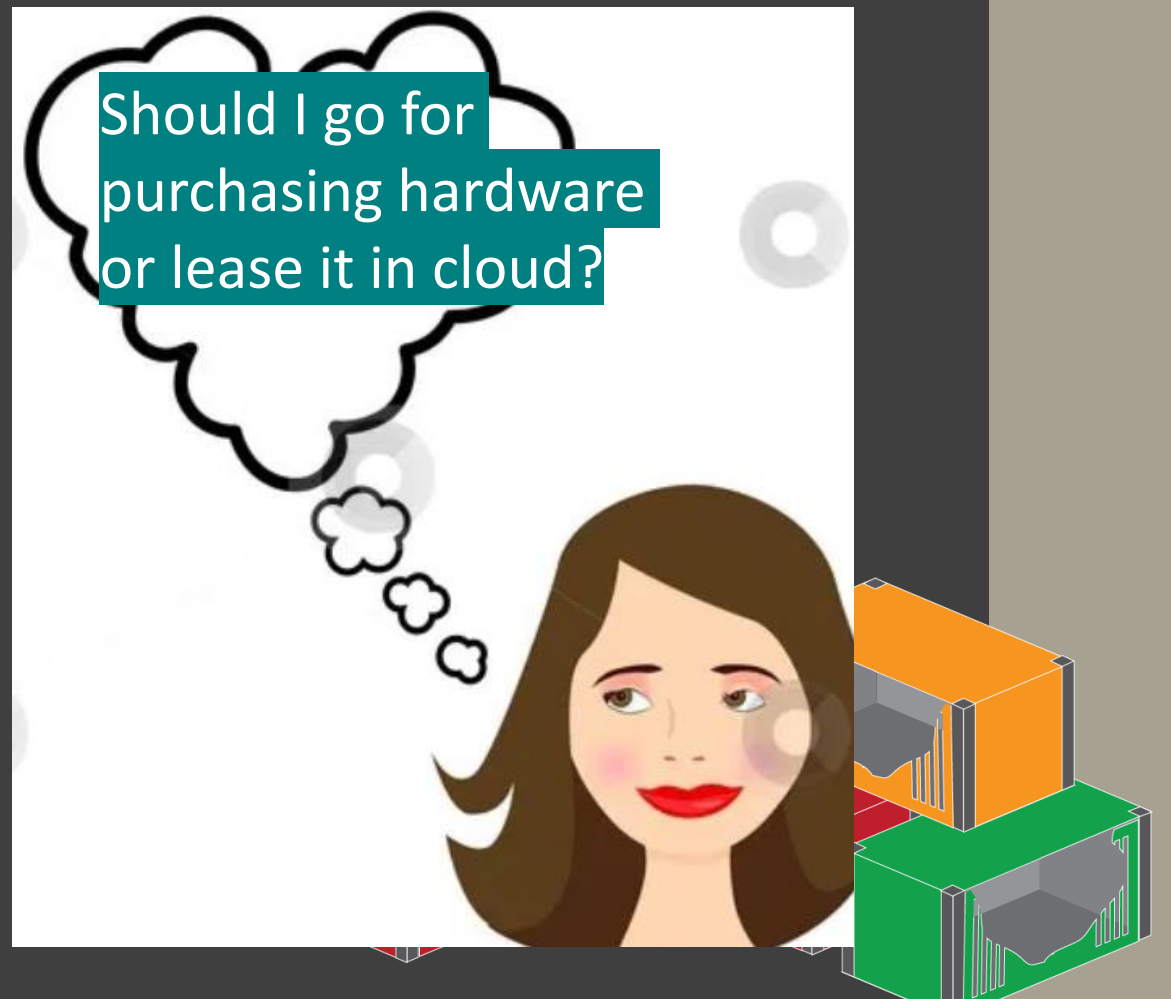
It is an expense required for the day-to-day functioning of a business. OpEx is spending money on services or products now and being billed for them now. There's no upfront cost.

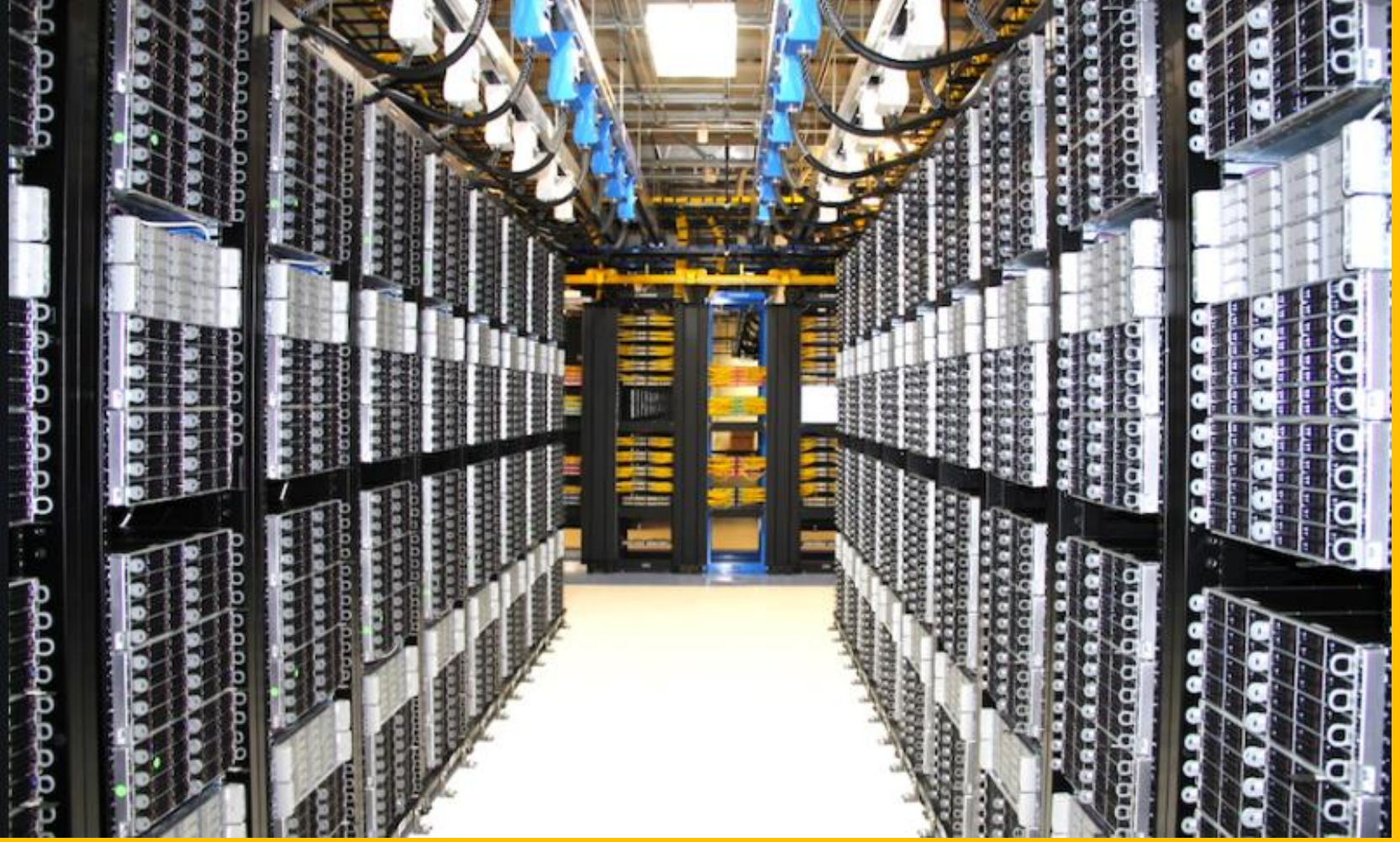
Example: Lease/rent storage in a data center, Leasing software

- Operating expenses and capital expenses are treated quite differently for accounting and tax purposes.
- CapEx stability or OpEx flexibility

CapEx vs OpEx





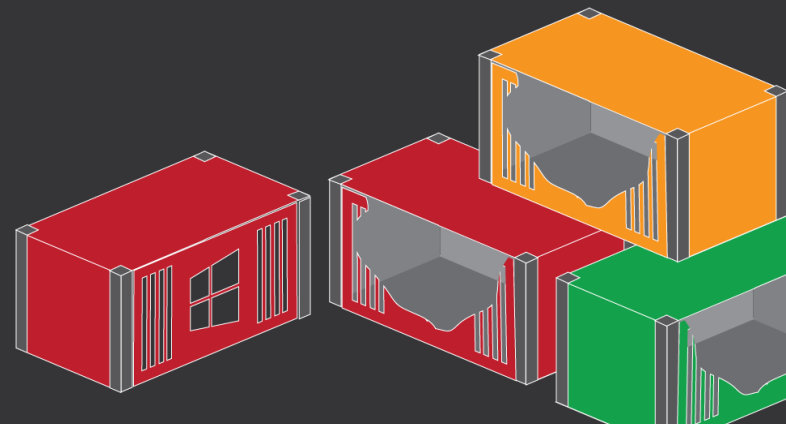


Azure Data Center

Azure Data Center

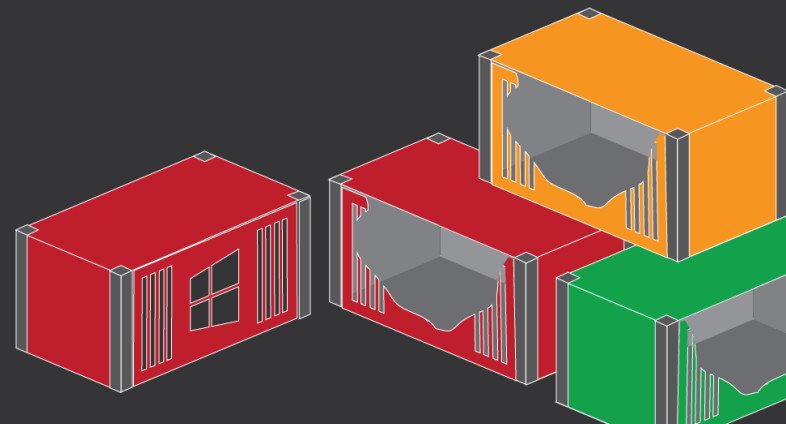
Economies of scale

Ability to do things more efficiently or at a lower-cost per unit when operating at a larger scale



Disadvantages of cloud

- ✓ Fear of change when there’s no going back
- ✓ Fear of data security
- ✓ Fear of losing control



Test Your Knowledge

Question: Which term from the list below would be viewed as benefits of using cloud services?

A.) Unpredictable costs

B.) Elasticity

C.) Local reach only

Answer: B

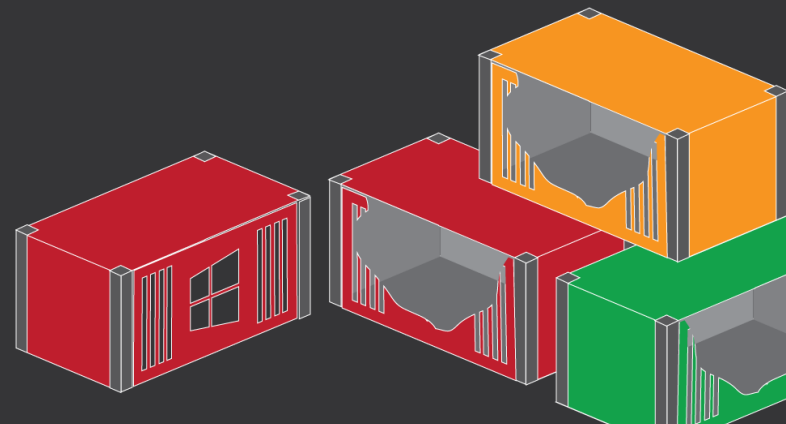
Cloud Deployment Models

Azure Fundamentals

Clouds Deployment Models

A cloud deployment model defines where your data is stored and how your customers interact with it – how do they get to it, and where do the applications run?

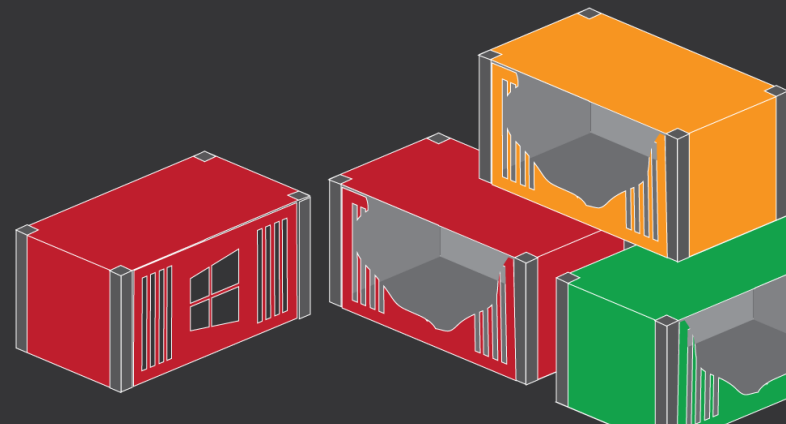
- Private cloud
- Public cloud
- Hybrid cloud
- Community Cloud



Private Cloud

- ✓Services offered over the Internet or over a private internal network to only select users, not the general public. It is a cloud-based infrastructure used by stand-alone organizations.
- ✓A private cloud hosting solution resides on company's intranet or hosted data center where all of your data is protected behind a firewall.
- ✓Private clouds are perfect for organizations that have high-security requirements, high management demands, and availability requirements.

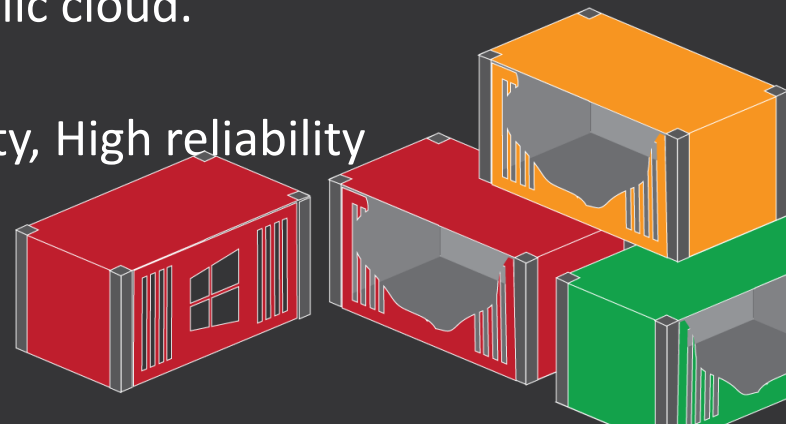
Advantages: More flexibility, Improved security, High scalability



Public Cloud

- ✓Services offered over the public Internet and available to anyone who wants to purchase them.
- ✓Infrastructure is shared by multiple businesses and owned and operated by a service provider, offering fast provisioning.
- ✓The cloud resources are owned and operated by a third-party cloud service provider and delivered over the Internet. Microsoft Azure is an example of a public cloud.

Advantages: Lower costs, No maintenance, Near-unlimited scalability, High reliability

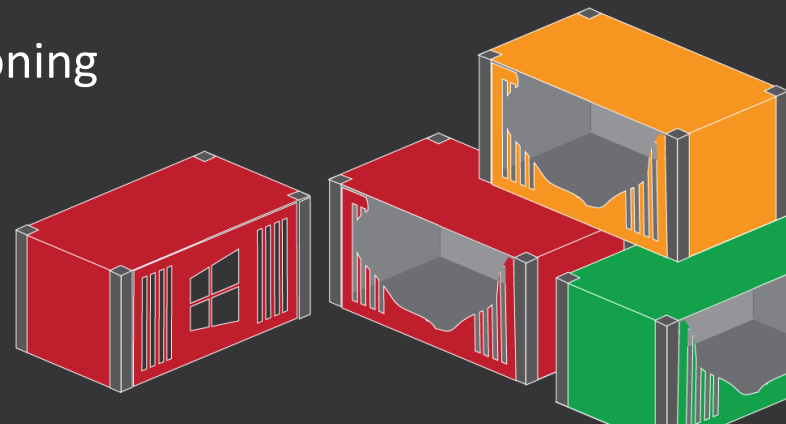


Hybrid Cloud

✓Often called “the best of both worlds”, hybrid clouds combine on-premises infrastructure, or private clouds, with public clouds so organizations can reap the advantages of both.

✓Connect dedicated servers, private and public clouds to tap the power of each and run workloads where they perform best.

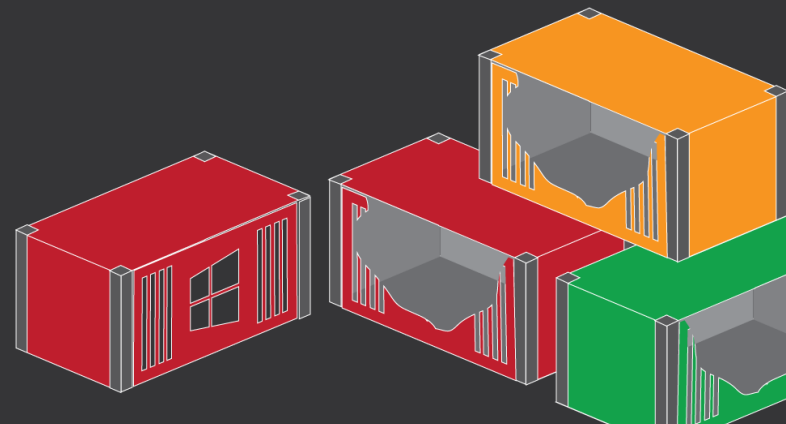
Advantages: Control, Flexibility, Cost-effectiveness, Ease—transitioning



Community Cloud

- ✓It is a mutually shared model between organizations that belong to a particular community such as banks, government organizations, or commercial enterprises.

- ✓Examples include universities cooperating in certain areas of research, or police departments within a county or state sharing computing resources..



Choosing a Cloud Deployment Model

To determine cloud deployment model, we must consider:

- **User Experience**
- **Security**
- **Responsibilities**

Test your Knowledge

Question 1.) Suppose you have two types of applications: legacy applications that require specialized mainframe hardware and newer applications that can run on commodity hardware.

Which cloud deployment model would be best for you?

A.) Public cloud

B.) Private cloud

C.) Hybrid cloud

Answer: C

Explanation: Hybrid cloud the benefit of both private cloud(you need for running your legacy application) and public cloud (which you can utilize for running you newer application)

Test your Knowledge: Understanding Cloud Concepts

Question 2.) Which cloud model provides the greatest degree of ownership and control?

A.) Public

B.) Private

C.) Hybrid

Answer: B

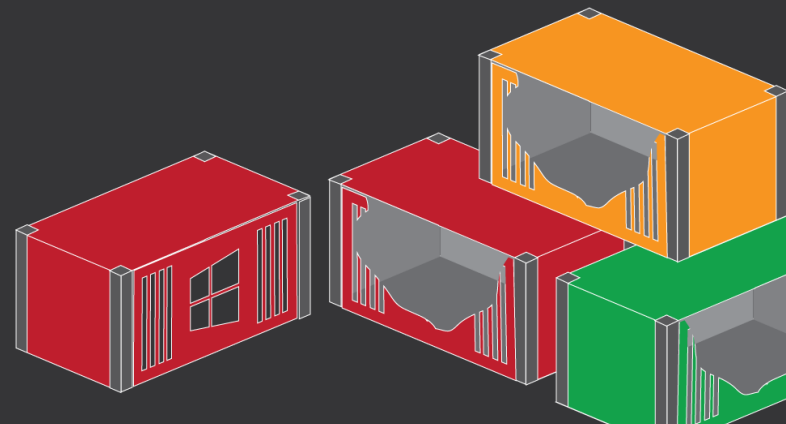
Explanation: Private cloud models is the correct answer. Both public and hybrid clouds have an infrastructure that is managed by another party. As such, there is less control over the infrastructure.

Types of Cloud Services

Azure Fundamentals

Types of Cloud Services

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)



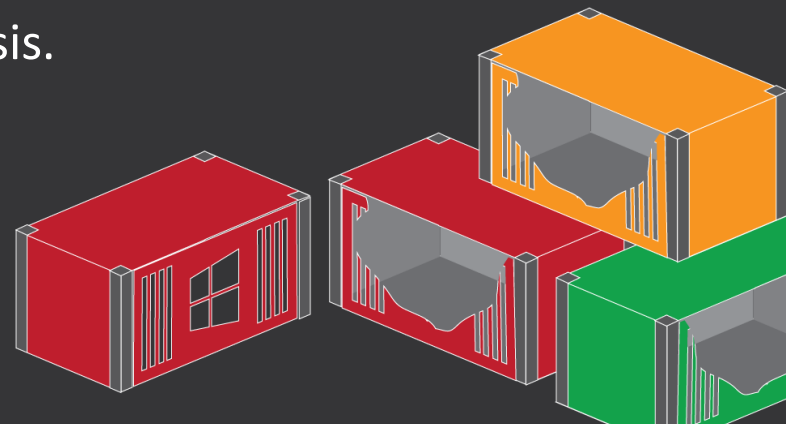
Types of Cloud Services

Infrastructure as a Service (IaaS)

IaaS is the lowest level of cloud solution

The cloud computing service provider such as Azure or AWS, manages the infrastructure, while you purchase, install, configure, and manage your own software—operating systems, middleware, and applications.

Example: Virtual Machines, Networks, and Storage etc. on rent basis.



Types of Cloud Services

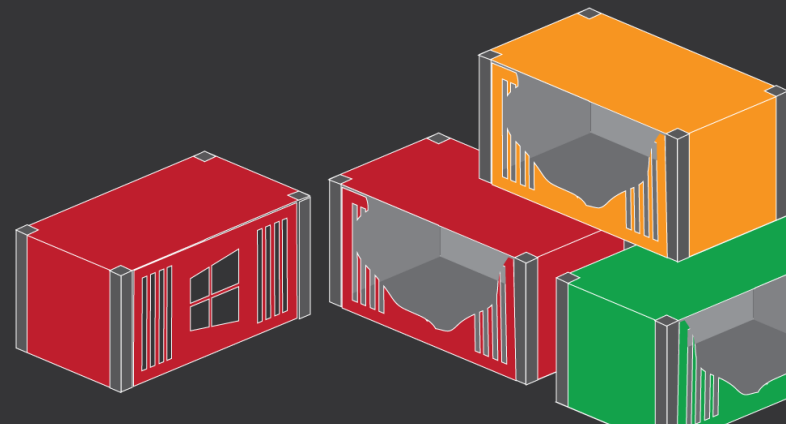
Platform as a Service (PaaS)

With PaaS, apart from simply providing infrastructure, providers also offer a computing platform and solution stack as a service.

This service is used in developing, testing and maintaining of software. PaaS is same as IaaS but also provides the additional tools like DBMS, BI services etc.

PaaS services are mostly used by companies that need to develop, test, collaborate and deploy cloud solutions for particular applications

Examples: Azure WebApps, Salesforce, Azure SQL database



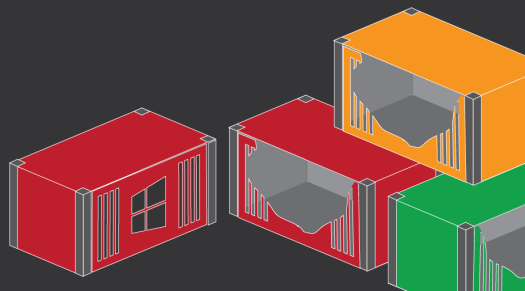
Types of Cloud Services

Software as a Service

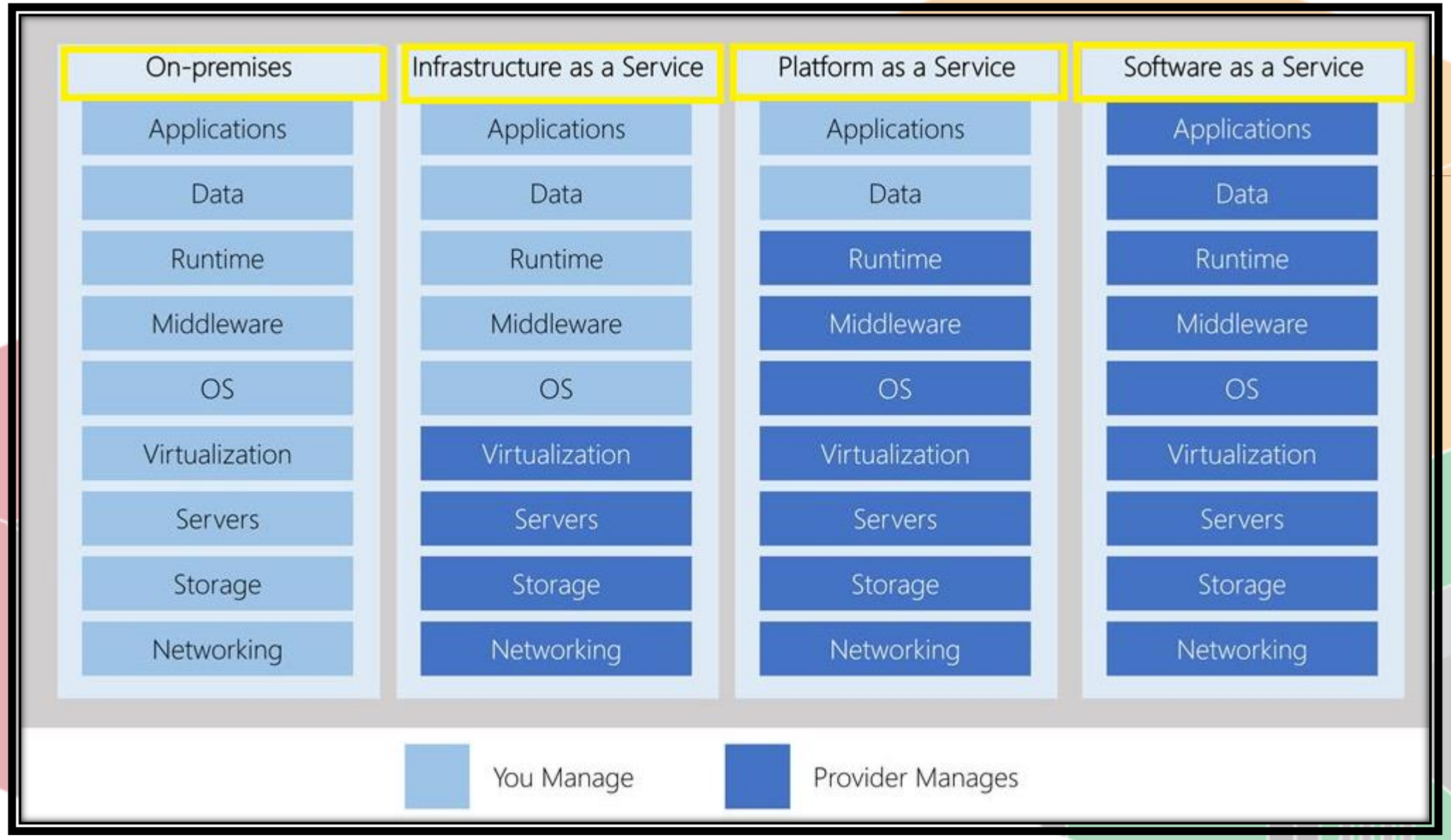
SaaS providers provide fully functionally web-based applications on demand to customers. The applications are mainly targeted at business users and can include web conferencing, ERP, CRM, email, time management, project tracking among others.

This service makes the users connect to the applications through the Internet on a subscription basis.

Example: Office365 , Google Applications, Salesforce, Citrix



Management responsibilities



Test your Knowledge : Understanding Cloud Concepts

Question 1: As an end User you want to create and deploy an application in cloud as quickly as possible without having to worry about managing the underlying infrastructure. Which service model is recommended for you?

A.) SaaS

B.) PaaS

C.) IaaS

Answer: B

In PaaS model, user has to only worry about application and data and other management responsibilities are with Cloud Service Provider.

Test your Knowledge : Understanding Cloud Concepts

Question 2: You are an IT company providing a supply chain software solution which is a multi tier application and has very complex architecture. You want to be able to quickly migrate your solution to public cloud. Which Service Model is ideal for your needs:

A.) SaaS

B.) PaaS

C.) IaaS

Answer: C

Explanation: IaaS will provides maximum flexibility and control among other service model to deploy your application quickly(lift and shift migration)

Cloud computing summary

Cloud computing provides a modern alternative to the traditional on-premises datacenter. Public cloud vendors provide and manage all computing infrastructure and the underlying management software.

These vendors provide a wide variety of cloud services. A cloud service in this case might be a virtual machine, a web server, or cloud-hosted database engine. As a cloud provider customer, you lease these cloud services on an as-needed basis.

In doing so, you convert the capital expense of hardware maintenance into an operational expense

Azure Architecture

Azure Fundamentals

Azure Architecture

What is a region?

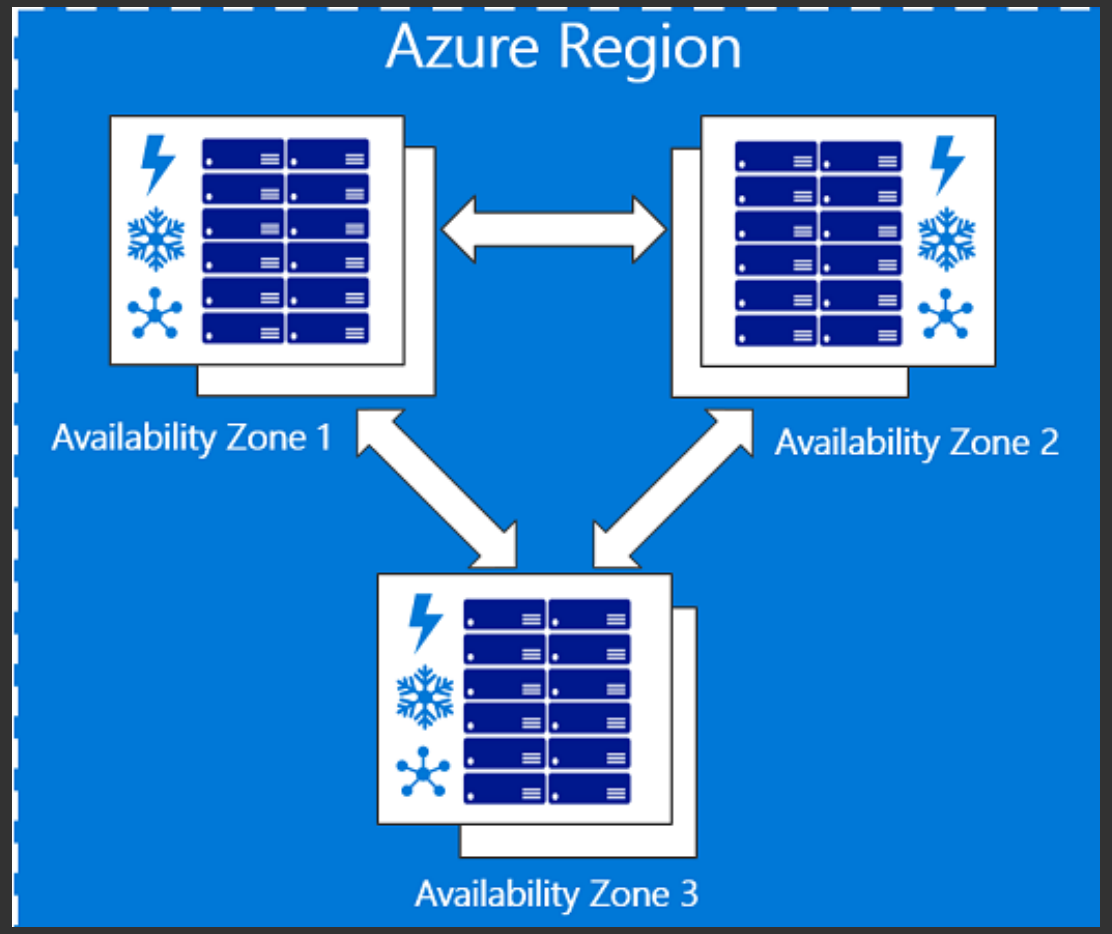
A region is a geographical area on the planet containing at least one, but potentially multiple datacenters that are nearby and networked together with a low-latency network. Azure intelligently assigns and controls the resources within each region to ensure workloads are appropriately balanced.

Azure Regions

https://azure.microsoft.com/en-in/global-infrastructure/regions/

- https://thenextweb.com/microsoft/2018/06/07/microsoft-just-dropped-864-servers-into-the-sea-to-run-an-underwater-data-center/
- https://youtu.be/AvvJc4Uw3aA

Azure Architecture



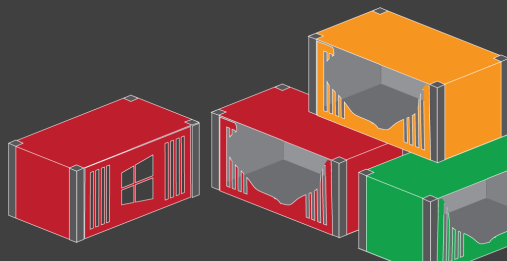
Availability Zone

- Availability Zones is a high-availability offering that protects your applications and data from datacenter failures
- To ensure resiliency, there’s a minimum of three separate zones in all enabled regions. The physical separation of Availability Zones within a region protects applications and data from datacenter failures.

- https://docs.microsoft.com/en-us/azure/availability-zones/az-overview

Availability Zone

- ✓ Availability Zones are physically separate datacenters within an Azure region.
- ✓ Each Availability Zone is made up of one or more datacenters equipped with independent power, cooling, and networking.
- ✓ If one zone goes down, the other continues working.
- ✓ Availability Zones are connected through high-speed, private fiber-optic networks.



Resource Group

An Azure resource group is a **container** that holds related resources for an Azure solution.

The resource group can include all the resources for the solution, or only resources that you want to manage as a group.

Resource

A manageable item that is available through Azure.

Virtual machines, storage accounts, web apps, databases, and virtual networks are examples of resources.

Test your Knowledge : Understand core Azure services

Q1. Deploying an app can be done directly to what level of physical granularity?

A.) Region

B.) Datacenter

C.) Server rack

Answer: A

Test your Knowledge : Understand core Azure services

Q2. To use Azure datacenters that are made available with power, cooling, and networking capabilities independent from other datacenters in a region, choose a region that supports _____?

A.) Geography distribution

B.) Service-Level Agreements (SLAs)

C.) Availability Zones

Answer : C

Test your Knowledge : Understand core Azure services

Q3. Application availability refers to what?

A.) The service level agreement of the associated resource.

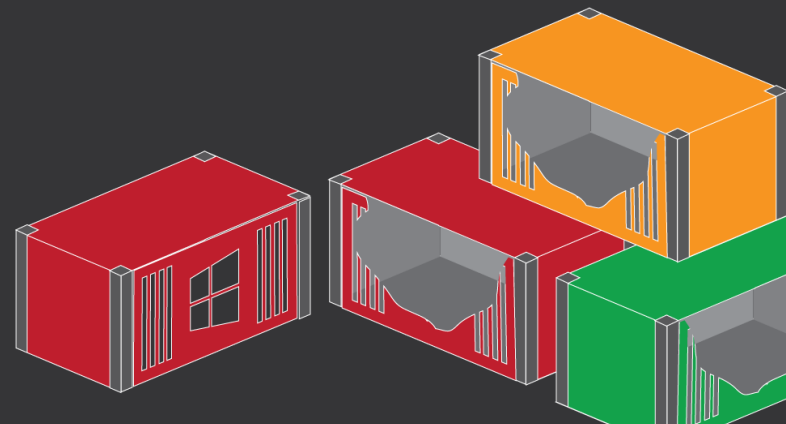
B.) Application support for an availability zone.

C.) The overall time that a system is functional and working.

Answer: C

Azure Account

An Azure account is an identity in either Azure AD, or a directory that is trusted by Azure AD, such as a work or school organization.



Azure Subscriptions

Azure Fundamentals

Azure Subscriptions

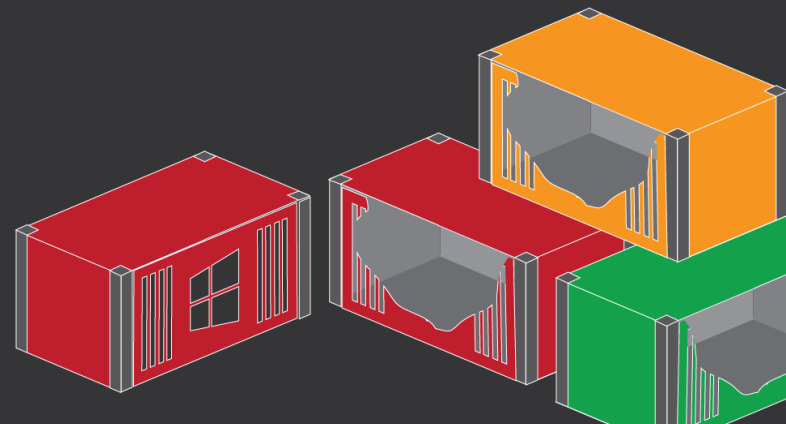
A subscription is an agreement with Microsoft to use one or more Microsoft cloud platforms or services, for which charges accrue based on either a per-user license fee or on cloud-based resource consumption.

Azure Subscriptions

An Azure subscription is a logical container used to provision resources in Microsoft Azure. It holds the details of all your resources like virtual machines, databases, and so on.

Every Azure subscription is associated with Azure AD.

Users and services that access the resources of the subscription first need to authenticate with Azure AD.

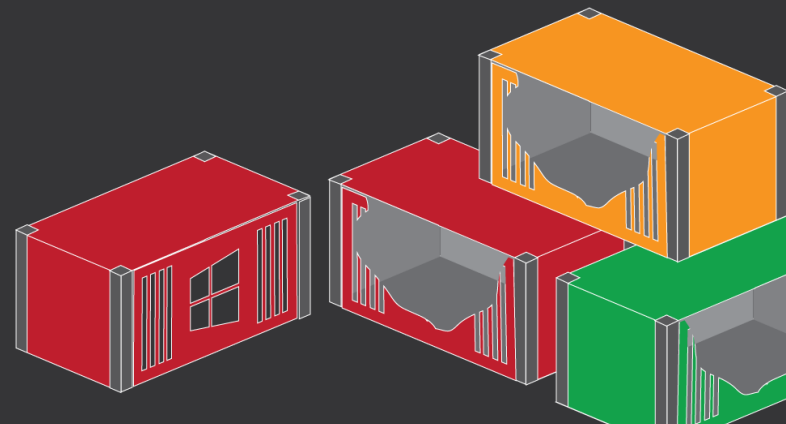


Azure Subscriptions

Subscription types

Azure offers free and paid subscription options to suit different needs and requirements. The most commonly used subscriptions are:

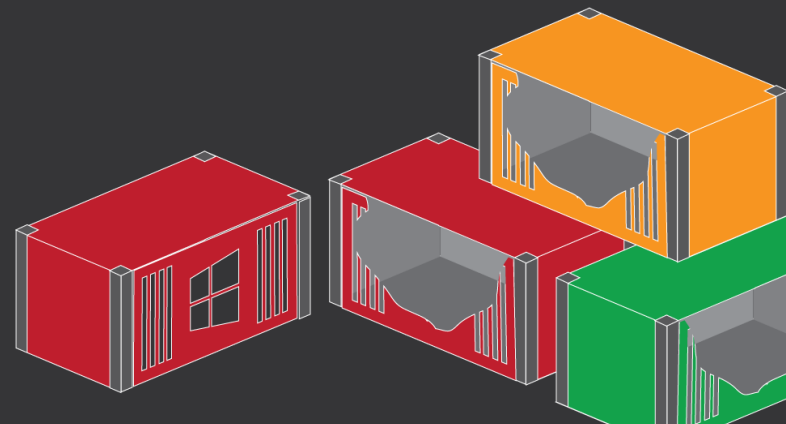
- Free
- Pay-As-You-Go
- Enterprise Agreement
- Student



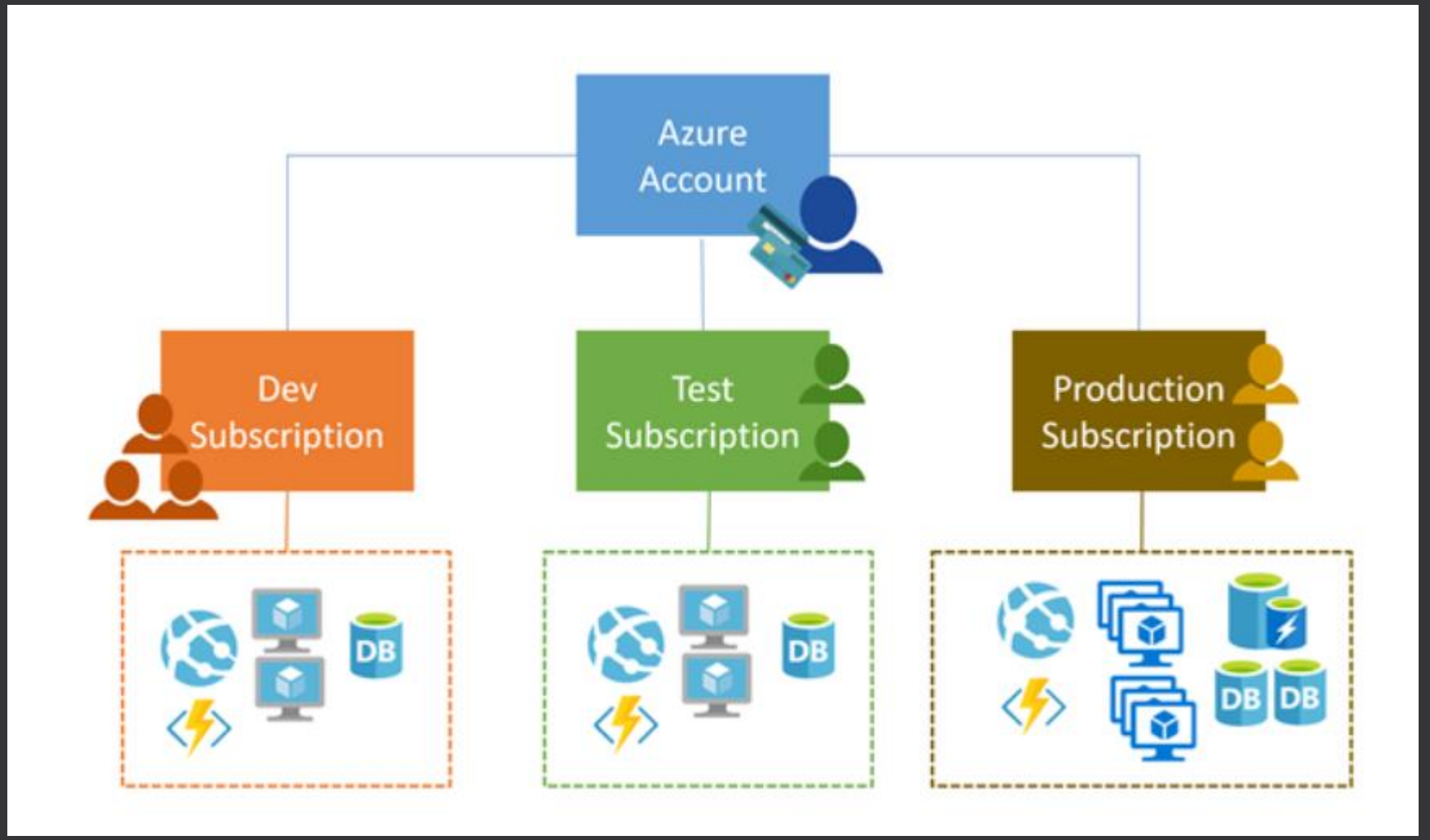
Azure Subscriptions

Why you might want Multiple Subscriptions?

- Access Management
- Separate Bill for Each Subscription



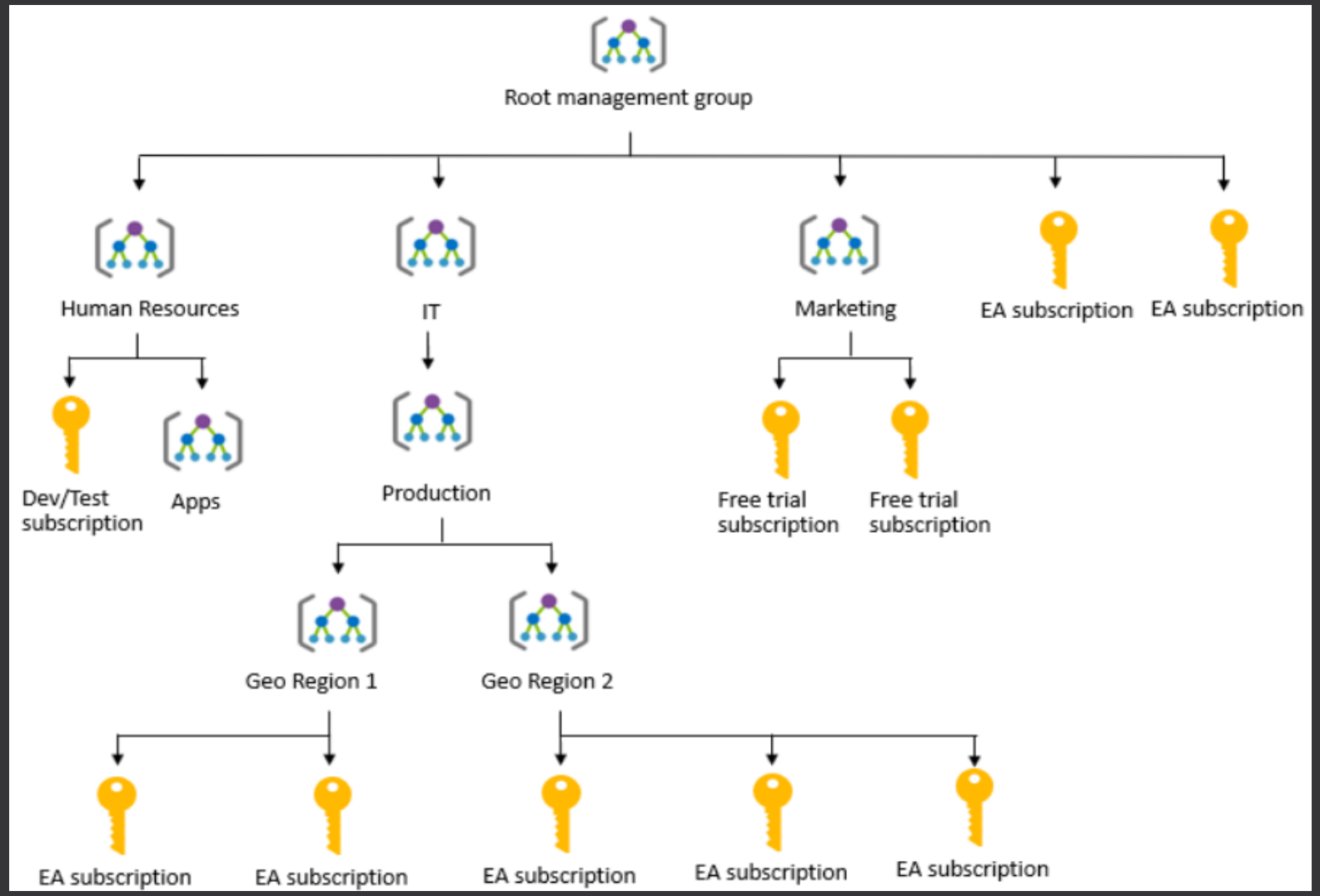
Azure Subscriptions



Azure Management Groups

Azure Fundamentals

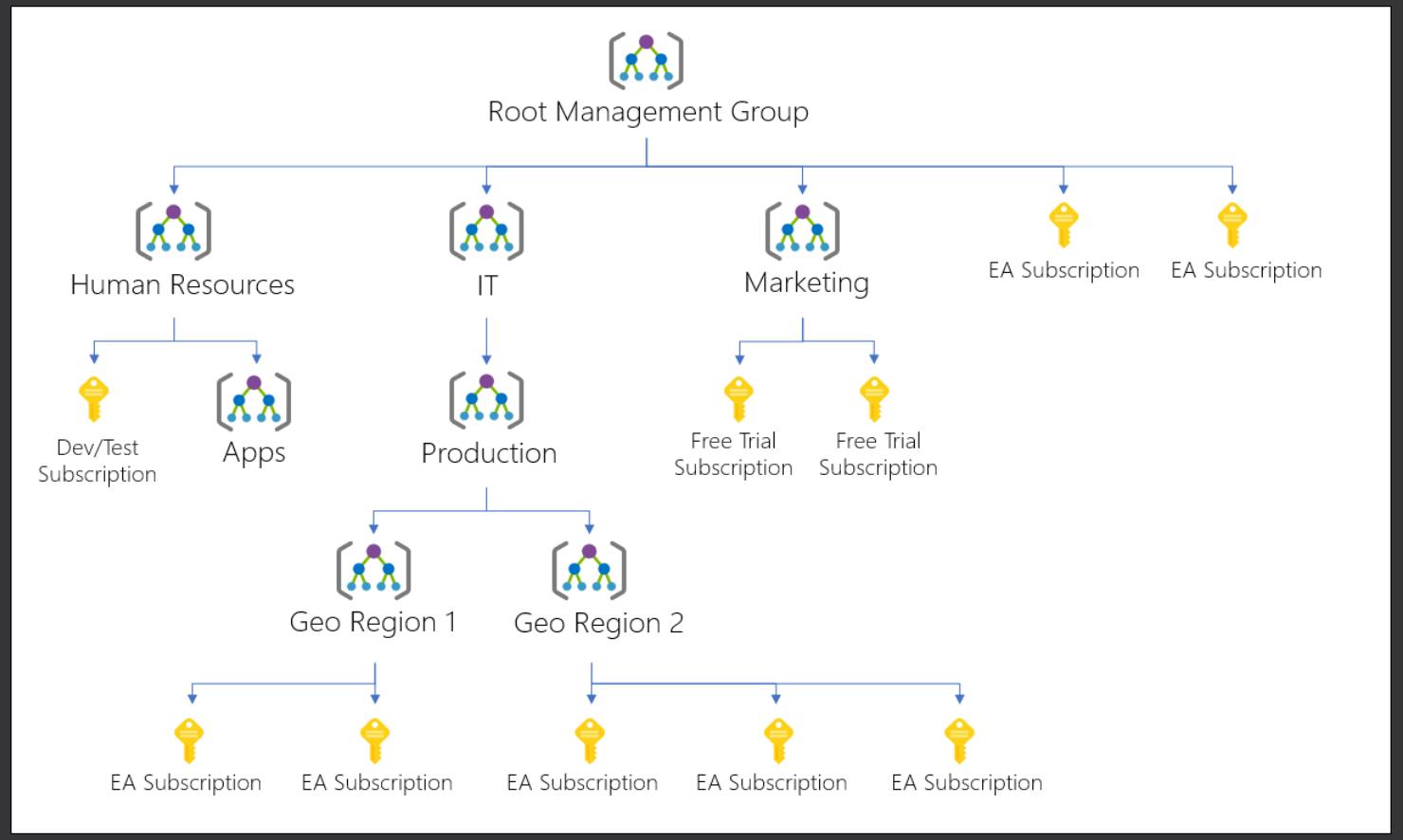
Management Groups



Azure Management Groups

Management groups provide a governance scope above subscriptions.

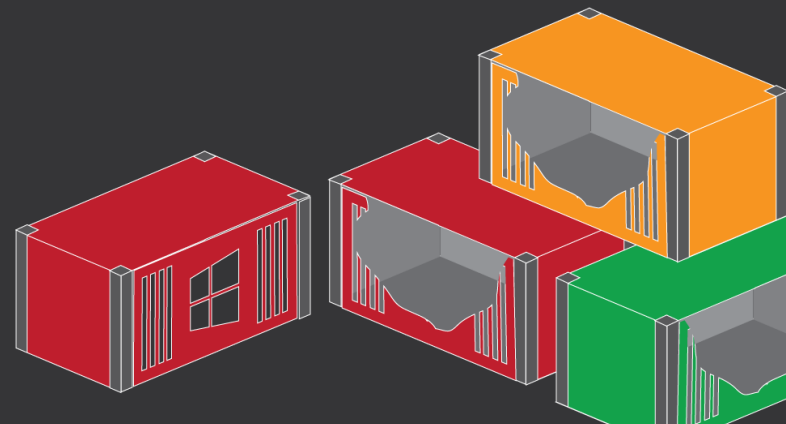
You organize subscriptions into management groups the governance conditions you apply cascade by inheritance to all associated subscriptions.



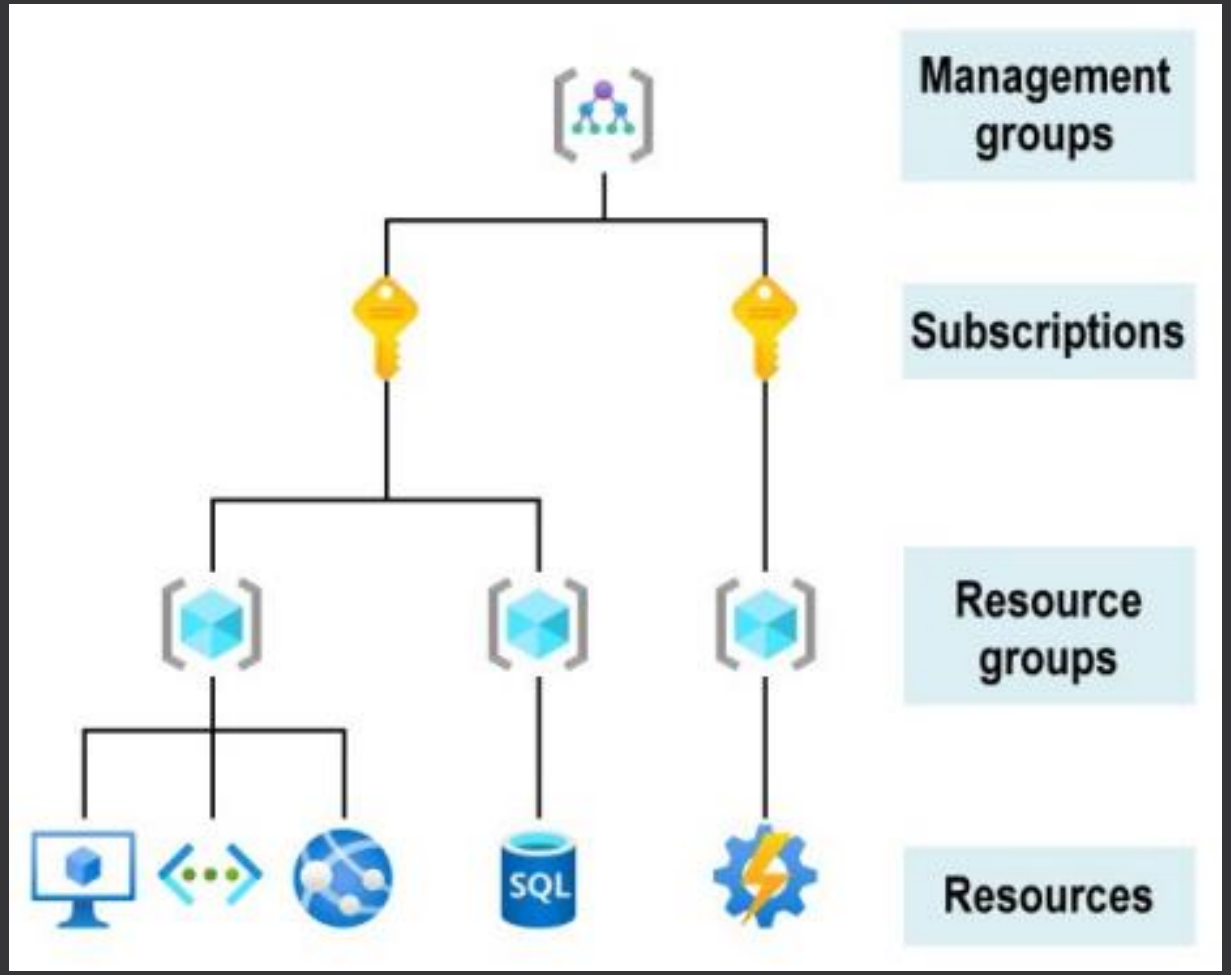
Management Groups

Azure Management Groups are containers for managing access, policies, and compliance across multiple Azure subscriptions.

Management groups allow you to order your Azure resources hierarchically into collections, which provides a further level of classification that is above the level of subscriptions.



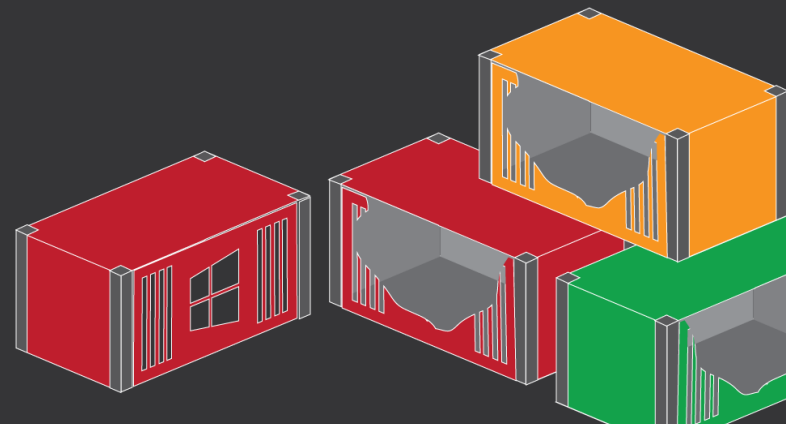
Object Hierarchy



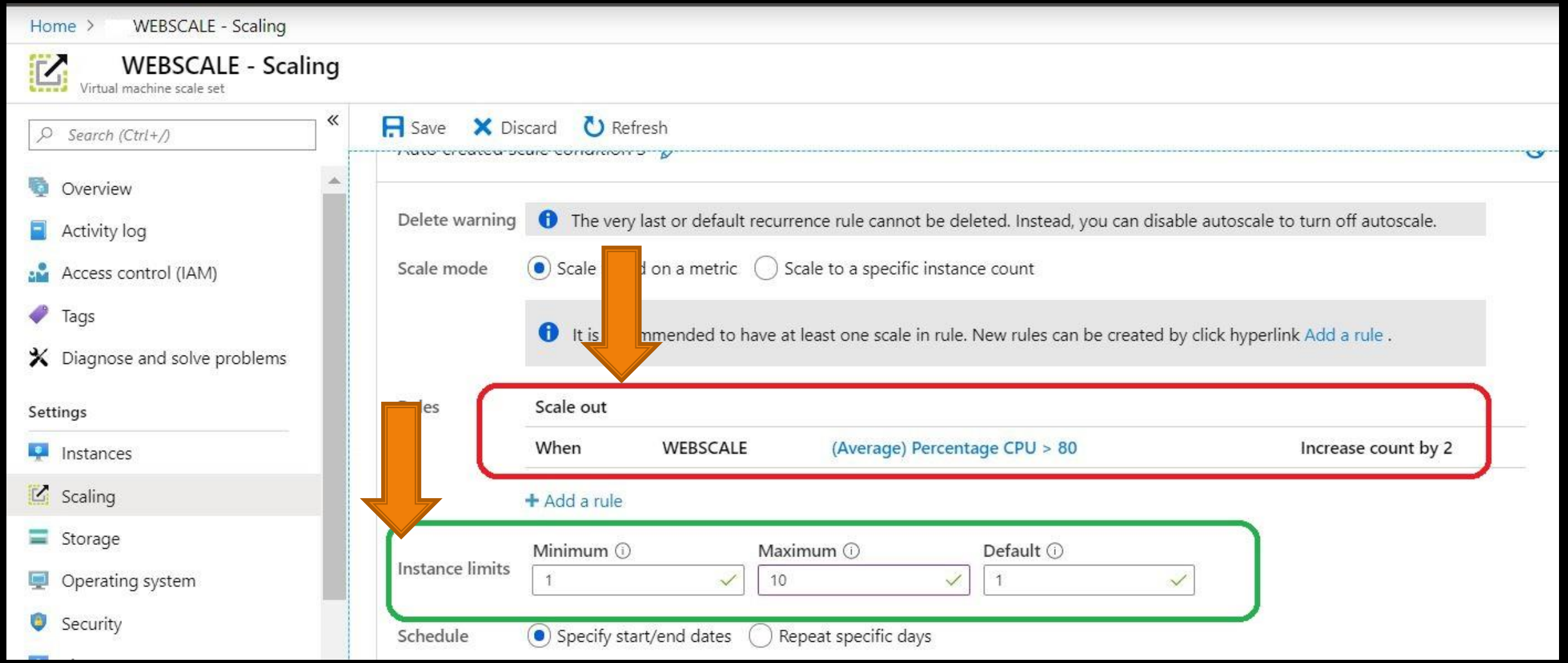
Azure Compute Services

Services for hosting and running application workload

- Azure Virtual Machines—both Linux and Windows
- Virtual Machine Scale Sets
- App Services (Web Apps, Mobile Apps, Logic Apps, API Apps, and Function Apps)
- Azure Container Service
- Azure Kubernetes Service (AKS)

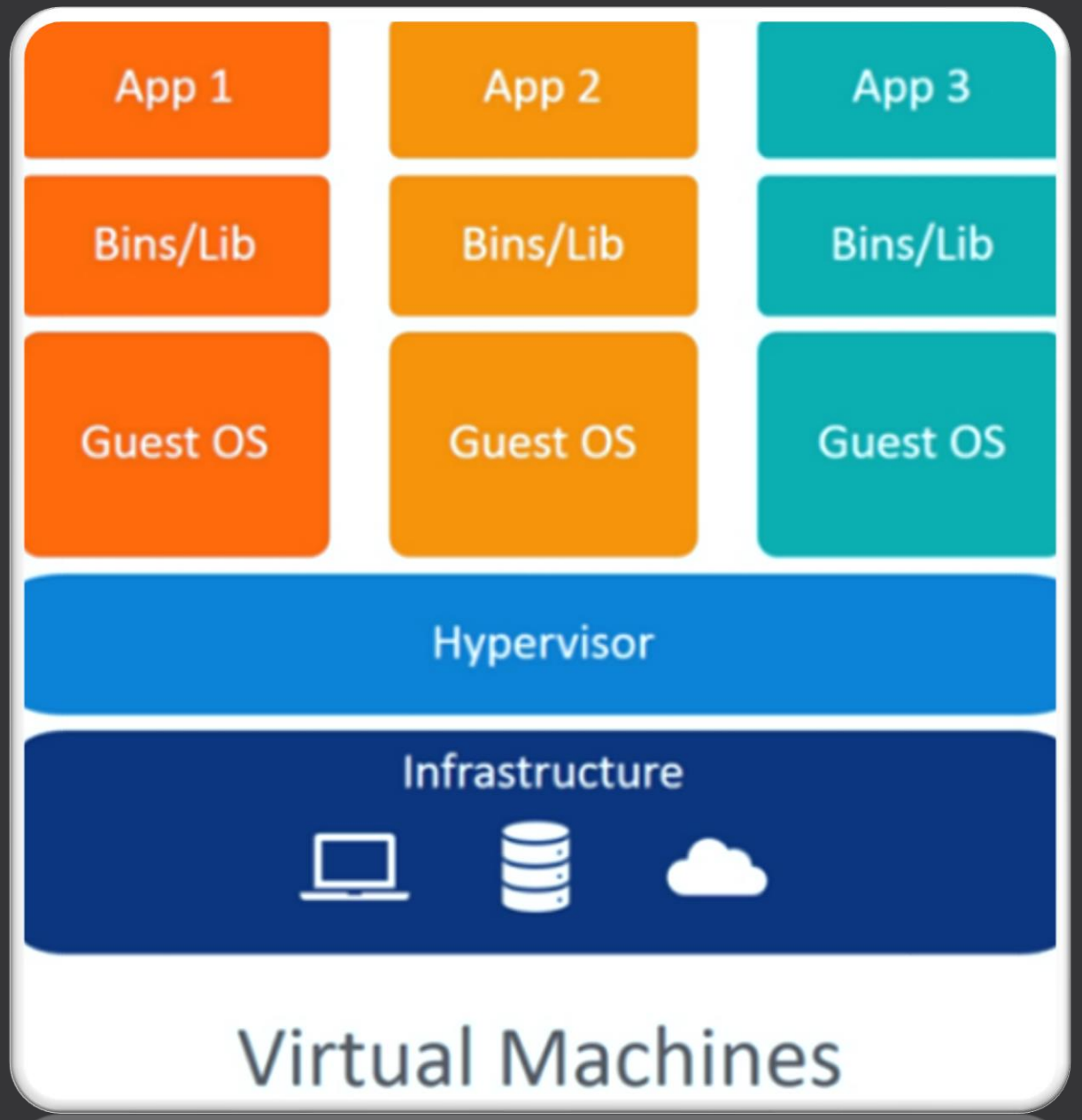


Virtual Machine Scale Sets



Azure Container Instances

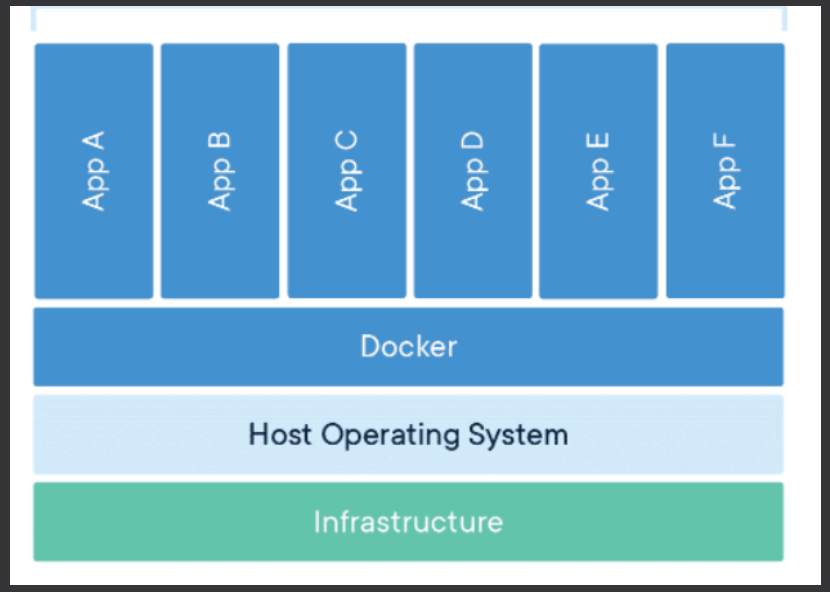
Azure Fundamentals

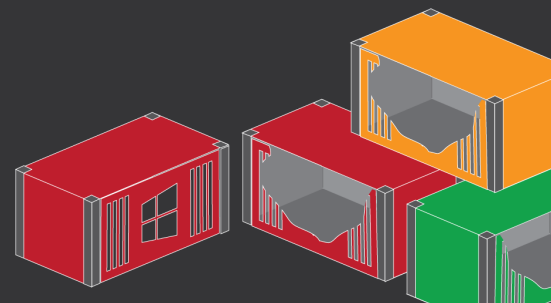

App 1
App 2
App 3
Bins/Lib
Bins/Lib
Bins/Lib
Guest OS
Guest OS
Guest OS
Hypervisor
Infrastructure
Virtual Machines

What is a Container?

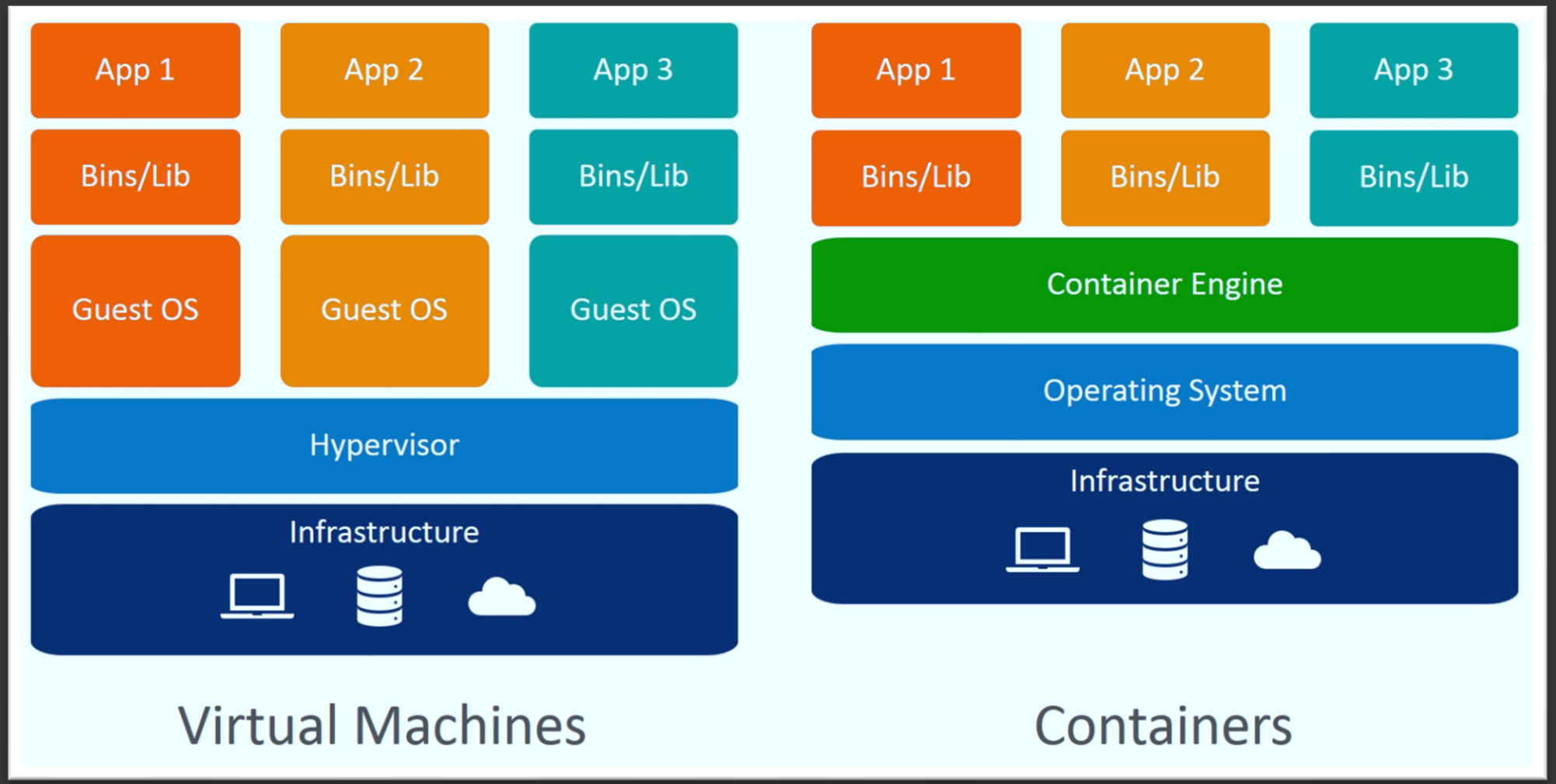
Containers are packages of software that contain all of the necessary elements to run in any environment.

Containers virtualize the operating system and run anywhere, from a private data center to the public cloud or even on a developer's personal laptop.





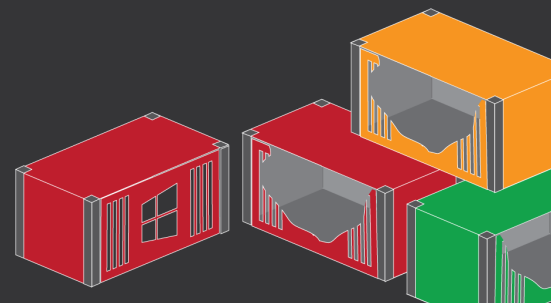
VM vs Container



Azure Container Instances

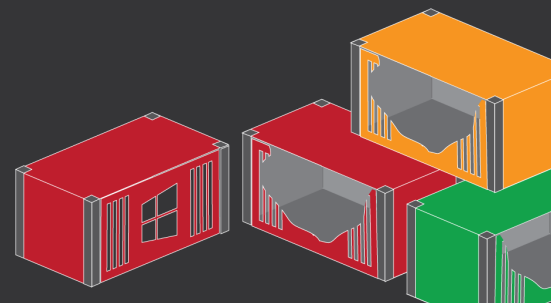
Containers are becoming the preferred way to package, deploy, and manage cloud applications. Azure Container Instances offers the fastest and simplest way to run a container in Azure, without having to manage any virtual machines and without having to adopt a higher-level service.

Azure Container Instances is a great solution for any scenario that can operate in isolated containers, including simple applications, task automation, and build jobs.



Benefits of containers

- Increased portability
- Less Overhead
- More consistent operation
- Container Isolation and Resource Sharing
- Greater efficiency
- Improved Developer Productivity



Serverless Computing

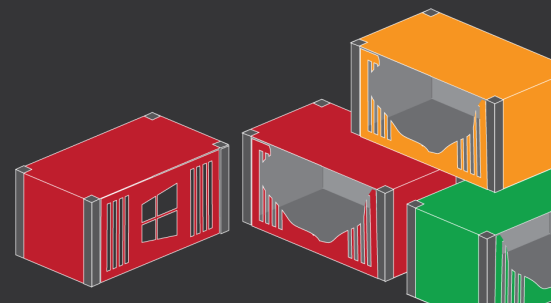
Azure Fundamentals

Serverless Computing

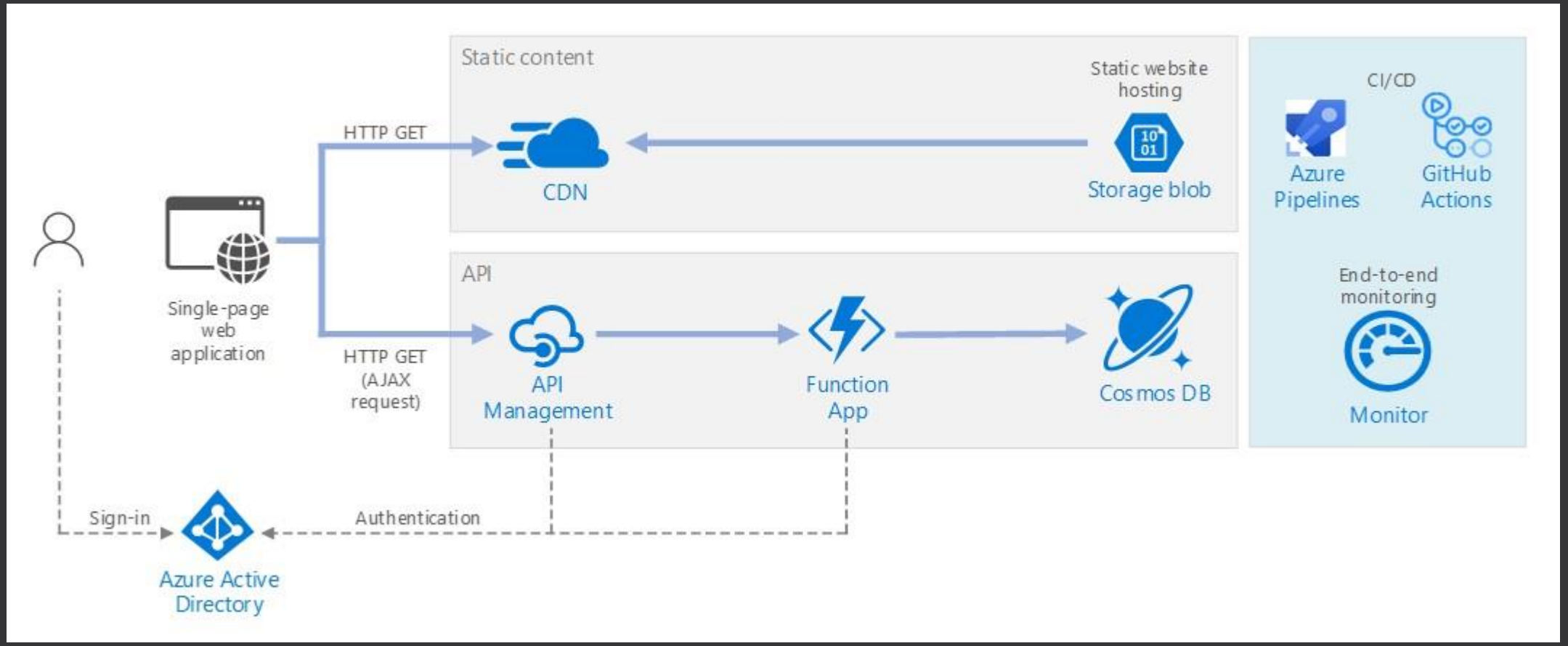
Serverless computing is a term used to describe an execution environment that's set up and managed for you.

With serverless applications, the cloud service provider automatically provisions, scales and manages the infrastructure required to run the code.

Serverless computing helps teams increase their productivity and bring products to market faster and it allows organizations to better optimize resources and stay focused on innovation.



Serverless Computing



Azure Functions

- Process events with serverless code.
- Functions are commonly used when you need to perform work in response to an event timer, or message from another Azure service, and when that work can be completed quickly.
- When you're concerned only about the code running your service, and not the underlying platform or infrastructure, using Azure Functions is ideal.
- Functions scale automatically based on demand, so they're a solid choice when demand is variable.

Azure Functions - common tasks

- ✓ Sending emails
- ✓ Starting backup
- ✓ Order processing
- ✓ Task scheduling such as database cleanup, sending notifications, messages, and IoT data processing.

Azure App Service

Azure Fundamentals

Azure App Service

Azure App Service is an HTTP-based service for hosting enterprise grade web applications, REST APIs, and mobile back ends.

It is a fully managed "Platform as a Service" (PaaS) offering.

You can develop in your favorite language, be it .NET, .NET Core, Java, Ruby, Node.js, PHP, or Python.

Applications run and scale with ease on both Windows and Linux-based environments.

App Service Plan

- An App Service plan defines a set of compute resources for a web app to run. These compute resources are analogous to the *server farm* in conventional web hosting.
- One or more apps can be configured to run on the same computing resources (or in the same App Service plan).
- The pricing tier of an App Service plan determines what App Service features you get and how much you pay for the plan.

Azure Networking Services

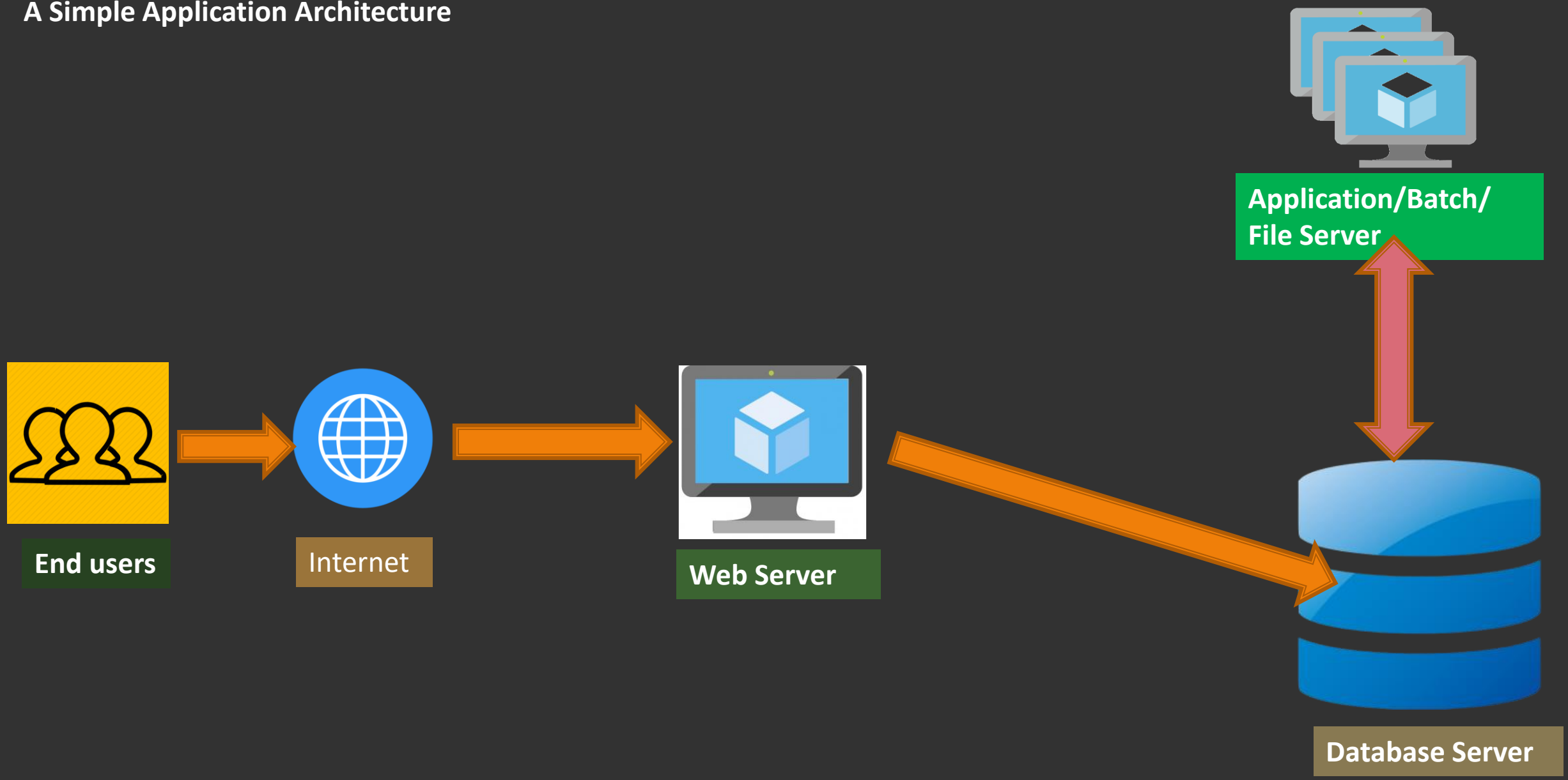
Azure Fundamentals

Network services

Services for networking both within Azure and between Azure and on-premises datacenters.

- Azure Virtual Network
- Azure Load Balancer
- VPN Gateway
- Application Gateway
- Azure Content Delivery Network

A Simple Application Architecture



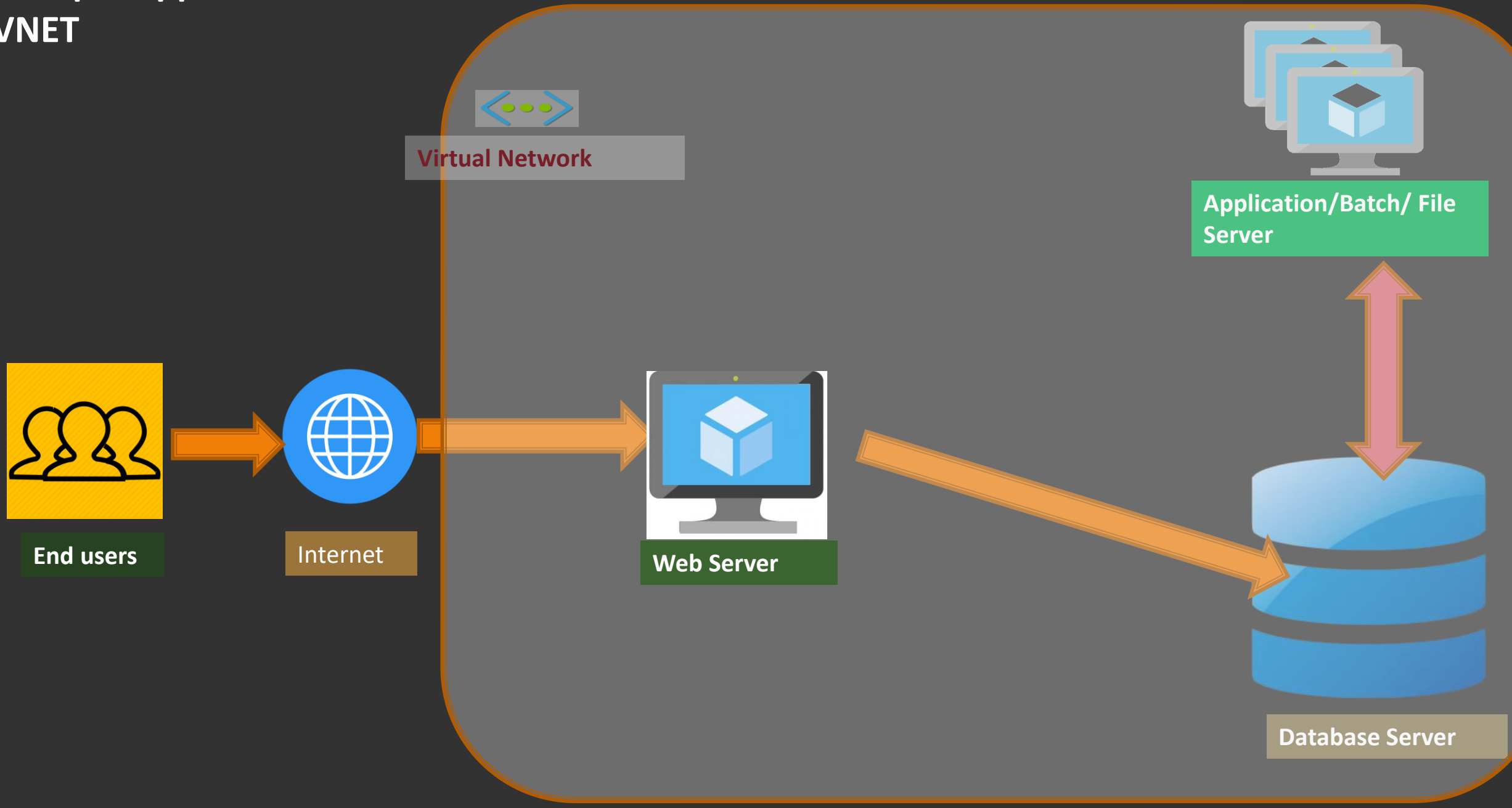
Virtual Network

An Azure Virtual Network (VNet) is a representation of your own network in the cloud.

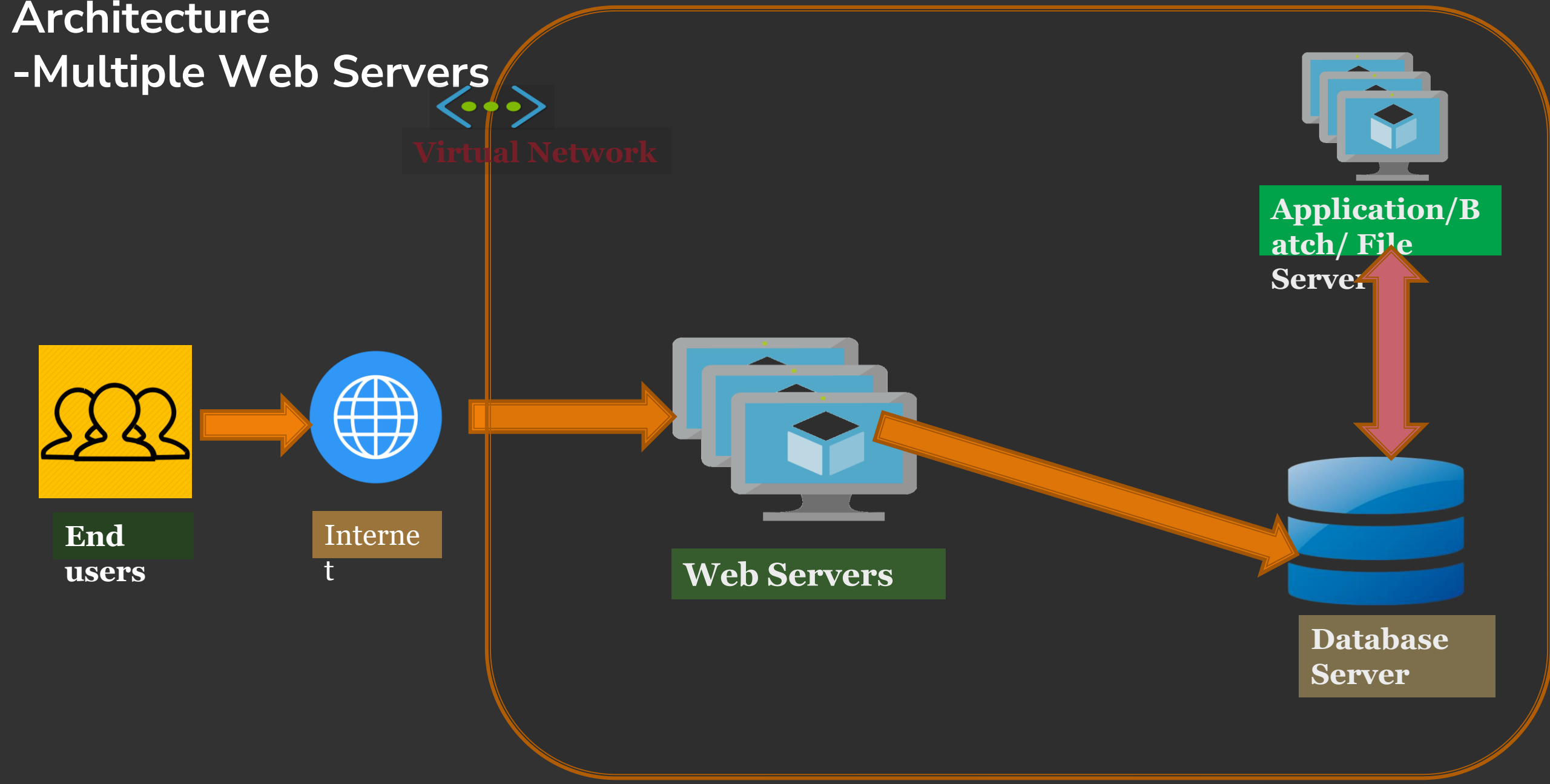
It is a logical isolation of the Azure cloud dedicated to your subscription.

You can use VNets to provision and manage virtual private networks (VPNs)

A Simple Application Architecture -VNET



A Simple Application Architecture -Multiple Web Servers



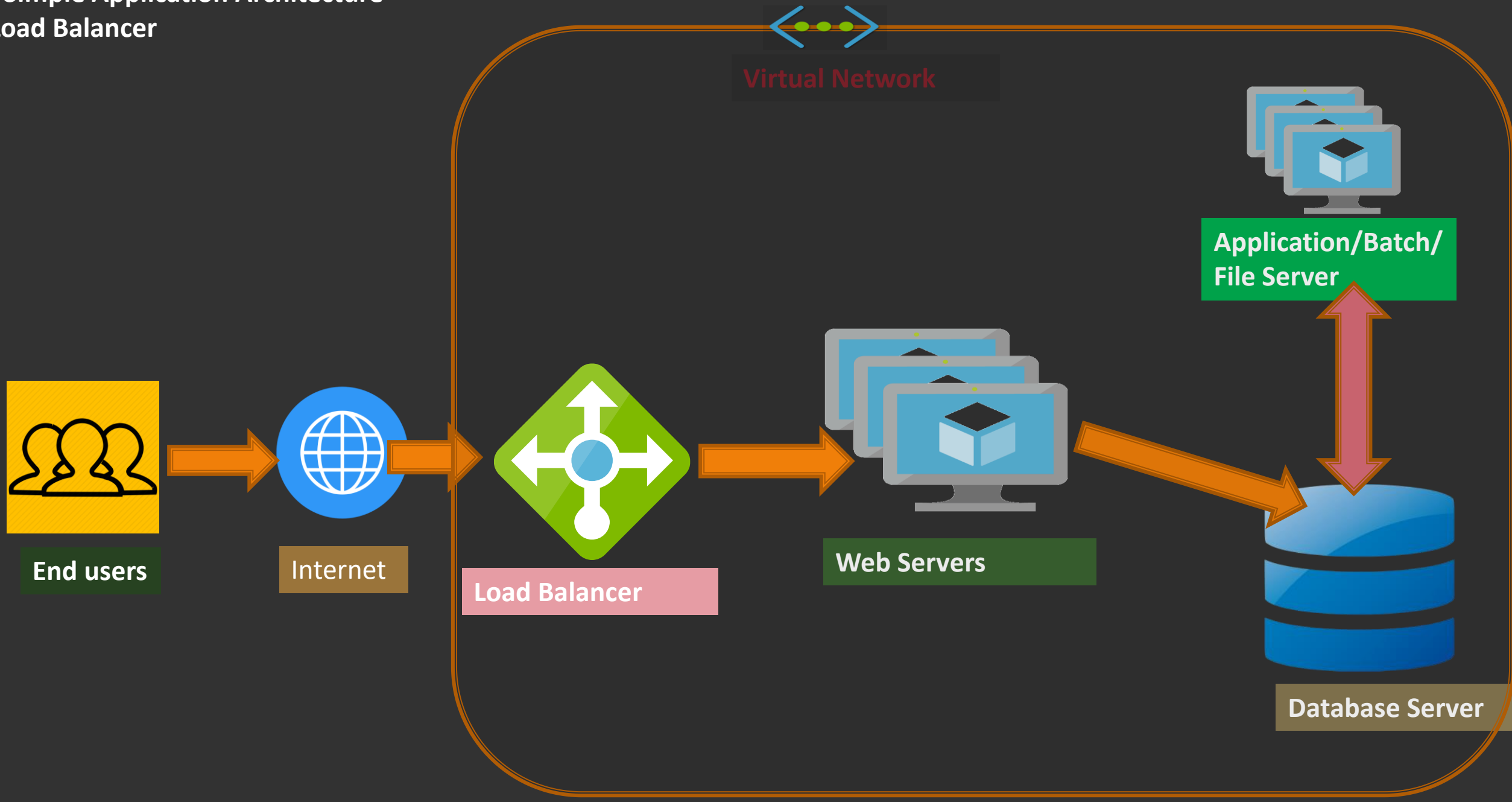
Load Balancer

With Azure Load Balancer, you can scale your applications and create high availability for your services.

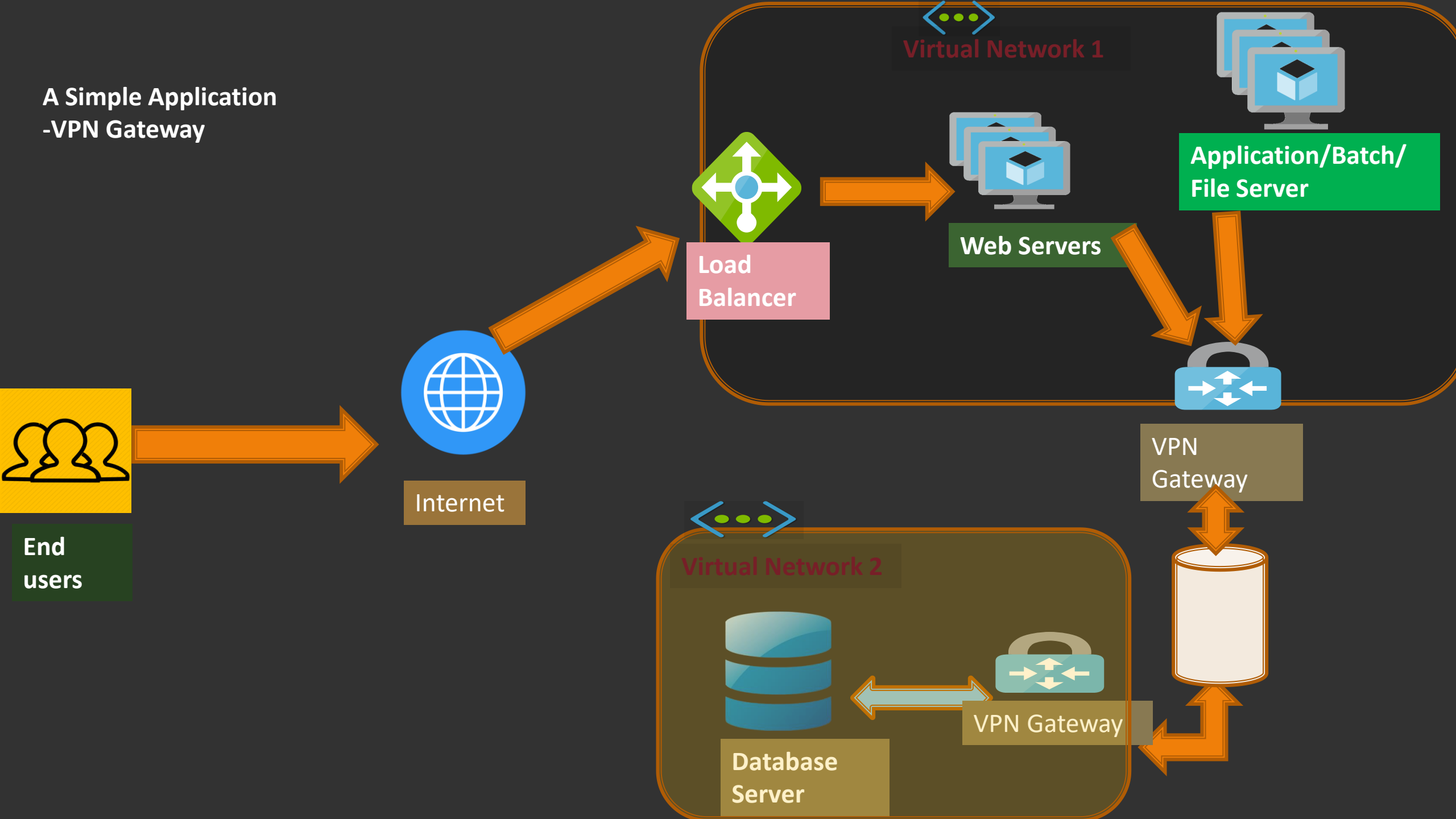
Azure load balancer is a layer 4 load balancer that distributes incoming traffic among healthy virtual machine instances. Load balancers uses a hash-based distribution algorithm.

We can configure the load balancer to:
Load balance incoming traffic across your virtual machines.
Forward traffic to and from a specific virtual machine using NAT rules.

A Simple Application Architecture -Load Balancer



A Simple Application
-VPN Gateway

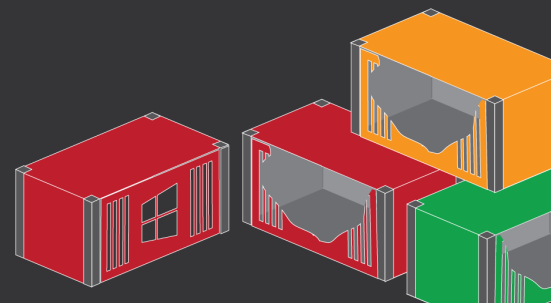


VPN Gateway

- A VPN gateway is a specific type of virtual network gateway that is used to send encrypted traffic between an Azure virtual network and an on-premises location over the public Internet.

- You can also use a VPN gateway to send encrypted traffic between Azure virtual networks over the Microsoft network.

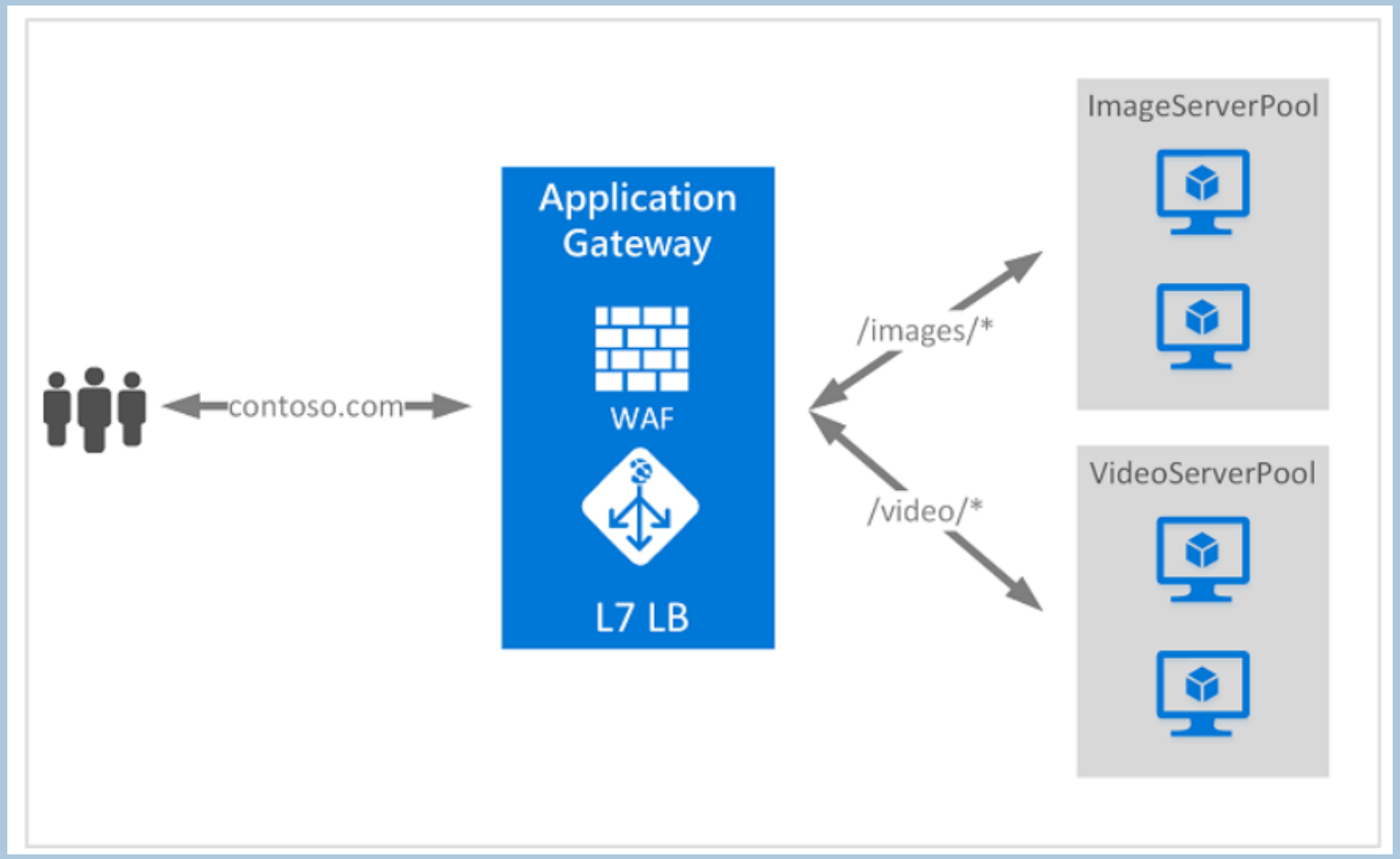
- Each virtual network can have only one VPN gateway.



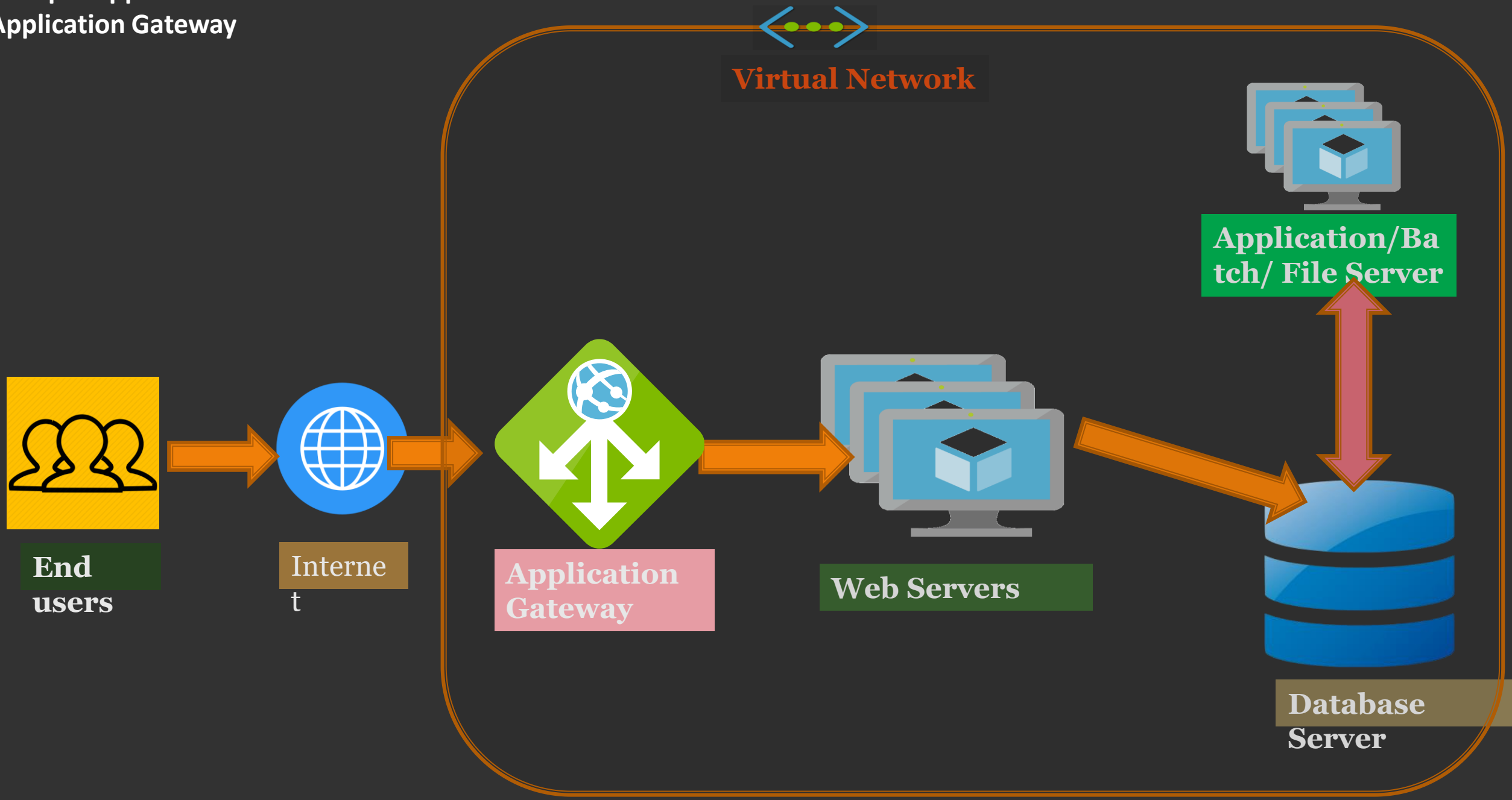
Azure Application Gateway

Azure Application Gateway is a web traffic load balancer that enables you to manage traffic to your web applications.

you can make routing decisions based on additional attributes of an HTTP request, such as URI path or host headers.



A Simple Application Architecture -Application Gateway

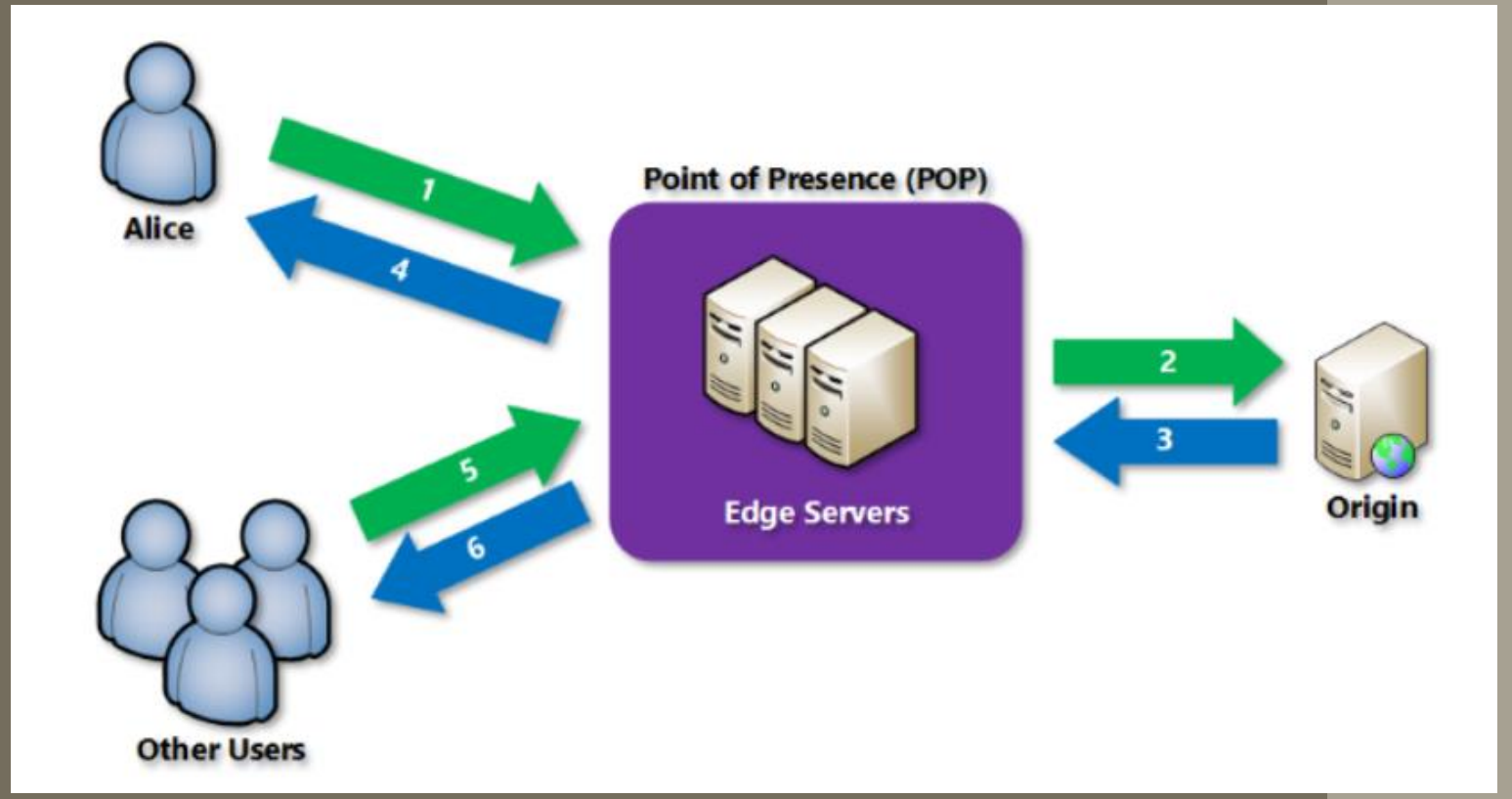



World Map with Continents
ARCTIC OCEAN
EUROPE
ASIA
NORTH AMERICA
NORTH PACIFIC OCEAN
PACIFIC OCEAN
AFRICA
EQUATOR
EQUATOR
SOUTH AMERICA
INDIAN OCEAN
AUSTRALIA & OCEANIA
SOUTH PACIFIC OCEAN
SOUTH ATLANTIC OCEAN
SOUTHERN OCEAN
ANTARCTICA
0 1,500 3,000 Miles
0 1,500 3,000 4,500 Kilometers
Copyright © 2019 www.mapsofworld.com

Azure CDN

A content delivery network (CDN) is a distributed network of servers that can efficiently deliver web content to users.

CDNs store cached content on edge servers in point-of-presence (POP) locations that are close to end users, to minimize latency.

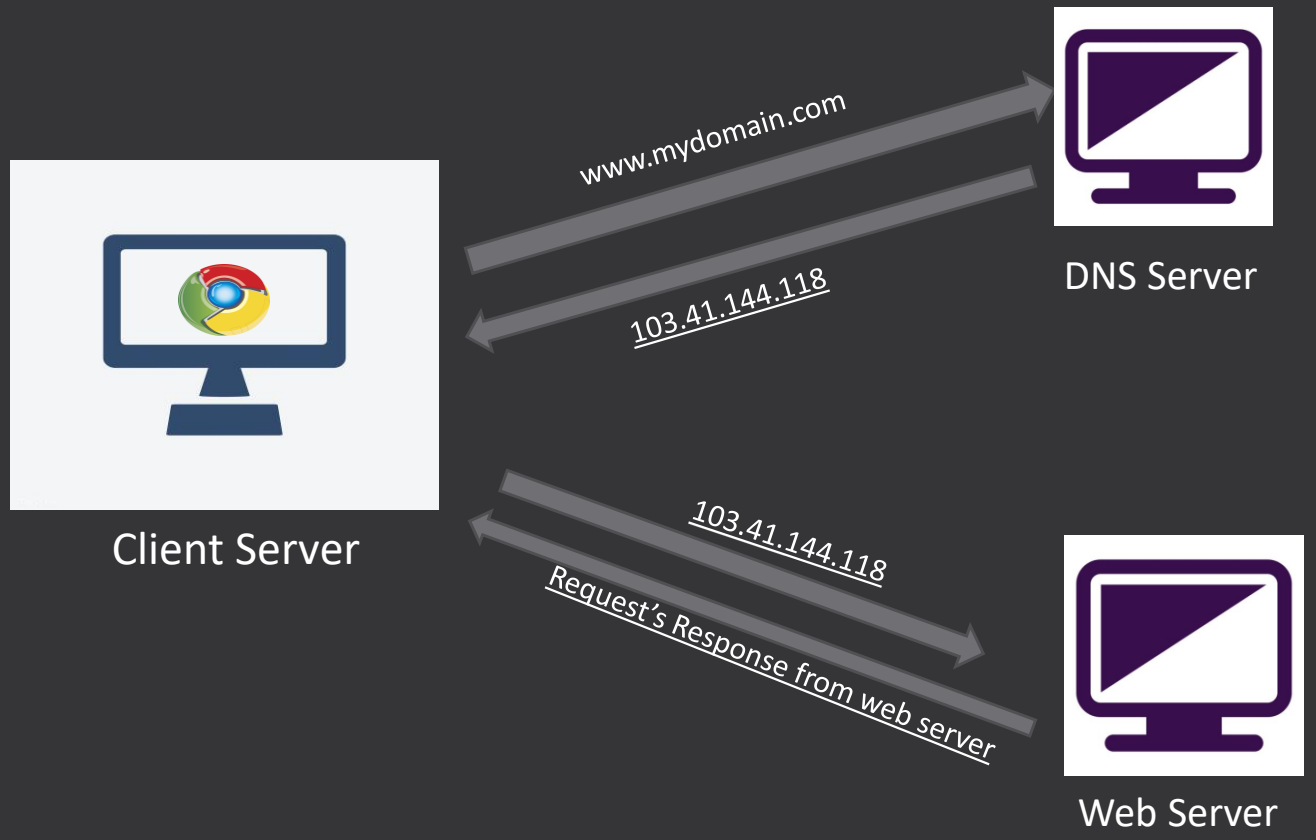


Azure DNS

Azure DNS is a hosting service for DNS domains that provides name resolution by using Microsoft Azure infrastructure.

By hosting your domains in Azure, you can manage your DNS records by using the same credentials, APIs, tools, and billing as your other Azure services.

DNS


www.mydomain.com
103.41.144.118
DNS Server
Client Server
103.41.144.118
Request's Response from web server
Web Server

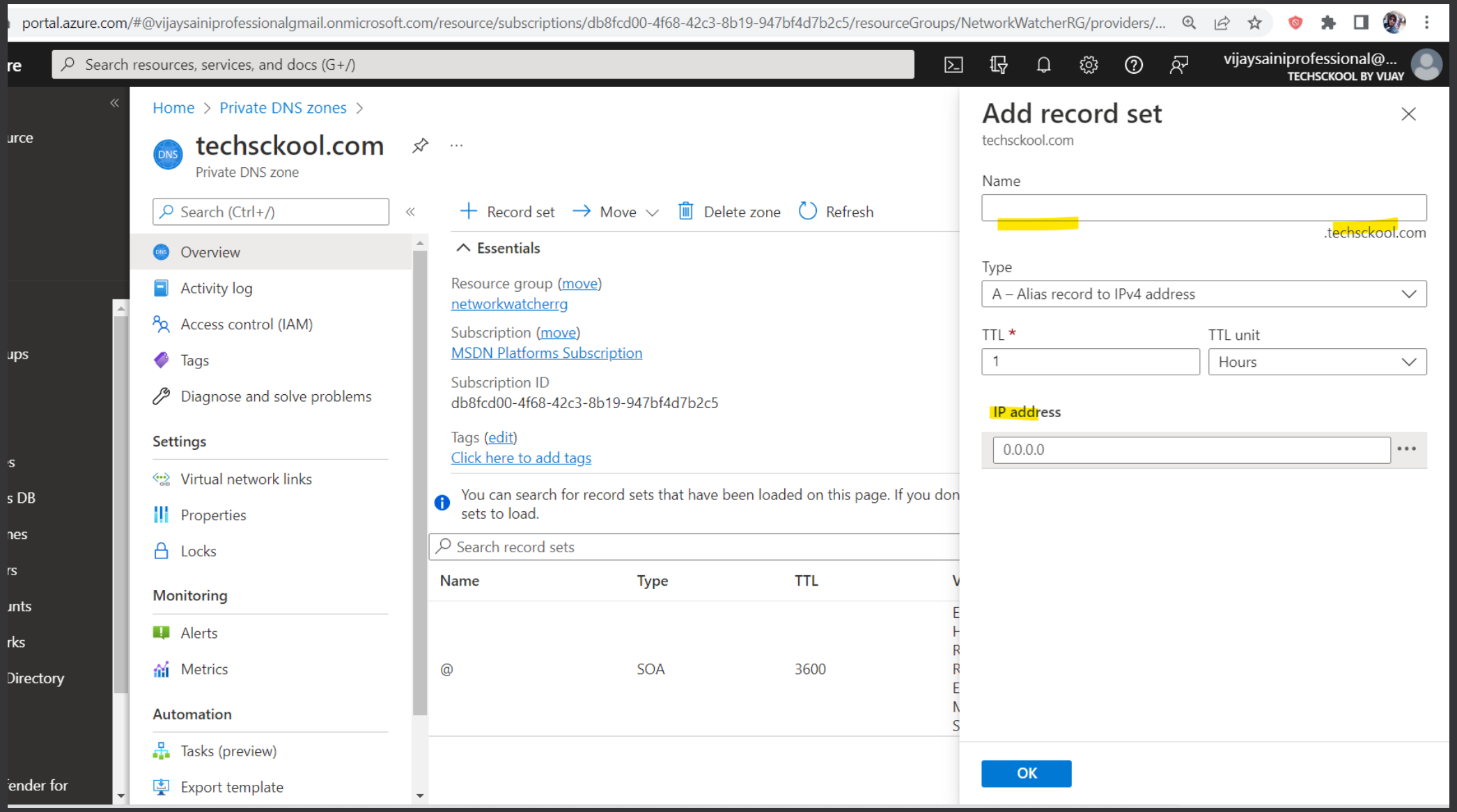
Azure Private DNS

Azure Private DNS provides a reliable and secure DNS service for your virtual network. Azure Private DNS manages and resolves domain names in the virtual network without the need to configure a custom DNS solution.

By using private DNS zones, you can use your own custom domain name instead of the Azure-provided names during deployment.

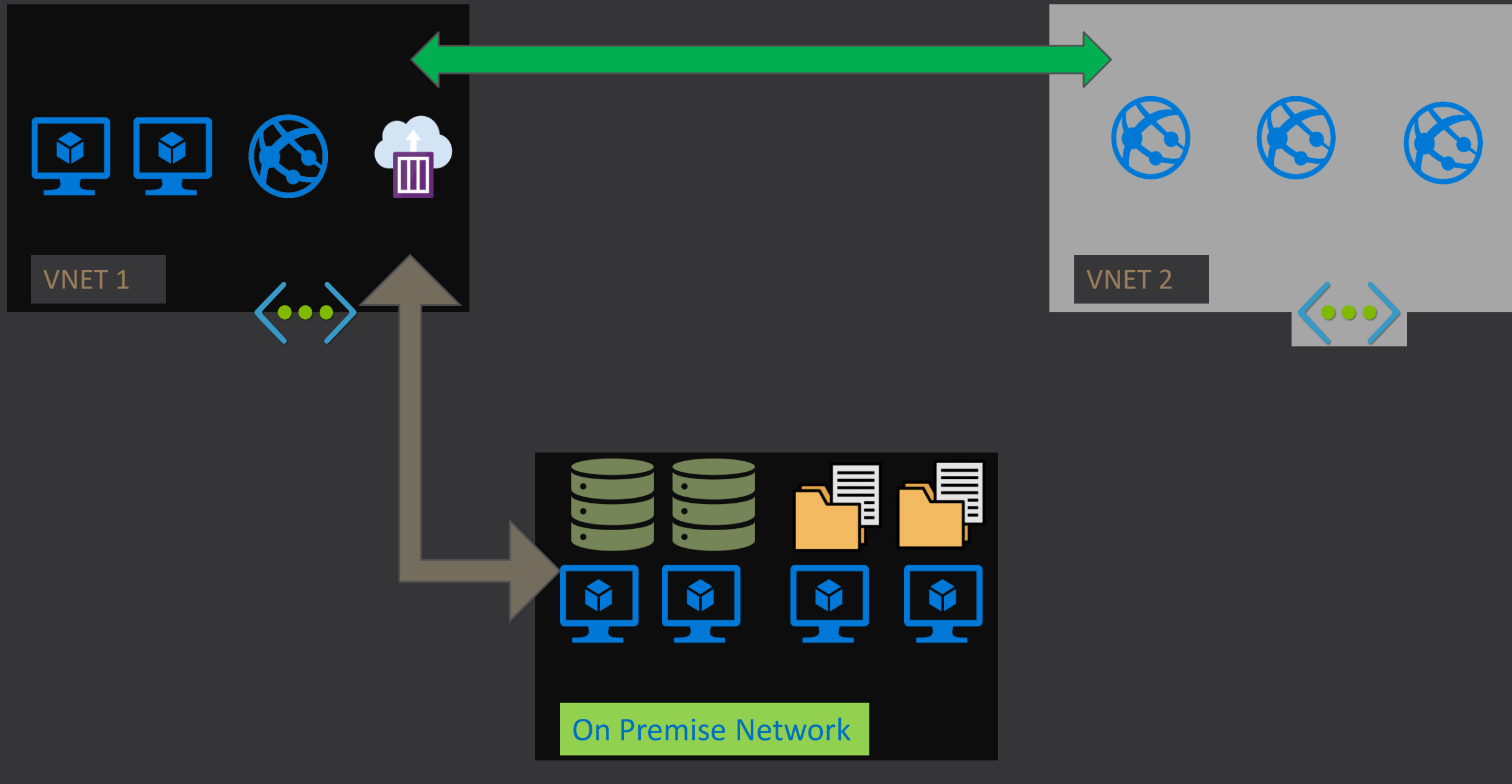
Using a custom domain name helps you tailor your virtual network architecture to best suit your organization's needs. It provides a naming resolution for virtual machines (VMs) within a virtual network and connected virtual networks.

Azure Private DNS



What is Azure Virtual Network?

Azure Virtual Network (VNet) is the fundamental building block for your private network in Azure.

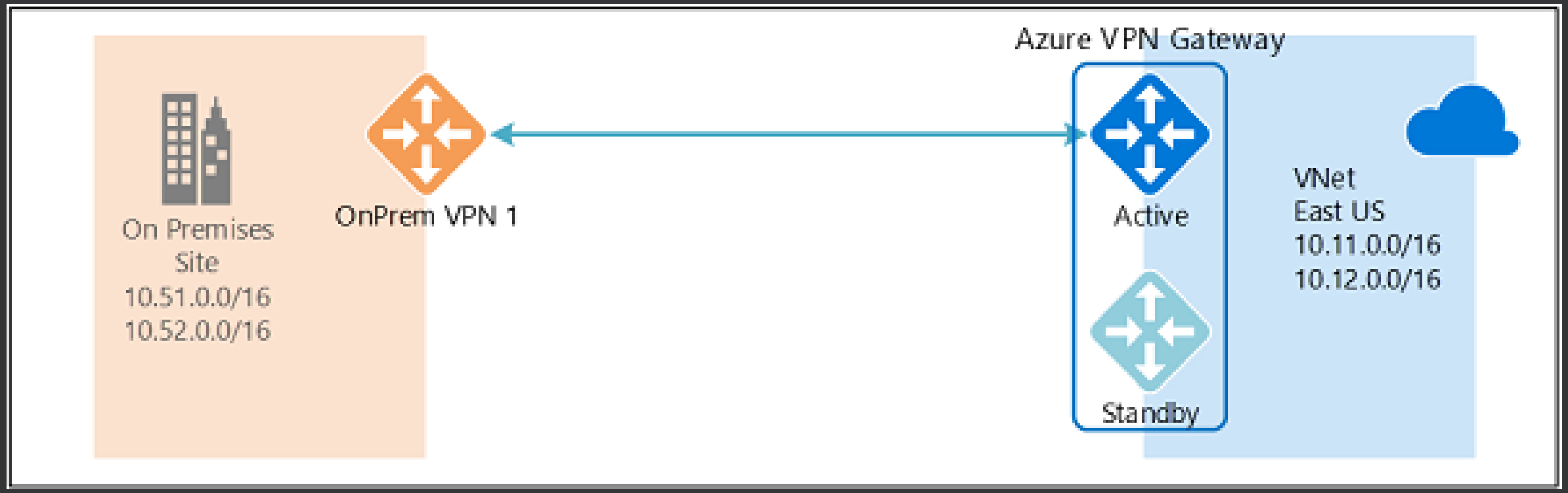

VNET 1
VNET 2
On Premise Network

Virtual Network Gateway

A virtual network gateway is composed of two or more VMs that are automatically configured and deployed to a specific subnet you create called the gateway subnet.

The gateway VMs contain routing tables and run specific gateway services. You can't directly configure the VMs that are part of the virtual network gateway, although the settings that you select when configuring your gateway impact the gateway VMs that are created.

Virtual Network Gateway

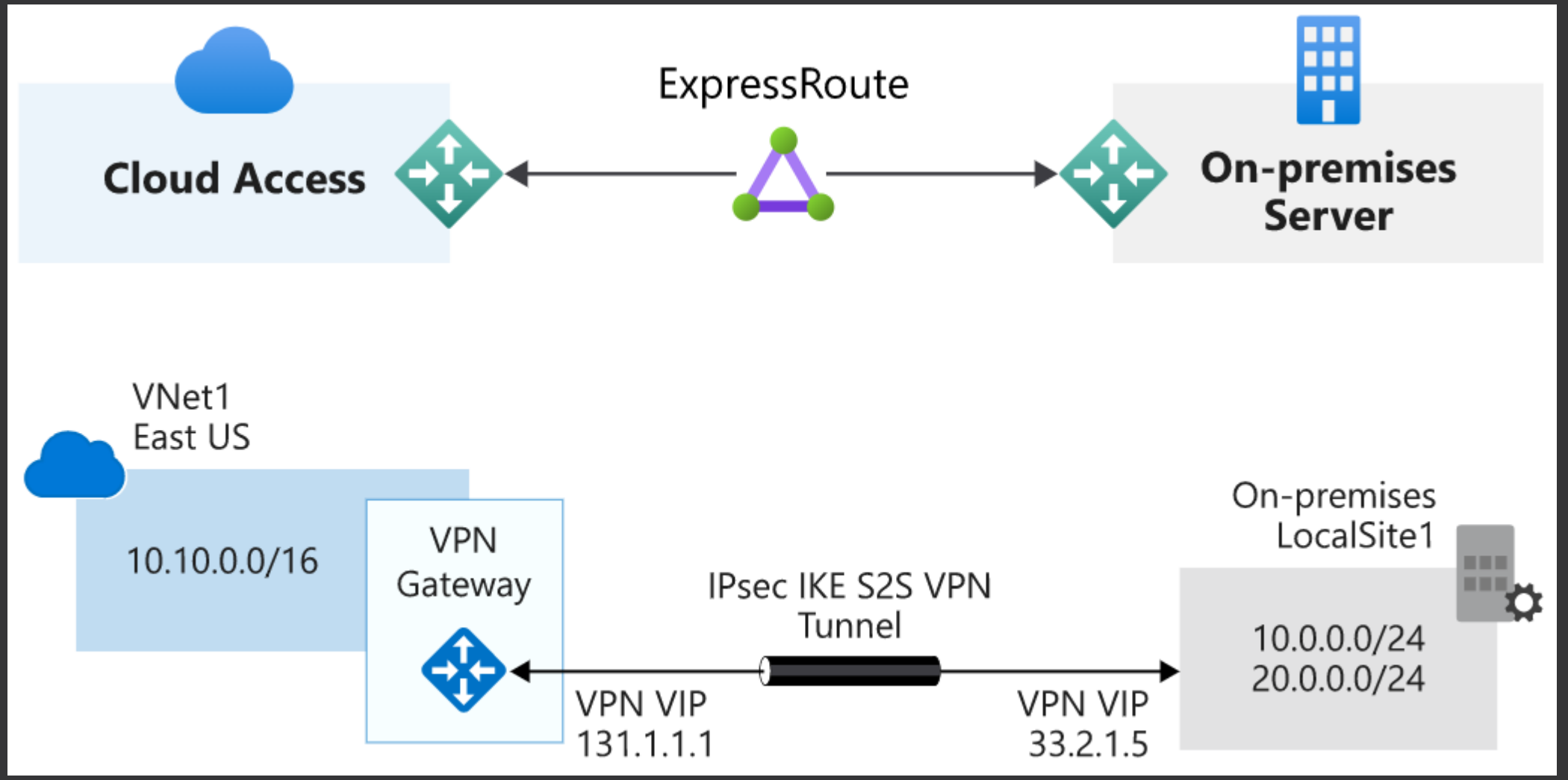


Gateway types

VPN Gateway - To send encrypted traffic across the public Internet, you use the gateway type 'Vpn'. This is also referred to as a VPN gateway. Site-to-Site, Point-to-Site, and VNet-to-VNet connections all use a VPN gateway.

ExpressRoute Gateway - To send network traffic on a private connection, you use the gateway type 'ExpressRoute'.

Virtual Network Gateway

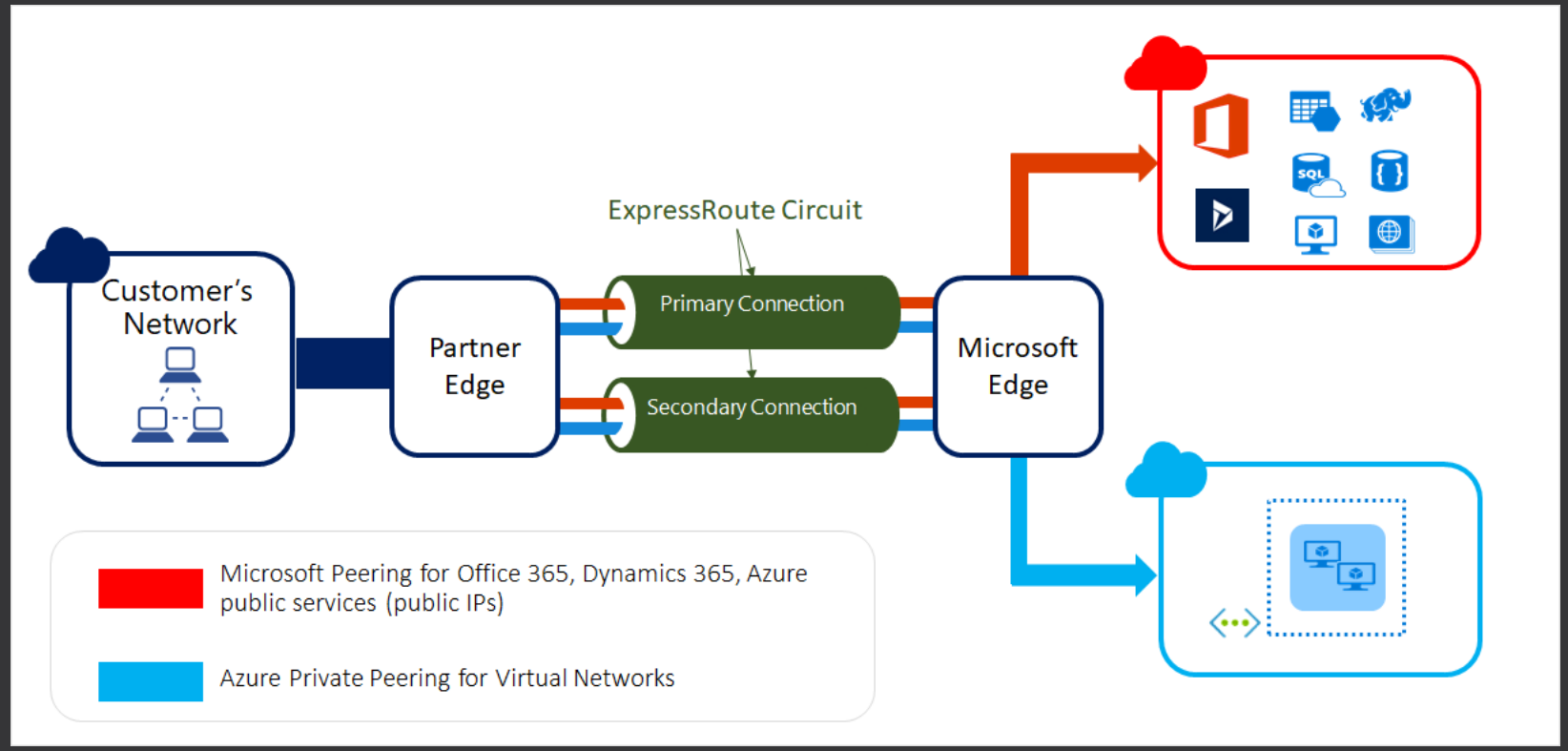


VPN Gateway

VPN Gateway sends encrypted traffic between an Azure virtual network and an on-premises location over the public Internet. You can also use VPN Gateway to send encrypted traffic between Azure virtual networks over the Microsoft network.

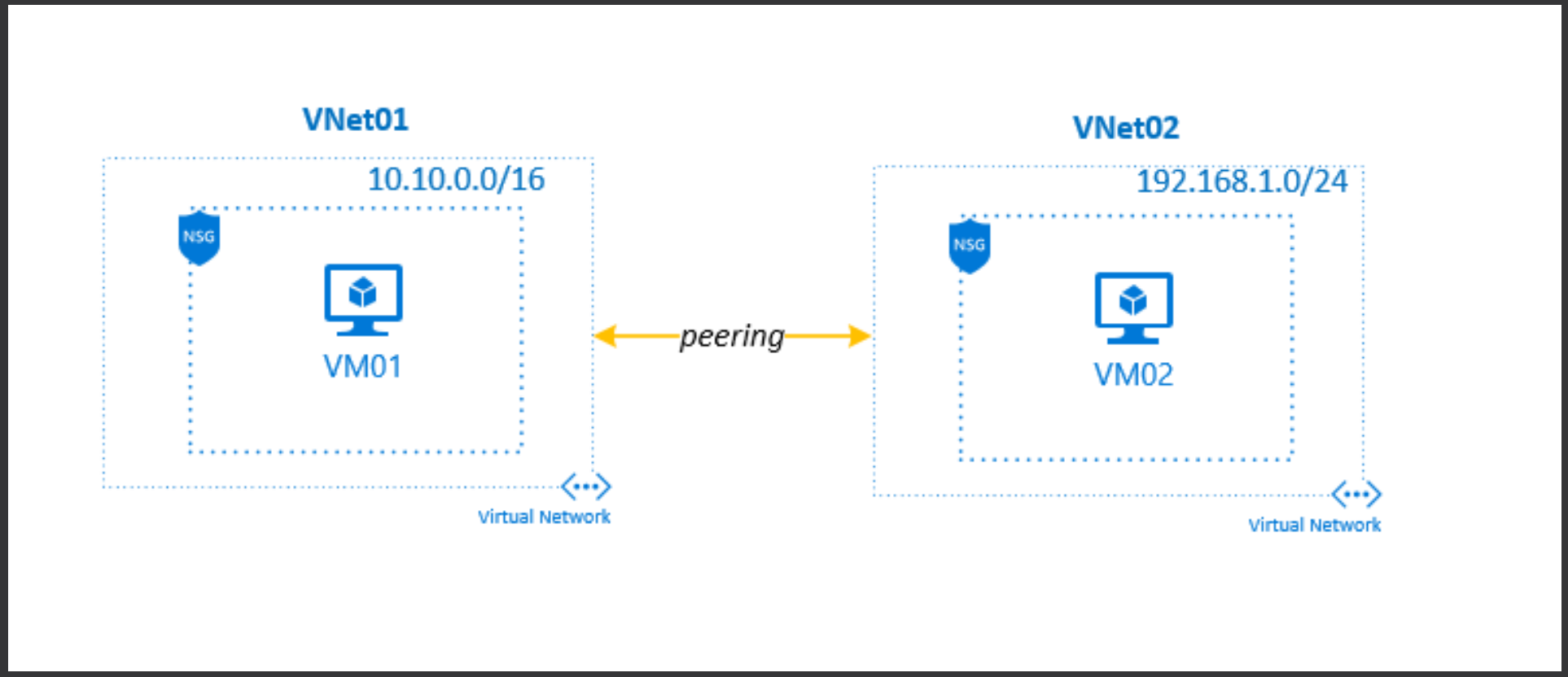
Azure ExpressRoute

ExpressRoute lets you extend your on-premises networks into the Microsoft cloud over a private connection with the help of a connectivity provider. With ExpressRoute, you can establish connections to Microsoft cloud services, such as Microsoft Azure and Microsoft 365.



Virtual Network Peering

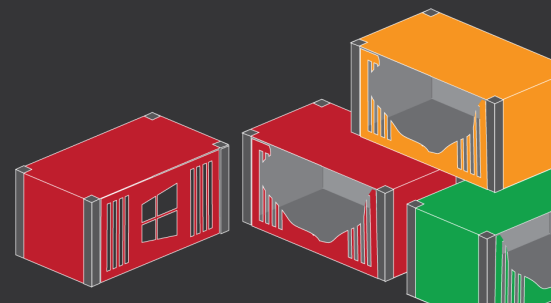
Virtual network peering enables you to seamlessly connect two or more Virtual Networks in Azure. The virtual networks appear as one for connectivity purposes. The traffic is routed through Microsoft's private network only.




Data is The New Oil

Types of data

- Structured Data
- Semi-structured Data
- Unstructured Data



Types of data

Structured Data

Structured data is data that adheres to a schema, so all of the data has the same fields or properties.

Example: A database table

Sr. Number	Emplyee Name	Monthly Salary
1	Vijay	$30,000
2	Pooja	$30,000
3	Mark	$50,000
4	James	$15,000

Types of data

Semi-structured Data

Semi-structured data doesn't fit neatly into tables, rows, and columns. Instead, semi-structured data uses *tags* or *keys* that organize and provide a hierarchy for the data.

Example: JSON file, XML file

```
student_certifications = @{
                "Student1" = @("AZ-900", "AZ-103");

                "Student2" = @("ITIL 4 Foundation", "AZ-900");

                "Student3" = @("AWS Solution Architect");

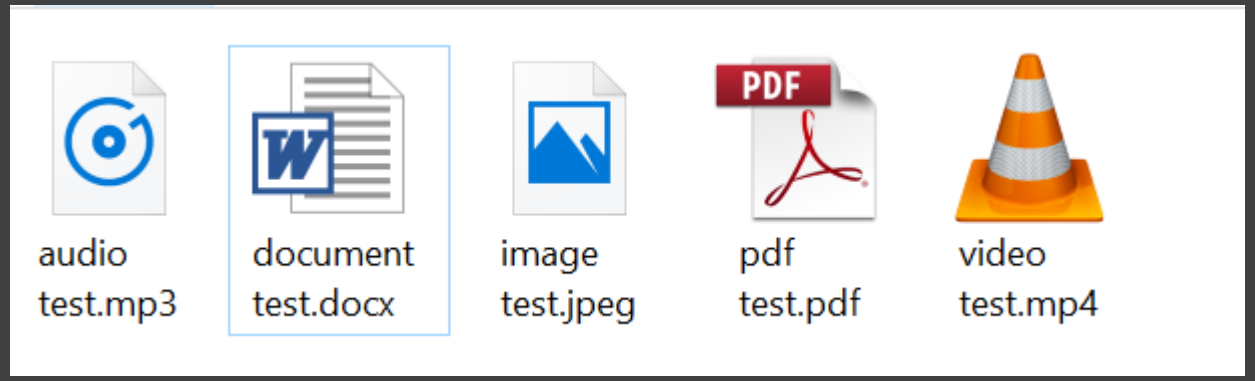
                "Student4" = @("AZ-900", "AZ-103", "AZ-200", "AZ-300")
            }
```

Types of data

Unstructured Data

Unstructured data encompasses data that has no designated structure to it. This lack of structure also means that there are no restrictions on the kinds of data it can hold.

Example: email, video file, pdf



Example

Structured data

Sr. Number	Emplyee Name	Monthly Salary
1	Vijay	$30,000
2	Pooja	$30,000
3	Mark	$50,000
4	James	$15,000

Semi-Structured data

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student_certifications = @{
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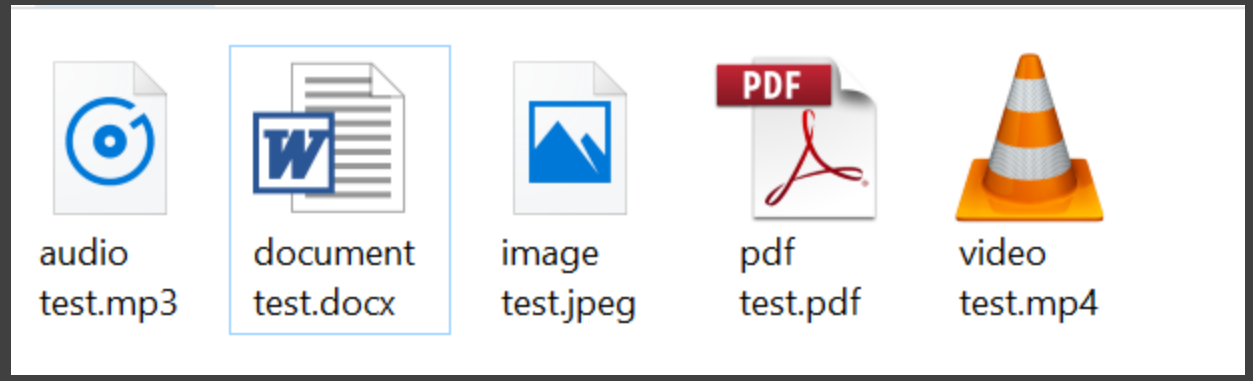
            }
```

Un-Structured data



Azure Data Services

Azure SQL Database

Azure SQL Database is a relational database as a service (DaaS) based on the latest stable version of the Microsoft SQL Server database engine.

SQL Database is a high-performance, reliable, fully managed and secure database.

Azure Database Services

Products available for Databases

- Azure SQL Database
- Azure Database for MySQL, Azure Database for PostgreSQL
- Cosmos DB
- Azure Database Migration service

Azure Data Services

Azure Cosmos DB

Azure Cosmos DB is a globally distributed database service. It supports schema-less data that lets you build highly responsive and Always On applications to support constantly changing data.

You can use it to build data-driven applications and websites in the programming language of your choice without needing to manage infrastructure.

Azure Storage Services

Azure Fundamentals

Azure Storage Services

Services for storing and managing Unstructured data:

- Blob Storage
- Disk Storage
- File Storage
- Archive Storage

Azure Storage Services

Blob Storage

- ✓ Azure Blob Storage is a service for storing large amounts of **unstructured** object data, such as text or binary data.

- ✓ No restrictions on the kinds of data it can hold

- ✓ You can use Blob Storage to expose data publicly to the world, or to store application data privately.

Azure Storage Services

File Storage

- ✓ Azure Files offers fully managed file shares in the cloud that are accessible via the industry standard Server Message Block (SMB) protocol.

- ✓ Azure file shares can be mounted concurrently by any number of cloud or on-premises VMs of Windows, Linux, and macOS at time.

- ✓ Typical usage scenarios would be to share files anywhere in the world, diagnostic data, or application data sharing.

Azure Storage Services

Disk Storage

- ✓ Disk storage provides disks for virtual machines, applications, and other services to access and use as they need
- ✓ A disk can be attached to only 1 VM at a time
- ✓ **Persistent, highly-secure, cost-effective SSD option**
- ✓ lift and shift of applications that read and write data to persistent disks

Azure Storage Services

Archive Storage

Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements

Azure Data Services

Benefits of using Azure to store data

- ✓ Automated backup and recovery
- ✓ Replication across the globe
- ✓ Support for data analytics
- ✓ Encryption capabilities
- ✓ Storage tiers

Test Your Knowledge

Q1.) Suppose you work at a startup with limited funding. Why might you prefer Azure data storage over an on-premises solution?

A.) To ensure you run on a specific brand of hardware, which will let you form a marketing partnership with that hardware vendor.

B.) The Azure pay-as-you-go billing model lets you avoid buying expensive hardware.

C.) To get exact control over the location of your data store.

Answer: B

Test Your Knowledge

Q2.) Which of the following situations would yield the most benefits from relocating an on-premises data store to Azure?

A.) Unpredictable storage demand that increases and decreases multiple times throughout the year.

B.) Long-term, steady growth in storage demand.

C.) Consistent, unchanging storage demand.

Answer: A

Test Your Knowledge

Q3.) A newly released mobile app using Azure data storage has just been mentioned by a celebrity on social media, seeing a huge spike in user volume. To meet the unexpected new user demand, what feature of pay-as-you-go storage will be most beneficial?

A.) The ability to provision and deploy new infrastructure quickly

B.) The ability to predict the service costs in advance

C.) The ability to meet compliance requirements for data storage

Answer: A

Test Your Knowledge

Q4.) You plan to map a network drive from several computers that run Windows 10 to Azure Storage. You need to create a storage solution in Azure for the planned mapped drive. What should you create?

A.) An Azure SQL database

B.) Virtual machine data disk

C.) Files service in a storage account

D.) Blobs service in a storage account

Answer C

An Azure SQL database can not be mapped to a VM. virtual machine data disk can be used by one VM only at a time. It cannot be used as a shared resource. Blobs storage can not be mapped/mounted to a VM. Hence The Files service in a storage account is the best solution for mapping a network drive from several computers.

Authentication and Authorization

Azure Fundamentals

Authentication and Authorization

Authentication.

Authentication is the process of establishing the identity of a person or service looking to access a resource. It involves the act of challenging a party for legitimate credentials, and provides the basis for c reating a security principal for identity and access control use. It establishes if they are who they say they are.

Authorization

Authorization is the process of establishing what level of access an authenticated person or servi ce has. It specifies what data they're allowed to access and what they can do with it.

Azure Active Directory

Azure Active Directory (Azure AD) is Microsoft's cloud-based identity and access management service, which helps your employees sign in and access resources in:

External resources, such as Microsoft Office 365, the Azure portal, and thousands of other SaaS applications.

Internal resources, such as apps on your corporate network and intranet, along with any cloud apps developed by your own organization.

Azure AD provides services such as:

- Authentication
- Single-Sign-On
- Application management
- Business to business (B2B) identity services
- Business-to-Customer (B2C) identity services
- Device Management

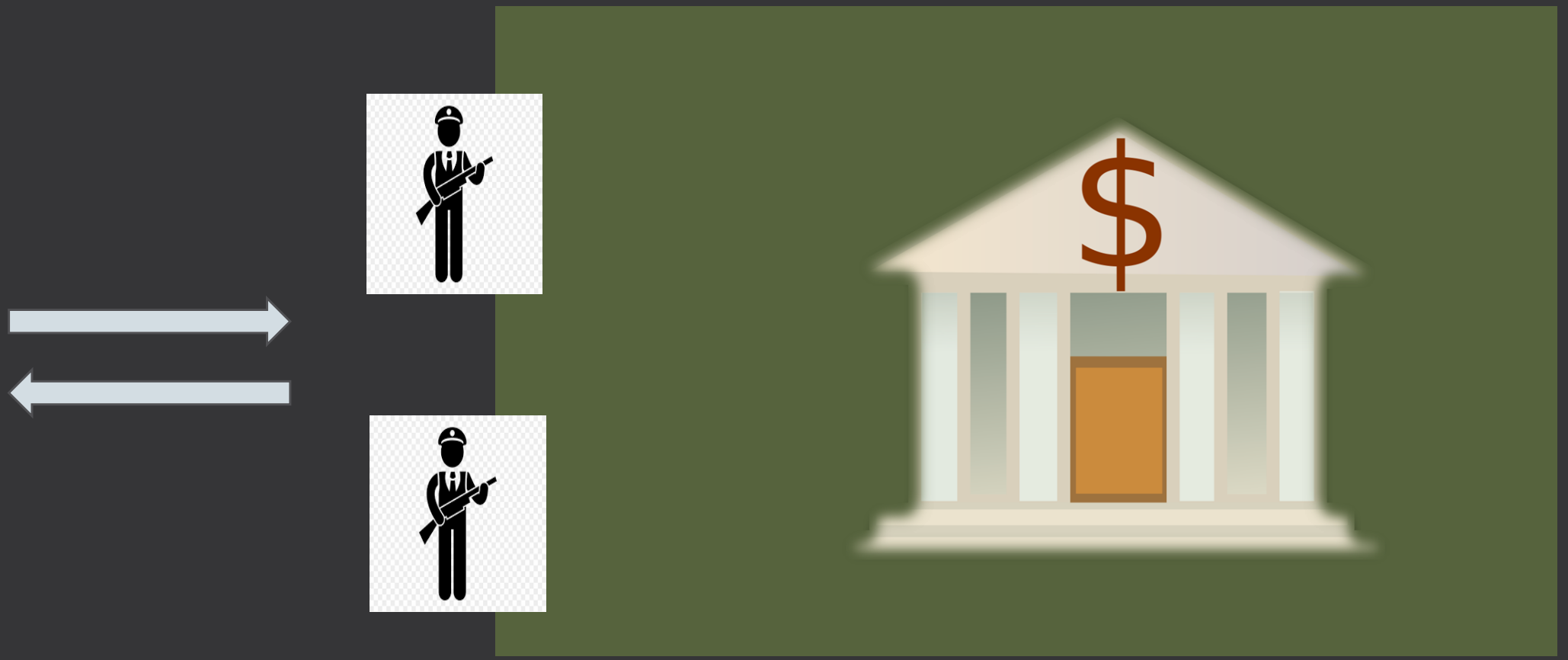
Azure Multi-Factor Authentication

Azure Multi-Factor Authentication (MFA) provides additional security for your identities by requiring two or more elements for full authentication

Zero Trust Model

Azure Fundamentals

Is it enough to have security at the entrance?



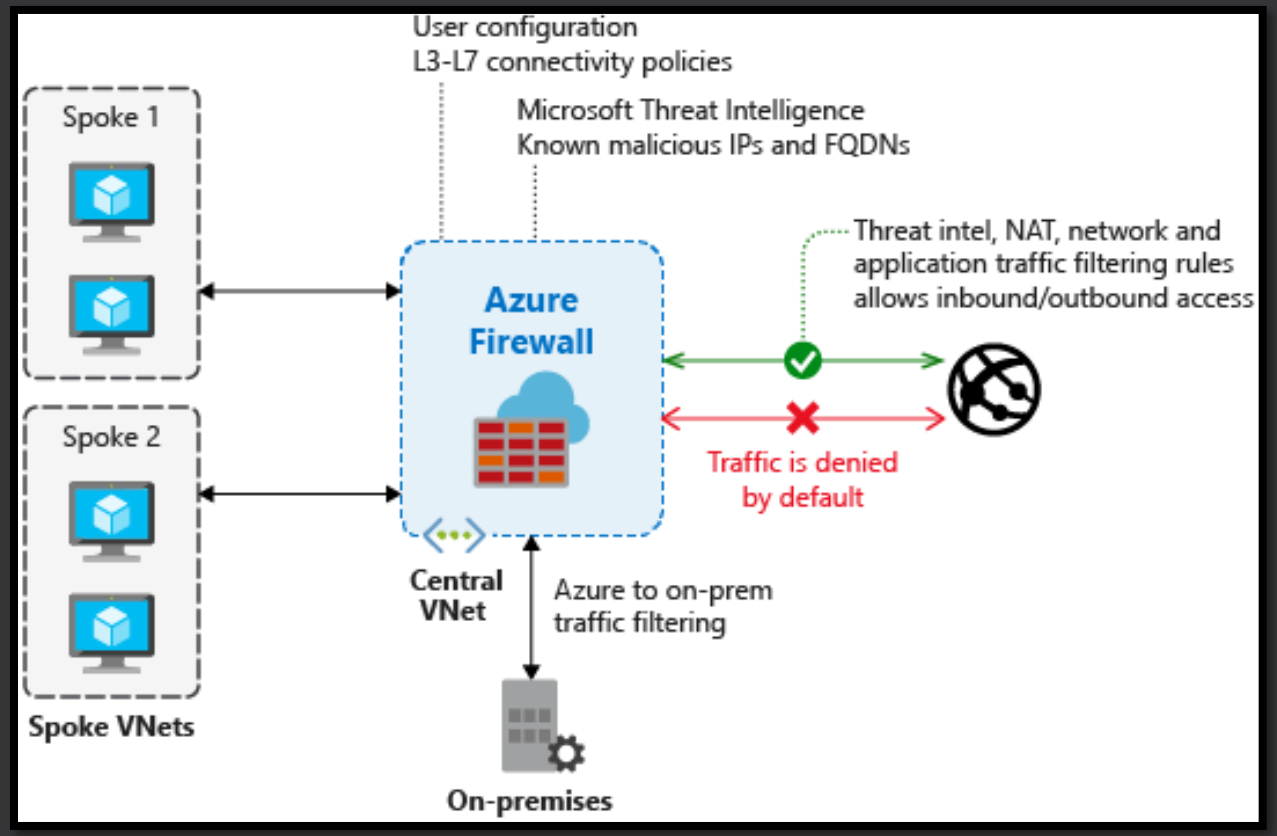
Why firewalls are insufficient?

- Firewalls can be hacked
- Vulnerabilities in Firewalls Outside the Office.
- Firewalls Don't Protect from Insider Threats

What is Firewall

A firewall is a network security device that monitors incoming and outgoing network traffic and permits or blocks data packets based on a set of security rules.

Its purpose is to establish a barrier between your internal network and incoming traffic from external sources (such as the internet) in order to block malicious traffic like viruses and hackers.



Zero Trust Model

Zero Trust is a security framework requiring all users, whether in or outside the organization's network, to be authenticated, authorized, and continuously validated for security configuration and posture before being granted or keeping access to applications and data.

Zero Trust assumes that there is no traditional network edge; networks can be local, in the cloud, or a combination or hybrid with resources anywhere as well as workers in any location.

Zero Trust is a framework for securing infrastructure and data for today's modern digital transformation. It uniquely addresses the modern challenges of today's business, including securing remote workers, hybrid cloud environments, and ransomware threats.

Zero Trust Model

The analyst firm Forrester Research introduced the Zero Trust model, which states that you should never assume trust, but instead continually validate trust.

When users, devices, and data all resided inside the organization's firewall, they were assumed to be trusted.

This assumed trust allowed for easy lateral movement after a malicious hacker compromised an endpoint device.

What are the Core Principles of the Zero Trust Model?

- ✓ **Continuous verification.** Always verify access, all the time, for all resources.
- ✓ **Limit the "blast radius."** Minimize impact if an external or insider breach occurs.
- ✓ **Automate context collection and response.** Incorporate behavioral data and get context from the entire IT stack (identity, endpoint, workload, etc..) for the most accurate

Benefits of zero trust

- ✓ Reduce business and organizational risk
- ✓ Gain access control over cloud and container environments
- ✓ Reduce the risk of a data breach
- ✓ Supports compliance initiatives

https://www.zscaler.com/resources/security-terms-glossary/what-is-zero-trust

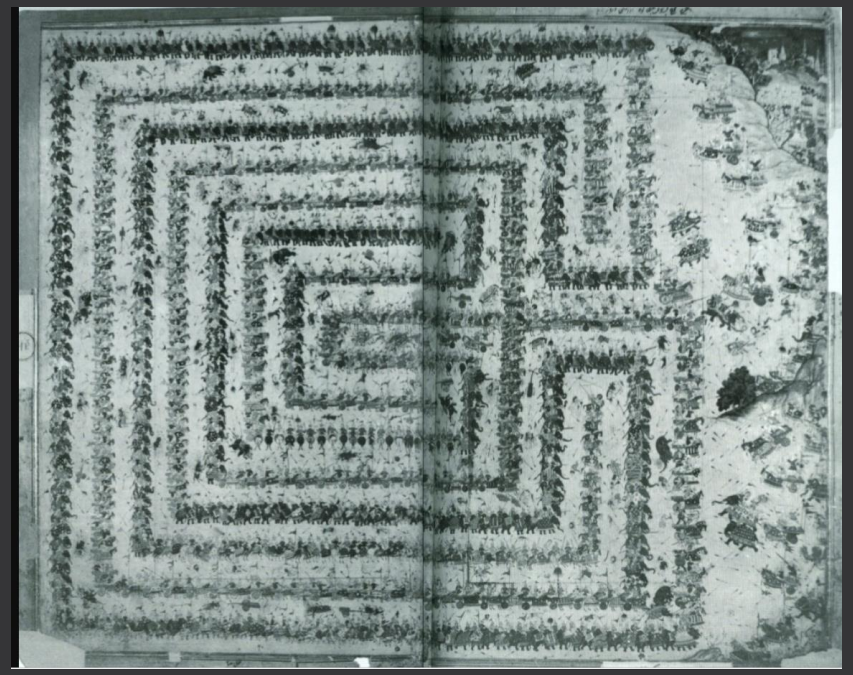
Defense in Depth Model

Azure Fundamentals

Padmavyuha (Chakravyuha)

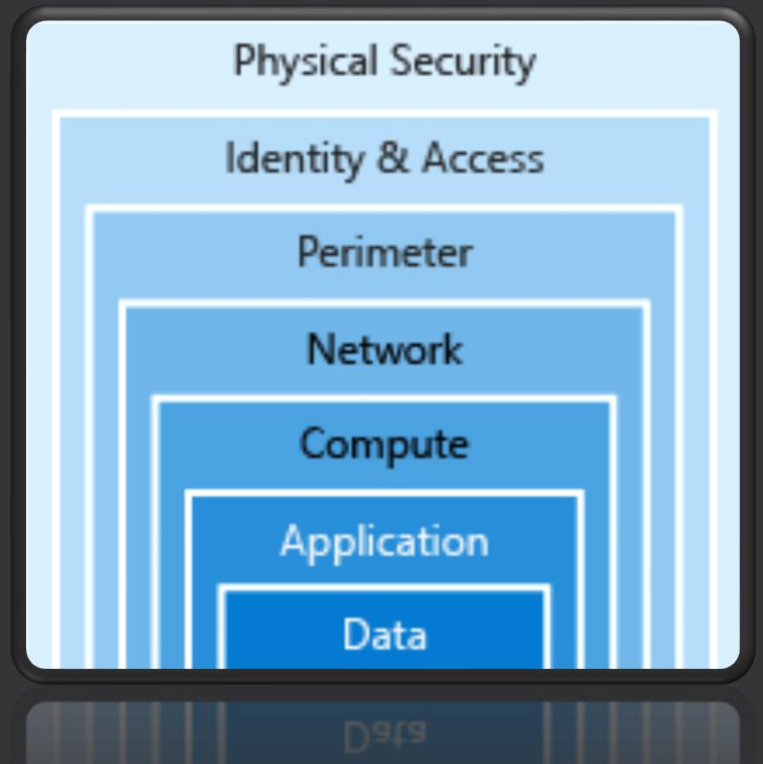
A military formation used to surround enemies, depicted in the Hindu epic Mahabharata. It resembles a labyrinth of multiple defensive walls.

https://en.wikipedia.org/wiki/Padmavyuha#:~:text=The%20Chakravy%C5%ABha%20or%20Padmavy%C5%ABha%20was,used%20it%20on%20the%20battlefield.



Defense in Depth

Defense in depth is a layered system that provides protection from unauthorized access. If one layer is breached, another layer prevents further exposure.



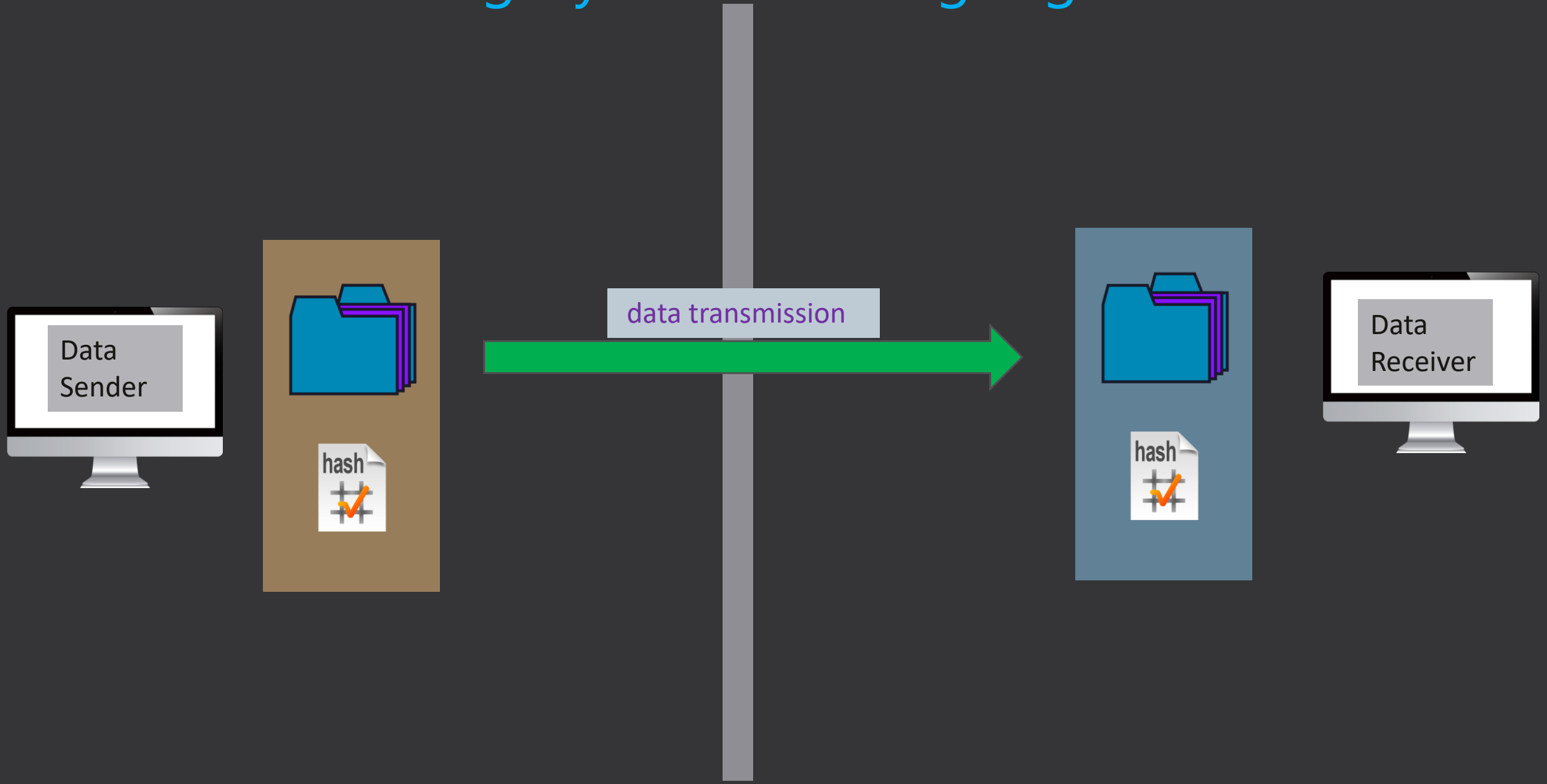
Defense in Depth: Common Principles

Confidentiality: The principle of least privilege restricts access to information only to individuals explicitly granted access.

Integrity: The goal is to prevent unauthorized changes to information at rest or in transit.

Availability: Ensure that services are available to authorized users.

Ensure Data Integrity with Hashing Algorithm

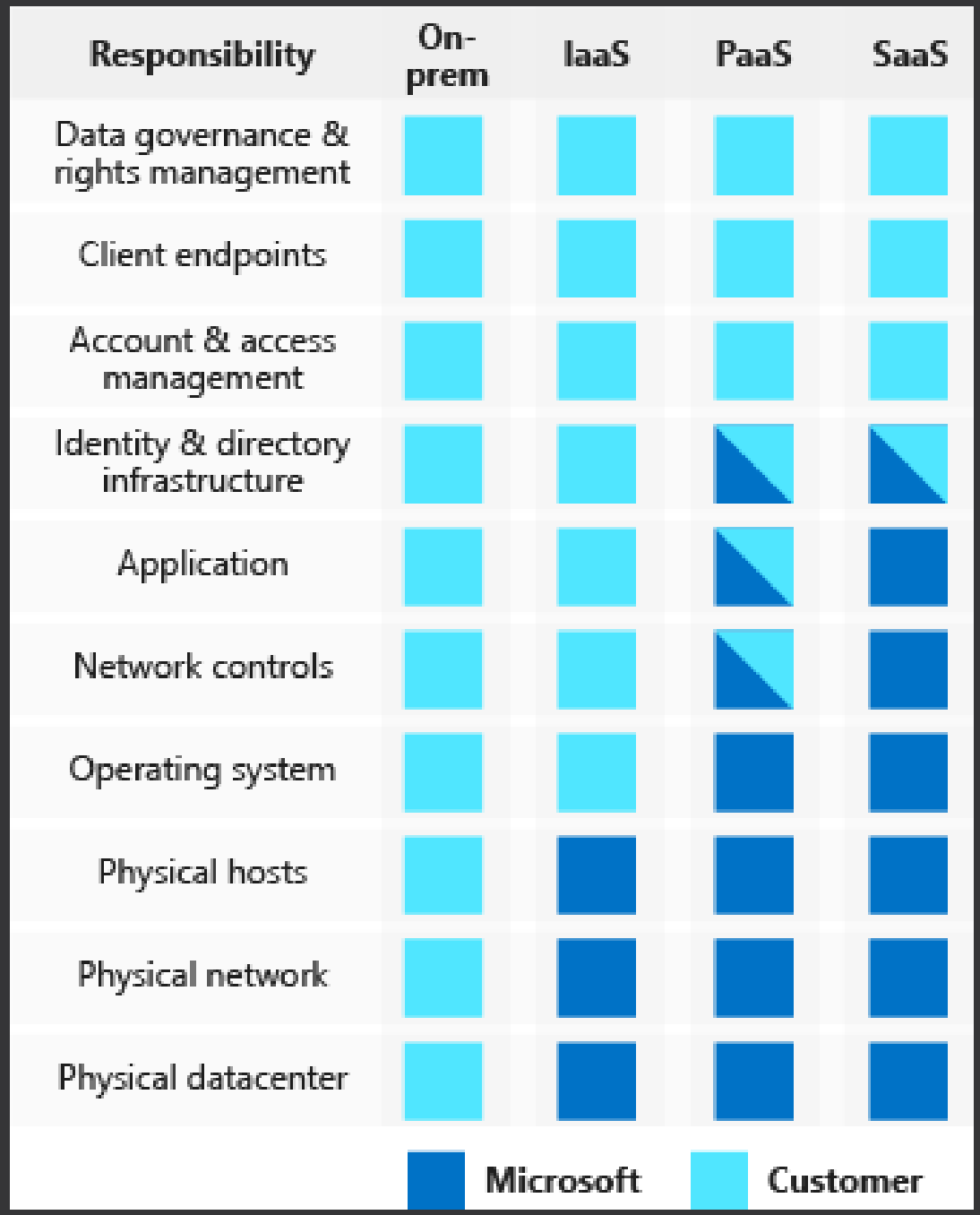


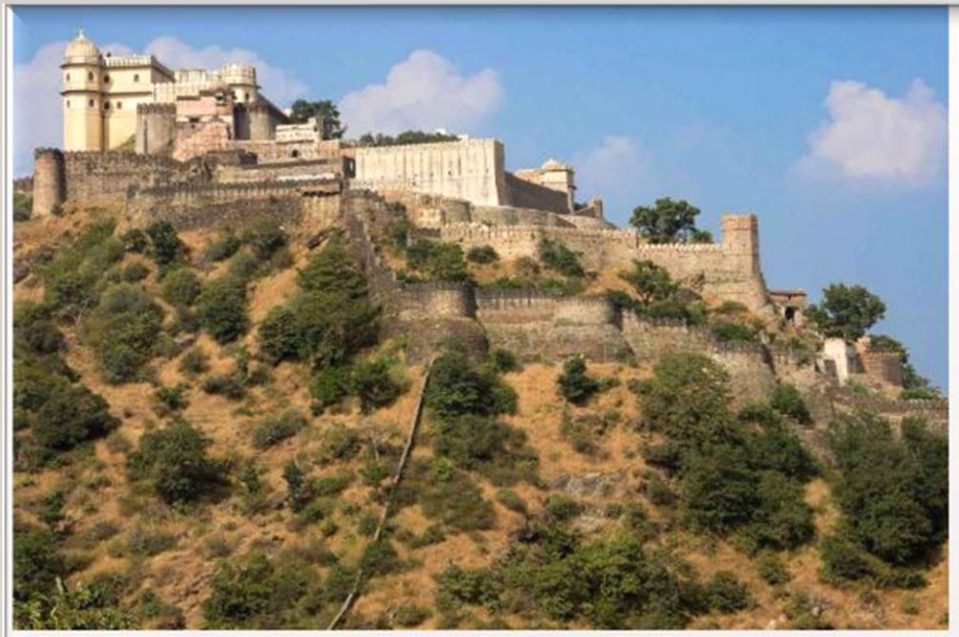
Defense in Depth Model: Security Layers

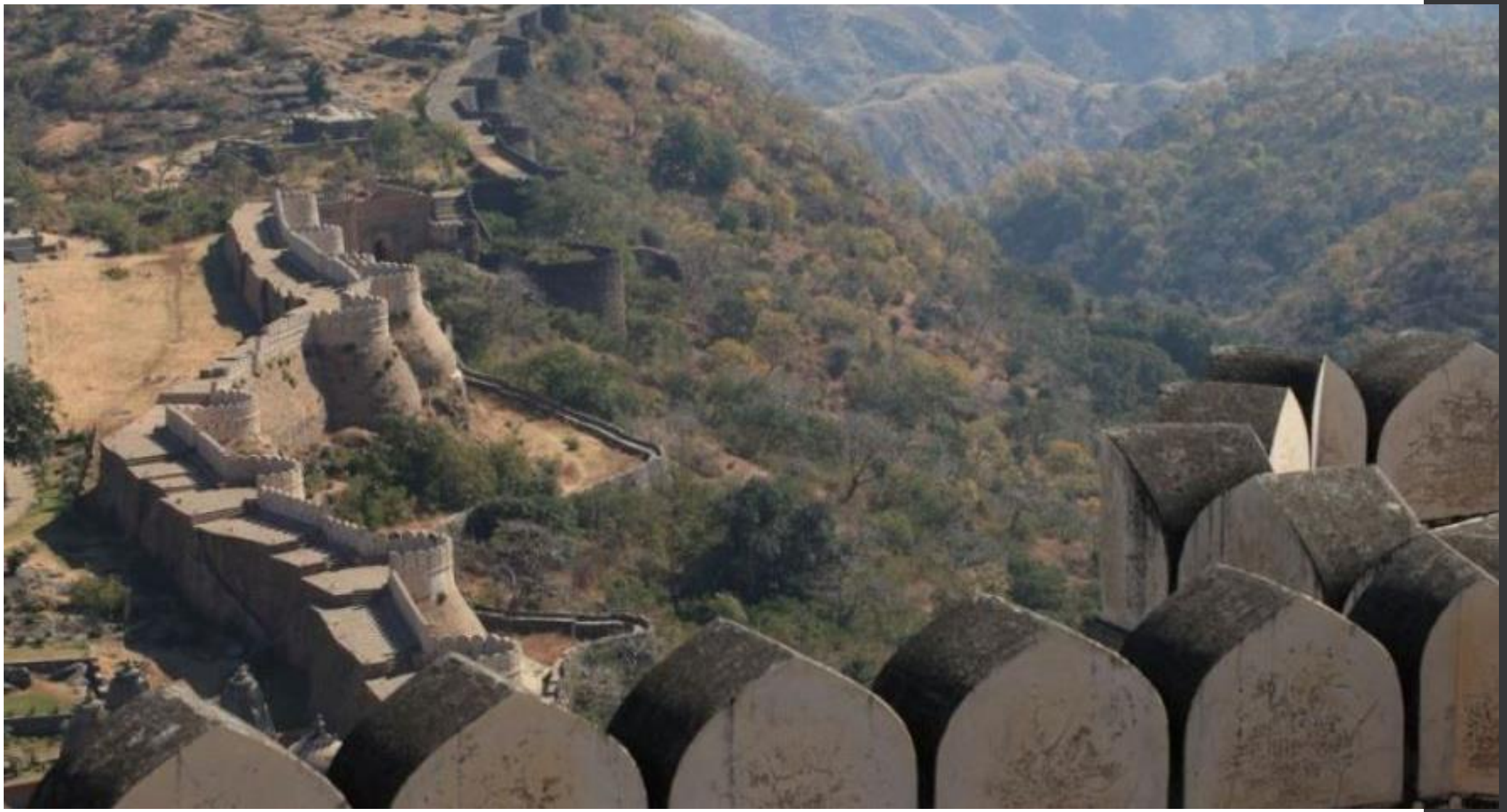
#	Ring	Example	Principle
1	Data	Data encryption at rest in Azure Blob Storage	Integrity
2	Application	SSL/TLS encrypted sessions	Integrity
3	Compute	Regular application of OS and layered software patches	Availability
4	Network	Network security rules	Confidentiality
5	Perimeter	DDoS protection	Availability
6	Identity & access	Azure Active Directory user authentication	Integrity
7	Physical security	Azure datacenter biometric access controls	Confidentiality

Shared Responsibilities

- ✓ As computing environments move from customer-controlled datacenters to cloud datacenters, the responsibility of security also shifts.
- ✓ Security is now a concern that both cloud providers and customers share.







Kumbhalgarh Fort, Rajasthan, India

Built during the course of the 15th century by Rana Kumbha.

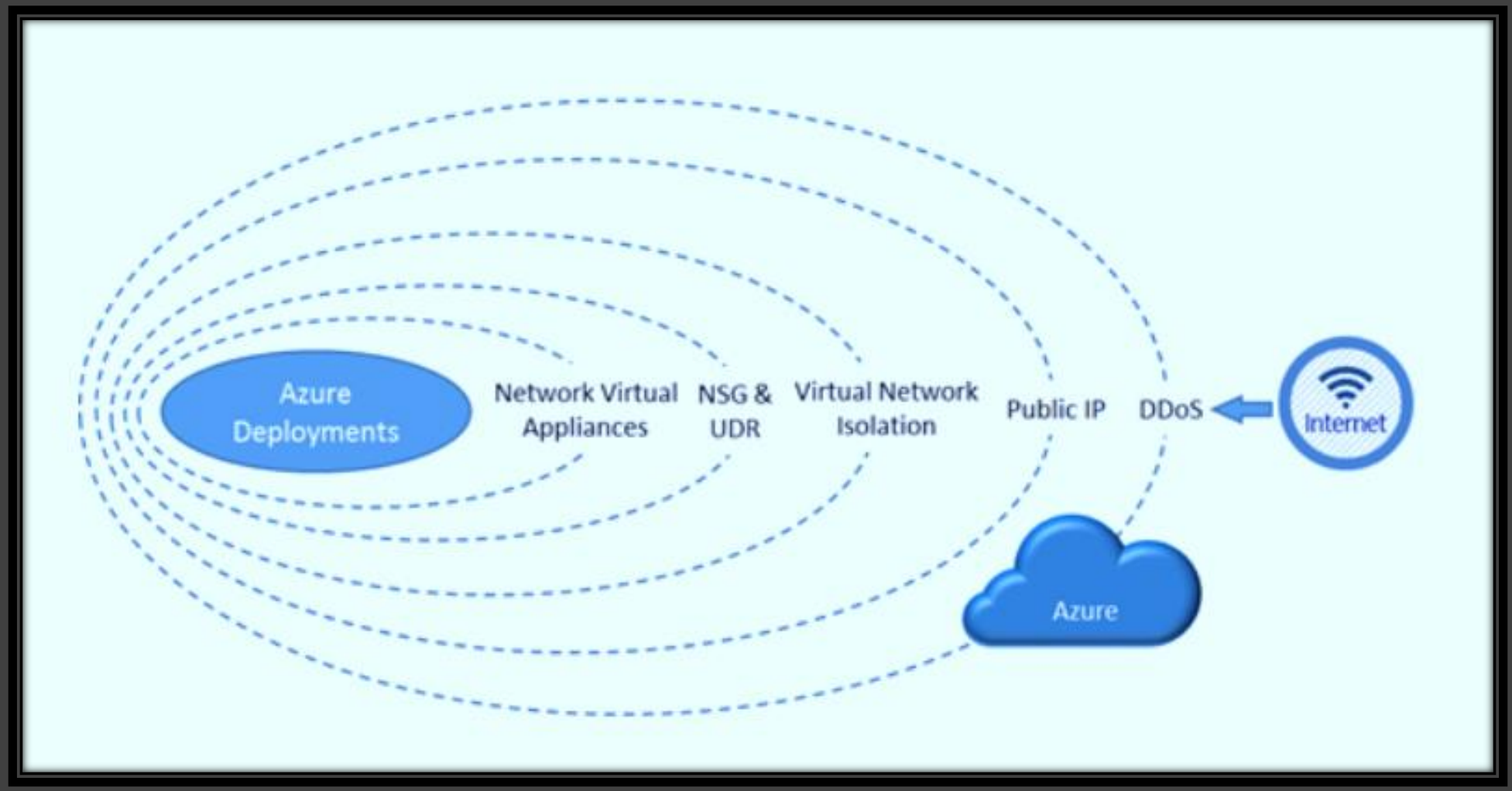
The wall that surrounds the ancient fort of Kumbhalgarh is one of the best-kept secrets in India, and perhaps the world. Protecting a massive fort that contains over 300 ancient temples, the wall was constructed half a millennium ago in tandem with Kumbhalgarh Fort itself.

Information & Picture Credit:

https://funalive.com/articles/the-great-wall-of-india-kumbhalgarh-fort_ExL.html

Securing Network Connectivity

A layered approach to securing Azure



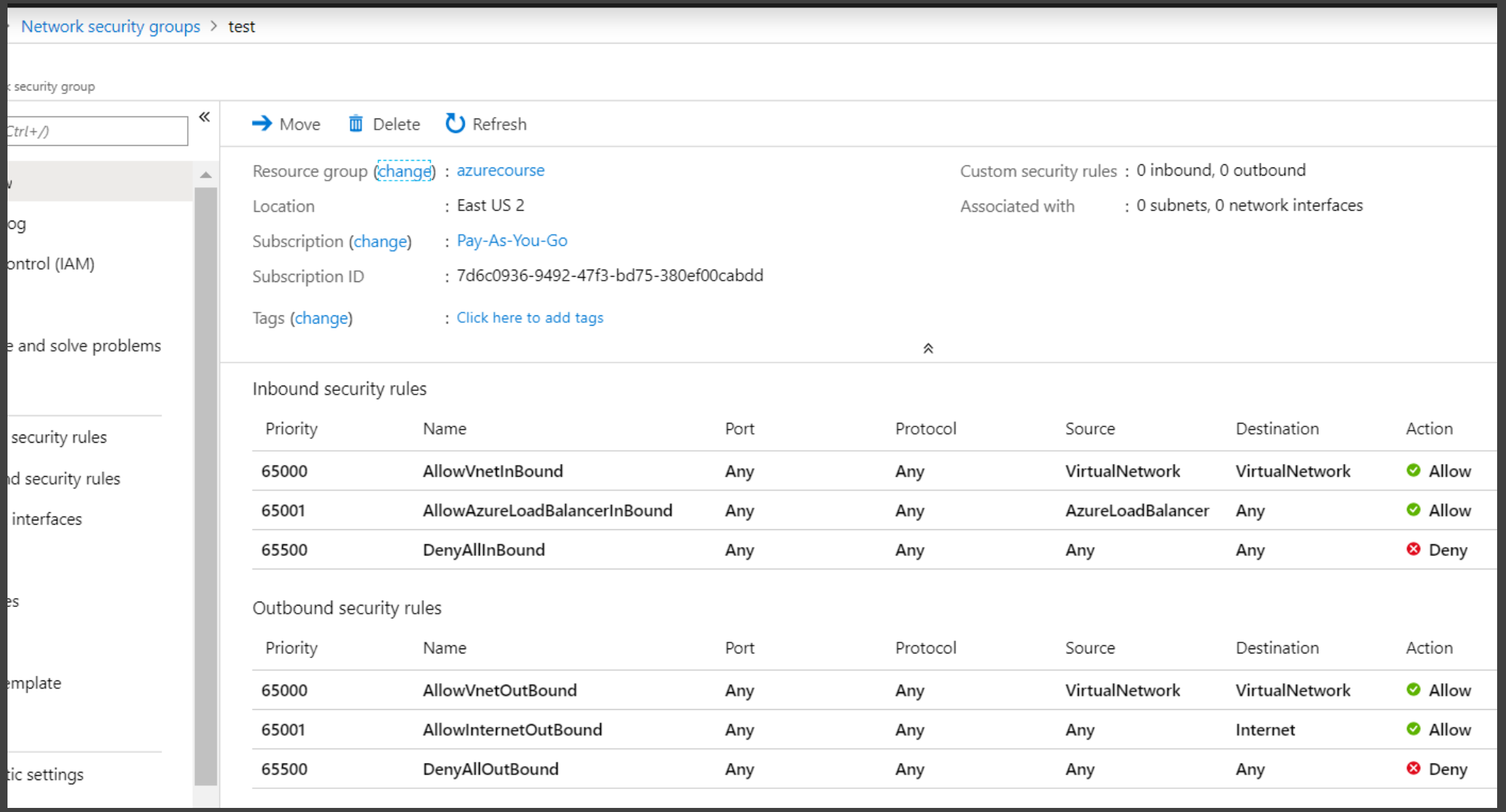
https://azure.microsoft.com/en-au/blog/azure-ddos-protection-service-preview/

Azure Network Security Groups (NSG)

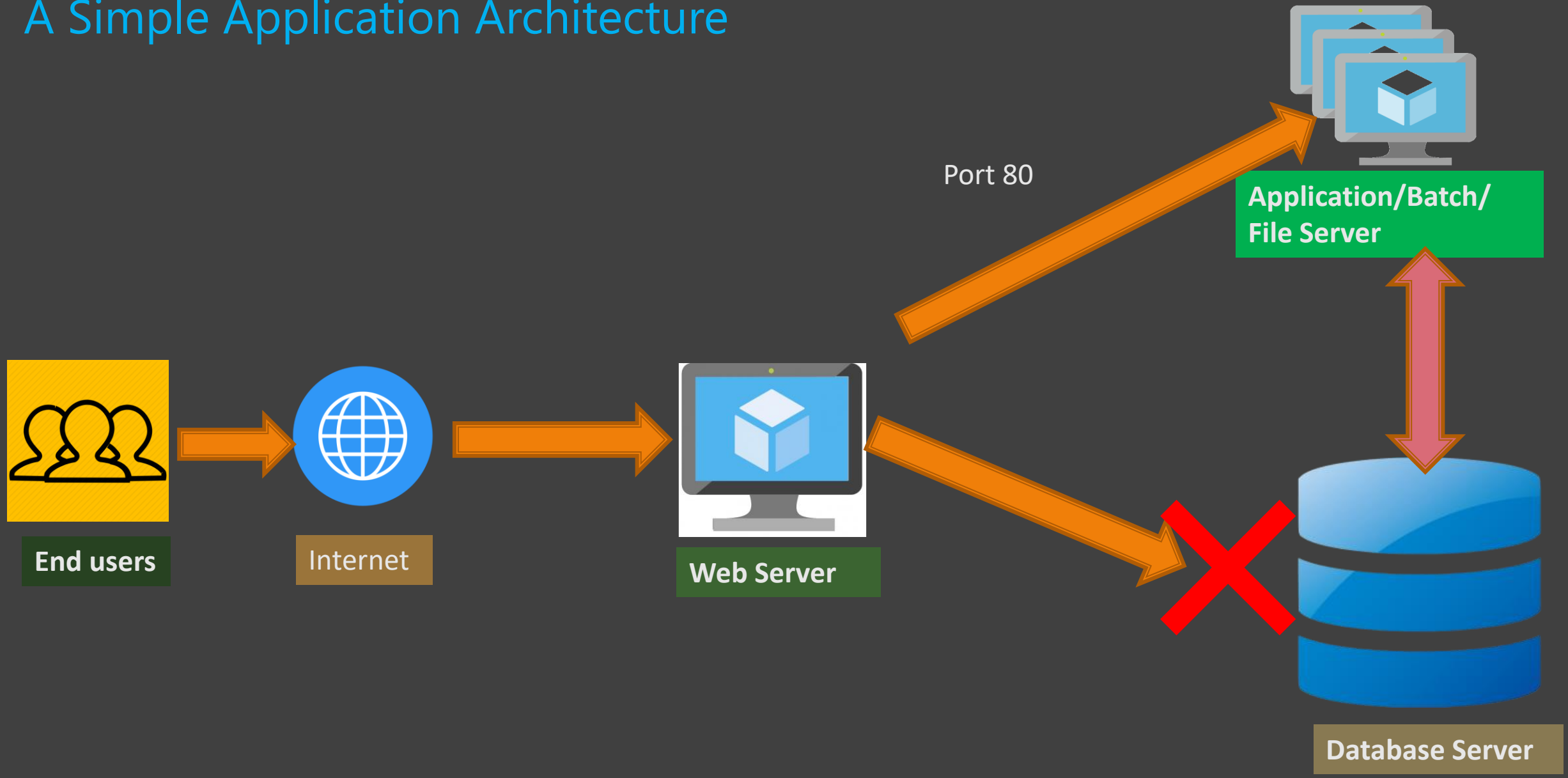
NSG contains a list of security rules that allow or deny network traffic to resources connected to Azure Virtual Networks (VNet).

NSGs can be associated to subnets, individual VMs (classic), or individual network interfaces (NIC) attached to VMs

NSG


Network security groups > test
security group
Ctrl+/)
Move
Delete
Refresh
Resource group (change) : azurecourse
Location : East US 2
Subscription (change) : Pay-As-You-Go
Subscription ID : 7d6c0936-9492-47f3-bd75-380ef00cabdd
Tags (change) : Click here to add tags
Custom security rules : 0 inbound, 0 outbound
Associated with : 0 subnets, 0 network interfaces
Inbound security rules
Priority Name Port Protocol Source Destination Action
65000 AllowVnetInBound Any Any VirtualNetwork VirtualNetwork Allow
65001 AllowAzureLoadBalancerInBound Any Any AzureLoadBalancer Any Allow
65500 DenyAllInBound Any Any Any Any Deny
Outbound security rules
Priority Name Port Protocol Source Destination Action
65000 AllowVnetOutBound Any Any VirtualNetwork VirtualNetwork Allow
65001 AllowInternetOutBound Any Any Any Internet Allow
65500 DenyAllOutBound Any Any Any Any Deny

A Simple Application Architecture

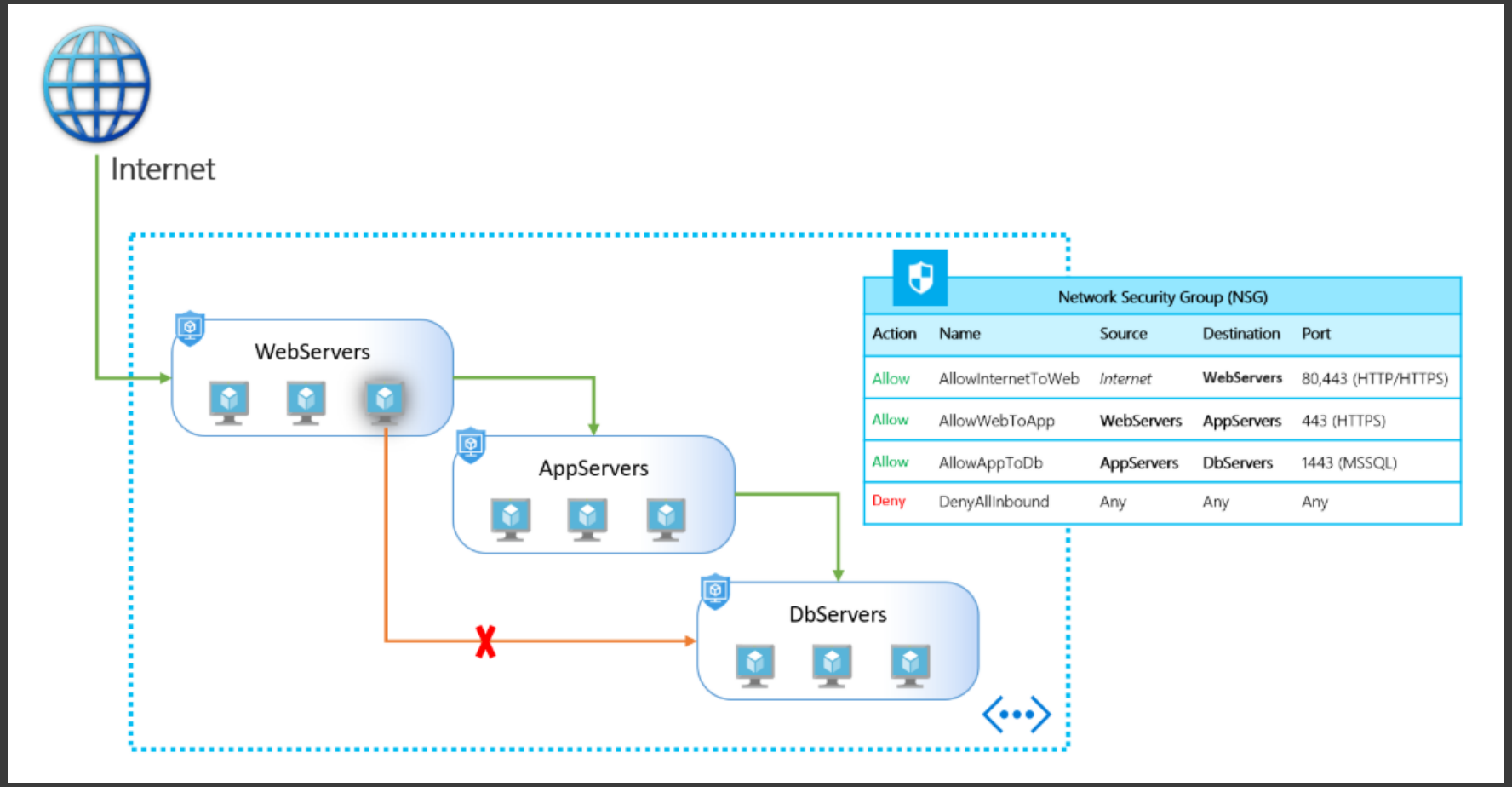


Azure Application Security Groups(ASG)

ASGs enable you to define fine-grained network security policies based on workloads, centralized on applications, instead of explicit IP addresses.

Provides the capability to group VMs and secure applications by filtering traffic from trusted segments of your network.

ASG


Internet
WebServers
AppServers
DbServers
Network Security Group (NSG)
Action Name Source Destination Port
Allow AllowInternetToWeb Internet WebServers 80,443 (HTTP/HTTPS)
Allow AllowWebToApp WebServers AppServers 443 (HTTPS)
Allow AllowAppToDb AppServers DbServers 1443 (MSSQL)
Deny DenyAllInbound Any Any Any

What factors affect cost?

Azure Fundamentals

What factors affect cost?

- Resource type
- Usage meters
- Resource usage
- Azure subscription types
- Azure Marketplace
- Location
- Billing Zone

Azure Cost Management + Billing features

Azure Fundamentals

Azure Cost Management + Billing features include

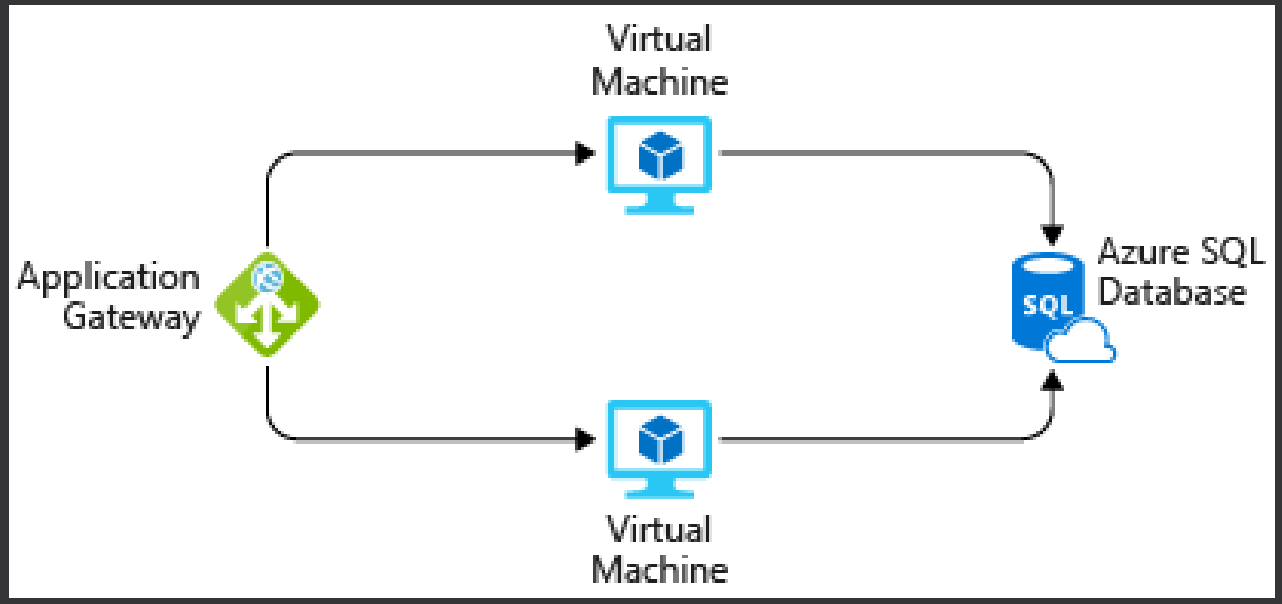
- Reporting: Use historical data to generate reports and forecast future usage and expenditure.
- Data enrichment : Improve accountability by categorizing resources with tags that correspond to real-world business and organizational units.
- Budgets: Create and manage cost and usage budgets by monitoring resource demand trends, consumption rates, and cost patterns.
- Alerting : Get alerts based on your cost and usage budgets.
- Recommendations : Receive recommendations to eliminate idle resources and to optimize the Azure resources you provision.

Azure Pricing Calculator

Azure Fundamentals

Calculate the cost of running below infra in Azure

- ✓ Use 2 Azure Windows Virtual Machines instances Windows (size: NV48s v3)
- ✓ Use Azure Application Gateway for load balancing
- ✓ Use Azure SQL Database to hold inventory and pricing information
- ✓ Region: East US
- ✓ Support: Standard



Demo Application Architecture

Pricing Calculator

The Pricing calculator displays Azure products in categories. You add these categories to your estimate and configure according to your specific requirements.

You then receive a consolidated estimated price, with a detailed breakdown of the costs associated with each resource you added to your solution. You can export or share that estimate or save it for later.

You can load a saved estimate and modify it to match updated requirements.

TCO Calculator

Azure Fundamentals

TCO Calculator

The TCO Calculator helps you estimate the cost savings of operating your solution on Azure over time, instead of in your on-premises datacenter.

With the TCO Calculator, you enter the details of your on-premises workloads. Then you review the suggested industry average cost (which you can adjust) for related operational costs.

These costs include electricity, network maintenance, and IT labor. You're then presented with a side-by-side report. Using the report, you can compare those costs with the same workloads running on Azure.

How does the TCO Calculator work?

Working with the TCO Calculator involves three steps:

- ✓ Define your workloads.
- ✓ Adjust assumptions.
- ✓ View the report.

Azure Tags

Azure Fundamentals

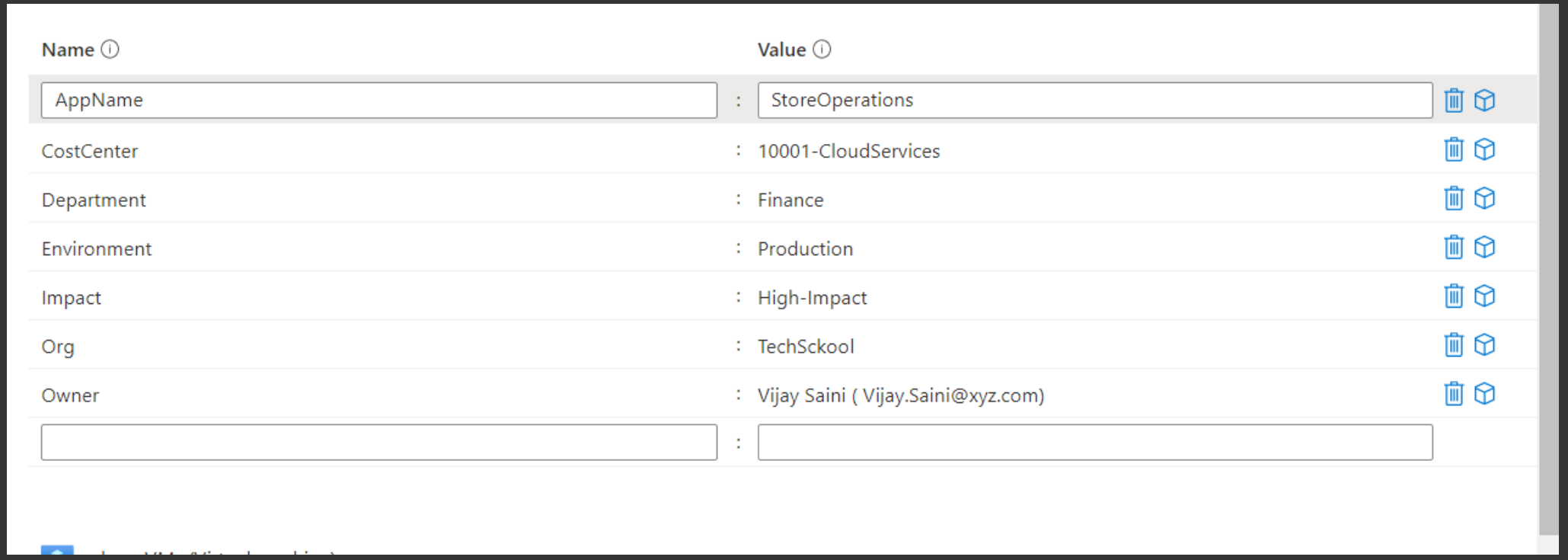
Tags

We apply tags to our Azure resources, resource groups, and subscriptions to logically organize them into a taxonomy.

Tags help you manage costs associated with the different groups of Azure products and resources. You can apply tags to groups of Azure resources to organize billing data.

Tags make it easier to identify groups that generate the biggest Azure costs, which can help you adjust your spending accordingly.

An example tagging structure



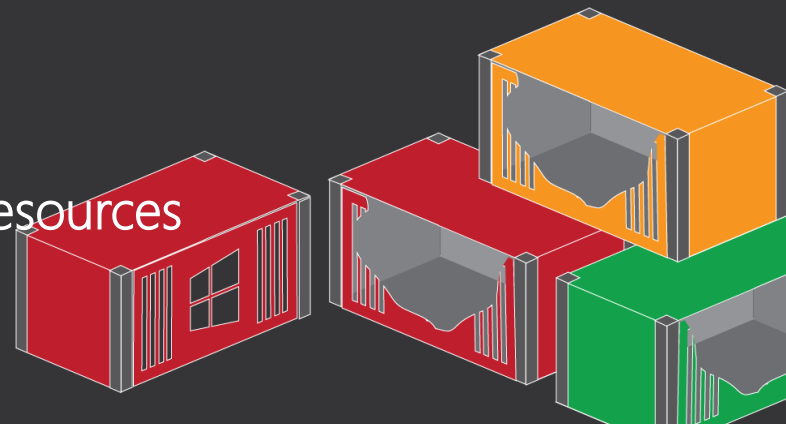
Name	Value
AppName	StoreOperations
CostCenter	10001-CloudServices
Department	Finance
Environment	Production
Impact	High-Impact
Org	TechSckool
Owner	Vijay Saini (Vijay.Saini@xyz.com)

IT Governance

Good IT governance involves planning your initiatives and setting priorities on a strategic level to help manage and prevent issues.

You need good governance when:

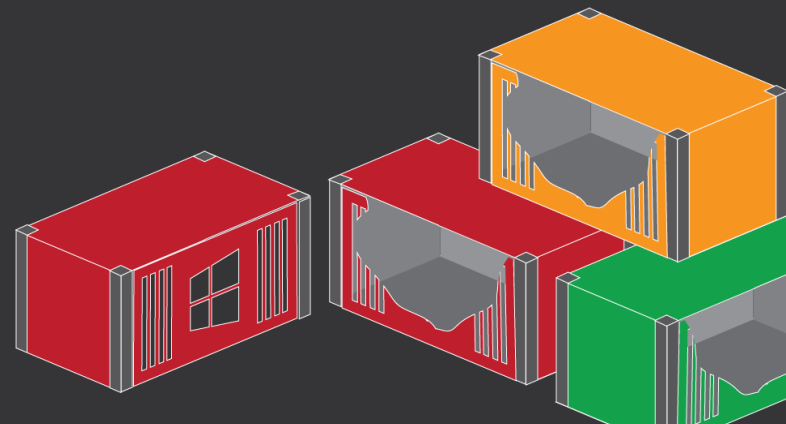
- You have multiple engineering teams working in Azure
- You have multiple subscriptions in your tenant
- You have regulatory requirements which must be enforced
- You want to ensure standards are followed for all IT allocated resources



Need of Good Governance

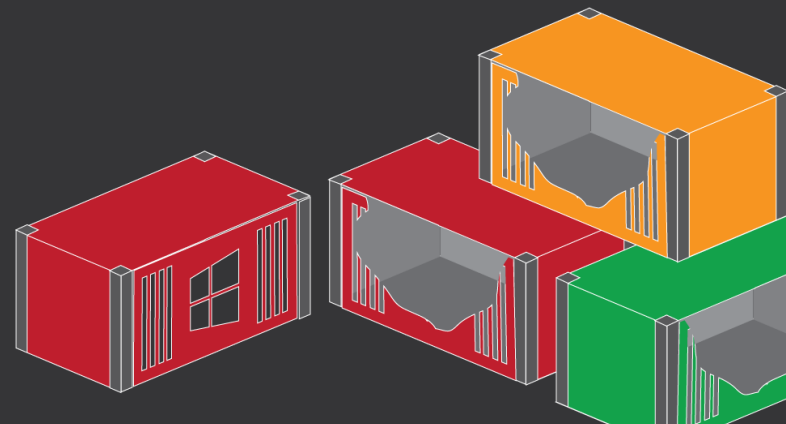
Your organization which need to enforced:

- All VM should be created should be of D series
- All resources should be tagged properly
- All resources should be created only in selected regions closer to your customers



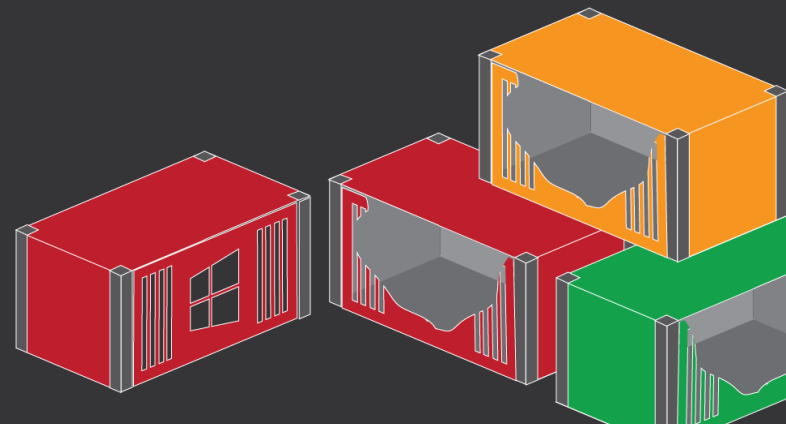
Good Governance

- Azure Policies
- Initiatives
- Role-Based Access Control (RBAC)
- Lock
- Azure Blueprints



Azure Policy

Azure Policy is an Azure service you use to create, assign and, manage policies. These policies enforce different rules and effects over your resources so that those resources stay compliant with your corporate standards and service level agreements.



Policy Effects

Requests to create or update a resource through Azure Resource Manager are evaluated by Azure Policy first. Policy creates a list of all assignments that apply to the resource and then evaluates the resource against each definition.

Policy Effect	What happens?
Deny	The resource creation/update fails due to policy.
Disabled	The policy rule is ignored (disabled). Often used for testing.
Append	Adds additional parameters/fields to the requested resource during creation or update. A common example is adding tags on resources such as Cost Center or specifying allowed IPs for a storage resource.
Audit, AuditIfNotExists	Creates a warning event in the activity log when evaluating a non-compliant resource, but it doesn't stop the request.
DeployIfNotExists	Executes a template deployment when a specific condition is met. For example, if SQL encryption is enabled on a database, then it can run a template after the DB is created to set it up a specific way.

Azure Policy

Here are some of the most common policy definitions you can apply.

Policy definition	Description
Allowed Storage Account SKUs	This policy definition has a set of conditions/rules that determine whether a storage account that is being deployed is within a set of SKU sizes. Its effect is to deny all storage accounts that do not adhere to the set of defined SKU sizes.
Allowed Resource Type	This policy definition has a set of conditions/rules to specify the resource types that your organization can deploy. Its effect is to deny all resources that are not part of this defined list.
Allowed Locations	This policy enables you to restrict the locations that your organization can specify when deploying resources. Its effect is used to enforce your geographic compliance requirements.
Allowed Virtual Machine SKUs	This policy enables you to specify a set of VM SKUs that your organization can deploy.
Not allowed resource types	Prevents a list of resource types from being deployed.

Azure Policy

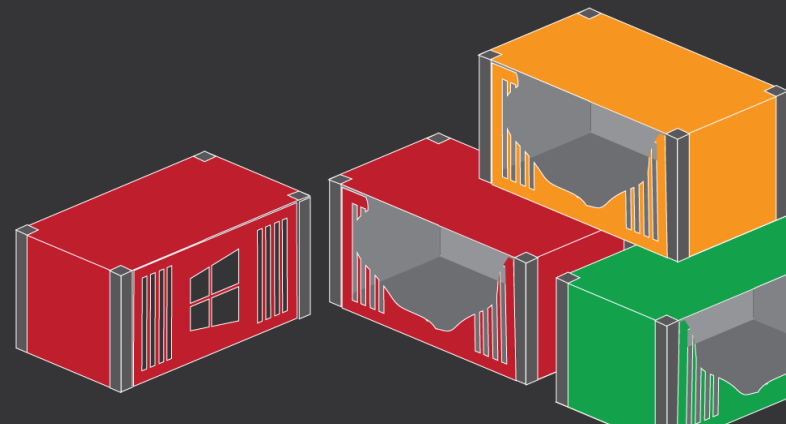
Examples of Built-In Policies

- Require SQL Server 12.0
- Allowed Storage Account SKUs
- Allowed Locations
- Allowed Virtual Machine SKUs
- Apply tag and its default value
- Not allowed resource types

Initiatives

An initiative definition is a set or group of policy definitions to help track your compliance state for a larger goal.

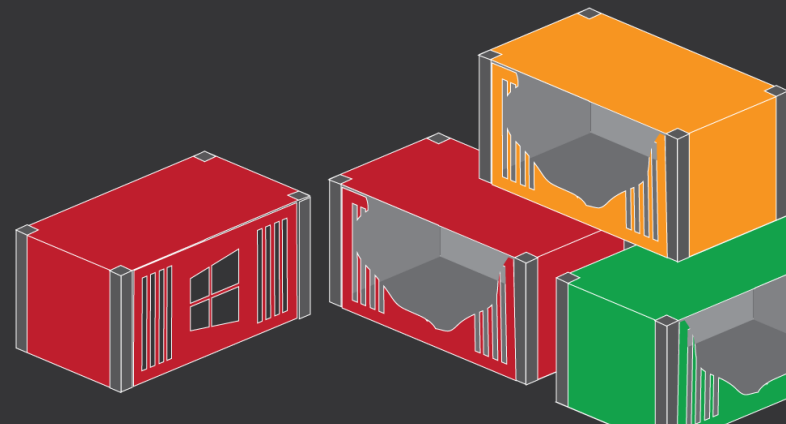
Even if you have a single policy, it is recommended to use initiatives if you anticipate increasing the number of policies over time.



Role-based access control (RBAC)

Examples of when you might use RBAC, when you want to:

- Allow one user to manage VMs in a subscription, and another user to manage Vnet.
- Allow a database administrator (DBA) group to manage SQL databases in a subscription.
- Allow a user to manage all resources in a resource group, such as VMs, websites, and subnet s.
- Allow an application to access all resources in a resource group.



Locks

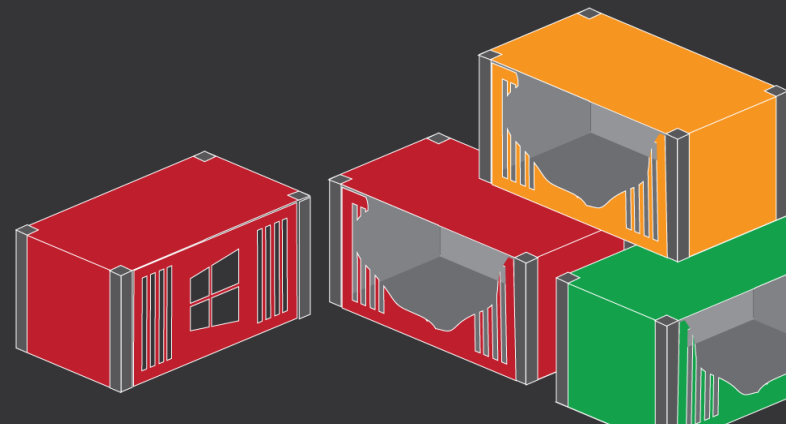
Locks help you prevent accidental deletion or modification of your Azure resources.

You may need to lock a subscription, resource group, or resource to prevent other users in your organization from accidentally deleting or modifying critical resources.

You can set the lock level to

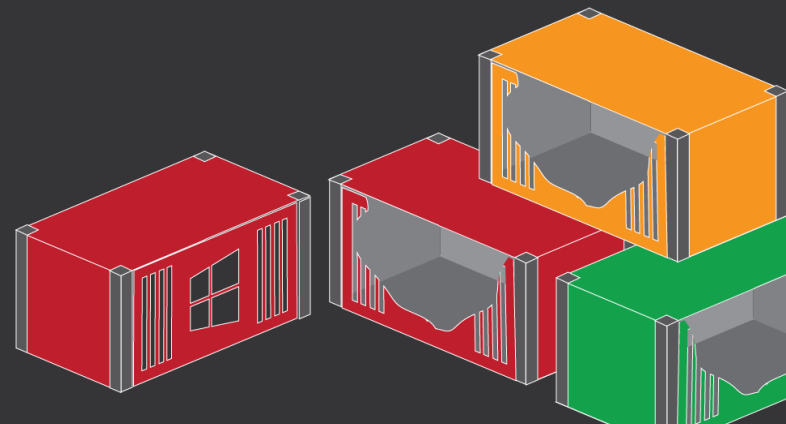
Delete

ReadOnly



Azure Blueprints

Azure Blueprints enables cloud architects and central information technology groups to define a repeatable set of Azure resources that implements and adheres to an organization's standards, patterns, and requirements..



Azure Blueprints

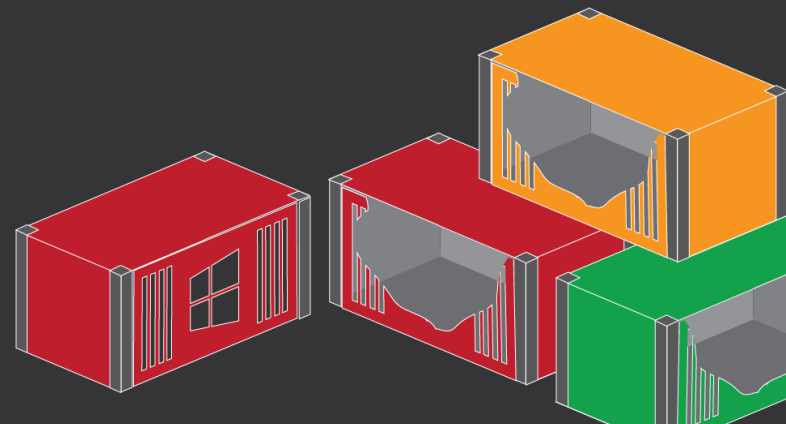
Azure Blueprints is a declarative way to orchestrate the deployment of various resource templates and other artifacts, such as:

Role assignments

Policy assignments

Azure Resource Manager templates

Resource groups



Azure Resource Manager

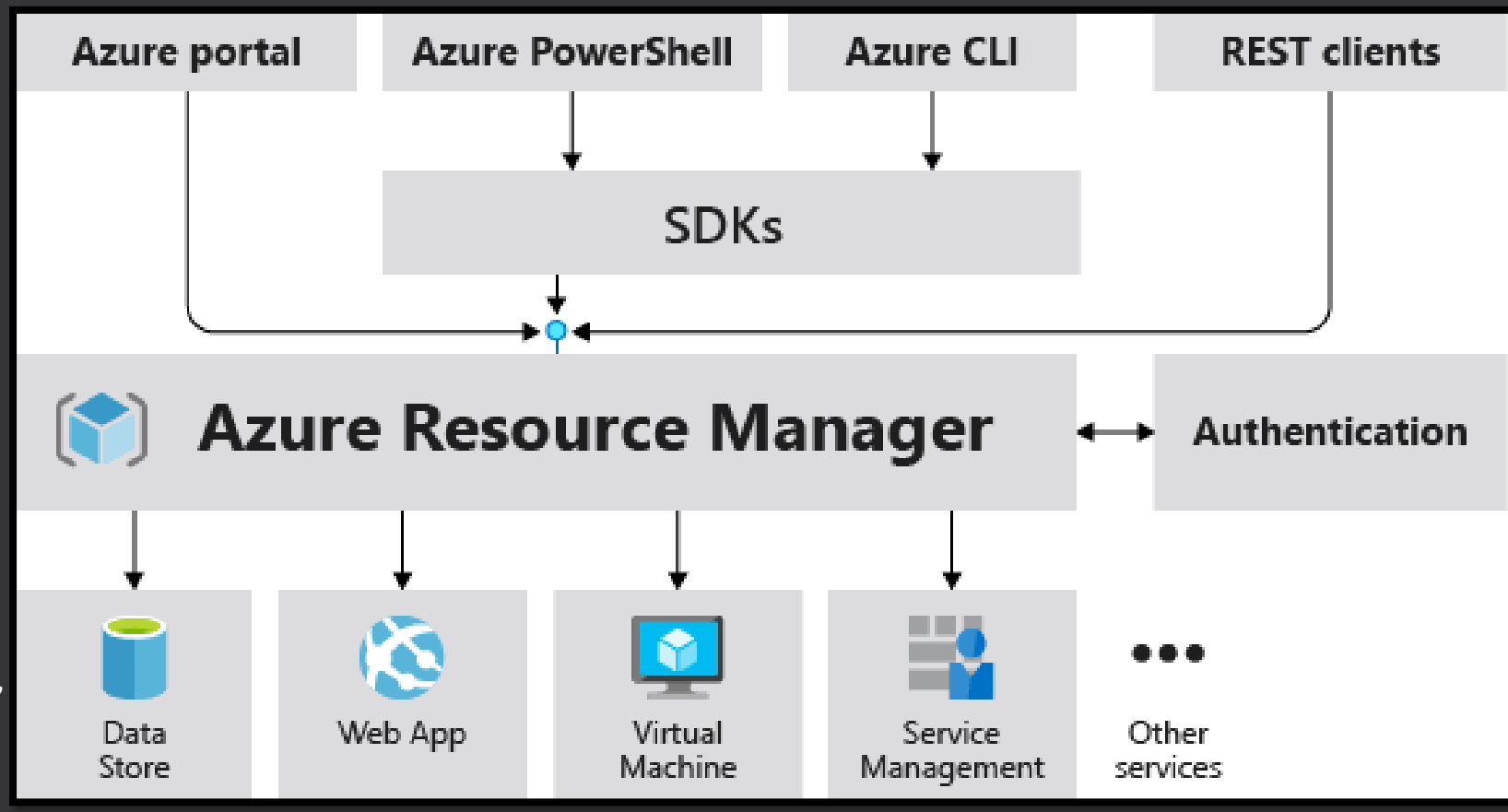
Azure Fundamentals

Azure Resource Manager

Azure Resource Manager is the service that manages and deploys Azure resources.

It has a management layer that allows us to create, update, and delete Azure account resources.

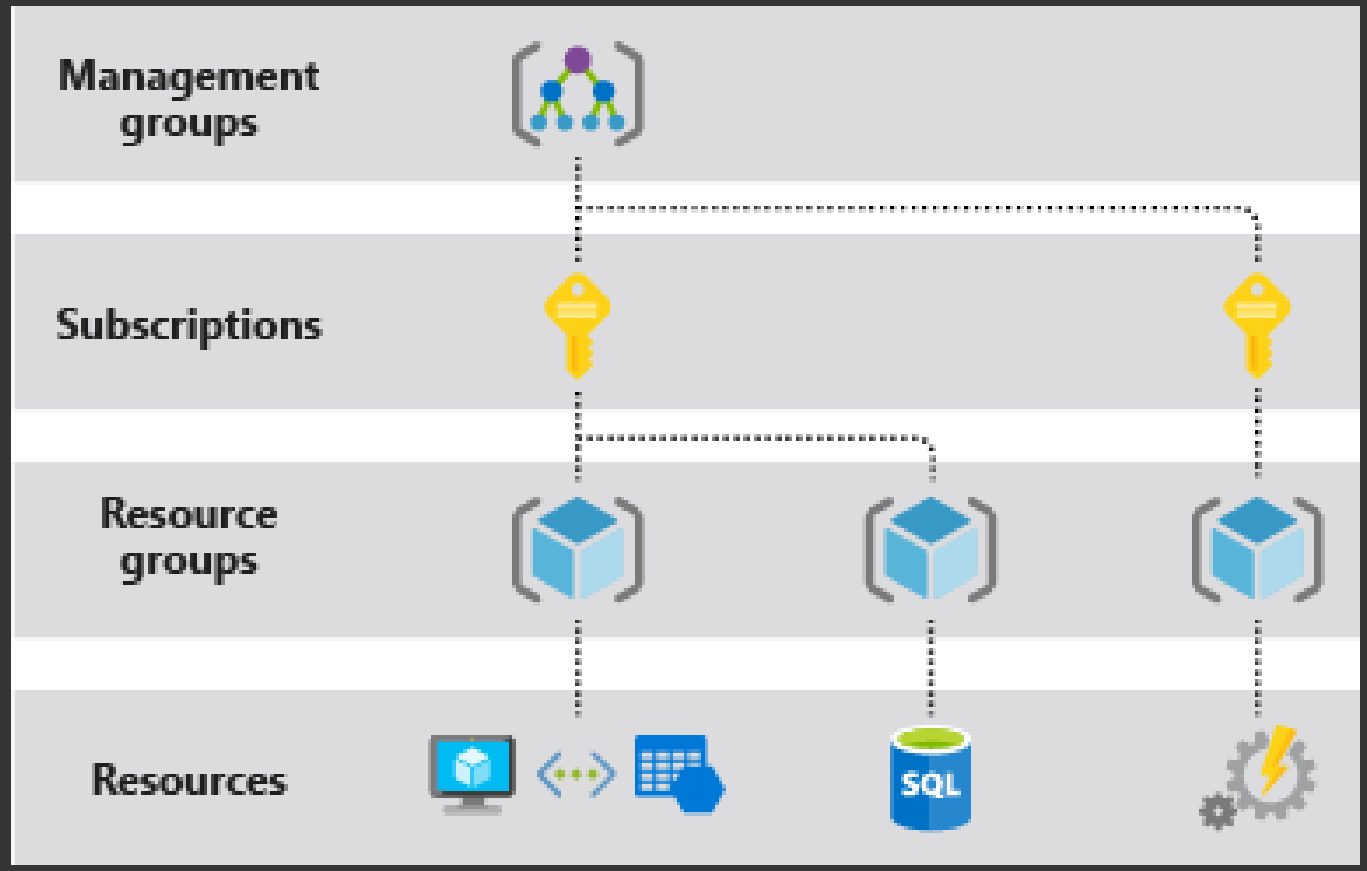
After deployment, we employ administration tools like access control, locks, and tags to secure and organize our resources.



Benefits of Azure Resource Manager

- Manage your infrastructure through declarative templates rather than scripts.
- Deploy, manage, and monitor all the resources for your solution as a group, rather than handling these resources individually.
- Redeploy your solution throughout the development lifecycle and have confidence your resources are deployed in a consistent state.
- Define the dependencies between resources so they're deployed in the correct order.
- Apply access control to all services because Azure role-based access control is natively integrated into the management platform.
- Apply tags to resources to logically organize all the resources in your subscription.
- Clarify your organization's billing by viewing costs for a group of resources sharing the same tag.

Azure Resource Manager - Scope



Azure Resource Manager Template

Azure Fundamentals

Azure Resource Manager Template

A JavaScript Object Notation (JSON) file that defines one or more resources to deploy to a resource group, subscription, management group, or tenant. The template can be used to deploy the resources consistently and repeatedly.

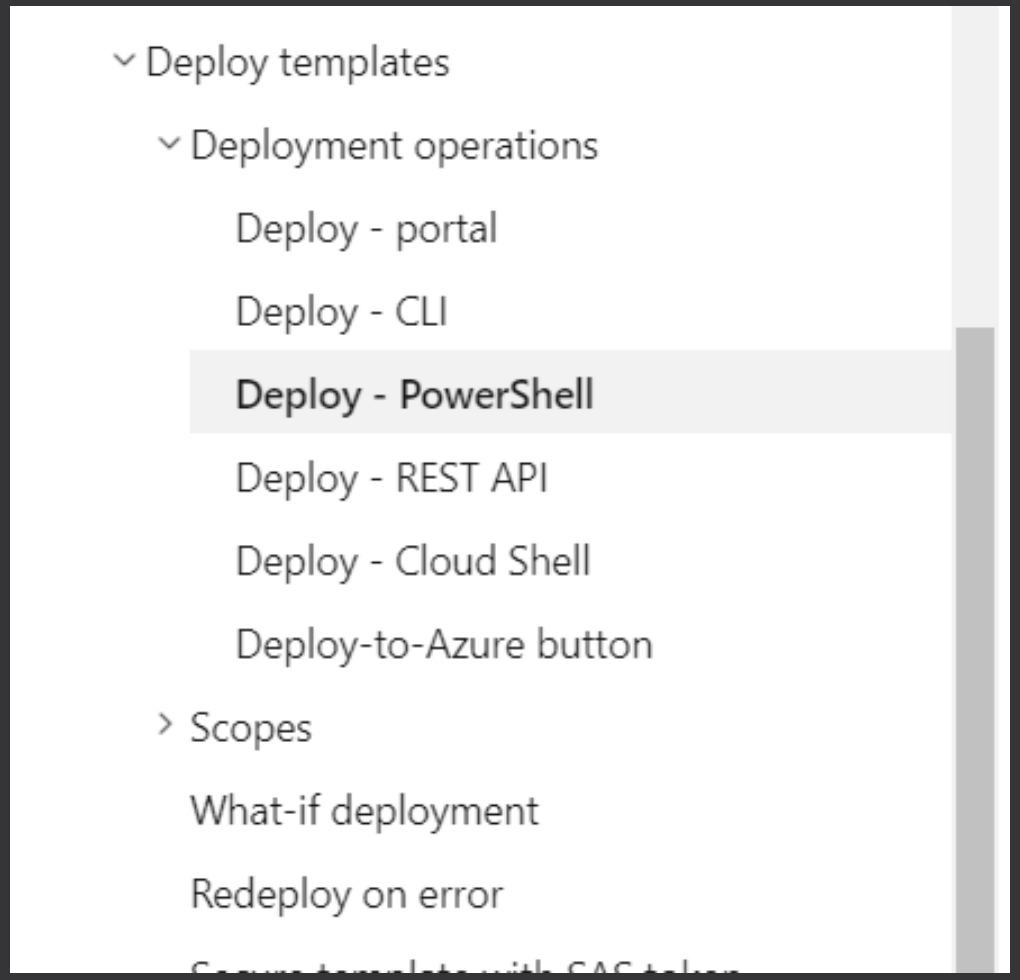
Document:

https://docs.microsoft.com/en-us/azure/azure-resource-manager/templates/overview

Bicep:

https://bicepdemo.z22.web.core.windows.net/

Azure Resource Manager Template



Azure Management tools

Azure Fundamentals

Azure management tools

- Azure Portal
- Azure PowerShell
- Azure CLI
- Azure Cloud Shell
- Azure Advisor

Azure management tools

Azure PowerShell

```
New-AzVm `
  -ResourceGroupName "myResourceGroup"
  -Name "testVM" `
  -image "win2016datacenter" `
  -Credential $cred
  -Location "East US"
```

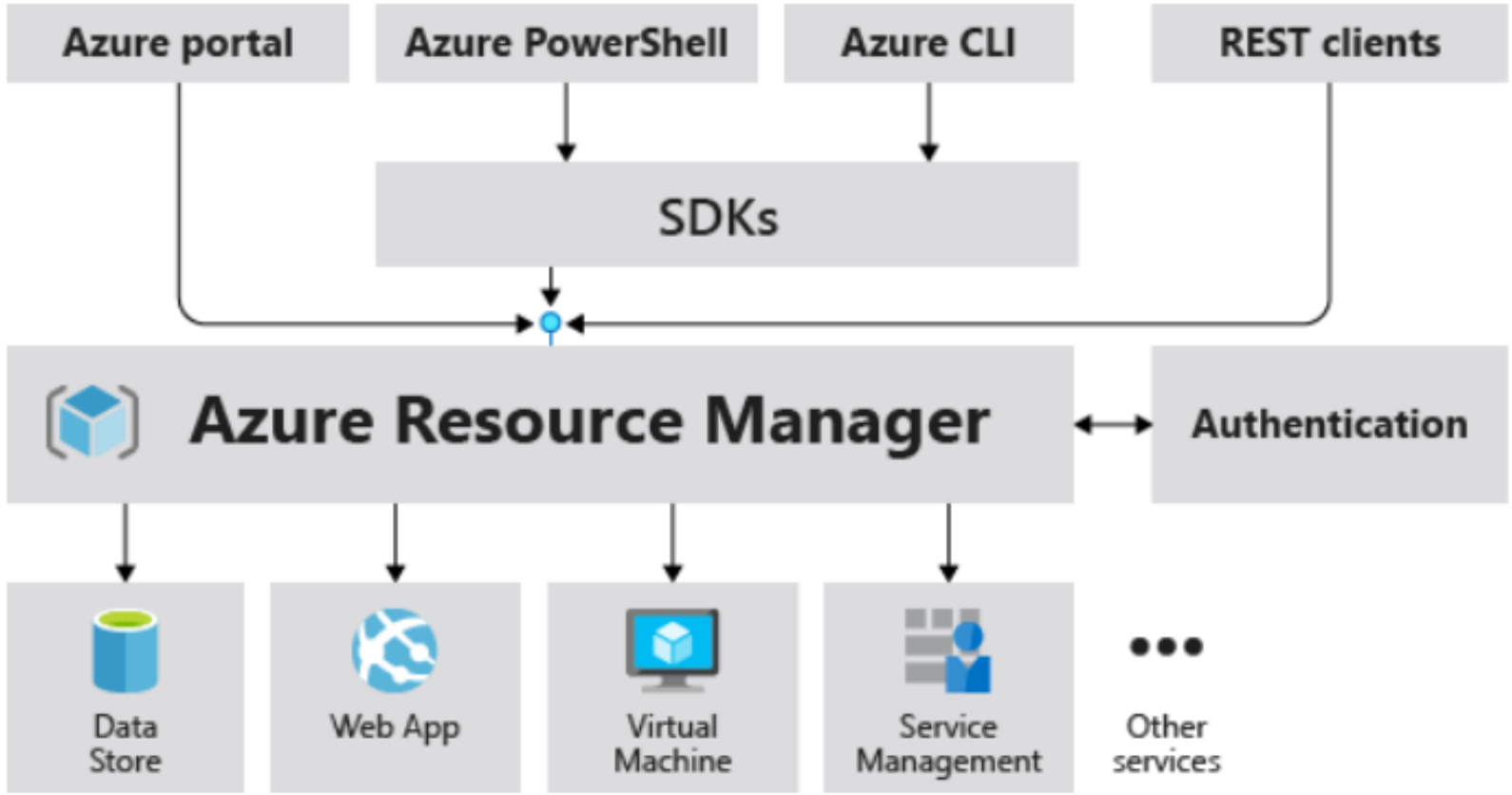
Azure CLI

```
az vm create \
  --resource-group azure_demo-rg \
  --name testVM \
  --image win2016datacenter \
  --admin-username demouser \
  --admin-password myPassword
  --location eastus
```

Azure Management Tools

- ✓ Azure PowerShell and Azure CLI are cross platform, so you can use them on Windows, Linux and MacOS without any problem
- ✓ Azure Portal supports all modern browsers and is not dependent on any OS
- ✓ Azure CloudShell is not dependent on any OS, It executes directly from Azure Portal

Azure management tools



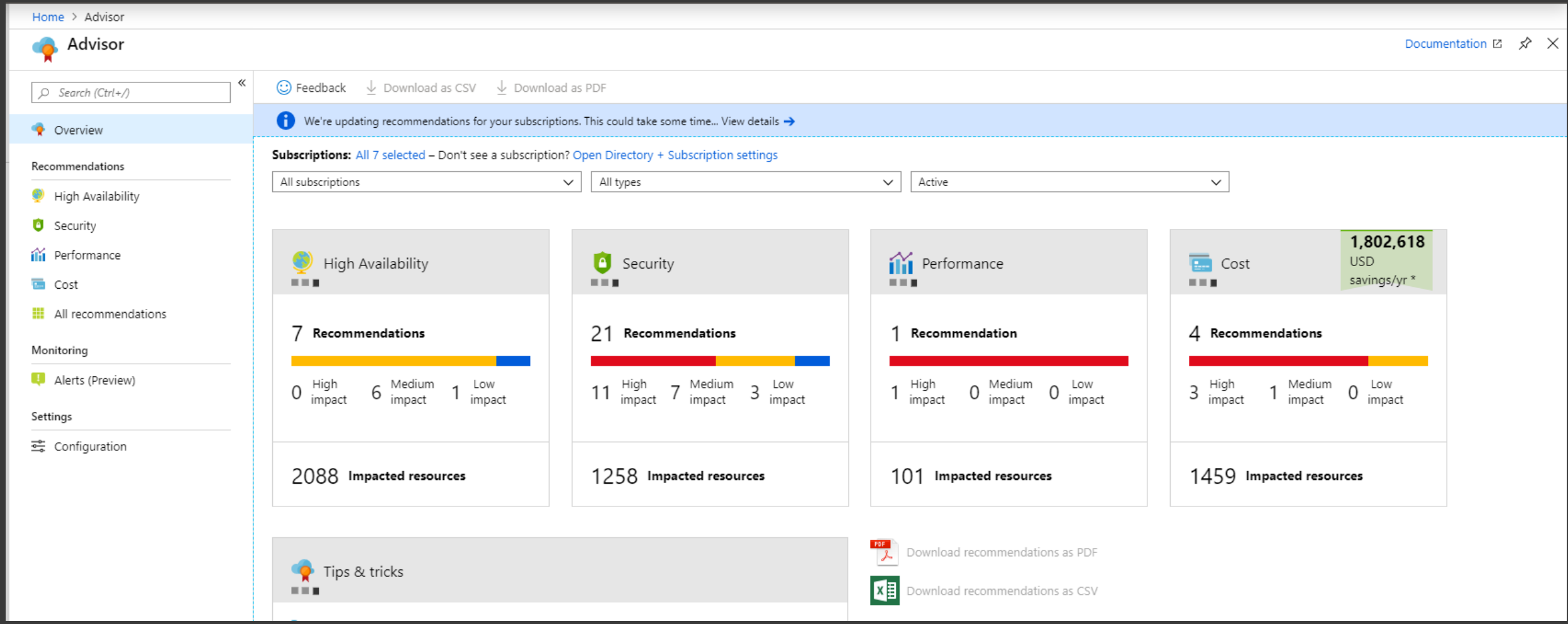
Monitoring tools in Azure

Azure Fundamentals

Azure Advisor

Azure Advisor is a free service built into Azure that provides recommendations on high availability, security, performance, and cost. Advisor analyzes your deployed services and looks for ways to improve your environment across those four areas.

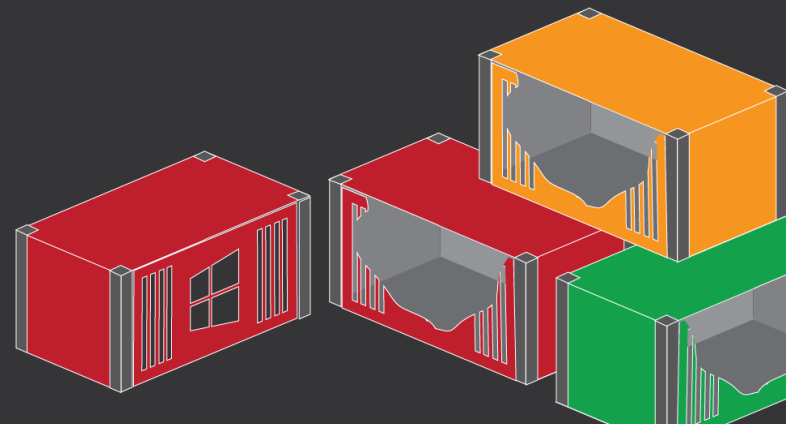
Azure Advisor



Azure Monitor

Azure Monitor maximizes the availability and performance of your applications by delivering a comprehensive solution for collecting, analyzing, and acting on telemetry from your cloud and on-premises environments.

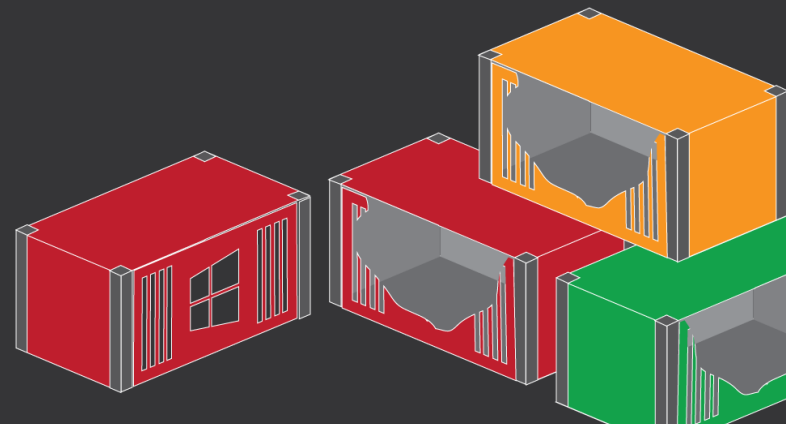
It helps you understand how your applications are performing and proactively identifies issues affecting them and the resources they depend on.



Azure Monitor

Can collect Data from different sources, such as :

- ✓ Application monitoring data
- ✓ Guest OS monitoring data
- ✓ Azure resource monitoring data
- ✓ Azure subscription monitoring data
- ✓ Azure tenant monitoring data



Azure Service Health

- Azure Service Health is a suite of experiences that provide personalized guidance and support when issues with Azure services affect you.
- It can notify you, help you understand the impact of issues, and keep you updated as the issue is resolved.
- Azure Service Health can also help you prepare for planned maintenance and changes that could affect the availability of your resources.

Azure Service Health

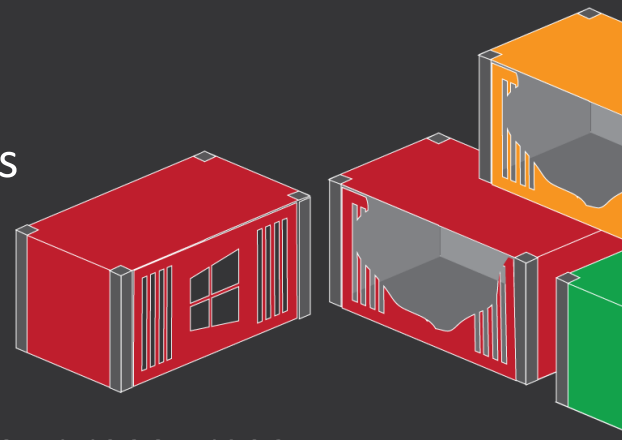
Azure Service Health is composed of the following:

Azure Status

provides a global view of the health state of Azure services

Service Health

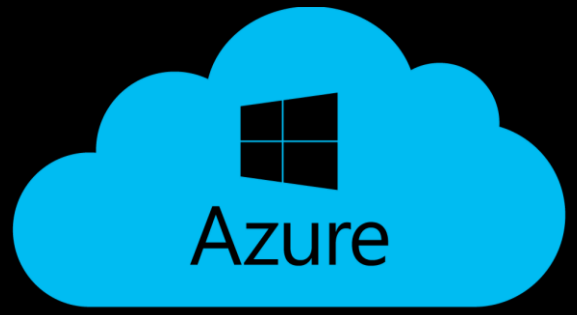
customizable dashboard that tracks the state of your Azure services



Resource Health

diagnose and obtain support when an Azure service issue affects your resources

Azure Monitor
vs
Azure Service Health



Test Your Knowledge

Q1.) You have an Azure environment. You need to create a new WebApp from an Android laptop. You use PowerShell in Azure Cloud Shell.
Will this work?
A. Yes B. No

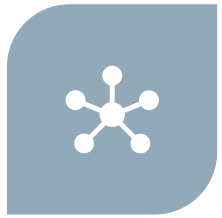
Q2.) An Azure administrator plans to run a PowerShell script that creates Azure resources. Administrator is running the script from a computer that runs macOS and has PowerShell Core 6.0 installed.
Does this meet the goal?
A. Yes B. No

Answer: Yes for both question

Test Your Knowledge

Q3.) Upon enabling, Azure Advisor makes your system highly available and secure.
True or False?

Answer: False, Azure Advisor only gives recommendation. Implementation of those is left with you.



SECURING NETWORK CONNECTIVITY

CORE AZURE IDENTITY SERVICES

SECURITY TOOLS & FEATURES

AZURE GOVERNANCE METHODOLOGIES

MONITORING AND REPORTING OPTIONS

PRIVACY, COMPLIANCE & DATA PROTECTION STANDARDS

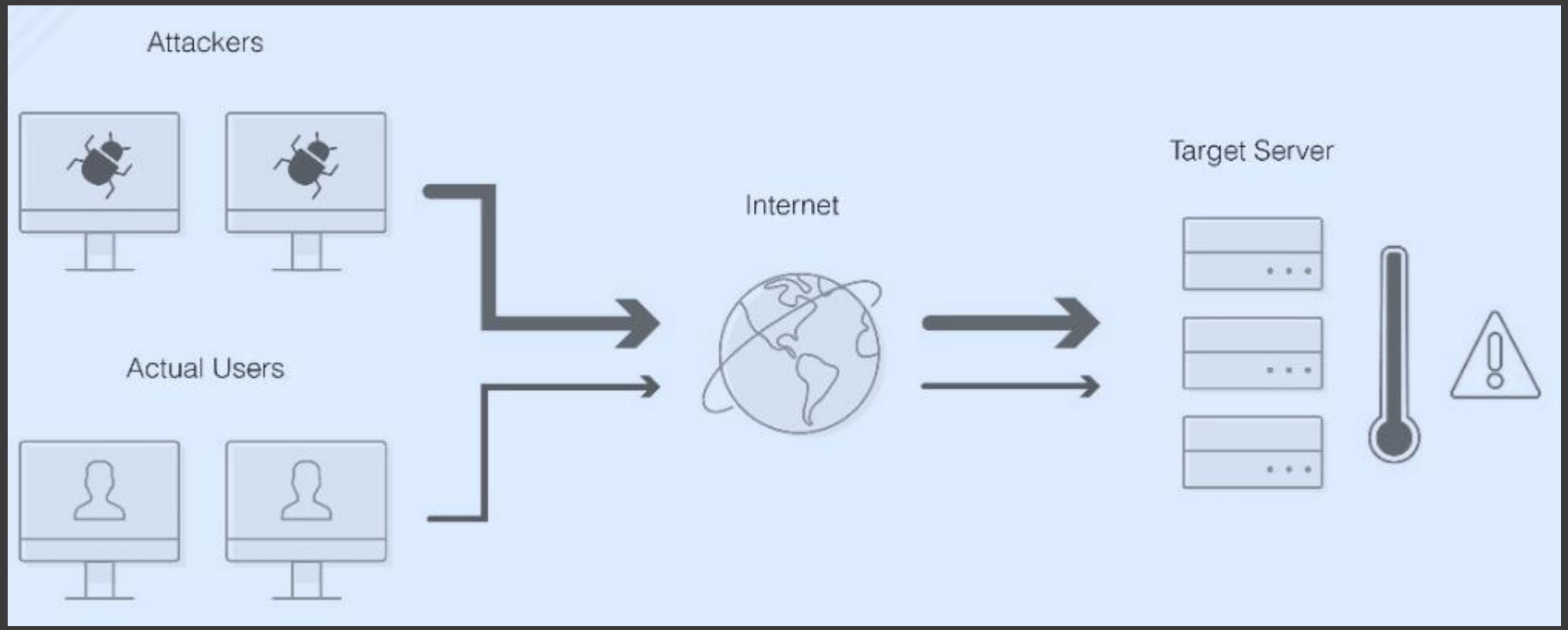
Section 3 : Understand security, privacy, compliance, and trust

DDoS Attack

Azure Fundamentals

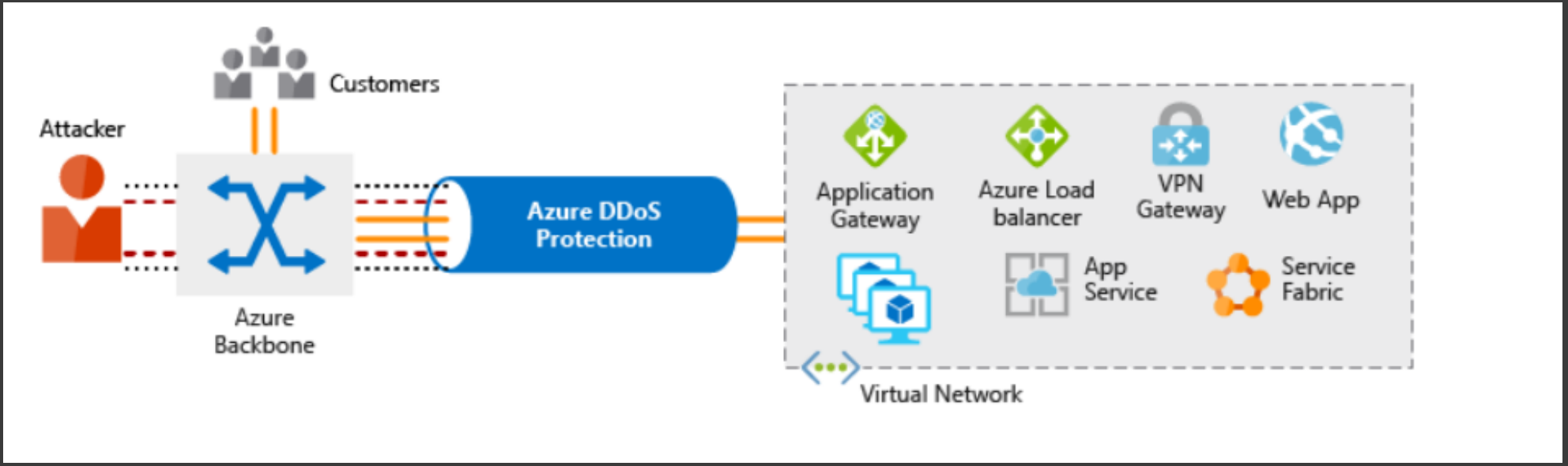
DDoS Attack

Distributed denial-of-service (DDoS) attack



Azure DDoS Protection

Azure DDoS protection, combined with application design best practices, provide defense against DDoS attacks such as Volumetric attacks, Protocol attacks, Resource (application) layer attacks



Azure DDoS Protection

Available in 2 tiers:

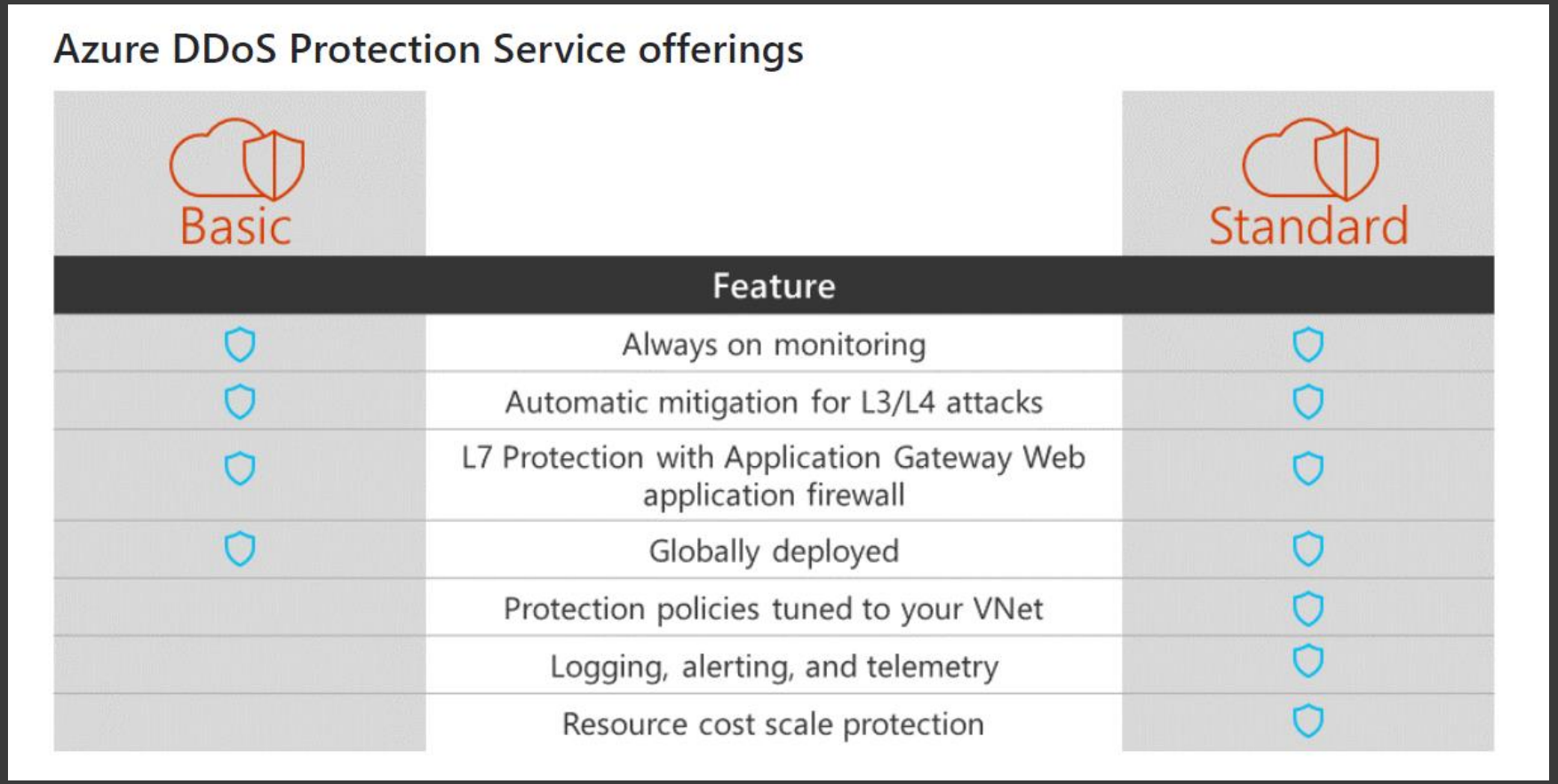
Basic:

Automatically enabled as part of the Azure platform. Always-on traffic monitoring, and real-time mitigation of common network-level attacks, provide the same defenses utilized by Microsoft's online services.

Standard:

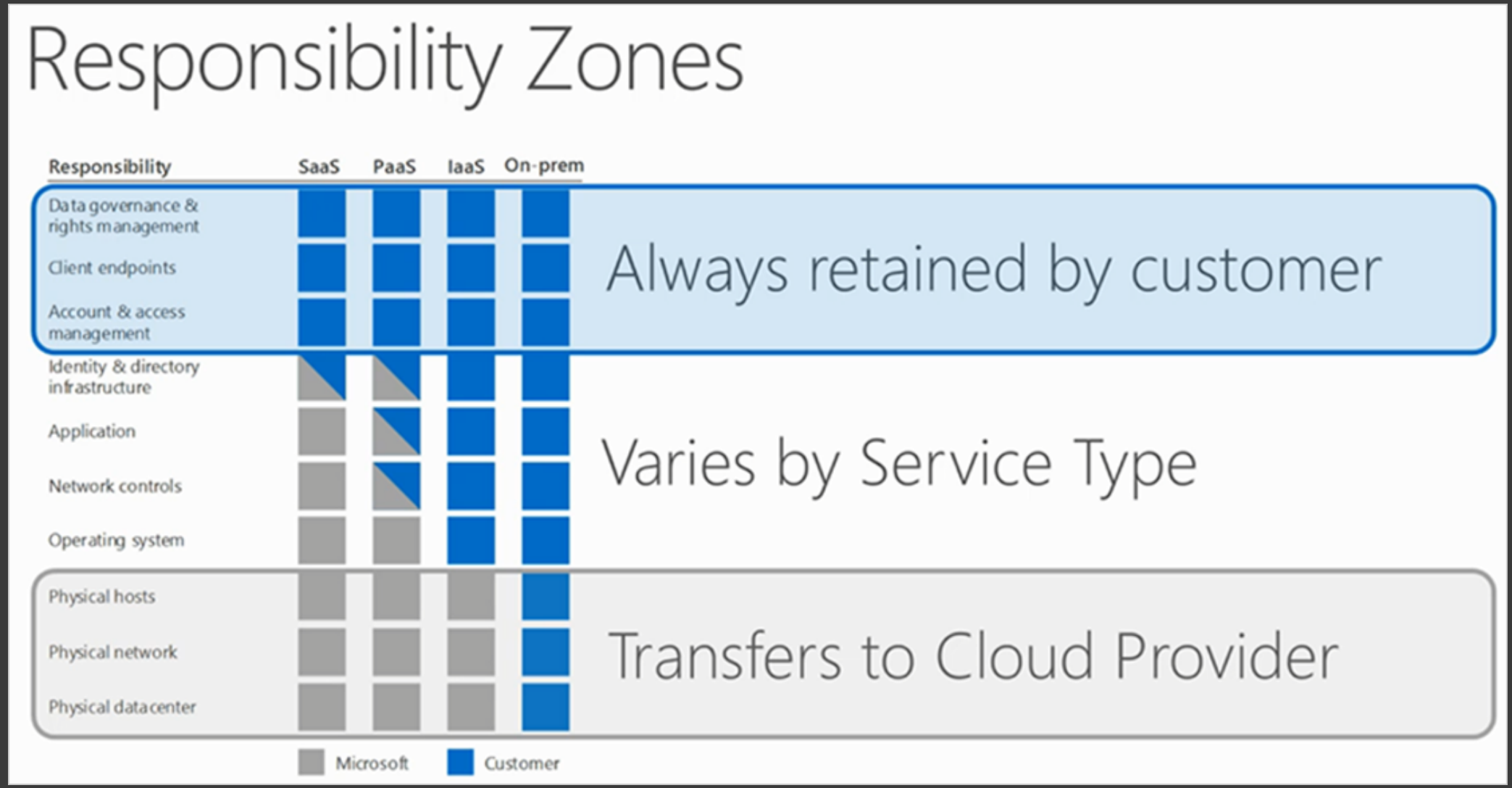
Provides additional mitigation capabilities over the Basic service tier that are tuned specifically to Azure Virtual Network resources.

Azure DDoS Protection



https://azure.microsoft.com/en-au/blog/azure-ddos-protection-service-preview/

Shared Responsibility Model



Azure Security Center

- Azure Fundamentals

Azure Security Center

Azure Security Center is a monitoring service that provides threat protection across all of your services both in Azure, and on-premises.

Azure Security Center is a unified infrastructure security management system that strengthens the security posture of your data centers, and provides advanced threat protection across your hybrid workloads in the cloud

What Azure Security Center can do

- ✓ Provide security recommendations based on your configurations, resources, and networks
- ✓ Monitor security settings across on-premises and cloud workloads
- ✓ Continuously monitor all your services, and perform automatic security assessments
- ✓ Use machine learning to detect and block malware
- ✓ Analyze and identify potential inbound attacks
- ✓ Provide just-in-time access control for ports

What Azure Security Center

Available in two tiers

Free

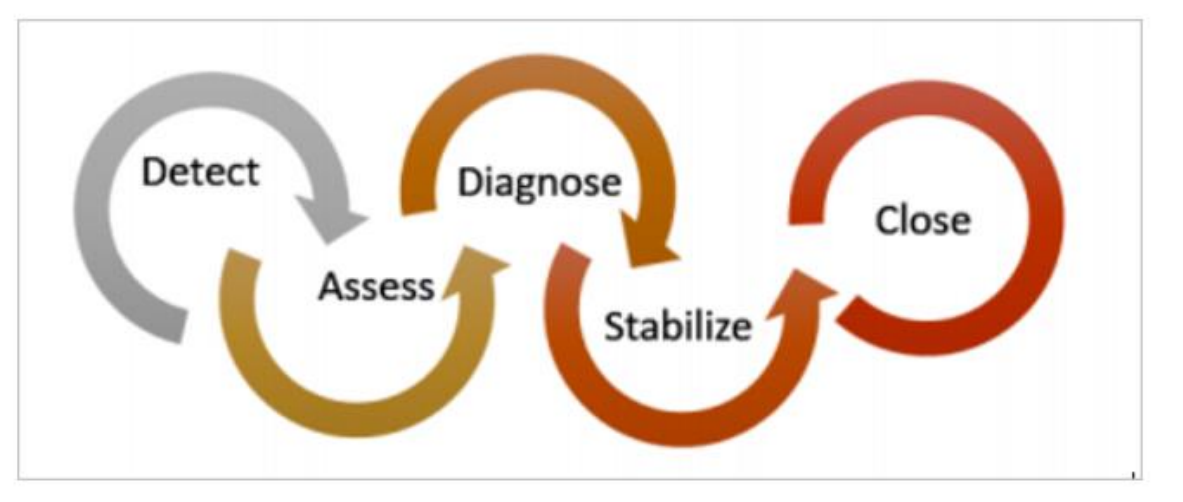
Limited to assessments and recommendations of Azure resources only

Standard

full suite of security-related services including continuous monitoring, threat detection, just-in-time access control for ports, and more.

Azure Security Center -Usage scenarios

1.) Use Security Center for incident response



2.) Use Security Center recommendations to enhance security

Advanced Threat Protection (ATP)

Azure Advanced Threat Protection (Azure ATP) is a cloud-based security solution that identifies, detects, and helps you investigate advanced threats, compromised identities, and malicious insider actions directed at your organization.

Azure ATP is capable of detecting known malicious attacks and techniques, security issues, and risks against your network.

Advanced Threat Protection (ATP)

Azure ATP consists of several components.

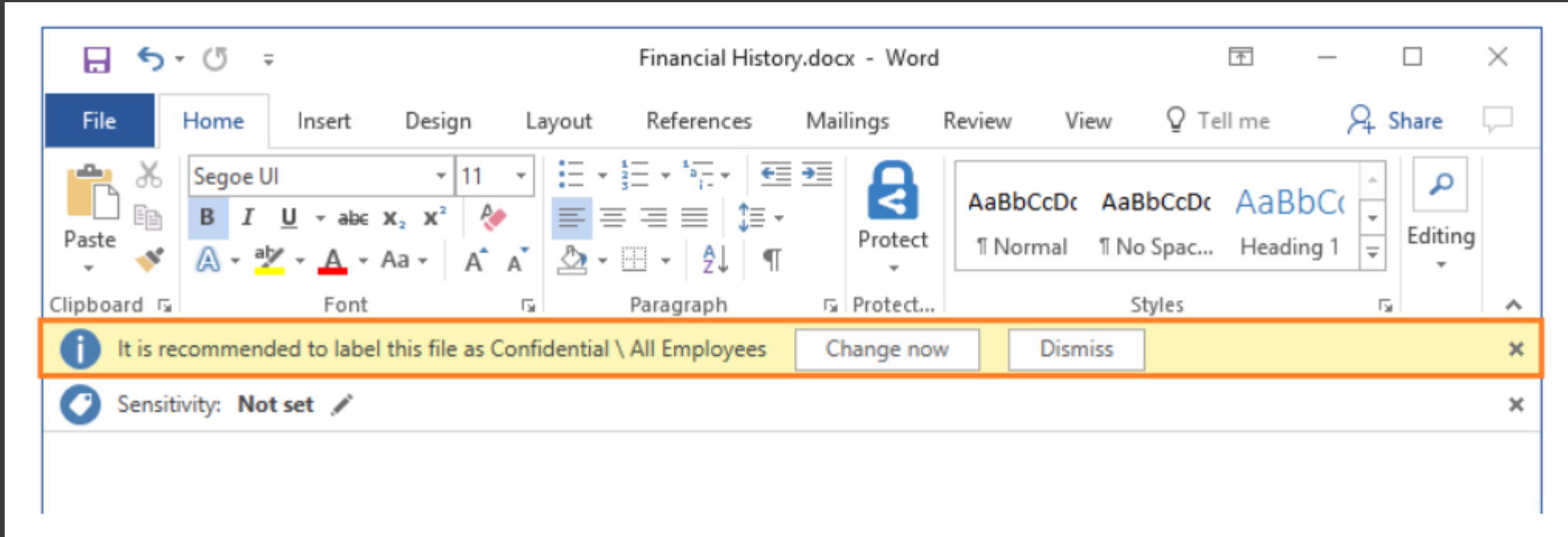
- Azure ATP portal (https://portal.atp.azure.com)
- Azure ATP sensor
- Azure ATP cloud service

Advanced Threat Protection (ATP) -Advantages

- Monitor and profile user behavior and activities
- Identify suspicious activities and advanced attacks
- Investigate alerts and user activities
- Protect user identities and reduce the attack surface

Azure Information Protection(AIP)

A cloud-based solution that helps organizations classify and optionally protect documents and emails by applying label



Azure Key Vault

Safeguard cryptographic keys and other secrets used by cloud apps and services

Azure Key Vault helps solve the following problems:

- Secrets Management
- Key Management
- Certificate Management

Section 4 : Understand Azure Pricing and Support

AZURE SUBSCRIPTIONS

PLANNING AND MANAGEMENT OF COSTS

THE SUPPORT OPTIONS AVAILABLE WITH AZURE

AZURE SERVICE LEVEL AGREEMENTS (SLAS)

SERVICE LIFECYCLE IN AZURE

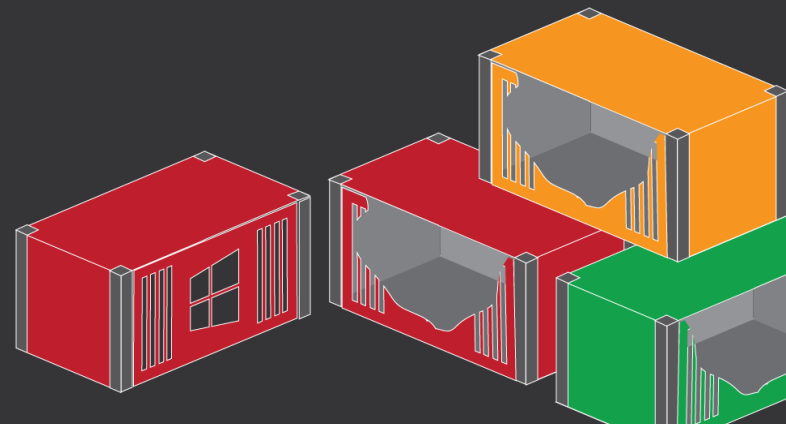
https://azure.microsoft.com/en-in/support/plans/

		Purchase support	Purchase support	Purchase support	Contact Premier
Scope	Available to all Microsoft Azure accounts	Microsoft Azure: Trial and non-production environments	Microsoft Azure: Production workload environments	Microsoft Azure: Business-critical dependence	All Microsoft Products, including Azure: Substantial dependence across multiple products
Customer Service, Self-Help and Communities	24x7 access to billing and subscription support, online self-help, documentation, whitepapers and support forums	24x7 access to billing and subscription support, online self-help, documentation, whitepapers and support forums	24x7 access to billing and subscription support, online self-help, documentation, whitepapers and support forums	24x7 access to billing and subscription support, online self-help, documentation, whitepapers and support forums	24x7 access to billing and subscription support, online self-help, documentation, whitepapers and support forums
Best Practices	Access to full set of Azure Advisor recommendations	Access to full set of Azure Advisor recommendations	Access to full set of Azure Advisor recommendations	Access to full set of Azure Advisor recommendations	Access to full set of Azure Advisor recommendations
Health Status and Notifications	Access to personalised Service Health Dashboard and Health API	Access to personalised Service Health Dashboard and Health API	Access to personalised Service Health Dashboard and Health API	Access to personalised Service Health Dashboard and Health API	Access to personalised Service Health Dashboard and Health API
Technical Support		Business hours access[1] to Support Engineers via email	24x7 access to Support Engineers via email and phone	24x7 access to Support Engineers via email and phone	24x7 access to Support Engineers via email and phone
Who Can Open Cases		Unlimited contacts / unlimited cases	Unlimited contacts / unlimited cases	Unlimited contacts / unlimited cases	Unlimited contacts / unlimited cases
Third-Party Software Support		Interoperability and configuration	Interoperability and configuration	Interoperability and configuration	Interoperability and configuration

Azure Support Options

Every Azure subscription includes free access to the following essential support services:

- Billing and subscription support
- Azure products and services documentation
- Online self-help documentation
- Whitepapers
- Community support forums



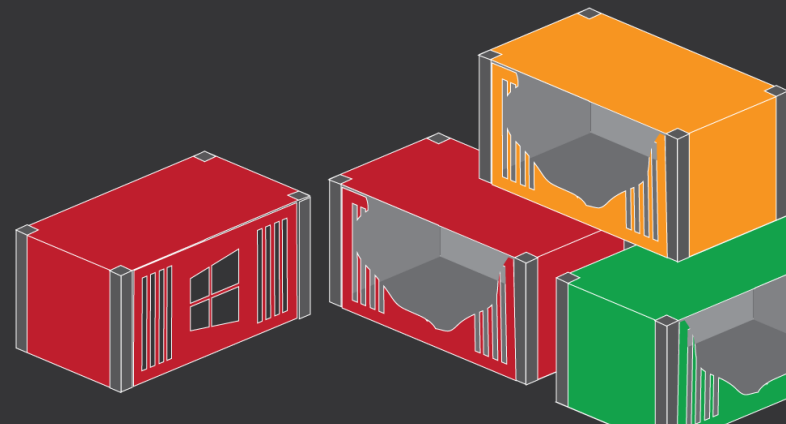
Available support channels outside of support plan channels

- **MSDN Forums** (https://social.msdn.microsoft.com/Forums/en-US/home?category=windowsazureplatform)
- **Azure Feedback Forums** (https://feedback.azure.com/forums/34192--general-feedback)
- **Stackoverflow** (https://stackoverflow.com/questions/tagged/azure/)
- **Twitter** (Tweet @AzureSupport to get answers and support)

Knowledge Center

The Azure Knowledge Center is a searchable database that contains answers to common support questions, from a community of Azure experts, developers, customers, and users.

https://azure.microsoft.com/en-in/resources/knowledge-center/



Service Level Agreements (SLAs)

Azure Fundamentals

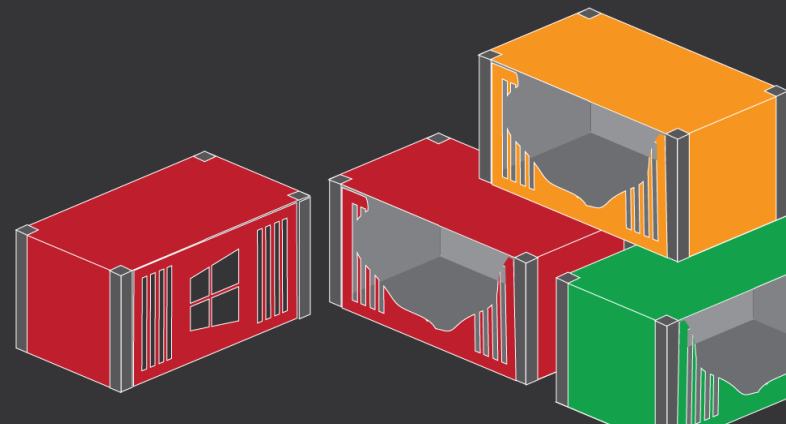
Service Level Agreements (SLAs)

There are three key characteristics of SLAs for Azure products and services:

Performance Targets

Uptime and Connectivity Guarantees

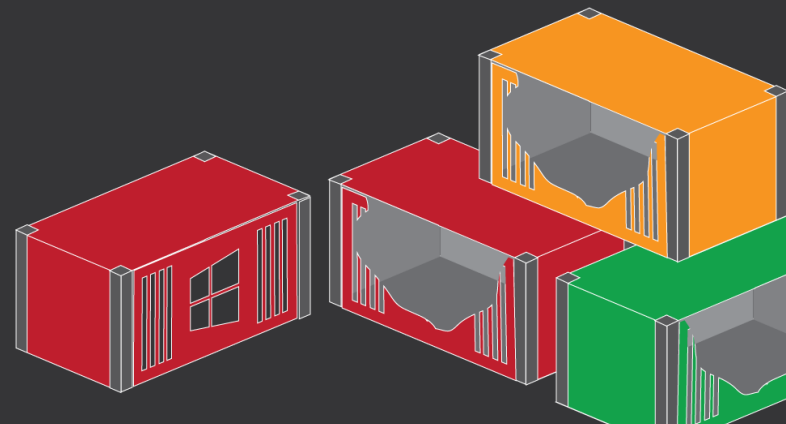
Service credits



Service Level Agreements (SLAs)

Microsoft maintains its commitment to providing customers with high-quality products and services by adhering to comprehensive operational policies, standards, and practices.

Formal documents called Service-Level Agreements (SLAs) capture the specific terms that define the performance standards that apply to Azure.



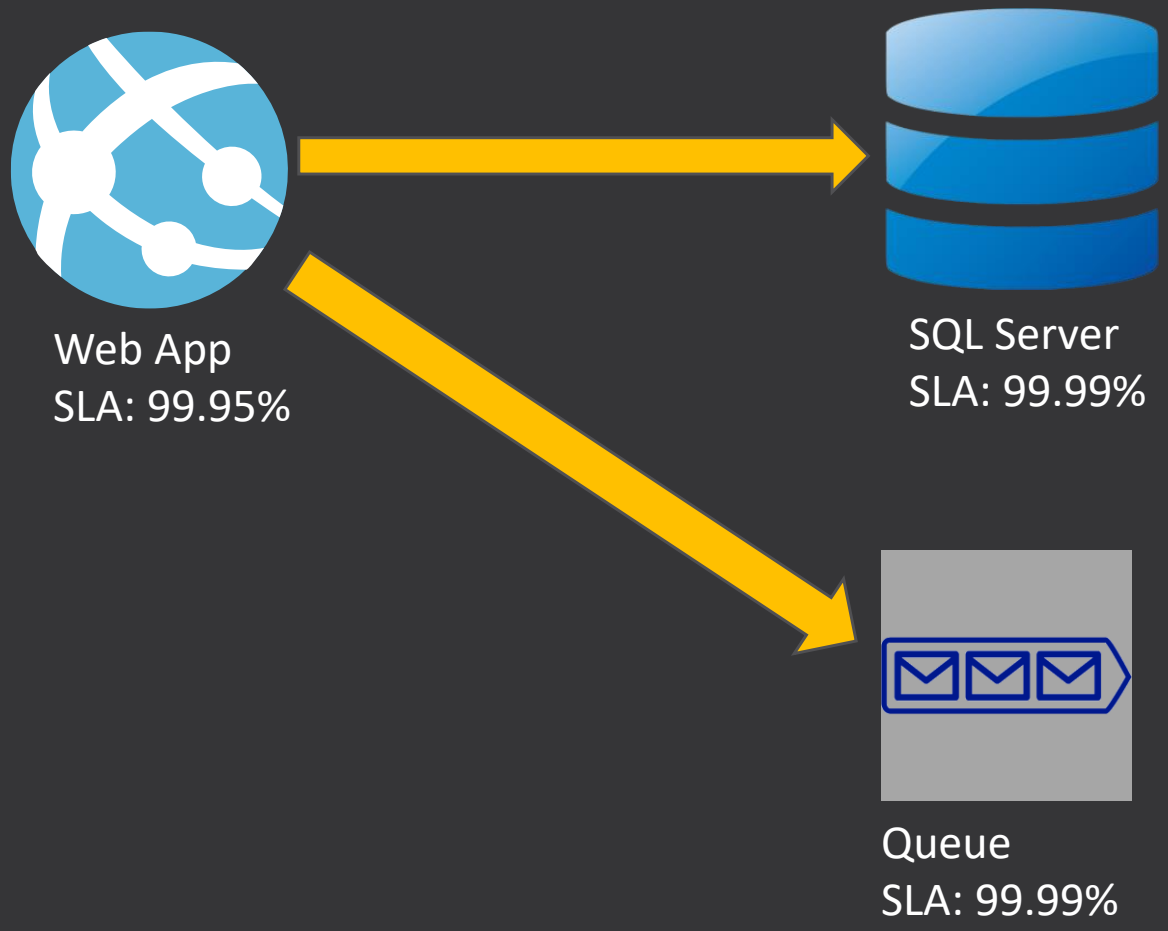
Composite SLAs

COMPOSITE SLA

= 99.95 percent × 99.99 percent

= 99.94 percent

Composite SLAs



~~**COMPOSITE SLA**~~
~~= 99.95 percent × 99.99 percent~~
~~= 99.94 percent~~

New COMPOSITE SLA

#Calculating UPTIME for SQL & Queue combined
= 1.0 − (0.0001 × 0.001)
= 99.99999 percent

#Composite SLA
Either SQL or Queue AND WebApp

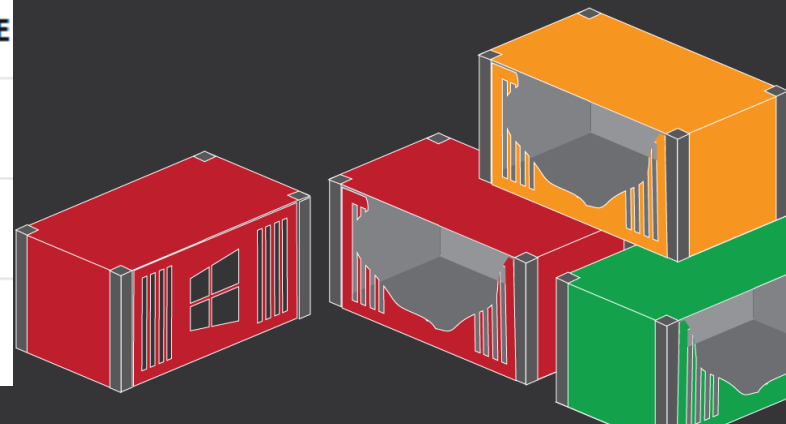
99.95 percent × 99.99999 percent
= ~99.95 percent

Service Credits

SLAs also describe how Microsoft will respond if an Azure product or service fails to perform to its governing SLA's specification.

For example, customers may have a discount applied to their Azure bill, as compensation for an under-performing Azure product or service.

MONTHLY UPTIME PERCENTAGE	SERVICE CREDIT PERCENTAGE
< 99.9	10
< 99	25
< 95	100



Public and Private Preview Features

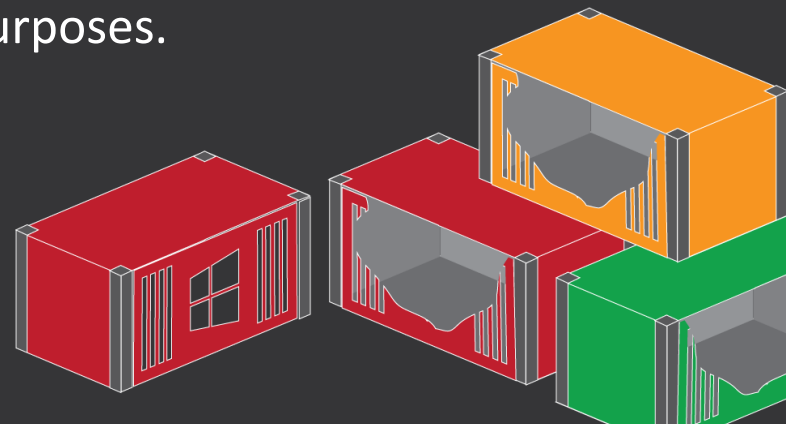
There are two categories of preview which are available:

Private Preview

Feature is available to certain Azure customers for evaluation purposes.

Public Preview

Feature is available to all Azure customers for evaluation purposes.



General Availability (GA)

Once a feature is evaluated and tested successfully, it may be released to customers as part of Azure's default product, service or feature set means that feature is moved to General Availability(GA) stage.