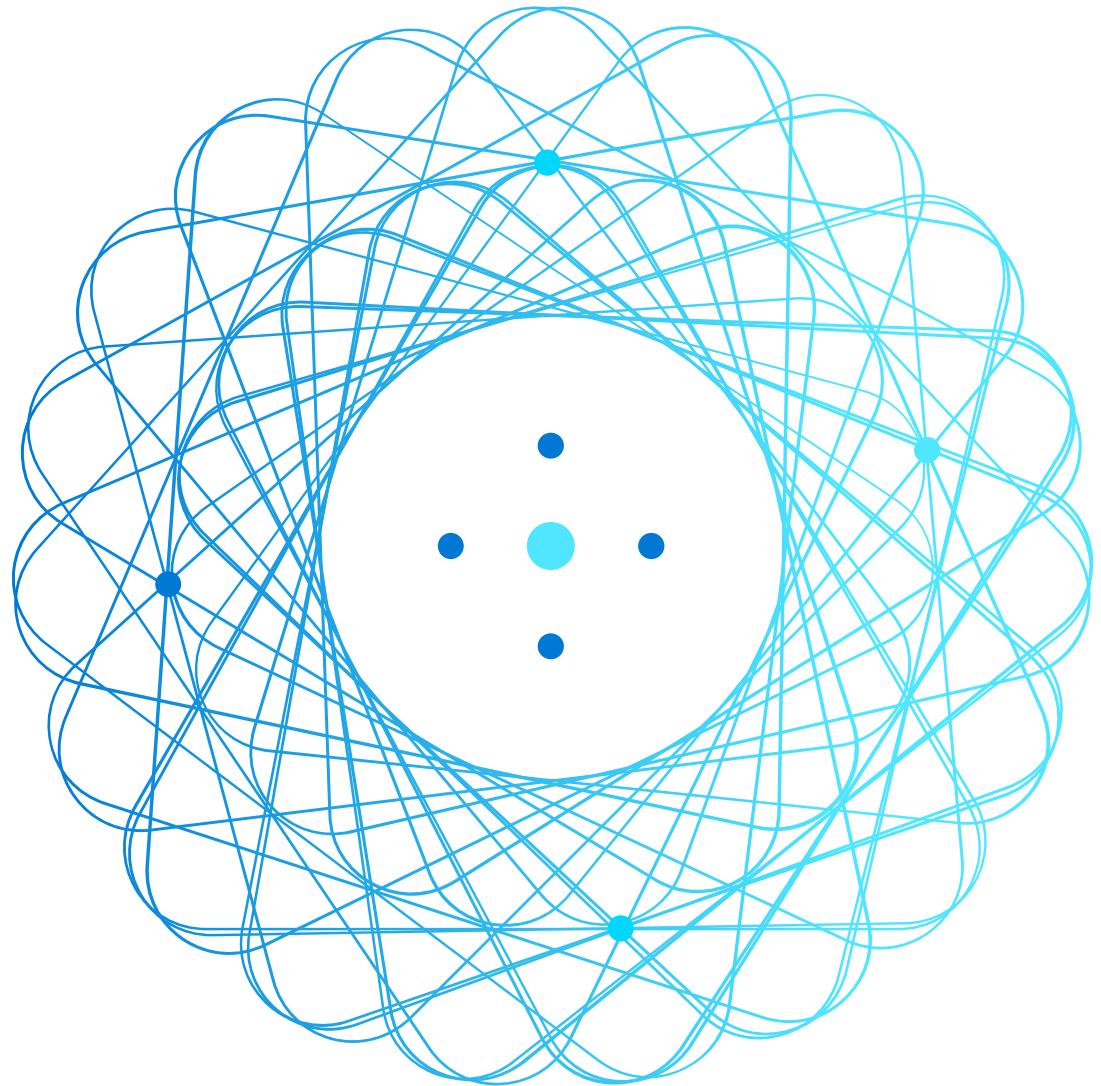


AZ-900: Microsoft Azure Fundamentals Exam Cram

Dwayne Natwick
Cloud Training Architect Lead
Opsgility



Hello! Instructor Introduction

I am a Microsoft Azure MVP and Cloud Training Architect Lead at Opsgility where I author content and provide live training. I am certified in multiple Azure and M365 roles, including Microsoft 365 Fundamentals, Microsoft 365 Security Administrator Associate, Azure Solution Architect Expert, Azure Administrator Associate, and Azure Security Engineer Associate.

In addition to creating curriculum, training, and blog writing, I am also a Microsoft Certified Trainer and Regional Lead.

You can email me or connect on social media at:

dnatwick@opsgility.com

<https://captainhyperscaler.com>

<http://linkedin.com/in/dnatwick>

@DwayneNcloud



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**Dwayne Natwick – Opsgility
Microsoft Azure MVP
Cloud Training Architect Lead
CISSP, PMP, 14x Azure and M365
Certified
MCT Regional Lead**



About the exam

- The Azure Fundamentals exam tests on the foundational level knowledge on cloud concepts; core Azure services; security, privacy, compliance, and trust; and Azure pricing and support.
- If you are just beginning to learn about cloud computing and how Microsoft Azure provides that service, then this exam will meet your needs.
- There are no prerequisites for the course, but students with an IT background will find the concepts easier to understand.
- After passing the AZ-900 exam, you will receive the Microsoft Certified: Azure Fundamentals badge. A Fundamentals certification does not have an expiration or renewal date.

Is This Exam for Me?

Exam 1: Microsoft Azure
Fundamentals (AZ-900)



About the Exam objectives

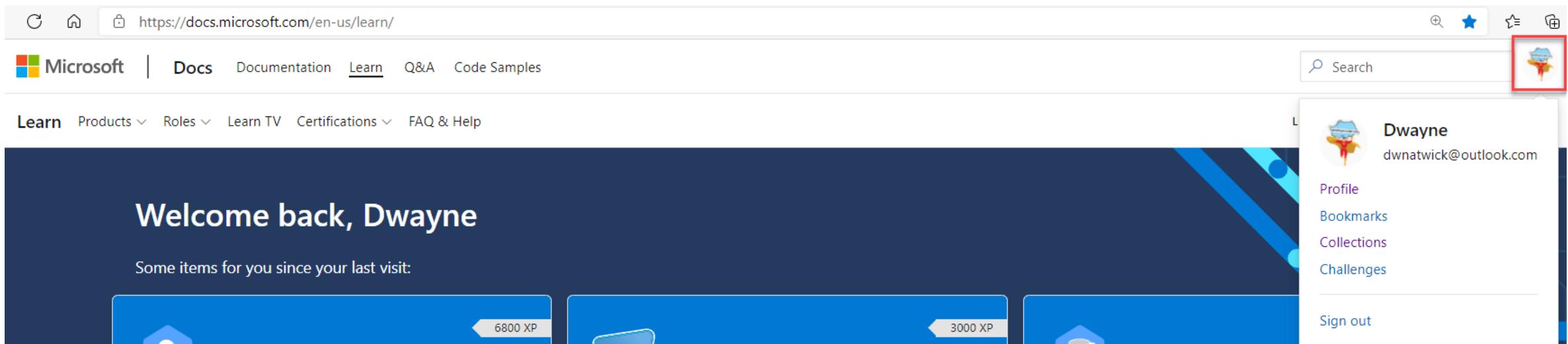
Objective	Weight
Describe Cloud Concepts	20-25%
Describe Core Azure Services	15-20%
Describe Core Solutions and Management Tools	10-15%
Describe General Security and Network Security	10-15%
Describe Identity, Governance, Privacy and Compliance	20-25%
Describe Azure cost management and Service Level Agreements	10-15%

- This course maps directly to the exam AZ-900 Microsoft Azure Fundamentals.
- Percentages indicate the relative weight of each area on the exam.
- The higher the percentage, the more questions you are likely to see in that area.
- [Exam AZ-900: Microsoft Azure Fundamentals - Learn | Microsoft Docs](#)



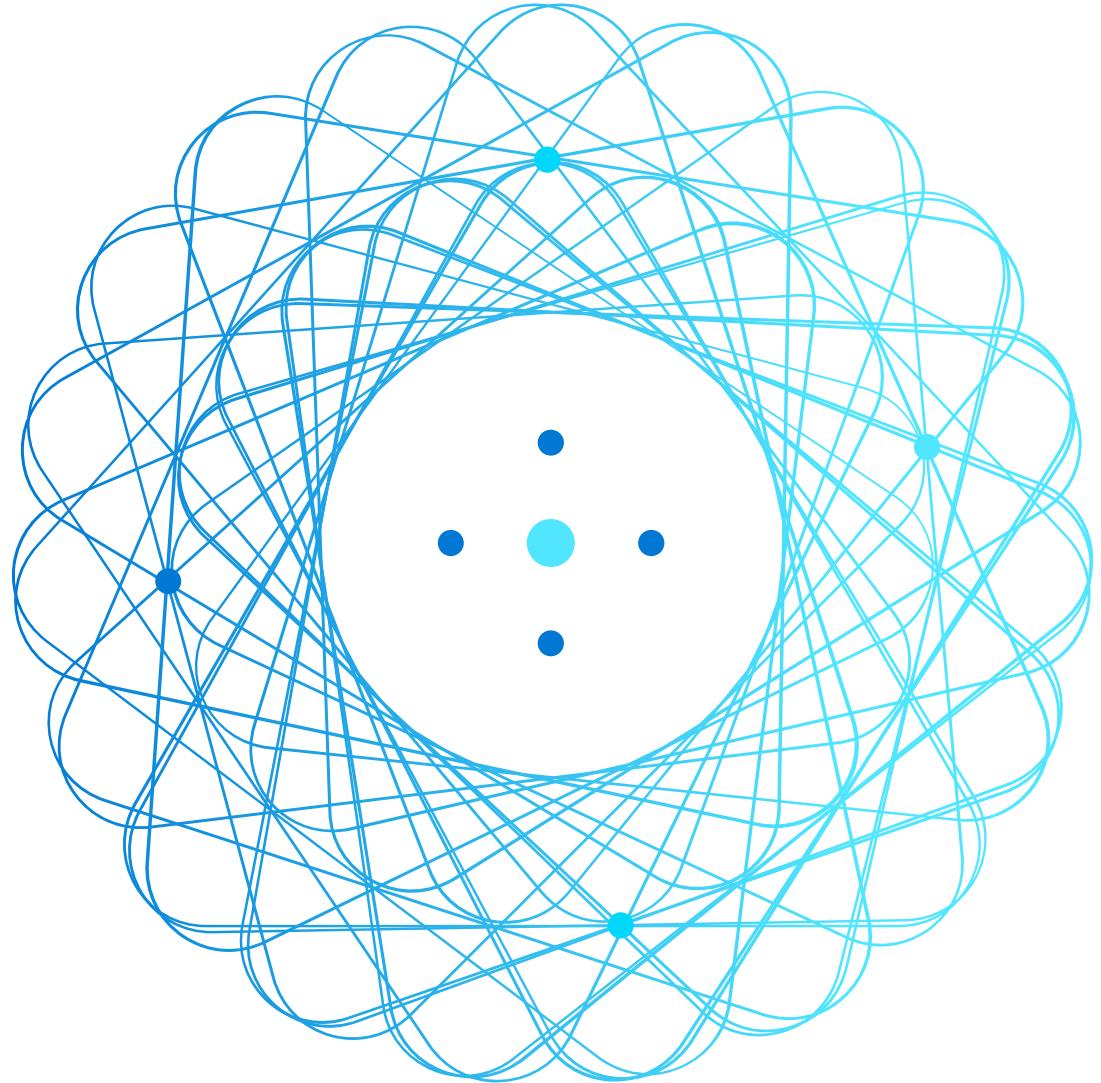
Create a Microsoft Learn account

- Go to <https://docs.Microsoft.com/learn>
- If you are not logged in at the top right, create an account



AZ-900 Objective 1: Cloud concepts

Dwayne Natwick



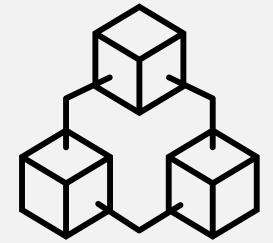
Objective Area 1

Includes the following concepts:

- **Cloud Models**
 - Public, Private, and Hybrid cloud
 - Choosing the best for you
- **Cloud Benefits and Considerations**
 - Benefits of the cloud
 - Cloud considerations
- **Cloud Services**
 - IaaS, PaaS, and SaaS
 - Sharing responsibility



Cloud Models

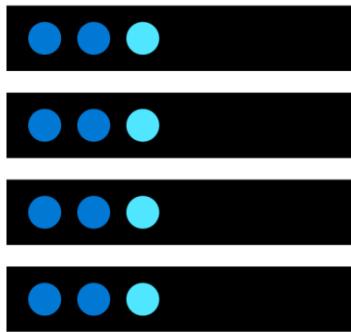


Cloud Models - Objective Domain

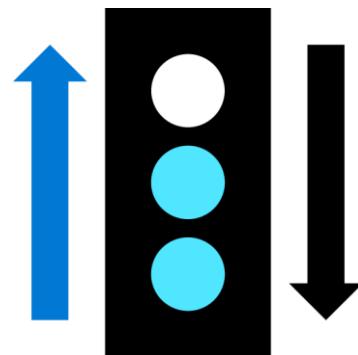
- Define cloud computing
- Describe Public cloud
- Describe Private cloud
- Describe Hybrid cloud
- Compare and contrast the three different cloud models

What is cloud computing?

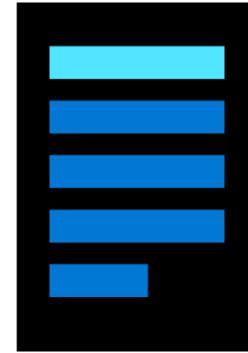
Cloud Computing is the delivery of computing services over the internet, enabling faster innovation, flexible resources, and economies of scale.



Compute



Networking



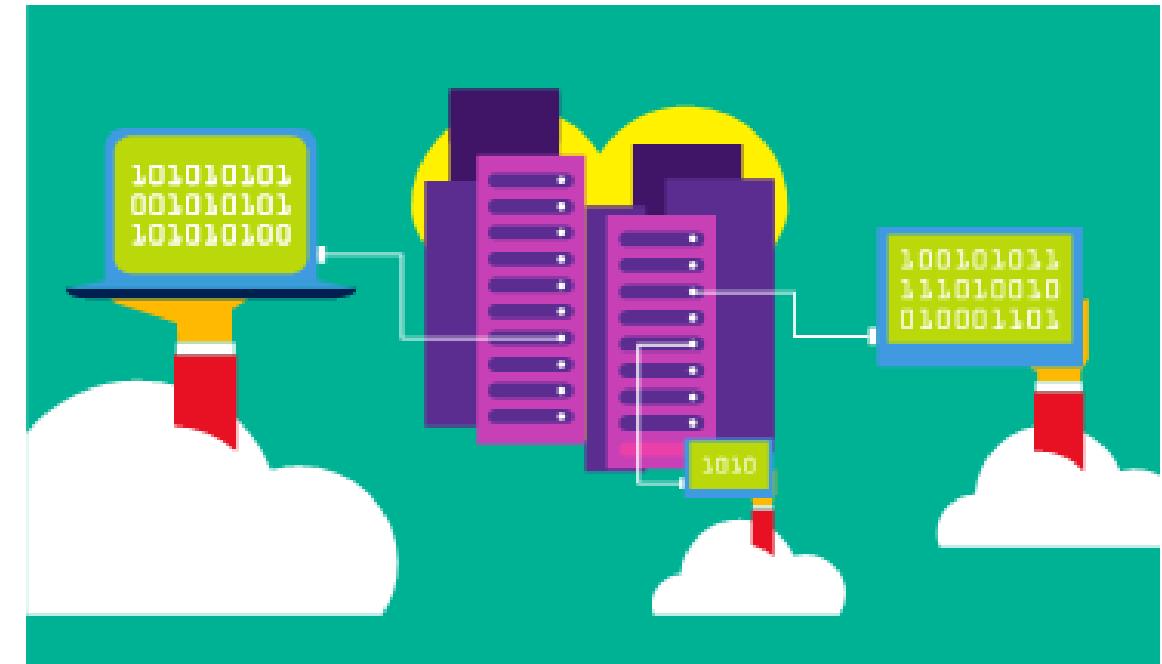
Storage



Analytics

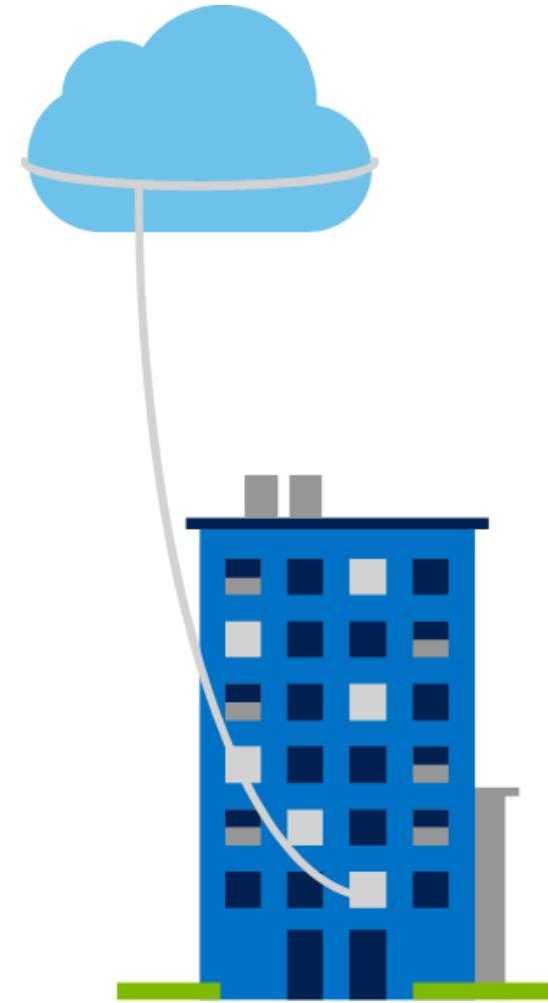
Public cloud

- Owned by cloud services or hosting provider.
- Provides resources and services to multiple organizations and users.
- Accessed via secure network connection (typically over the internet).

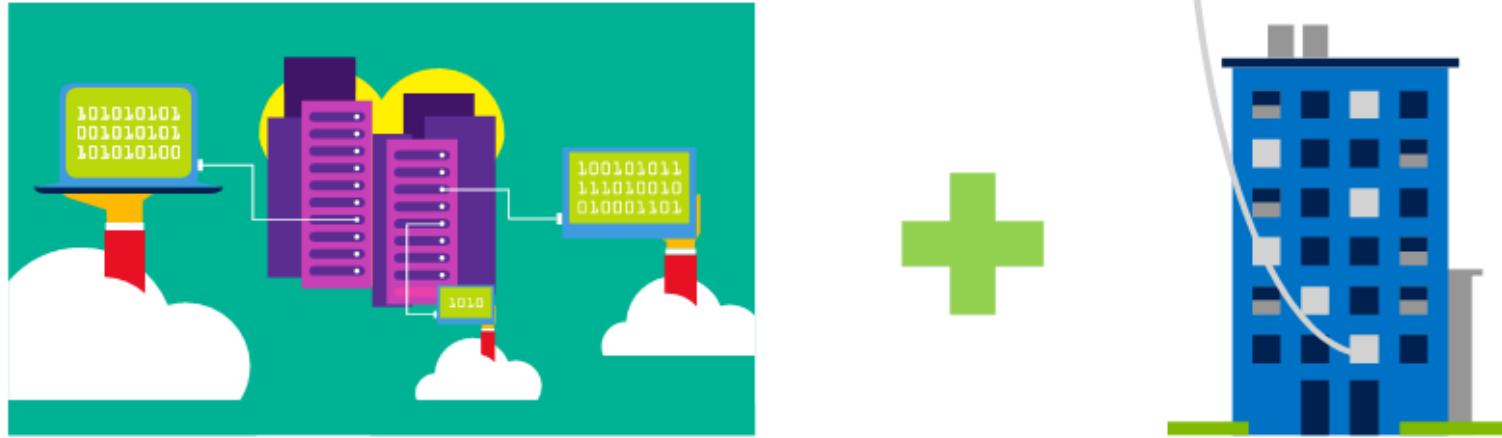


Private cloud

- Organizations create a cloud environment in their datacenter.
- Organization is responsible for operating the services they provide.
- Does not provide access to users outside of the organization.



Hybrid cloud



Combines **Public** and **Private** clouds to allow applications to run in the most appropriate location.

Cloud model comparison

Public Cloud

- No capital expenditures to scale up.
- Applications can be quickly provisioned and deprovisioned.
- Organizations pay only for what they use.

Private Cloud

- Hardware must be purchased for start-up and maintenance.
- Organizations have complete control over resources and security.
- Organizations are responsible for hardware maintenance and updates.

Hybrid Cloud

- Provides the most flexibility.
- Organizations determine where to run their applications.
- Organizations control security, compliance, or legal requirements.

Knowledge Check

Which cloud service type requires the customer to manage the underlying hypervisor platform for their cloud deployments?

- a) Infrastructure-as-a-Service
- b) Platform-as-a-Service
- c) Software-as-a-Service
- d) None of the above

Answer

Which cloud service type requires the customer to manage the underlying hypervisor platform for their cloud deployments?

- a) Infrastructure-as-a-Service
- b) Platform-as-a-Service
- c) Software-as-a-Service
- d) *None of the above*

Knowledge check

Which cloud service types would best match the following situation?

Several web applications have been developed internally in your organization. The web applications allow users to enter details in a form and those details are then emailed to a shared mailbox. The form is accessible from the internet and can be accessed anonymously.

Answer

PaaS (Platform-as-a-Service)

Because the web applications are publicly accessible and do not require authentication, a PaaS service that allows customers to host web sites without having to manage servers would be best.

The websites can be deployed quickly and will have publicly accessible endpoints with minimal configuration.

Emails could be sent using a SaaS solution as well.

Cloud benefits and considerations



Cloud Benefits - Objective Domain

- Identify the benefits of cloud computing such as High Availability, Scalability, Elasticity, Agility, and Disaster Recovery.
- Identify the differences between Capital Expenditure (CapEx) and Operational Expenditure (OpEx).
- Describe the consumption-based model.

Cloud Benefits

High availability

Fault tolerance

Scalability

Elasticity

Global reach

Customer latency capabilities

Agility

Predictive cost considerations

Disaster recovery

Security

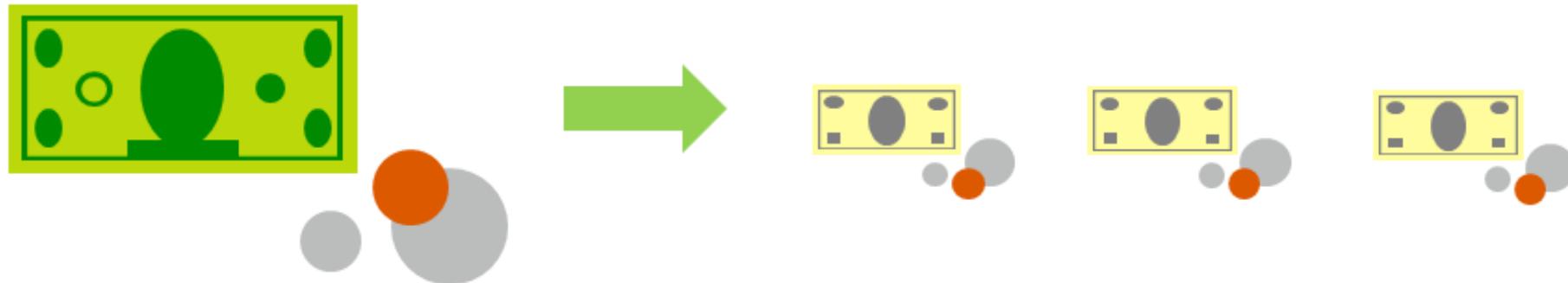
Compare CapEx vs. OpEx

Capital Expenditure (CapEx)

- The up-front spending of money on physical infrastructure.
- Costs from CapEx have a value that reduces over time.

Operational Expenditure (OpEx)

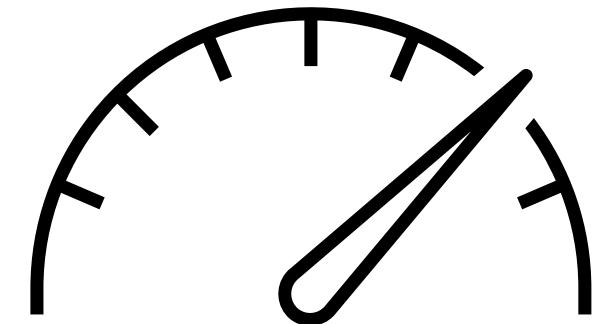
- Spend on products and services as needed, pay-as-you-go
- Get billed immediately



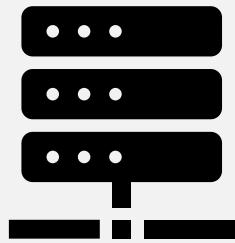
Consumption-based model

Cloud service providers operate on a consumption-based model, which means that end users only pay for the resources that they use. Whatever they use is what they pay for.

- Better cost prediction
- Prices for individual resources and services are provided
- Billing is based on actual usage



Cloud services

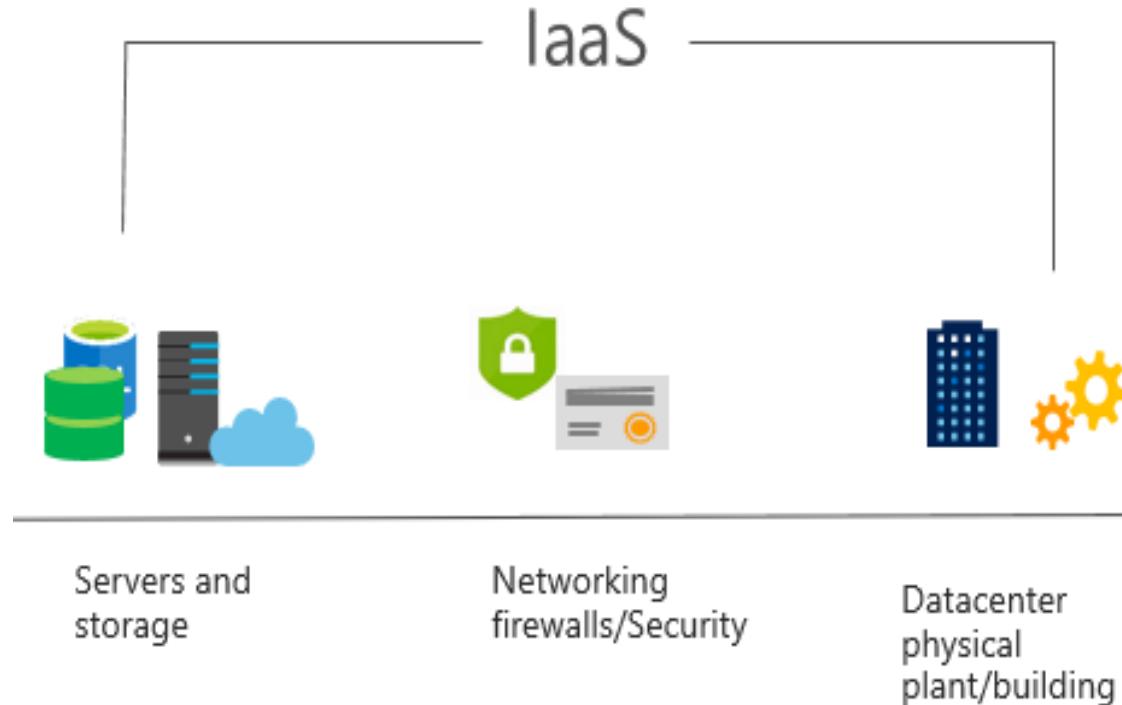


Cloud Services - Objective Domain

- Describe Infrastructure-as-a-Service (IaaS)
- Describe Platform-as-a-Service (PaaS)
- Describe Software-as-a-Service (SaaS)
- Identify a service type based on a use case
- Describe the shared responsibility model
- Describe serverless computing

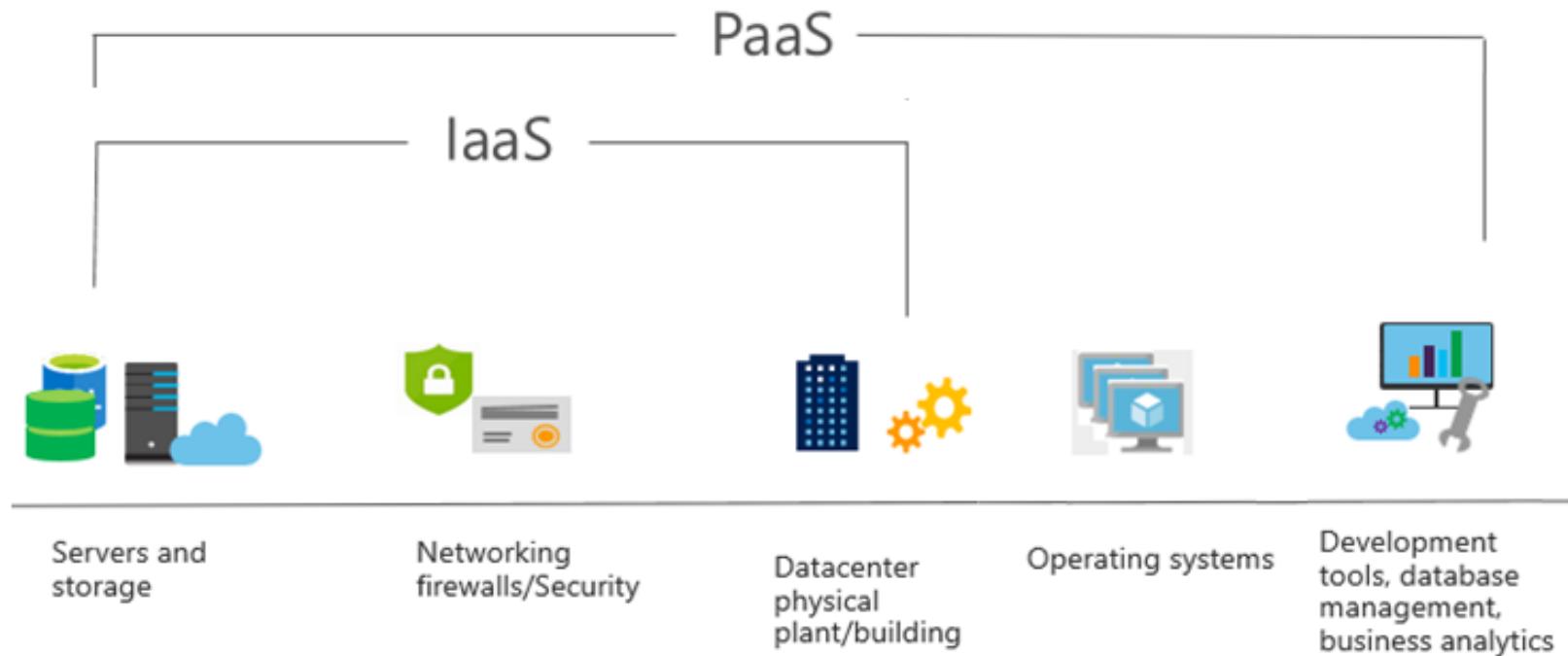
Infrastructure as a Service (IaaS)

Build pay-as-you-go IT infrastructure by renting servers, virtual machines, storage, networks, and operating systems from a cloud provider.



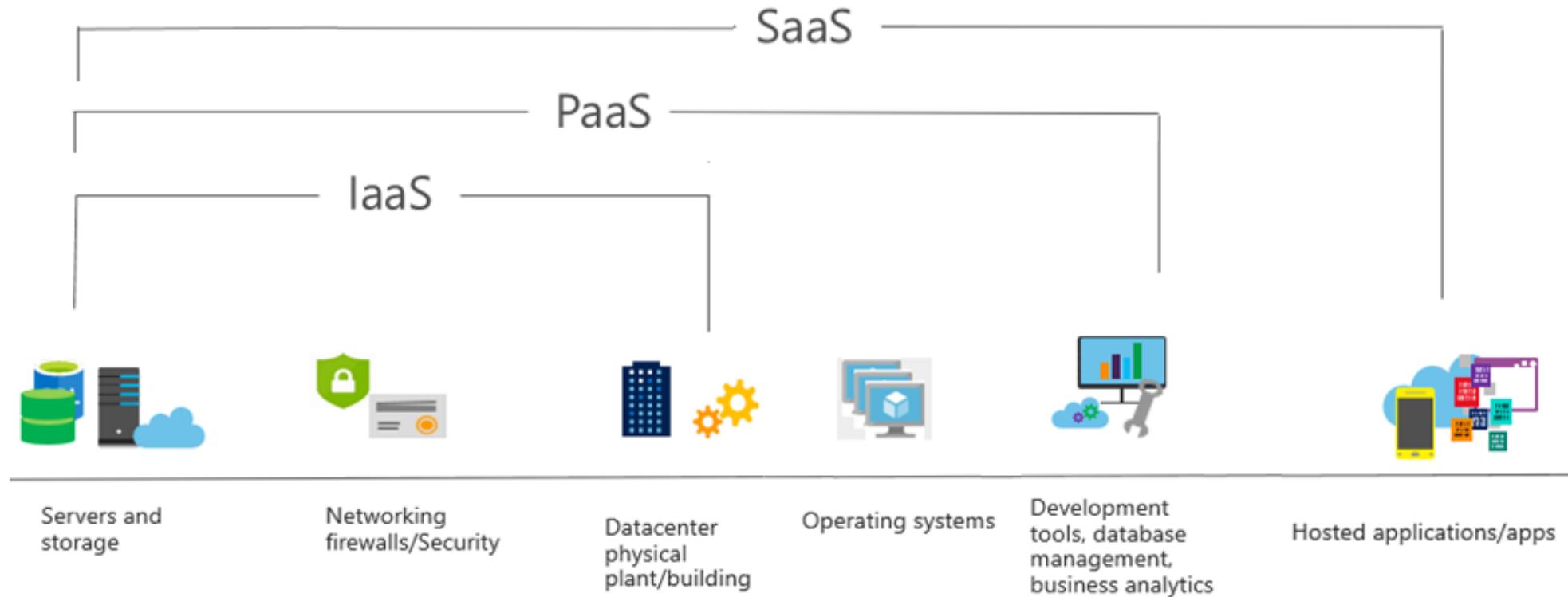
Platform as a Service (PaaS)

Provides environment for building, testing, and deploying software applications; without focusing on managing underlying infrastructure.



Software as a Service (SaaS)

Users connect to and use cloud-based apps over the internet: for example, Microsoft Office 365, email, and calendars.



Cloud service comparison

IaaS

The most flexible cloud service.

You configure and manage the hardware for your application.

PaaS

Focus on application development.

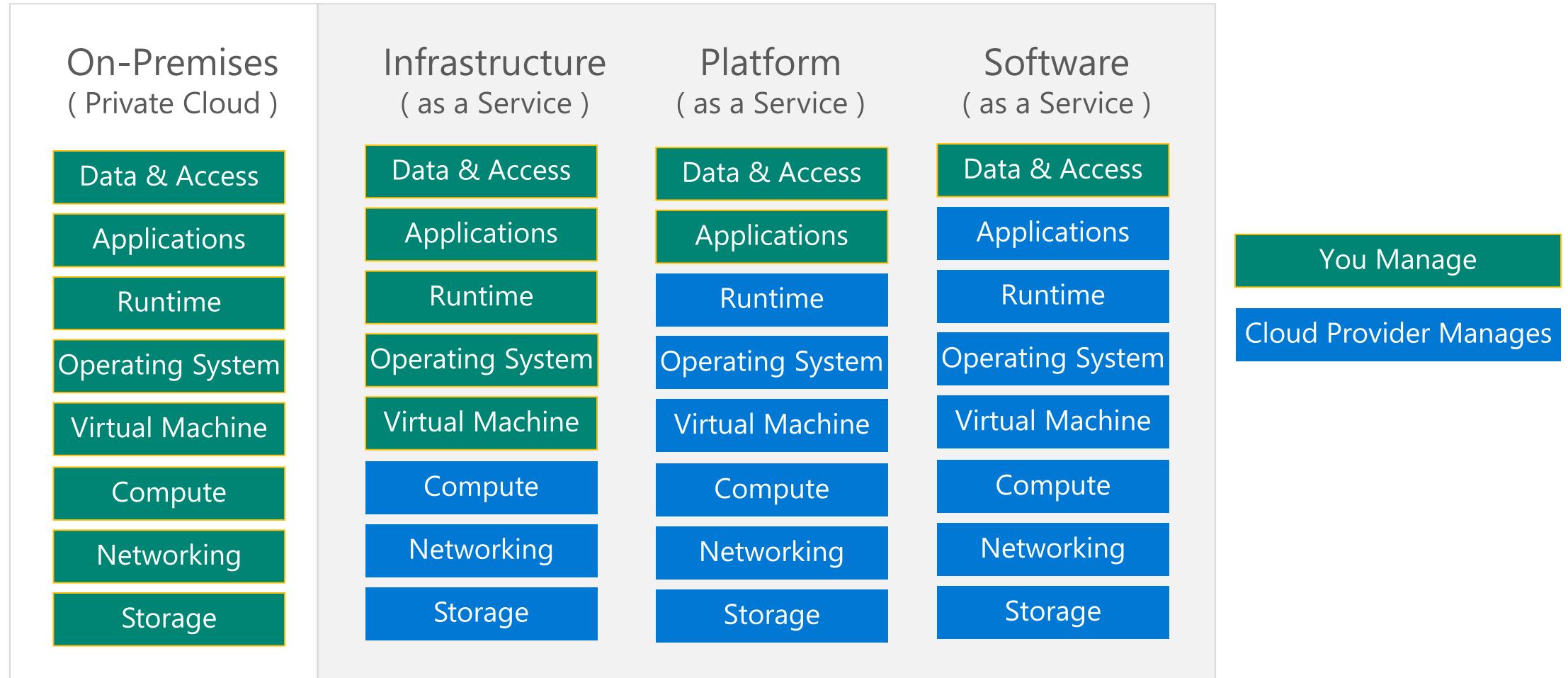
Platform management is handled by the cloud provider.

SaaS

Pay-as-you-go pricing model.

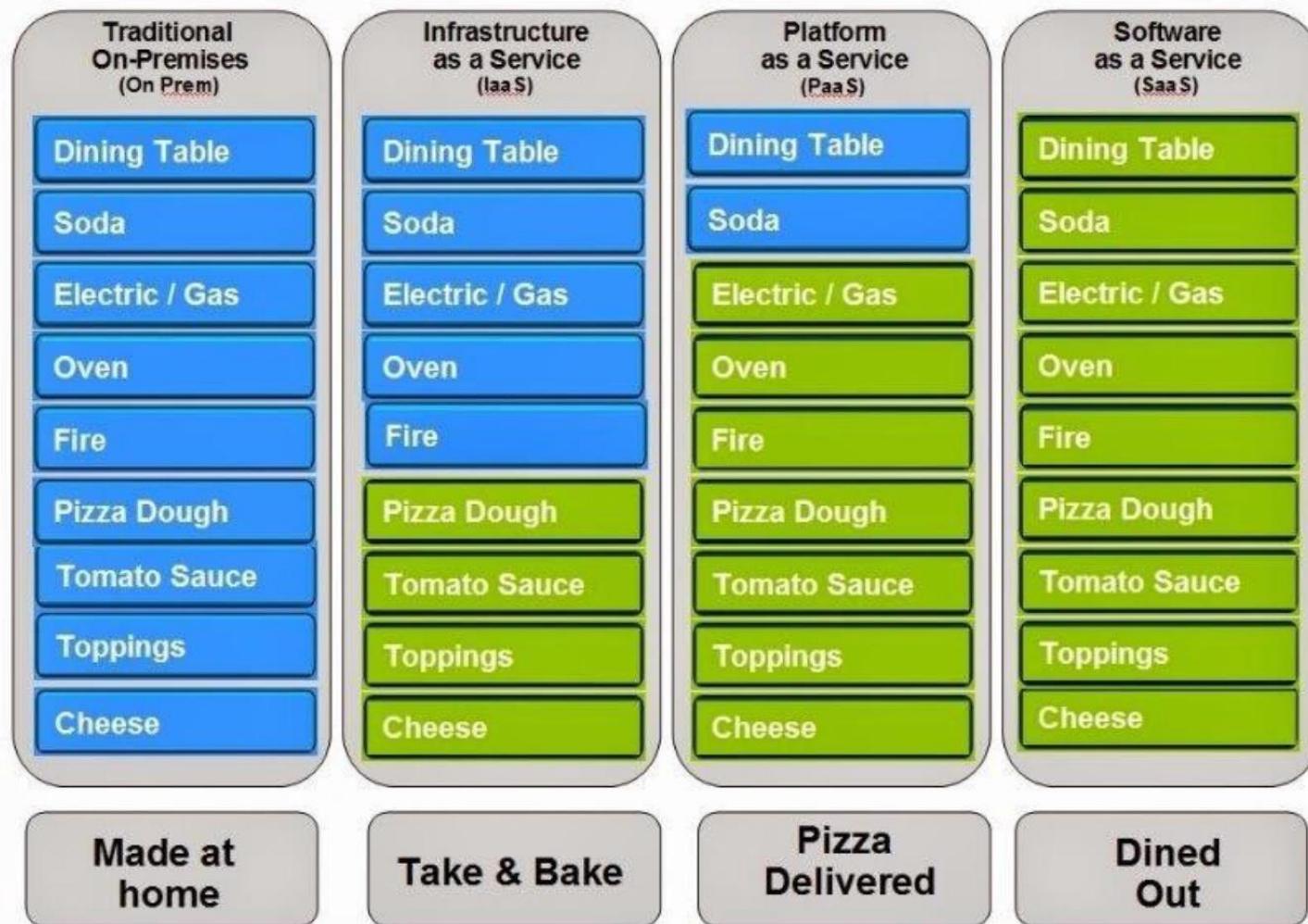
Users pay for the software they use on a subscription model.

Shared responsibility model



Pizza Shared Responsibility

Pizza as a Service



■ You Manage ■ Vendor Manages

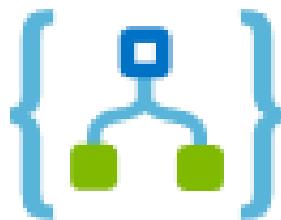
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Serverless Computing

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



Azure Functions is code running your service and not the underlying platform or infrastructure. It creates infrastructure based on an event.



Azure Logic Apps is a cloud service that helps you automate and orchestrate tasks, business processes, and workflows when you need to integrate apps, data, systems, and services.

Knowledge check

Which cloud deployment model would be best for the following scenario?

A server is needed to process data for a short-term project. The organization does not have hardware that meets the performance requirements or any available staff to deploy it. The project starts in a few days and the server is not needed when the project is completed.

Answer

Public Cloud

Because the server is only needed for a short time, public cloud would be the best option.

Creating a server in the public cloud will be cost-effective with pay per-usage billing and the resource can be removed when the project is complete.

A PaaS database could also be a candidate, eliminating the need for a server.

Knowledge Check

The capability of a system to be enlarged to accommodate a growing amount of work is best described by the term

- a) Reliability
- b) Elasticity
- c) Scalability
- d) Agility

Answer

The capability of a system to be enlarged to accommodate a growing amount of work is best described by the term

- a) Reliability
- b) Elasticity
- c) Scalability
- d) Agility

Knowledge Check

In general terms, when an organization moves to the cloud will it see a reduction in CapEx, OpEx, or both?

Answer

Both.

Quite often, an immediate reduction in CapEx is realized by moving to the cloud. This can be through the immediate reduction in on-premises components by eliminating or migrating workloads.

Organizations can also see a reduction in OpEx through the reduced time and hours spent on IT maintenance. Organizations that move to the cloud see a significant reduction in IT management tasks as responsibilities shift to the cloud provider.

Objective 1 Review



Microsoft Learn Modules
(docs.microsoft.com/Learn)

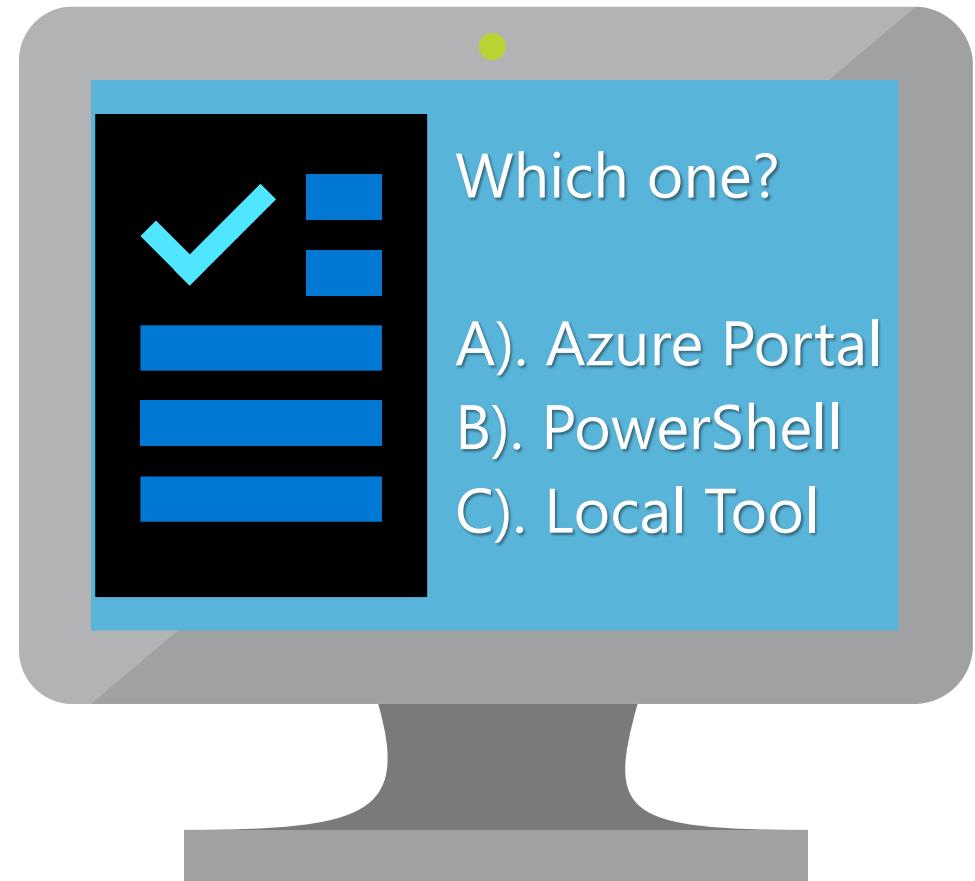
- Microsoft offers Public, Private, and Hybrid cloud models so you can build based on your needs.
- From high-availability to elasticity to disaster recovery to pay-as-use the benefits of the Azure cloud are numerous.
- IaaS, PaaS, SaaS, and serverless, or a combination.
- Shared responsibility.

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module 1

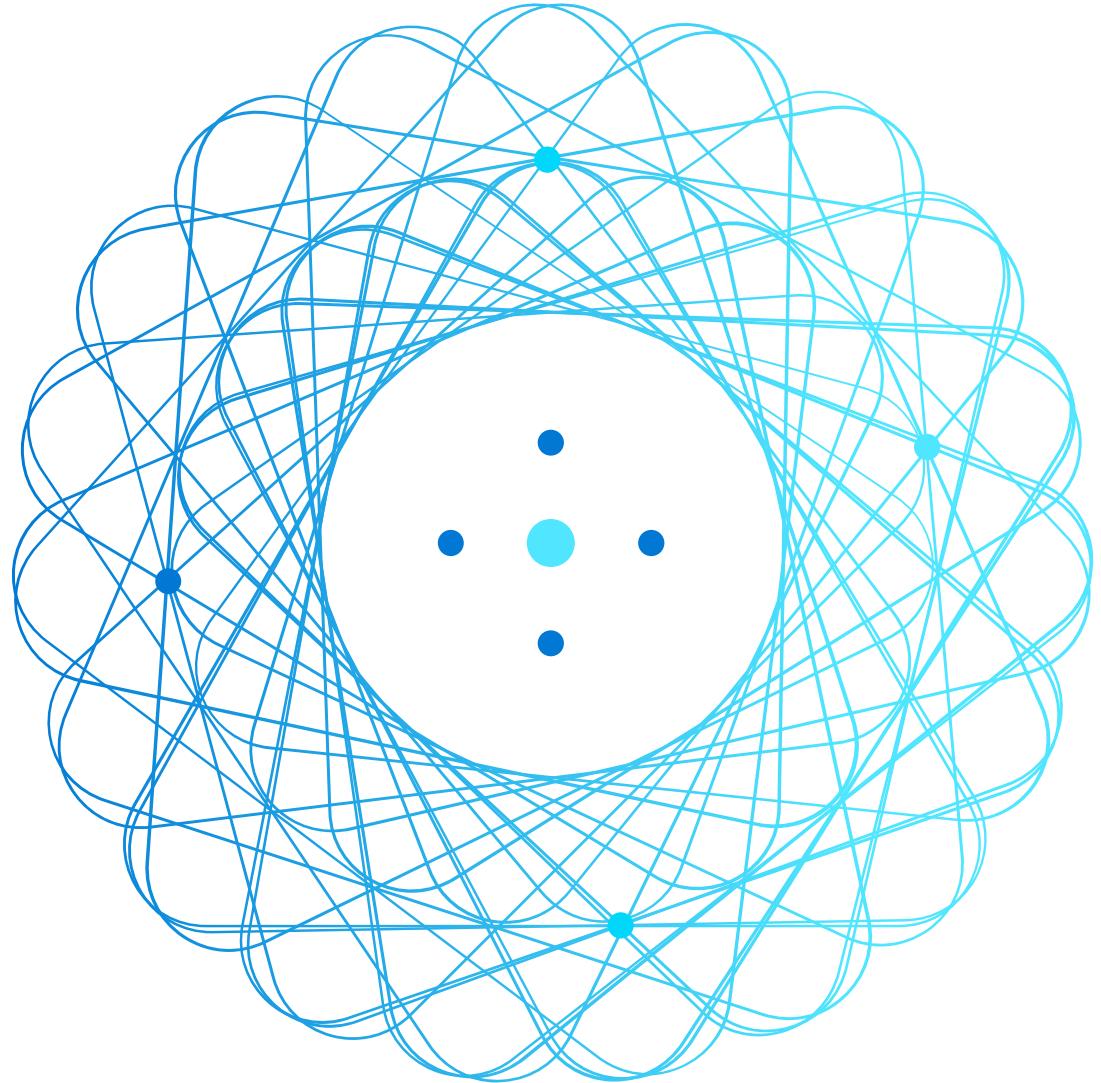
1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRUNjBOMjlwMUVTQUVSU0VMUFFMUDJaNTFYNi4u
2. Please participate in the quiz for this section



AZ-900

Objective 2:

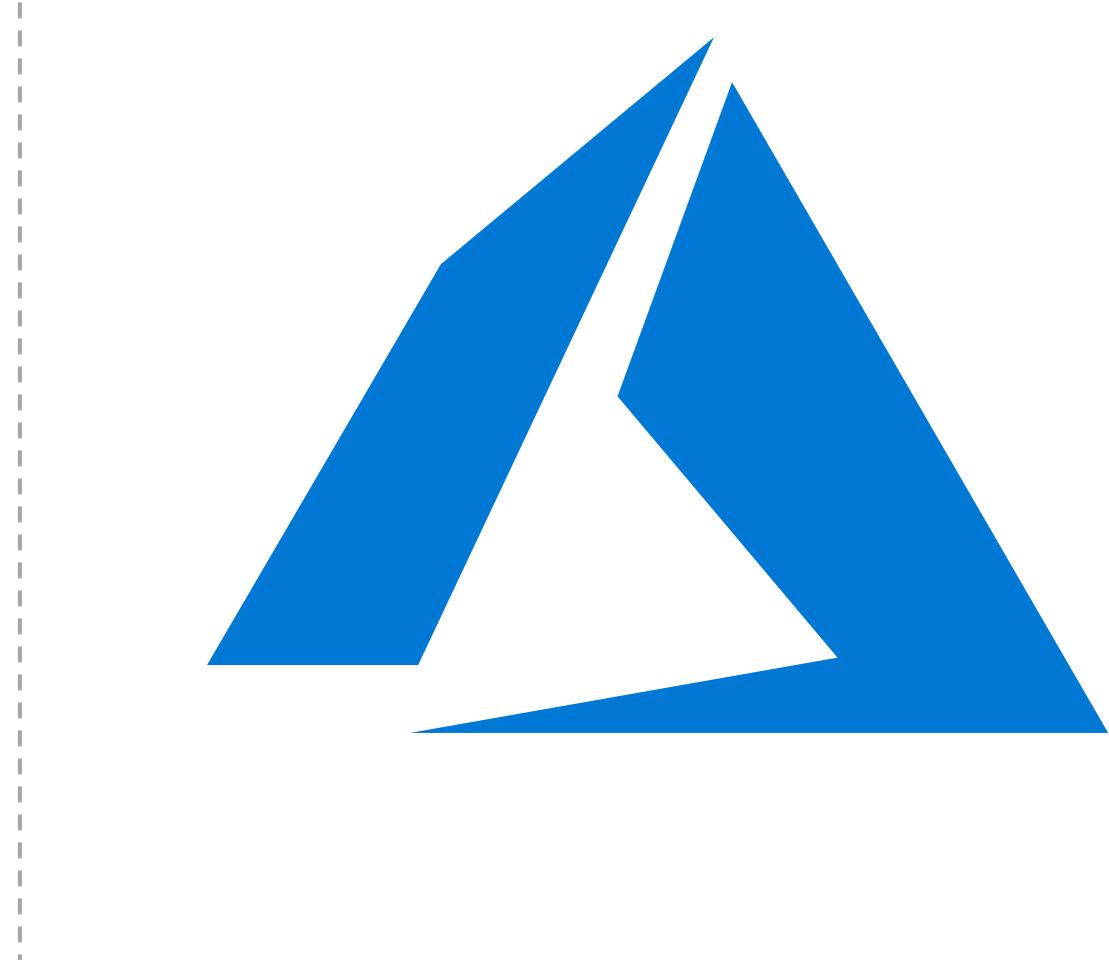
Core Azure Services



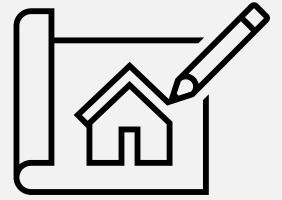
Objective area 2

Includes the following concepts:

- **Azure Architectural Components**
 - Regions and Availability Zones
 - Subscriptions and Resource Groups
- **Core Azure Resources**
 - Compute
 - Networking
 - Storage
 - Databases



Core Azure architectural components



Core Azure architectural components – Objective Domain

Describe the benefits and usage of:

- Regions and Region Pairs
- Availability Zones
- Azure Resources
- Resource Groups
- Azure Resource Manager
- Subscriptions
- Azure Management Groups

Regions

Azure offers more global regions than any other cloud provider with 60+ regions representing over 140 countries



- Regions are made up of one or more datacenters in close proximity.
- Provide flexibility and scale to reduce customer latency.
- Preserve data residency with a comprehensive compliance offering.

Region Pairs

- At least 300 miles of separation between region pairs.
- Automatic replication for some services.
- Prioritized region recovery in the event of outage.
- Updates are rollout sequentially to minimize downtime.

Web Link: <https://aka.ms/PairedRegions>

Region	Region
North Central US	South Central US
East US	West US
West US 2	West Central US
US East 2	Central US
Canada Central	Canada East
North Europe	West Europe
UK West	UK South
Germany Central	Germany Northeast
South East Asia	East Asia
East China	North China
Japan East	Japan West
Australia Southeast	Australia East
India South	India Central
Brazil South (Primary)	South Central US

Geographies

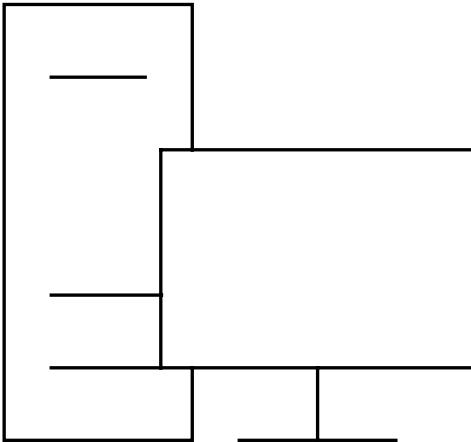
- Discrete markets that preserve data residency and compliance boundaries.
- Typically contain two or more regions.
- Allow customers with specific data-residency and compliance needs to keep their data and applications in close proximity.
- Categorized as Americas, Europe, Asia Pacific, Middle East, and Africa.



Availability Options

VM SLA

99.9% with Premium Storage

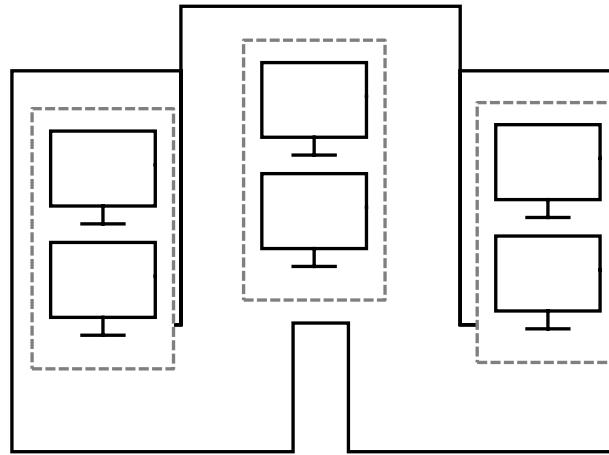


SINGLE VM

Easier lift and shift

VM SLA

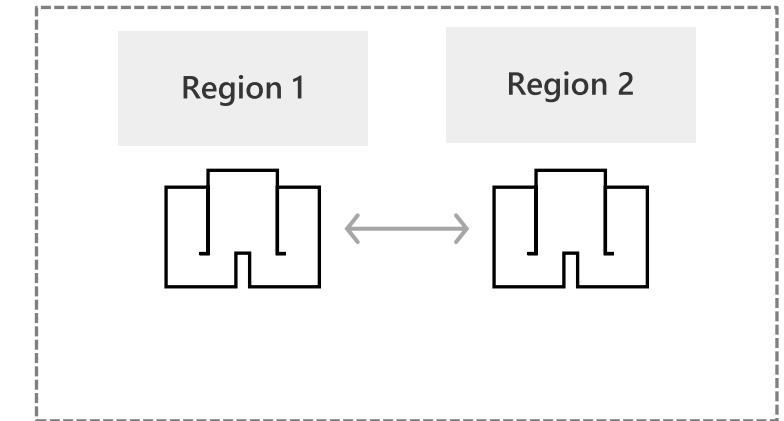
99.99%



AVAILABILITY ZONES

Protection from entire datacenter failures

MULTI-REGION DISASTER RECOVERY

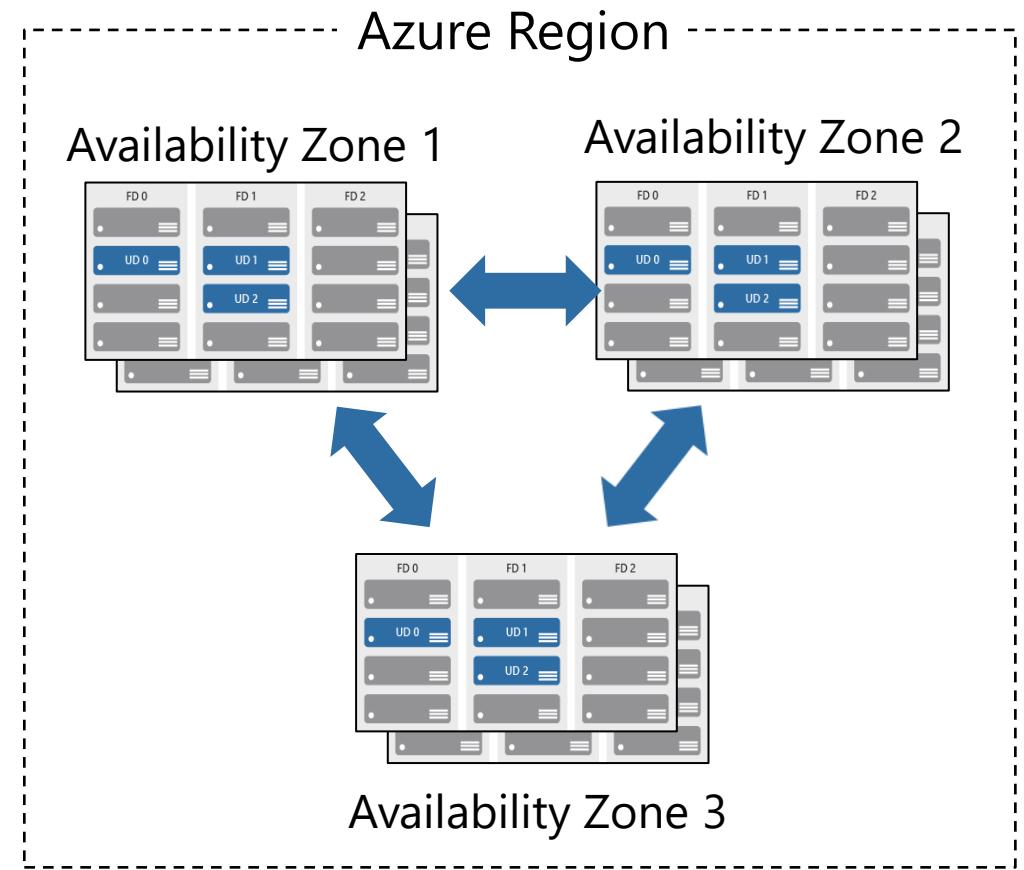


REGION PAIRS

Regional protection within Data Residency Boundaries

Availability zones

- Provide protection against downtime due to datacenter failure.
- Physically separate datacenters within the same region.
- Each datacenter is equipped with independent power, cooling, and networking.
- Connected through private fiber-optic networks.

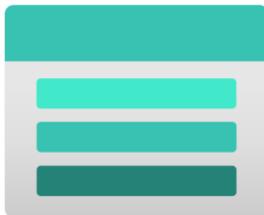


Azure Resources

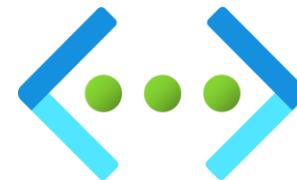
Azure **resources** are components like storage, virtual machines, and networks that are available to build cloud solutions.



Virtual Machines



Storage Accounts



Virtual Networks



App Services



SQL Databases



Functions

Resource groups

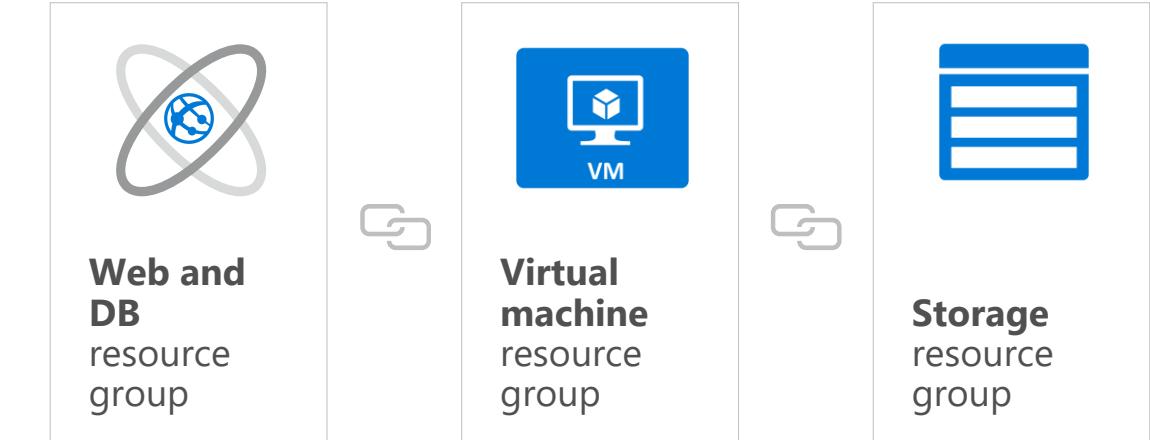
A **resource group** is a container to manage and aggregate resources in a single unit.

- Resources can exist in only one resource group.
- Resources can exist in different regions.
- Resources can be moved to different resource groups.
- Applications can utilize multiple resource groups.

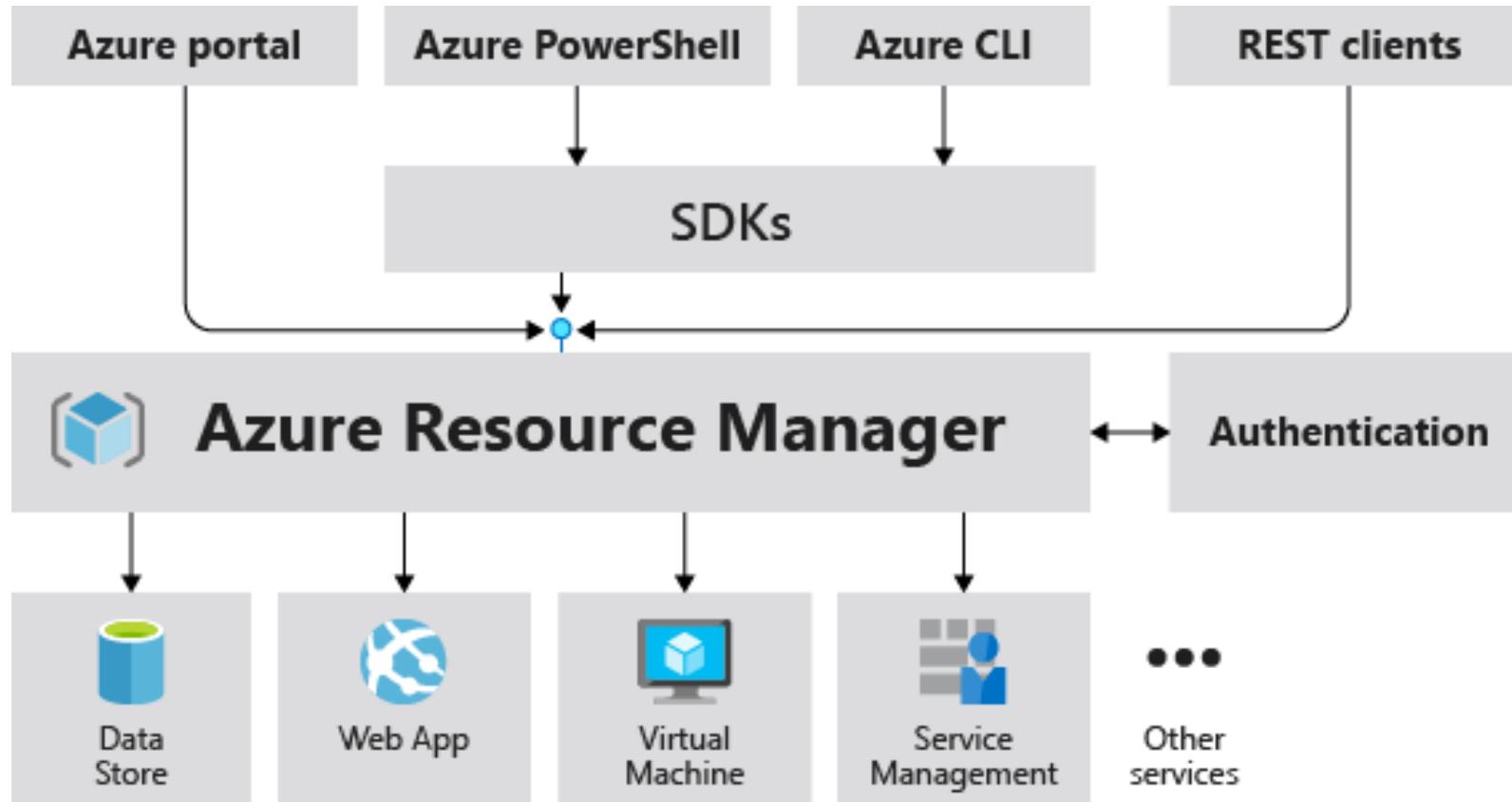
Resource groups
(web + DB, VM, Storage) in one group



OR



Azure Resource Manager

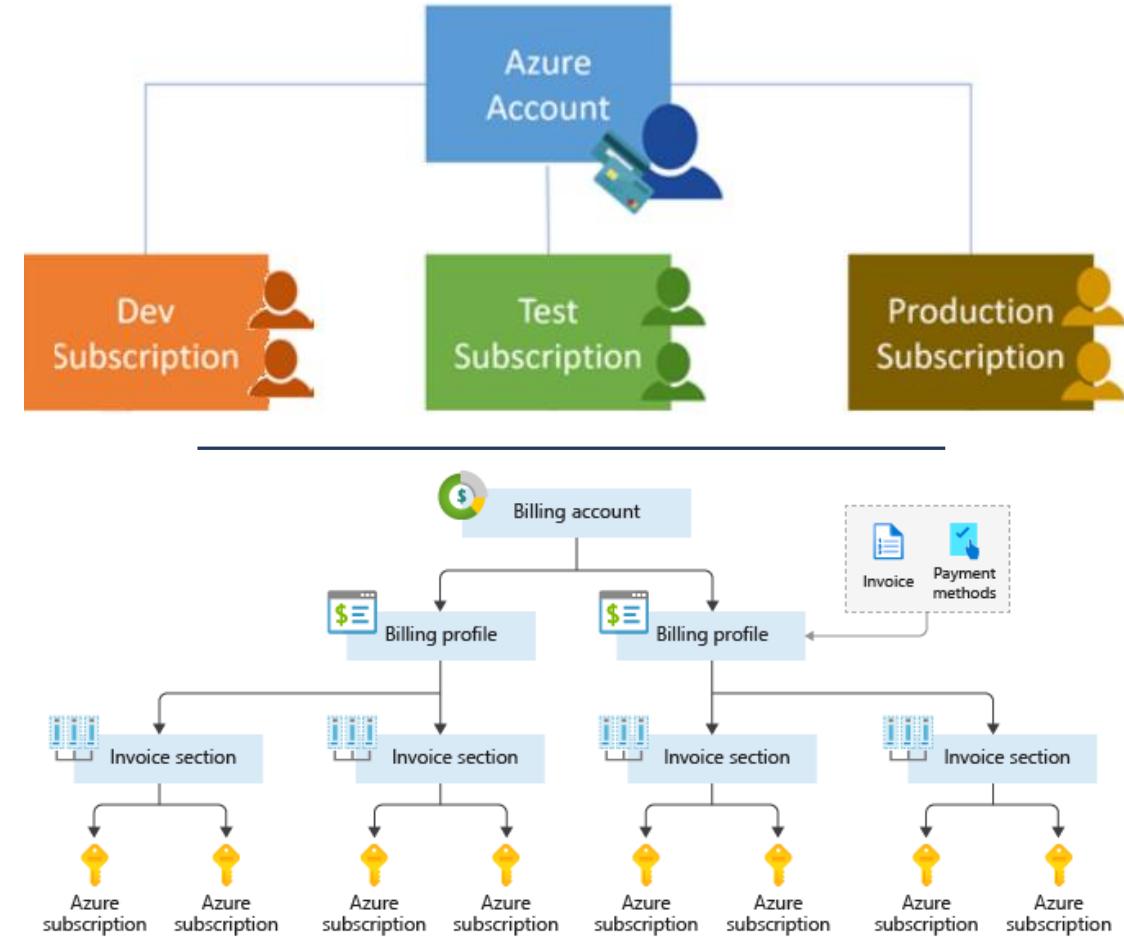


The **Azure Resource Manager (ARM)** provides a management layer that enables you to create, update, and delete resources in your Azure subscription.

Azure Subscriptions

An Azure subscription provides you with authenticated and authorized access to Azure accounts.

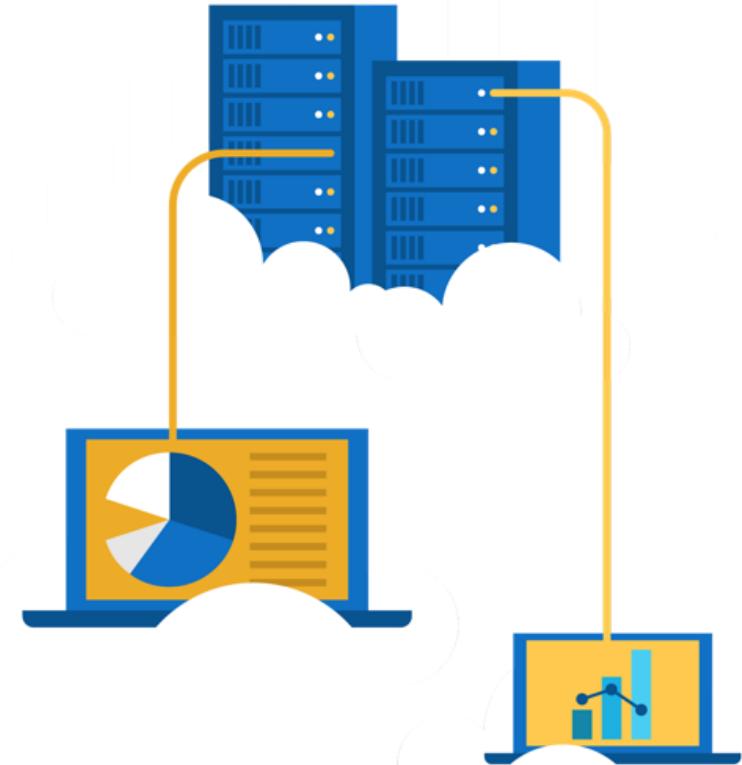
- **Billing boundary:** generate separate billing reports and invoices for each subscription.
- **Access control boundary:** manage and control access to the resources that users can provision with specific subscriptions.



Walkthrough – Explore the Azure Portal

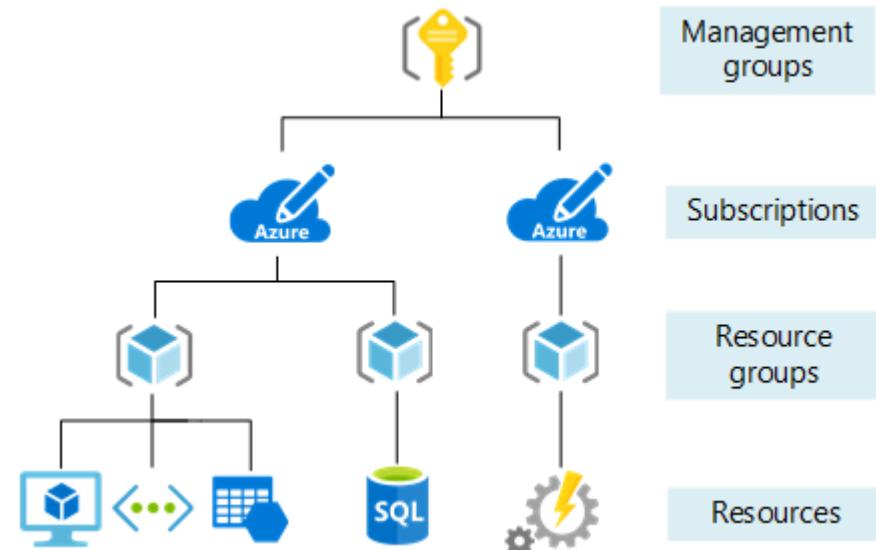
Launch the Azure Portal and have a look at the common components used everyday building cloud solutions

1. Connect to <https://portal.azure.com>
2. Explore the home screen.
3. Find “All Services” and see what is available.

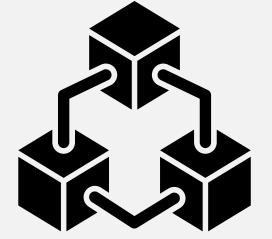


Management Groups

- Management groups can include multiple Azure subscriptions.
- Subscriptions inherit conditions applied to the management group.
- 10,000 management groups can be supported in a single directory.
- A management group tree can support up to six levels of depth.



Core Azure workload products



Security & Management



Portal



Azure Active Directory



Multi-Factor Authentication



Automation



Key Vault



Store / Marketplace



VM Image Gallery & VM Depot

Platform Services

Compute



Cloud Services



Service Fabric



Batch



Remote App

Web and Mobile



Web Apps



API Apps



API Management



Mobile Apps



Logic Apps



Notification Hubs

Developer Services



Visual Studio



Azure SDK



Team Project



Application Insights

Integration



Storage Queues



Biztalk Services



Hybrid Connections



Service Bus

Media & CDN



Media Services



Content Delivery Network (CDN)

Analytics & IoT



HDInsight



Machine Learning



Data Factory



Event Hubs



Stream Analytics



Mobile Engagement

Data



SQL Database



SQL Data Warehouse



Redis Cache



Search



DocumentDB



Tables

Hybrid Operations



Azure AD Connect Health



Azure AD Privileged Identity Management



Backup



Operations Management Suite



Import/Export



Site Recovery



StorSimple

Infrastructure Services

Compute



Storage



BLOB Storage



Azure Files



Premium Storage



Virtual Network



Load Balancer



DNS

Networking



Express Route



Traffic Manager



VPN Gateway



Application Gateway

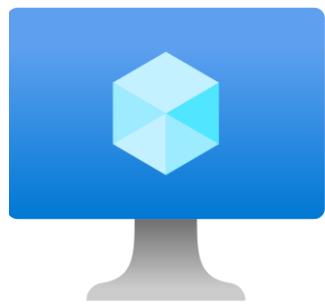
Core Azure Workloads - Objective Domain

Describe the benefits and usage of:

- Virtual Machines, Azure App Services, Azure Container Instances (ACI), Azure Kubernetes Service (AKS), and Windows Virtual Desktop
- Virtual Networks, VPN Gateway, Virtual Network peering, and ExpressRoute
- Container (Blob) Storage, Disk Storage, File Storage, and storage tiers
- Cosmos DB, Azure SQL Database, Azure Database for MySQL, Azure Database for PostgreSQL, and SQL Managed Instance
- Azure Marketplace

Azure compute services

Azure **compute** is an on-demand computing service that provides computing resources such as disks, processors, memory, networking, and operating systems.



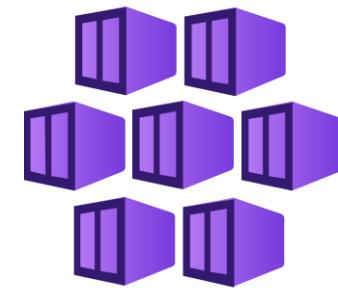
Virtual
Machines



App
Services



Container
Instances



Azure Kubernetes
Services (AKS)



Windows Virtual
Desktop

Azure virtual machines

Azure **Virtual Machines (VM)** are software emulations of physical computers.

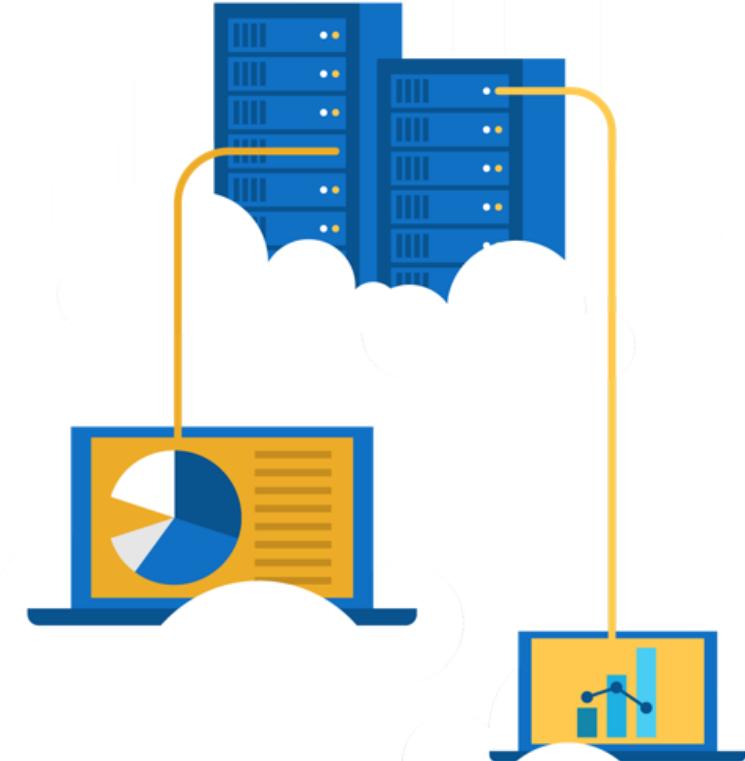
- Includes virtual processor, memory, storage, and networking.
- IaaS offering that provides total control and customization.



Walkthrough – Create a Virtual Machine

Create a virtual machine in the Azure Portal, connect to the virtual machine, install the web server role, and test.

1. Create the virtual machine.
2. Connect to the virtual machine.
3. Install the web server role and test.



Azure App Services



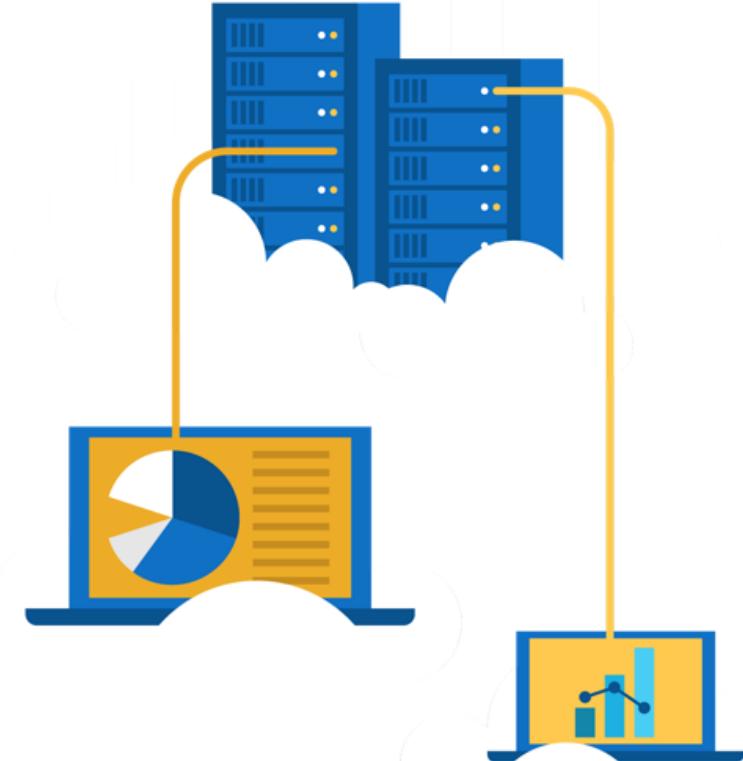
Azure **App Services** is a fully managed platform to build, deploy, and scale web apps and APIs quickly.

- Works with .NET, .NET Core, Node.js, Java, Python, or php.
- PaaS offering with enterprise-grade performance, security, and compliance requirements.

Walkthrough – Create an App Service

Create a new Web App by using a Docker image stored in Azure Container Registry.

1. Create a Web App using a Docker image.
2. Test the Web App.

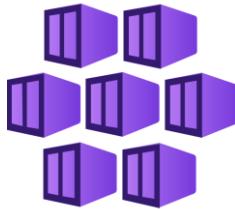


Azure Container Services

Azure **Containers** are a light-weight, virtualized environment that does not require operating system management, and can respond to changes on demand.



Azure Container Instances: a PaaS offering that runs a container in Azure without the need to manage a virtual machine or additional services.

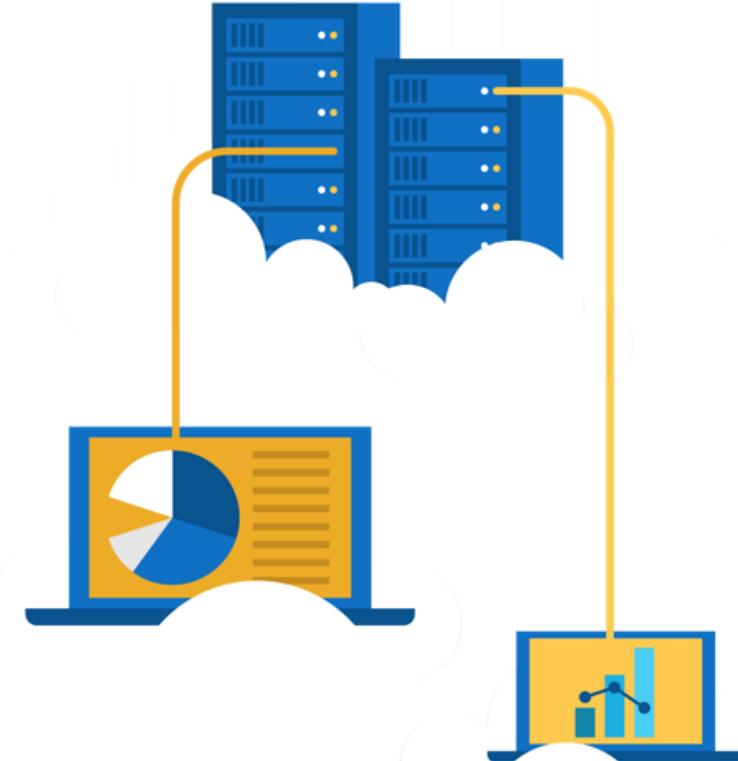


Azure Kubernetes Service: an orchestration service for containers with distributed architectures and large volumes of containers.

Walkthrough - Deploy Azure Container Instances

Using the Azure Portal create, configure, and deploy a Docker container to an Azure Container Instance. The container will deploy a Hello HTML page.

1. Create a container instance.
2. Deploy the container and test.



Windows Virtual Desktop

Windows Virtual Desktop is a desktop and app virtualization that runs in the cloud.

- Create a full desktop virtualization environment without having to run additional gateway servers.
- Publish unlimited host pools to accommodate diverse workloads.
- Reduce costs with pooled, multi-session resources.



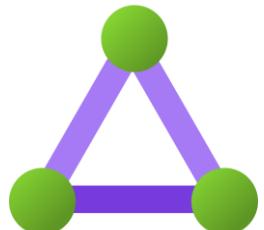
Azure networking services



Azure Virtual Network (VNet) enables Azure resources to communicate with each other, the internet, and on-premises networks.



Virtual Private Network Gateway (VPN) is used to send encrypted traffic between an Azure virtual network and an on-premises location over the public internet.

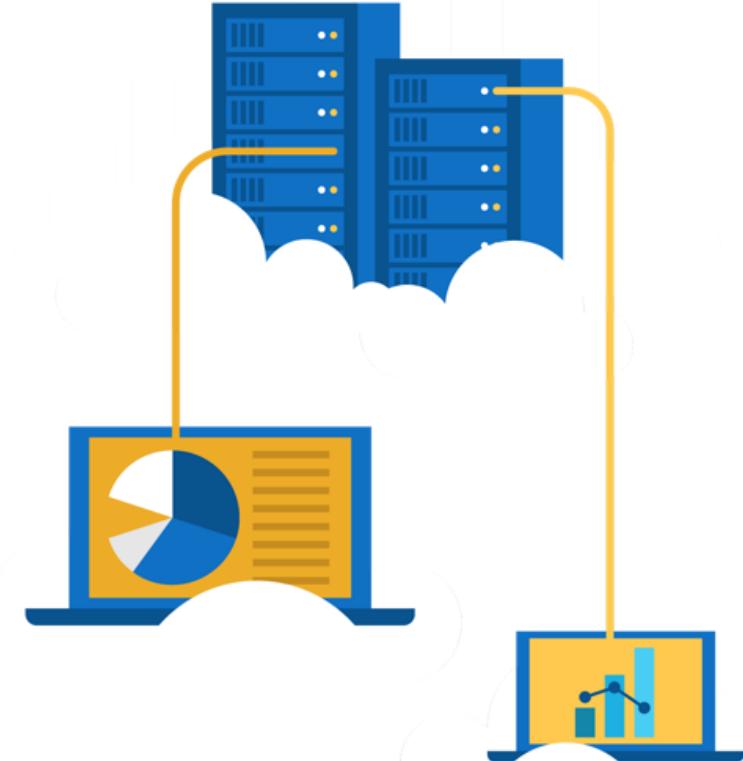


Azure Express Route extends on-premises networks into Azure over a private connection that is facilitated by a connectivity provider.

Walkthrough - Create a virtual network

Create a virtual network with two virtual machines and then test connection between the machines.

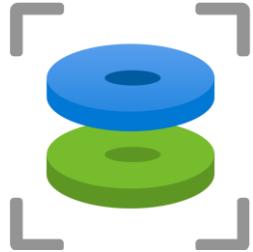
1. Create a virtual network.
2. Create two virtual machines.
3. Test the connection.



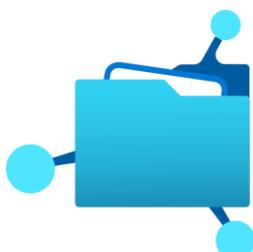
Azure storage services



Container storage (blob) is optimized for storing massive amounts of unstructured data, such as text or binary data.

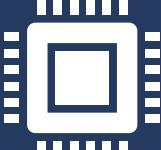


Disk storage provides disks for virtual machines, applications, and other services to access and use.



Azure Files sets up a highly available network file shares that can be accessed by using the standard Server Message Block (SMB) protocol.

Azure storage access tiers

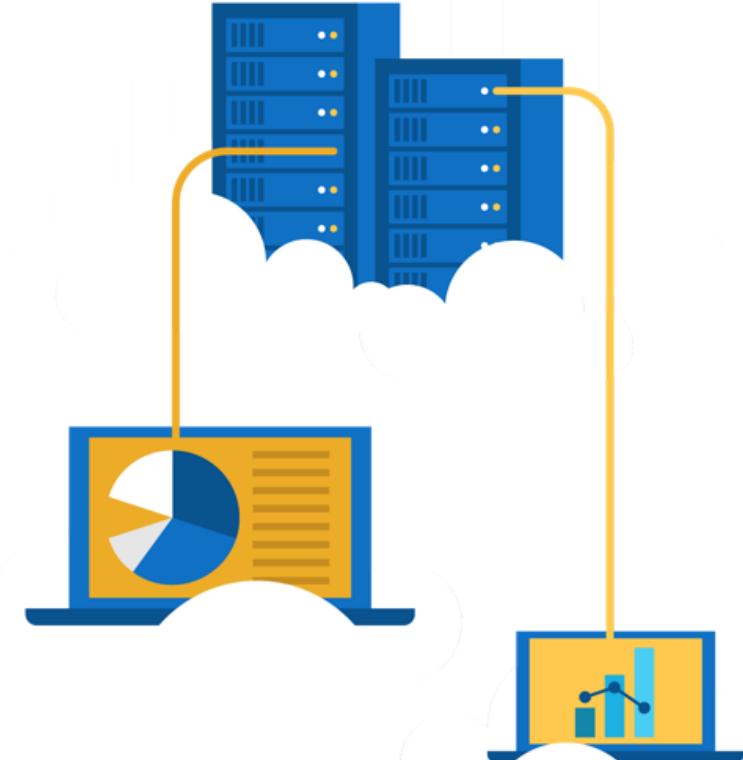
 Hot	 Cool	 Archive
Optimized for storing data that is accessed frequently.	Optimized for storing data that is infrequently accessed and stored for at least 30 days.	Optimized for storing data that is rarely accessed and stored for at least 180 days with flexible latency requirements.

You can switch between these access tiers at any time.

Walkthrough - Create blob storage

Create a storage account with a blob storage container. Work with blob files.

1. Create a storage account.
2. Work with blob storage.
3. Monitor the storage account.



Azure database services



Azure Cosmos Database is a globally-distributed database service that elastically and independently scales throughput and storage.



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



Azure Database for MySQL is a fully-managed MySQL database service for app developers.



Azure Database for PostgreSQL is a relational database service based on the open-source Postgres database engine.

Azure SQL Managed Instance

Azure SQL Managed Instance allows existing SQL Server customers to lift and shift their on-premises applications to the cloud with minimal application and database changes.

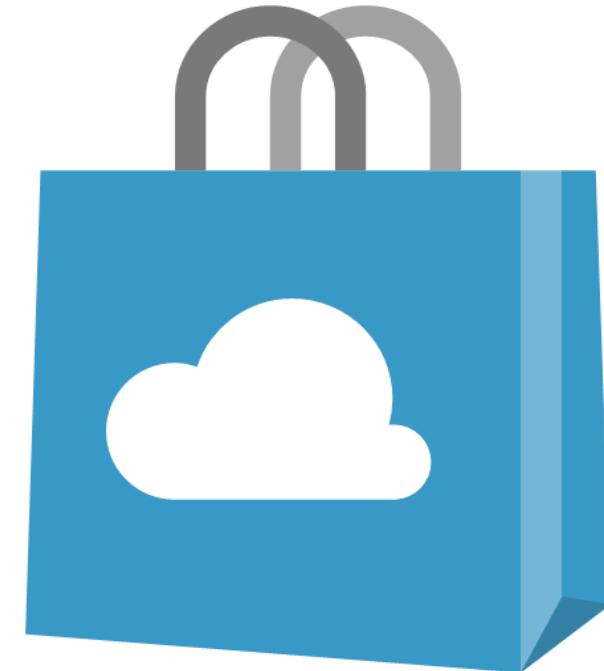
- Fully managed and evergreen platform as a service.
- Preserves all PaaS capabilities (automatic patching and version updates, automated backups, and high availability)
- Exchange existing licenses for discounted rates on SQL Managed Instance using the Azure Hybrid Benefit



Explore Azure Marketplace

Azure Marketplace allows customers to find, try, purchase, and provision applications and services from hundreds of leading service providers, which are all certified to run on Azure.

- Open source container platforms.
- Virtual machine and database images.
- Application build and deployment software.
- Developer tools.
- And much more, with 10,000+ listings!



Knowledge Check

Pick the term that best describes the feature that is made up of one or more datacenters equipped with independent power, cooling, and networking. It is set up to be an isolation boundary. If one goes down, the others continue to work. They are typically connected to each other through very fast, private fiber-optic networks.

- a) Availability sets
- b) Availability zones
- c) Regional availability

Answer

b) Availability zones

Each availability zone is made up of one or more datacenters equipped with independent power, cooling, and networking. It is set up to be an isolation boundary. If one availability zone goes down, the others continue to work. The availability zones are typically connected to each other through very fast, private fiber-optic networks.

Knowledge Check

Suppose you have an existing application running local on your own server. You need additional capacity but prefer to move to Azure instead of buying upgraded on-premises hardware. Which compute option would likely give you the quickest route to getting your application running in Azure?

Answer

Virtual machines

You have full control over the VM setup, so you can configure it to match your on-premises server. This will allow your existing application to run on the Azure VM with little or no change.

Knowledge Check

Which service offers a distributed network of servers that can efficiently deliver web content to users that focuses on minimizing latency?

- a) Azure Virtual Network
- b) Azure Load Balancer
- c) Azure Application Gateway
- d) Content Delivery Network

Answer

d) Content Delivery Network

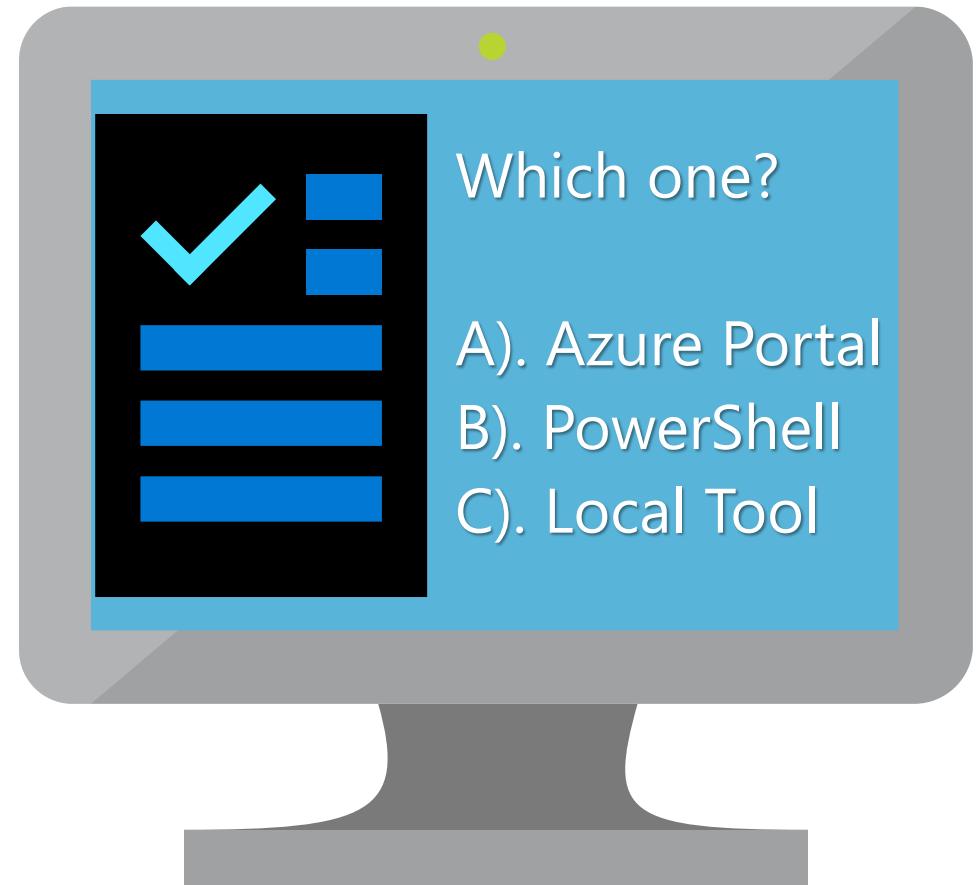
A *content delivery network* (CDN) is a distributed network of servers that can efficiently deliver web content to users. It is a way to get content to users in their local region to minimize latency. CDN can be hosted in Azure or any other location.

Knowledge Check

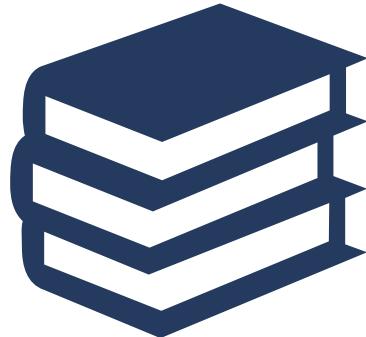
Populate with instructions to use the polling tool of your choice

Module 2

1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRUNVlxTEFEVzZJVUFHTFlaQUVFNDRERVJJUi4u
2. Please participate in the quiz for this section



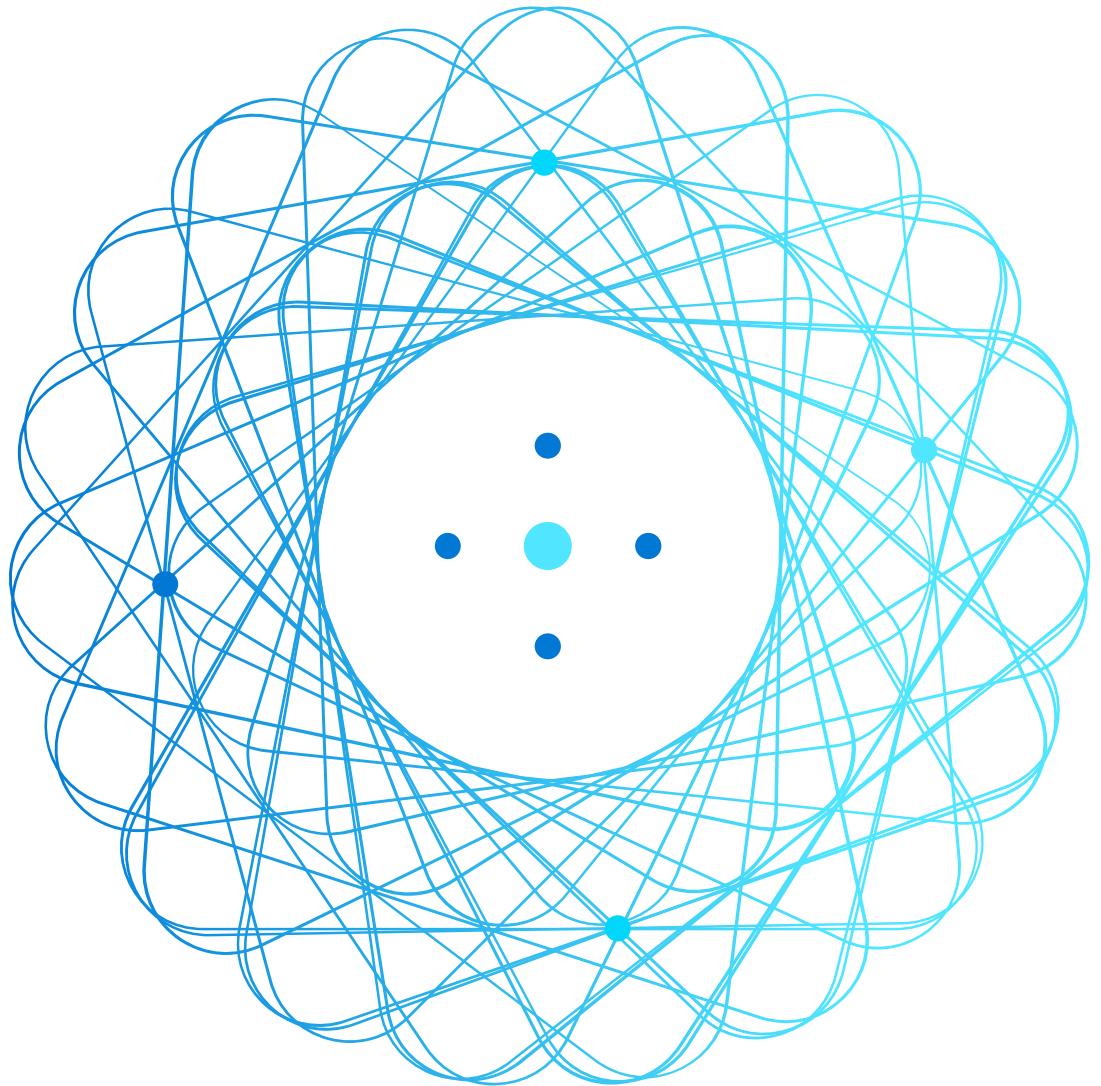
Module 02 Review



Microsoft Learn Modules
(docs.microsoft.com/Learn)

- Microsoft provides more global presence than any other cloud provider with over 60 regions distributed worldwide
- Azure Management tools
- Azure's multiple services (compute, networking, storage, and databases)
- Azure Marketplace

10 - minute break



Next Step: Get Certified

Get a free student exam voucher from Microsoft

While supplies last, apply for a no-cost exam bundle with practice test and exam voucher for any Fundamentals exam:

- Take advantage of this offer for any Fundamentals exam – one application per student – one voucher code, two uses (good for re-take or 2nd Fundamentals exam)
- Offer also includes practice exam for any Fundamentals
- Exams and practice tests must be redeemed and taken before July 1, 2021

To Claim:

- Email certfund@microsoft.com with subject line Certification is Fundamental to receive URL and password
- Visit URL provided in email and enter your information in the redemption form
- Enter the password in the redemption form **EXACTLY** as it is provided in email



Thank you for your interest in Microsoft Certified Fundamentals certification!

Are you looking for a way as a student to validate your skills and prepare for a career? Certification is an effective way to measure success and prepare for a career. Microsoft Fundamentals certification exams are globally recognized and enhance individual productivity, marketability, and value.

Microsoft is offering **FREE Microsoft Fundamentals certification**, delivered through OnVUE, and the ability to prepare for the exam.*

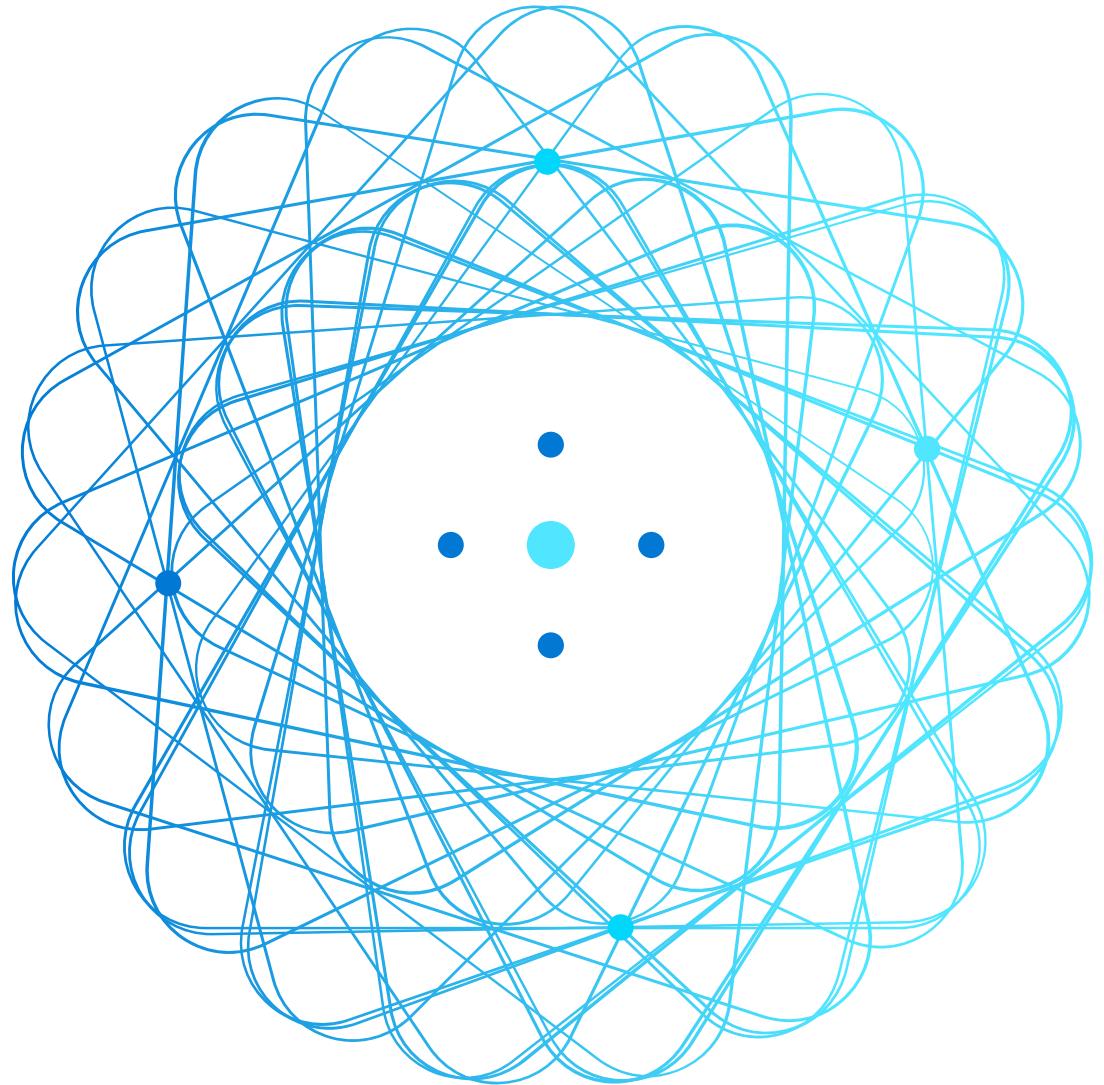
Before you can claim this offer, you will need to attend at least one of the two Microsoft Exam Cram offerings listed below. The events can be attended live or on-demand. Select the link for the Exam Cram you are interested in below and register for the event through the website.

During the event, be sure to look for an announcement with instructions to redeem the voucher and fill out the form to the right. A password will be given to you. You will then need to come back to this page and place the correct password into the form.

Please attend one Microsoft Exam Cram session to obtain a password. Then fill out the form below and receive a **FREE MeasureUp practice test code and Fundamentals exam voucher**.

First Name*	<input type="text"/>
Last Name*	<input type="text"/>
Email Address (School Email Preferred)*	<input type="text"/>
Educational Institution*	<input type="text"/>
Are you a student?*	<input type="select"/>
Are you an educator?*	<input type="select"/>
Sector*	<input type="select"/>

AZ-900 Objective 3: Core Solutions



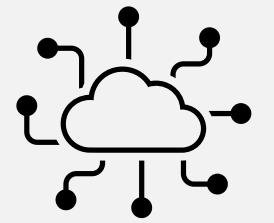
Objective area 3

Includes the following concepts:

- **Core Azure solutions**
 - IoT to Azure Sphere
 - Synapse Analytics to Databricks
 - AI / ML
- **Azure management tools**
 - Portal, PowerShell, CLI, and others
 - Advisor, Monitor, and Service Health



Azure solutions



Security & Management



Portal



Azure Active Directory



Multi-Factor Authentication



Automation



Key Vault



Store / Marketplace



VM Image Gallery & VM Depot

Platform Services

Compute



Cloud Services



Service Fabric



Batch



Remote App

Web and Mobile



Web Apps



API Apps



API Management



Mobile Apps



Logic Apps



Notification Hubs

Developer Services



Visual Studio



Azure SDK



Team Project



Application Insights

Integration



Storage Queues



Biztalk Services



Hybrid Connections



Service Bus

Media & CDN



Media Services



Content Delivery Network (CDN)

Analytics & IoT



HDInsight



Machine Learning



Data Factory



Event Hubs



Stream Analytics



Mobile Engagement

Data



SQL Database



SQL Data Warehouse



Redis Cache



Search



DocumentDB



Tables

Hybrid Operations



Azure AD Connect Health



Azure AD Privileged Identity Management



Backup



Operations Management Suite



Import/Export



Site Recovery



StorSimple

Infrastructure Services

Compute



Virtual Machines



Containers

Storage



BLOB Storage



Azure Files



Premium Storage



Virtual Network



Load Balancer



DNS

Networking



Express Route



Traffic Manager



VPN Gateway



Application Gateway

Azure Solutions - Objective Domain

Describe the benefits and usage of:

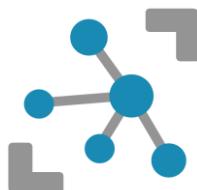
- Internet of Things (IoT) Hub, IoT Central, and Azure Sphere
- Azure Synapse Analytics, HDInsight, and Azure Databricks
- Azure Machine Learning, Cognitive Services, and Azure Bot Service
- Serverless computing solutions that include Azure Functions and Logic Apps
- Azure DevOps, GitHub, GitHub Actions, and Azure DevTest Labs

Azure Internet of Things

Internet of Things (IoT) is the ability for devices to garner and then relay information for data analysis.



Azure IoT Central is a fully managed global IoT SaaS solution that makes it easy to connect, monitor, and manage IoT assets at scale.



Azure IoT Hub is a managed service hosted in the cloud that acts as a central message hub for bi-directional communication between IoT applications and the devices it manages.



Azure Sphere is a secured, high-level application platform with built-in communication and security features for internet-connected devices.

Big data and analytics

Azure Synapse Analytics



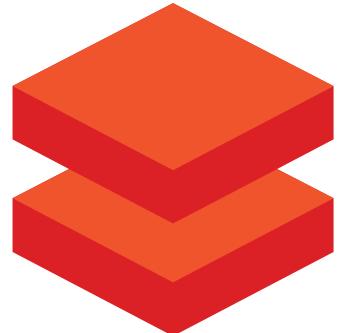
A cloud-based Enterprise Data Warehouse.

Azure HDInsight



A fully-managed, open-source analytics service for enterprises.

Azure Databricks



Apache Spark based analytics service.

Artificial Intelligence & Machine Learning



Azure Machine Learning: cloud-based to develop, train, and deploy machine learning models.



Cognitive Services: quickly enable apps to see, hear, speak, understand, and interpret a user's needs.



Azure Bot Service: develop intelligent, enterprise-grade bots.

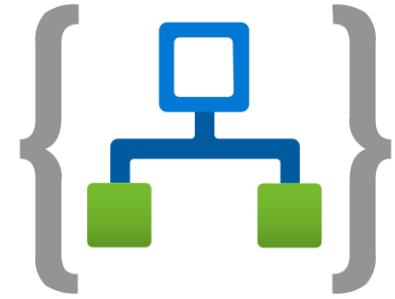
Serverless Computing

Azure Functions



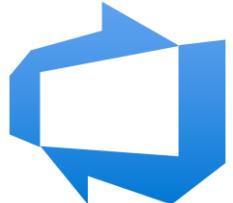
Event based code running your service and not the underlying infrastructure.

Azure Logic Apps



Automate and orchestrate tasks, business processes, and workflows to integrate apps.

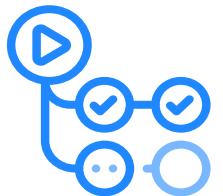
Develop your apps with DevOps and GitHub



Azure DevOps: development collaboration tools including pipelines, Kanban boards, and automated cloud-based load testing.



GitHub: software development hosting with version control, source code management, and bug/task management.



GitHub Actions for Azure: automate software workflow to build, test, and deploy from within GitHub.



Azure DevTest Labs: quickly create environments in Azure while minimizing waste and controlling cost.

Azure management tools

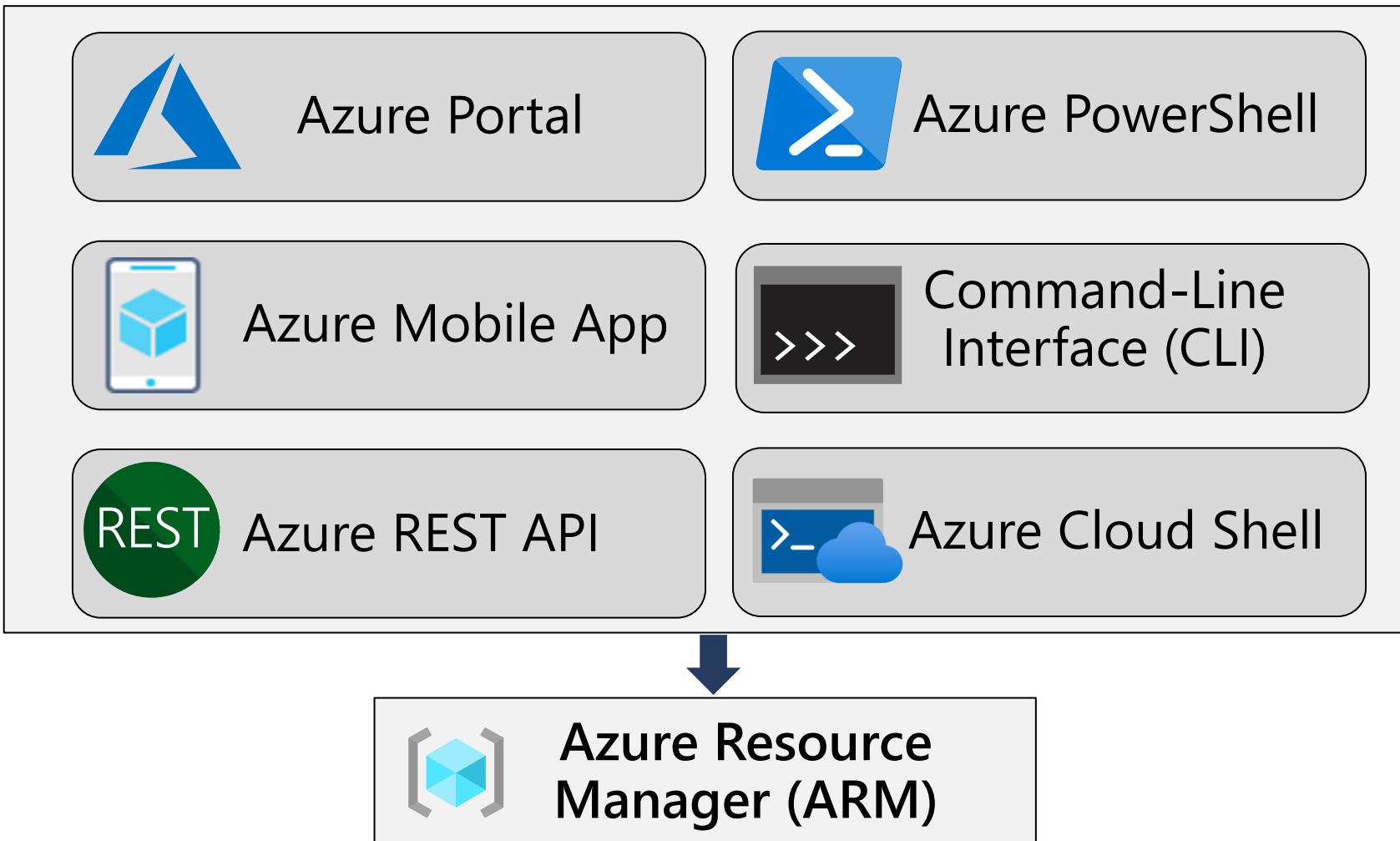


Azure Management Tools - Objective Domain

Describe the functionality and usage of:

- Azure Portal, Azure PowerShell, Azure CLI, Cloud Shell, and Azure Mobile App.
- Azure Advisor.
- Azure Resource Manager (ARM) templates.
- Azure Monitor.
- Azure Service Health.

Management tools available in Azure

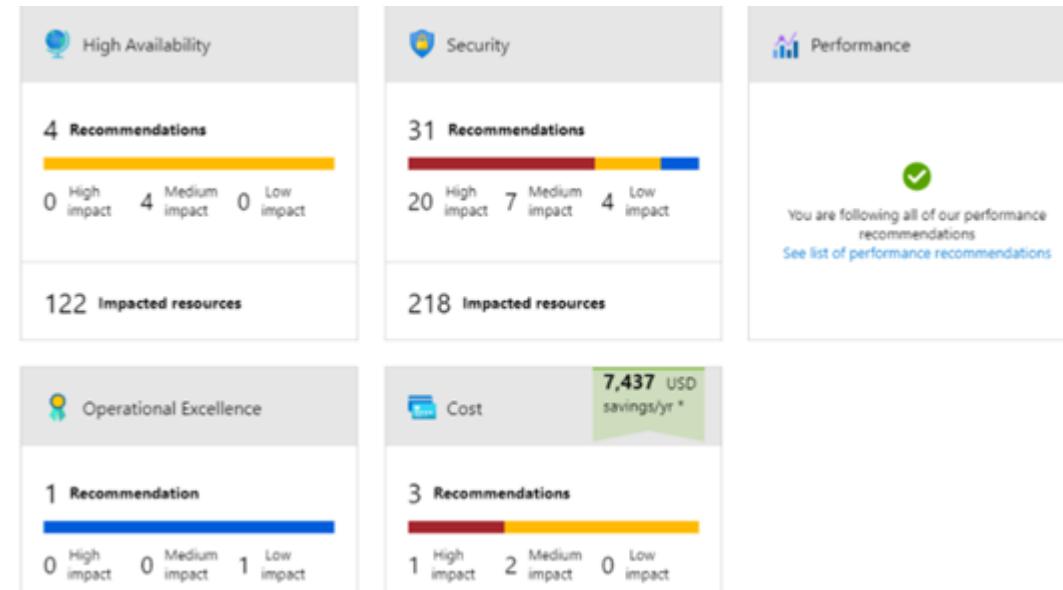




Azure Advisor

Azure Advisor analyzes deployed Azure resources and makes recommendations based on best practices to optimize Azure deployments.

- Reliability
- Security
- Performance
- Cost
- Operational Excellence



Azure Monitor

Azure Monitor maximizes the availability and performance of applications and services by collecting, analyzing, and acting on telemetry from cloud and on-premises environments.

- Application Insights
- Log Analytics
- Smart Alerts
- Automation Actions
- Customized Dashboards



Azure Service Health

Microsoft Azure Search resources, services, and docs (G+)

Home > Service Health | Service issues

ACTIVE EVENTS

- Service issues (4)
- Planned maintenance (3)
- Health advisories (5)
- Security advisories (1)

HISTORY

- Health history

RESOURCE HEALTH

- Resource health

ALERTS

- Health alerts

Save View Delete View + Add service health alert

Subscription: 28 selected Region: 28 selected Service: 170 selected

Issue Name	Tracking ID	Service(s)	Region(s)	Start Time	Updated
Availability issues – Storage	DTTL-HP8	Storage	West US, West US 2	2020-06-24T00:00:00Z (6 days ago)	3 hours ago
Allocation Failures – Virtual Machi...	TTTL-H90	SQL Database; Virtual...	East US, West Central...	2020-06-24T00:00:00Z (6 days ago)	3 hours ago

No permissions to read Service Health events for 22 subscription(s). To view Service Health events, users must have the [reader role](#) on a subscription. See 2 service issue(s) outside of your filter.

Service issue : Availability issues – Storage

Summary Potential impact Issue updates

Tracking ID: DTTL-HP8

Share the below link with your team or use it for reference in your problem management system
<https://app.azure.com/h/DTTL-HP8/76c813>

Impacted service(s): Storage

Impacted region(s): West US; West US 2

Impacted subscription(s): [REDACTED]

Last update (3 hours ago): Customers may have experience difficulties connecting to resources hosted in Central India. A number of Storage and Compute scale units had gone offline, impacting Virtual Machines and other Azure services with dependencies on these.
[See all updates](#)

Potential impact: 60 resource(s) in 1 subscription(s)
[View details](#)

Was this helpful? Was this helpful?



Evaluate the impact of Azure service issues with personalized guidance and support, notifications, and issue resolution updates.

Azure Service Health (continued)

Azure Service Health provides a personalized view of the health of Azure services and the regions being used.

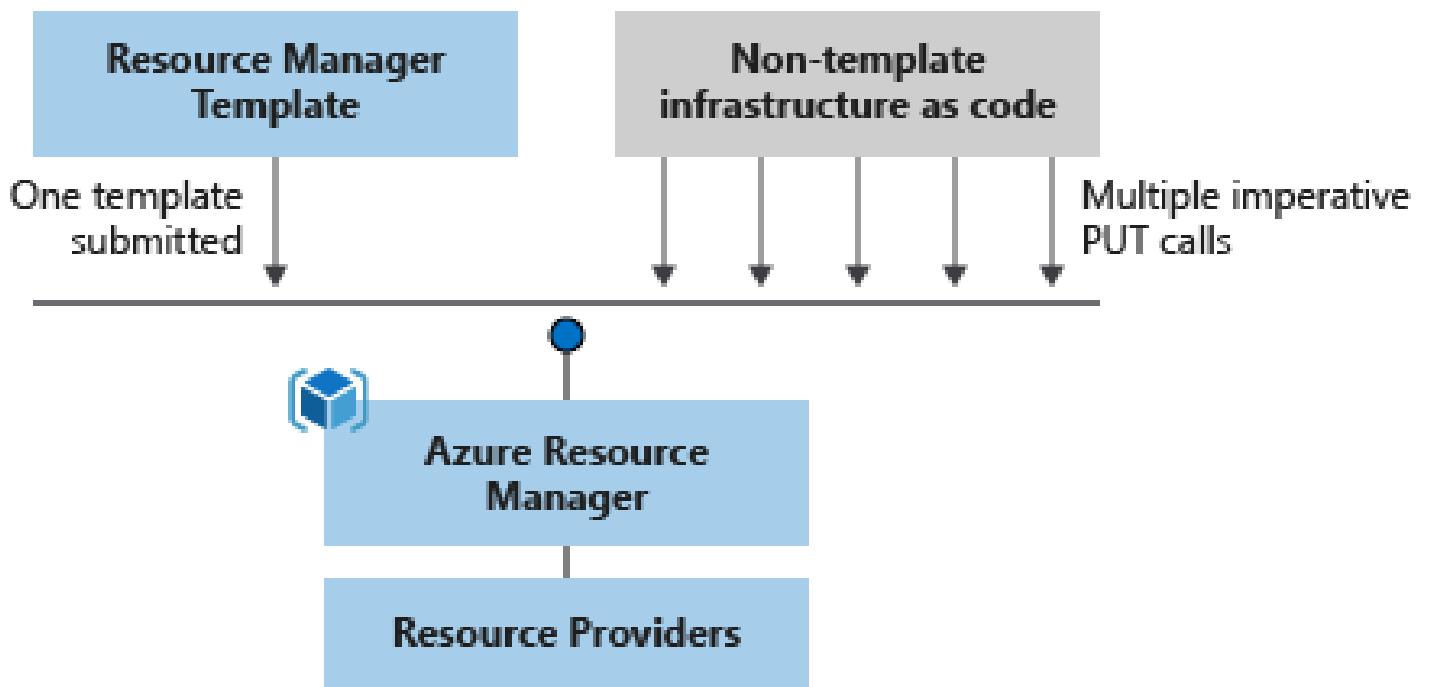
- Communication regarding outages
- Planned maintenance
- Other health advisories

Microsoft Azure	Health Advisory Summary	2020-08-22T19:43:35Z
Title:	We have important information regarding your ExpressRoute service	
Tracking ID:	PLWN-F80	
Event type:	Health Advisory	
Status:	Ongoing as of 2020-08-22T19:43:34Z	
Service(s):	ExpressRoute \ ExpressRoute Circuits	
Region(s):	Australia Central, Australia Central 2, Australia East, Australia Southeast, Brazil South, Canada Central, Canada East, Central India, Central US, Central US EUAP, East Asia, East US, East US 2, East US 2 EUAP, France Central, France South, Germany North, Germany West Central, Global, Japan East, Japan West, Korea Central, Korea South, North Central US, North Europe, South Africa North, South Africa West, South Central US, Southeast Asia, South India, Switzerland North, Switzerland West, UAE Central, UAE North, UK South, UK West, West Central US, West Europe, West India, West US, West US 2	
Start time:	2020-08-18T00:00:00Z	
Resolve time:	Ongoing as of 2020-08-22T19:43:34Z	
Last update time:	2020-08-19T07:19:29Z	
Impacted subscriptions:	5733bcb3-7fde-4caf-8629-41dc15e3b352 (Contoso Hotels)	

Azure Resource Manager (ARM) templates

Azure Resource Manager (ARM) templates are JavaScript Object Notation (JSON) files that can be used to create and deploy Azure infrastructure without having to write programming commands.

- Declarative syntax
- Repeatable results
- Orchestration
- Modular files
- Built-in validation
- Exportable code



Knowledge Check

Your company has multiple web properties that a customer can reach you. You would like to create a common set of code that each of them can use to create a lead in your customer database. Which service Azure App Service app would you use?

- a) Azure Web App
- b) Azure Mobile App
- c) Azure API App
- d) Web Apps for Containers

Answer

a) Azure API App

Azure API Apps are designed to expose functionality as an application programming interface or API. APIs allow multiple clients to use the same code base using common protocols such as HTTP and HTTPS.

Knowledge Check

Which service below is NOT considered a feature of Azure serverless computing?

- a) Azure Machine Learning
- b) Azure Functions
- c) Azure Logic Apps
- d) Azure Event Grid

Answer

a) Azure Machine Learning

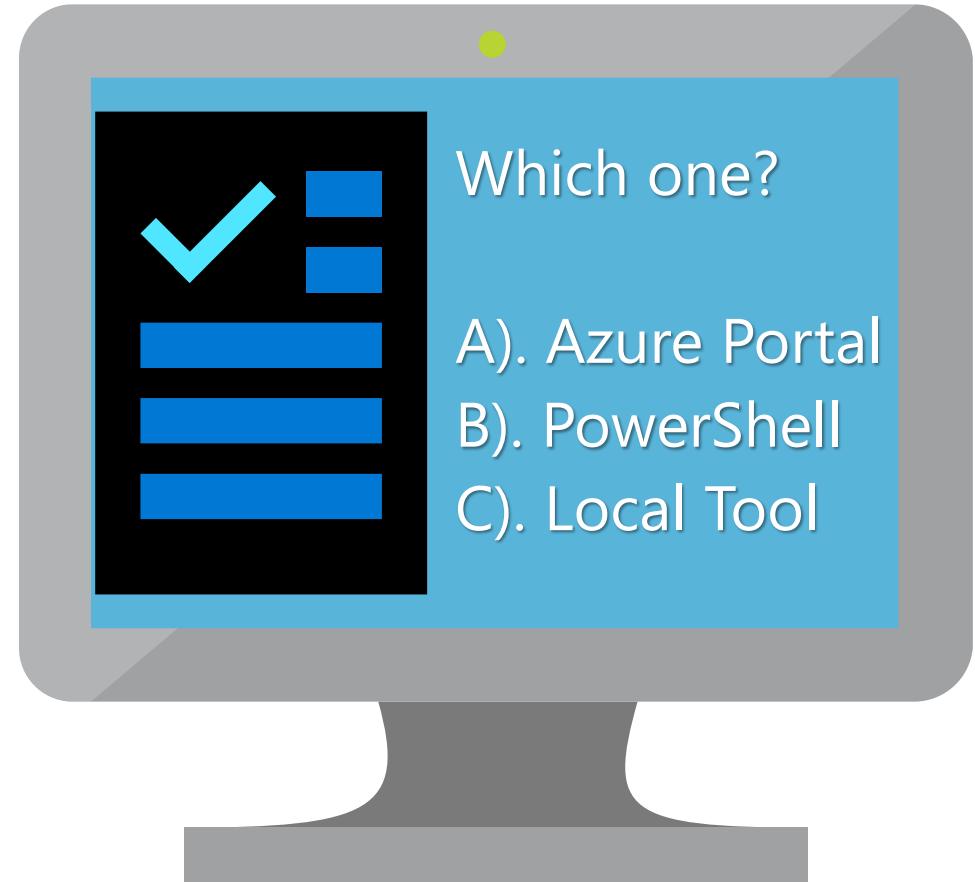
Azure Machine Learning service provides a cloud-based environment you can use to develop, train, test, deploy, manage, and track machine learning models. Azure Machine Learning service can auto-generate a model and auto-tune it for you. It will let you start training on your local machine, and then scale out to the cloud. When you have the right model, you can easily deploy it in a container such as Docker in Azure.

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module 3

1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRUMIE4S1NCUUYwNktYU0hHSINBNldQVUk2Ty4u
2. Please participate in the quiz for this section



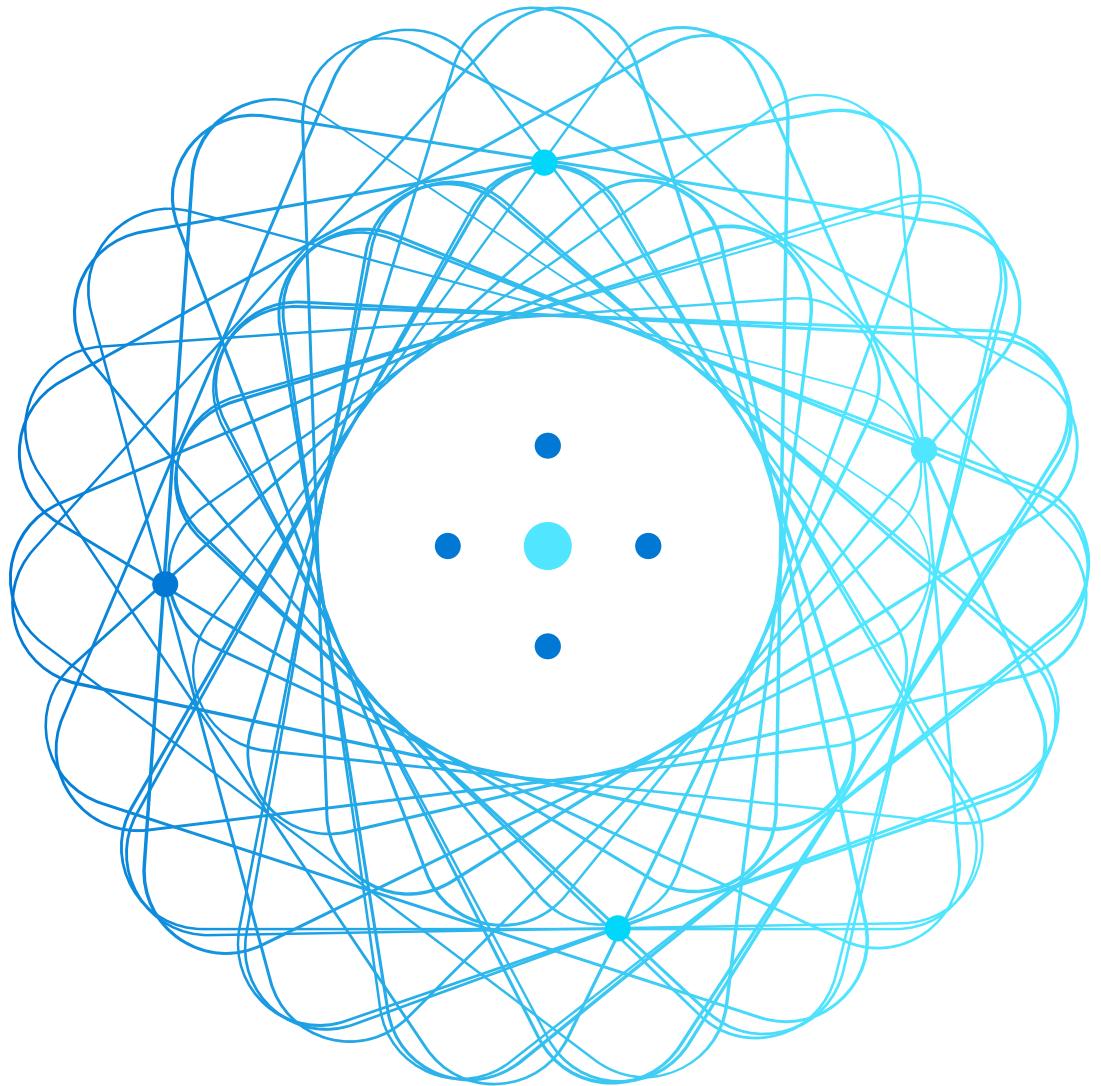
Module 03 Review



- Azure services: IoT, big data, analytics, and development tools.
- Azure Resource Manager.
- Azure Monitoring tools.

Microsoft Learn Modules
(docs.microsoft.com/Learn)

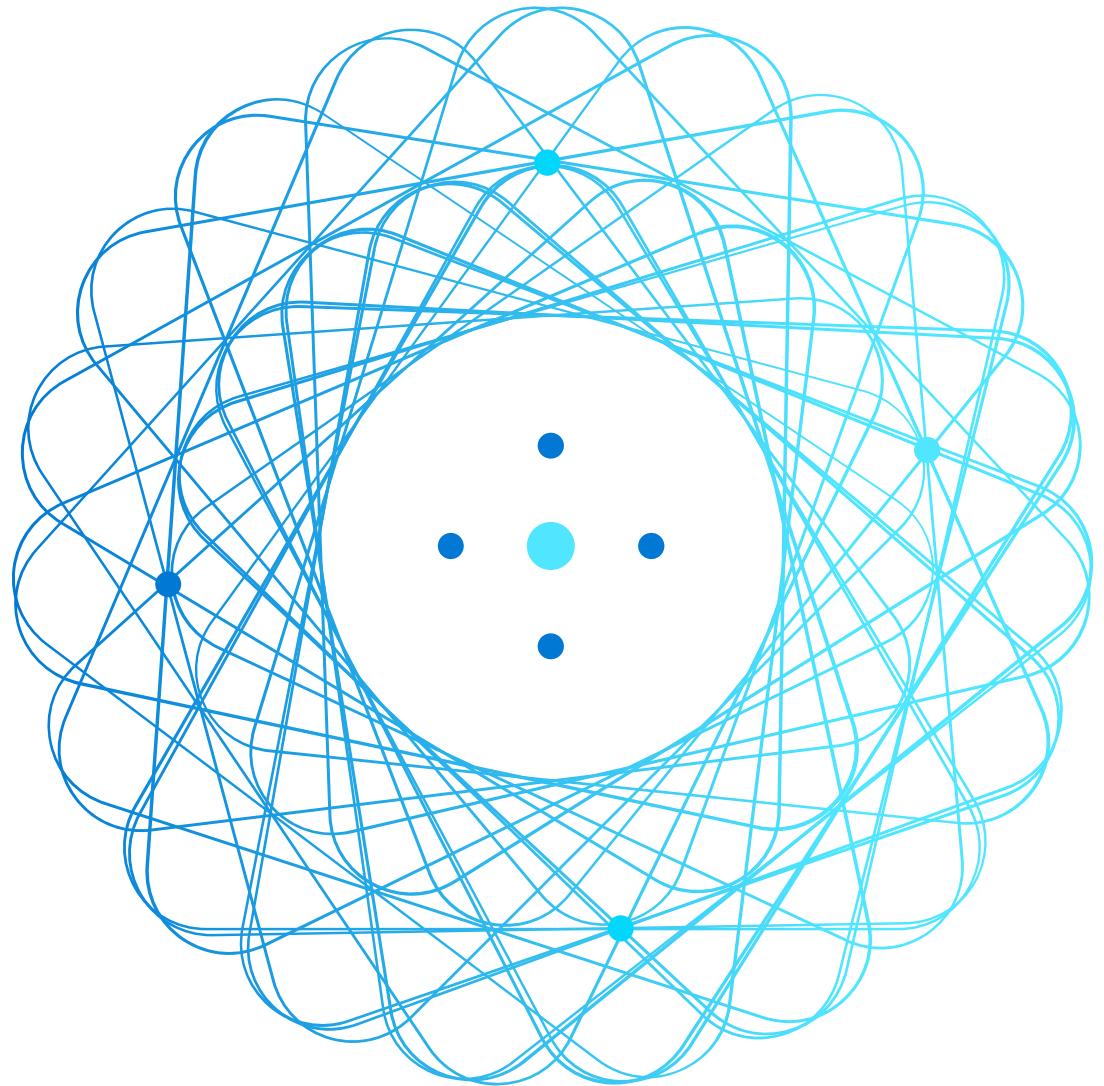
10 - minute break



AZ-900

Objective 4:

Security



Objective area 4

Includes the following concepts:

- **Azure Security features**
 - Security Center and resource hygiene
 - Key Vault, Sentinel, and Dedicated Hosts
- **Azure network security**
 - Defense in depth
 - Network Security Groups and Firewalls
 - DDoS protection



Security tools and features



Security tools and features - Objective Domain

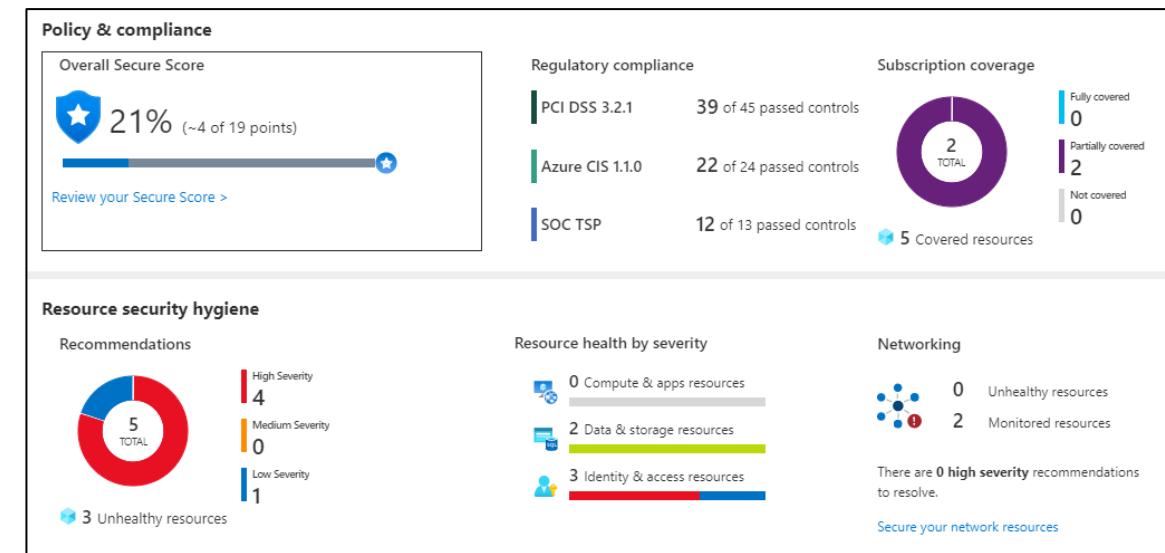
Describe the features and the functionality of:

- Azure Security Center, including policy compliance, security alerts, secure score, and resource hygiene
- Azure Sentinel
- Key Vault
- Azure Dedicated Hosts

Azure Security Center

Azure Security Center is a monitoring service that provides threat protection across both Azure and on-premises datacenters.

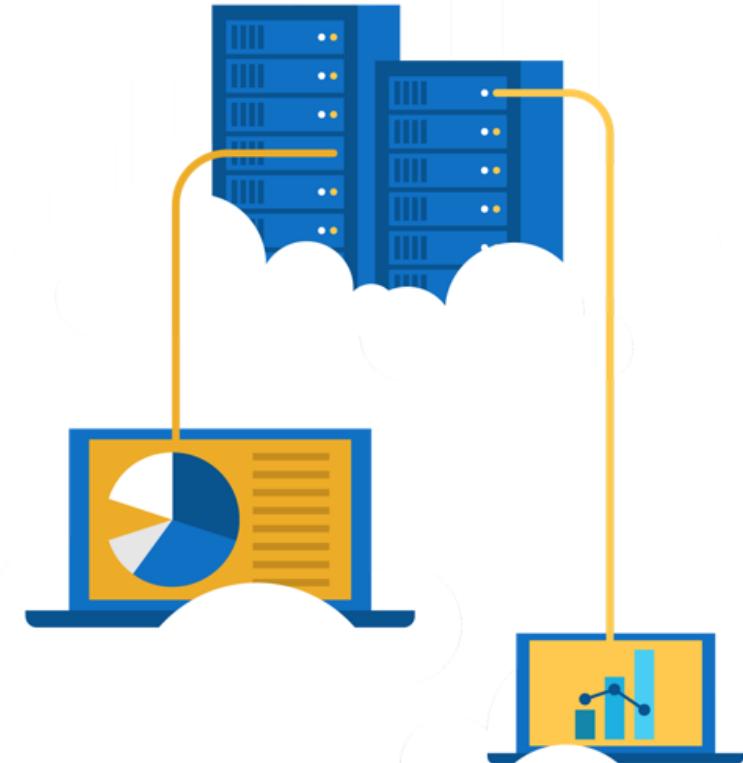
- Provides security recommendations
- Detect and block malware
- Analyze and identify potential attacks
- Just-in-time access control for ports



Walkthrough-Azure Security Center

Open Azure Security Center and view some of the common features and configuration options.

1. Launch Azure Security Center.
2. View Policy compliance options.
3. Review your Secure Score.
4. Set a Security Alert.
5. Explore Resource Hygiene.



Azure Security Center – capabilities



Policy compliance

Security Center is built on top of Azure Policy controls so you can **set and monitor** your policies to run on management groups, across subscriptions, and even for a whole tenant.

Security alerts

Security Center automatically collects, analyzes, and integrates log data from your Azure resources like firewall and endpoint protection to detect real threats. Then list of prioritized security alerts is shown in Security Center along with the information you need to quickly investigate and remediate an attack.

Secure score

Security Center continually assesses your resources for security issues; then aggregates all the findings into a single score so that you can tell your current security situation.

Resource Security Hygiene

Security visibility and recommendations by resource.

RESOURCE SECURITY HYGIENE	
	Recommendations
	Compute & apps
	Networking

Azure Security Center - capabilities

Policy Compliance

Run policies across management groups, subscriptions, or tenants.

Continuous Assessments

Assess new and deployed resources to ensure that they are configured properly.

Tailored Recommendations

Recommendations based on existing workload with instructions on how to implement them.

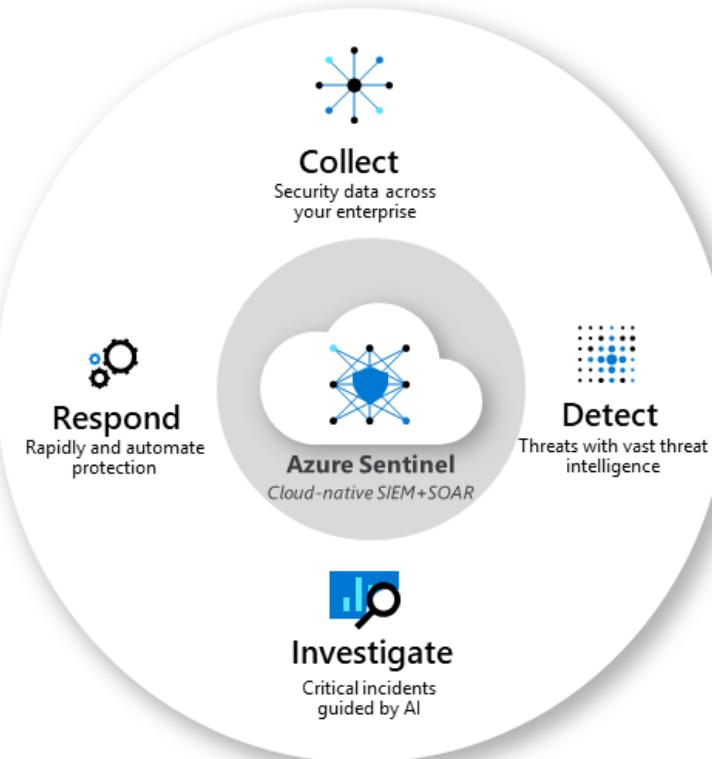


Threat Protection

Analyze attempted threats through alerts and impacted resource reports.

Azure Sentinel

Azure Sentinel is a security information management (SIEM) and security automated response (SOAR) solution that provides security analytics and threat intelligence across an enterprise.



Connector and Integrations:

- Office 365
- Azure Active Director
- Azure Advanced Threat Protection
- Microsoft Cloud App Security

Azure Key Vault

Azure Key Vault stores application secrets in a centralized cloud location in order to securely control access permissions and access logging.

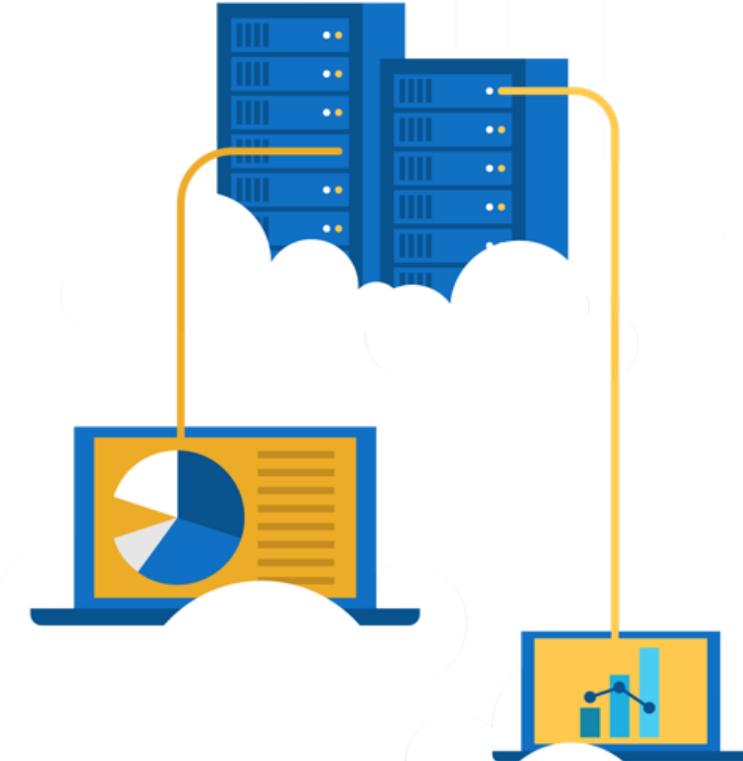
- Secrets management.
- Key management.
- Certificate management.
- Storing secrets backed by hardware security modules (HSMs).



Walkthrough-Implement Azure Key Vault

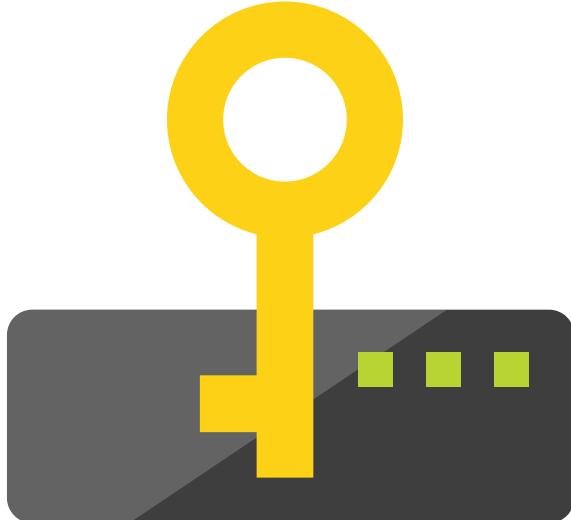
Create an Azure Key vault and then create a password secret within the key vault.

1. Create an Azure key vault.
2. Add a secret to the Azure key vault.



Azure Dedicated Host

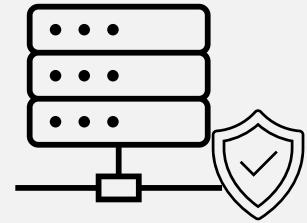
Azure Dedicated Host provides physical servers that host one or more Azure virtual machines that is dedicated to a single organization's workload.



Benefits

- Hardware isolation at the server level
- Control over maintenance event timing
- Aligned with Azure Hybrid Use Benefits

Secure network connectivity



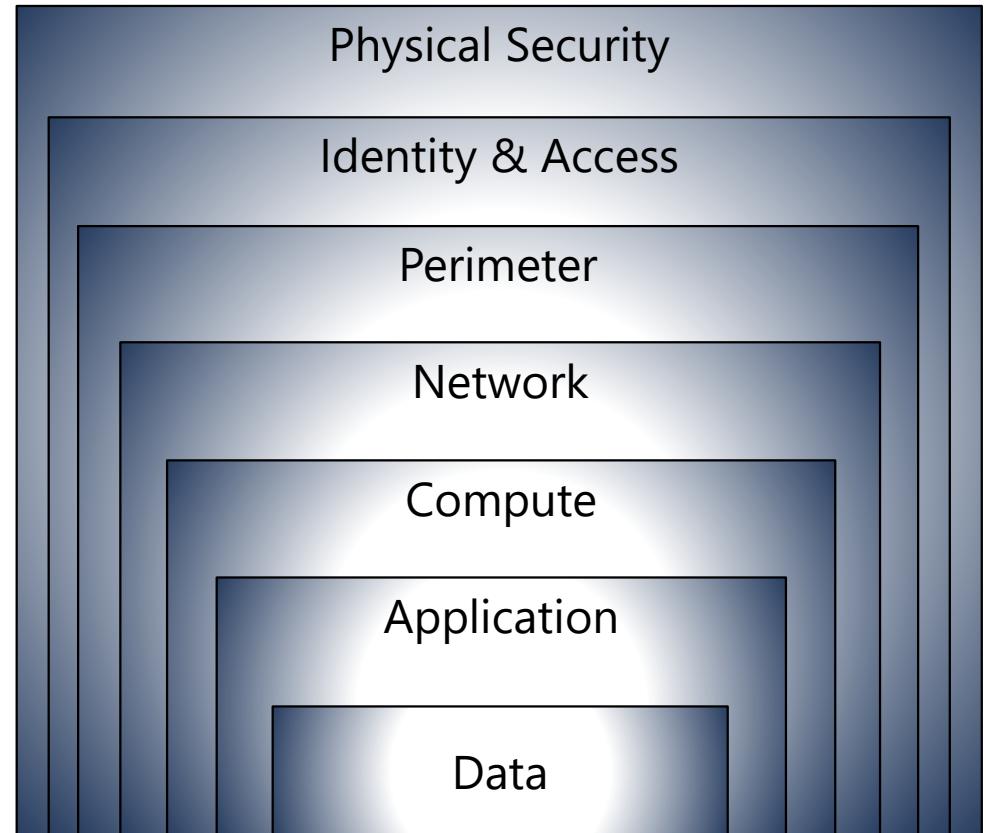
Secure Network Connectivity - Objective Domain

Describe the concept and functionality of:

- Defense in depth
- Network Security Groups (NSG)
- Azure Firewall
- Azure DDoS protection

Defense in depth

- A layered approach to securing computer systems.
- Provides multiple levels of protection.
- Attacks against one layer are isolated from subsequent layers.



Shared Security

- Migrating from customer-controlled to cloud-based datacenters shifts the responsibility for security.
- Security becomes a shared concern between cloud providers and customers.

Responsibility	On-Premises	IaaS	PaaS	SaaS
Data governance and Rights Management	Customer	Customer	Customer	Customer
Client endpoints	Customer	Customer	Customer	Customer
Account and access management	Customer	Customer	Customer	Customer
Identity and directory infrastructure	Customer	Customer	Microsoft/ Customer	Microsoft/ Customer
Application	Customer	Customer	Microsoft/ Customer	Microsoft
Network controls	Customer	Customer	Microsoft/ Customer	Microsoft
Operating system	Customer	Customer	Microsoft	Microsoft
Physical hosts	Customer	Microsoft	Microsoft	Microsoft
Physical network	Customer	Microsoft	Microsoft	Microsoft
Physical datacenter	Customer	Microsoft	Microsoft	Microsoft

Network Security Groups (NSGs)

Network Security Groups (NSGs) filter network traffic to and from Azure resources on Azure Virtual Networks.

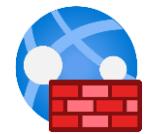
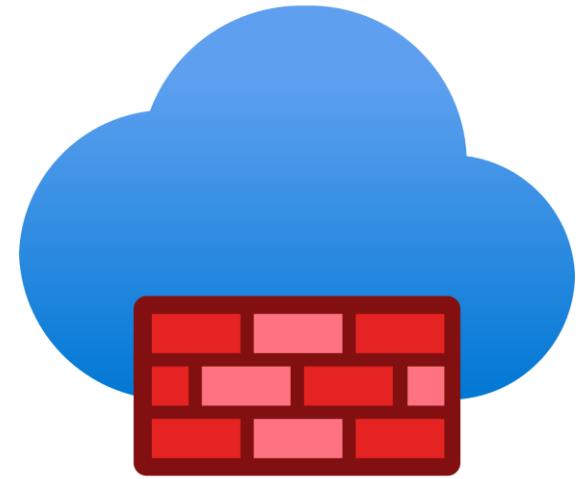
- Set inbound and outbound rules to filter by source and destination IP address, port, and protocol.
- Add multiple rules, as needed, within subscription limits.
- Azure applies default, baseline security rules to new NSGs.
- Override default rules with new, higher priority rules.



Azure Firewall

A stateful, managed Firewall as a Service (FaaS) that grants/denies server access based on originating IP address, in order to protect network resources.

- Applies inbound and outbound traffic filtering rules
- Built-in high availability
- Unrestricted cloud scalability
- Uses Azure Monitor logging



Azure Application Gateway also provides a firewall, Web Application Firewall (WAF). WAF provides centralized, inbound protection for your web applications.

Azure Distributed Denial of Service (DDoS) protection

DDoS attacks overwhelm and exhaust network resources, making apps slow or unresponsive.

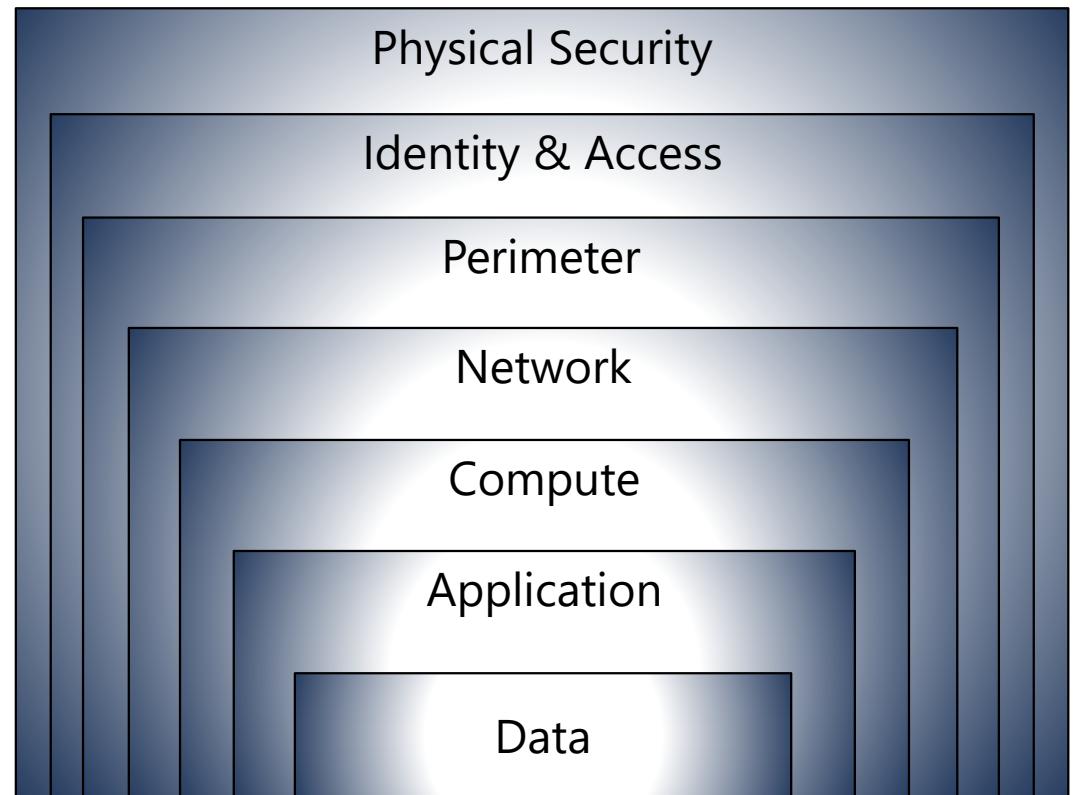
- Sanitizes unwanted network traffic before it impacts service availability.
- Basic service tier is automatically enabled in Azure.
- Standard service tier adds mitigation capabilities that are tuned to protect Azure Virtual Network resources.



Defense in Depth Reviewed

Combining network security solutions

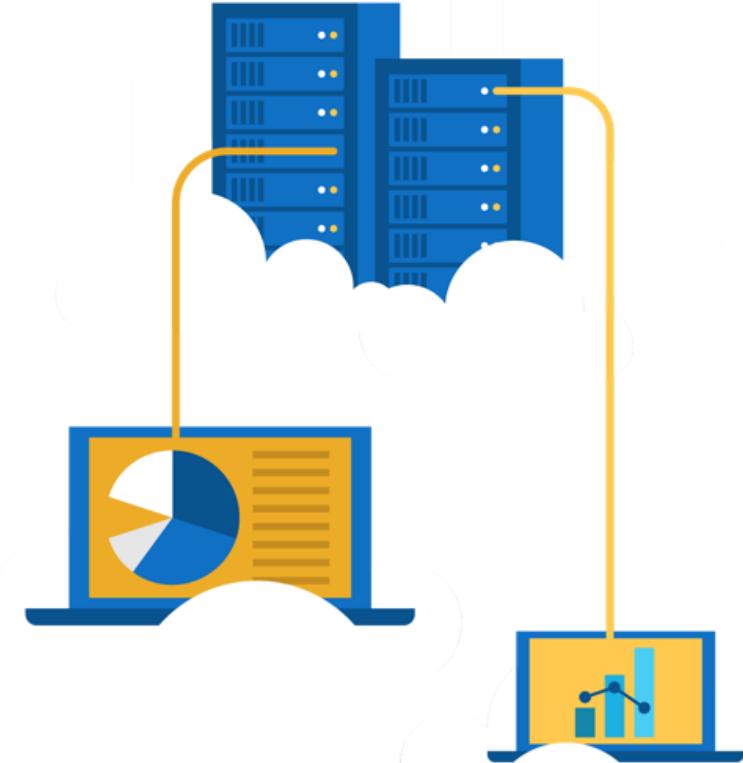
- **NSGs with Azure Firewall** to achieve defense in depth.
- **Perimeter layer** protects your network boundaries with Azure DDoS Protection and Azure Firewall.
- **Networking layer** only permits traffic to pass between networked resources with Network Security Group (NSG) inbound and outbound rules.



Walkthrough - Secure network traffic

Create and configure inbound & outbound security port rules.

1. Deploy a custom template to create a virtual machine.
2. Create a network security group.
3. Create an inbound security port rule to allow RDP.
4. Configure an outbound security port rule to deny Internet access.



Knowledge Check

Which of the following is *not* a method for protecting internet facing services from network attacks?

- a) Azure DDoS
- b) Azure Application Gateway WAF
- c) Azure Disk Encryption
- d) Azure Firewall

Answer

Azure Disk Encryption

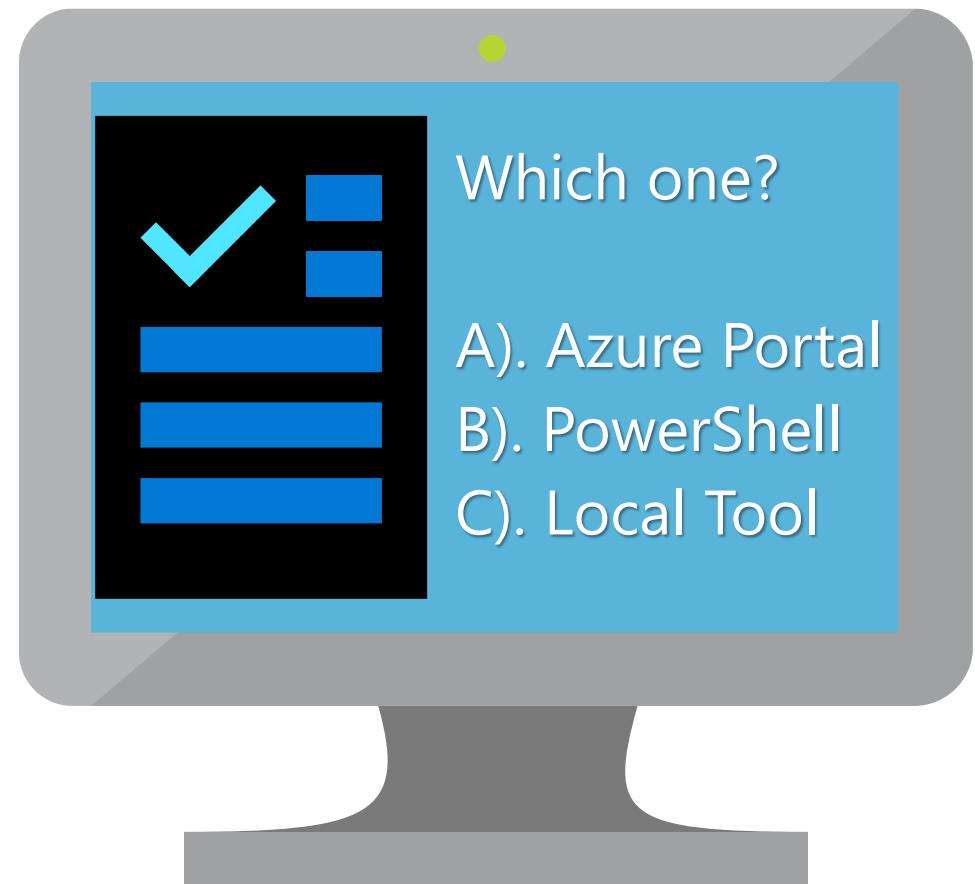
- Azure Disk Encryption protects your virtual machine VHDs from exposure but does not provide protection from network-based attacks.
- Azure DDoS can be used to protect your internet facing services from a DoS attack.
- Application Gateway WAF can be used to protect your internet facing services from attacks such as XSS and SQL injection.
- Azure Firewall is a cloud-native firewall that can provide customized network protection traffic that requires inspection from your virtual networks.

Knowledge Check

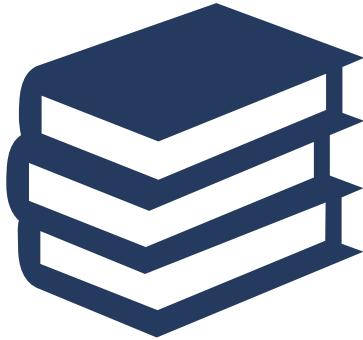
Populate with instructions to use the polling tool of your choice

Module 4

1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRURVM2NDVCSkI1WDQ3R0tBOEVHOFExRUdKMS4u
2. Please participate in the quiz for this section



Module 4 Review



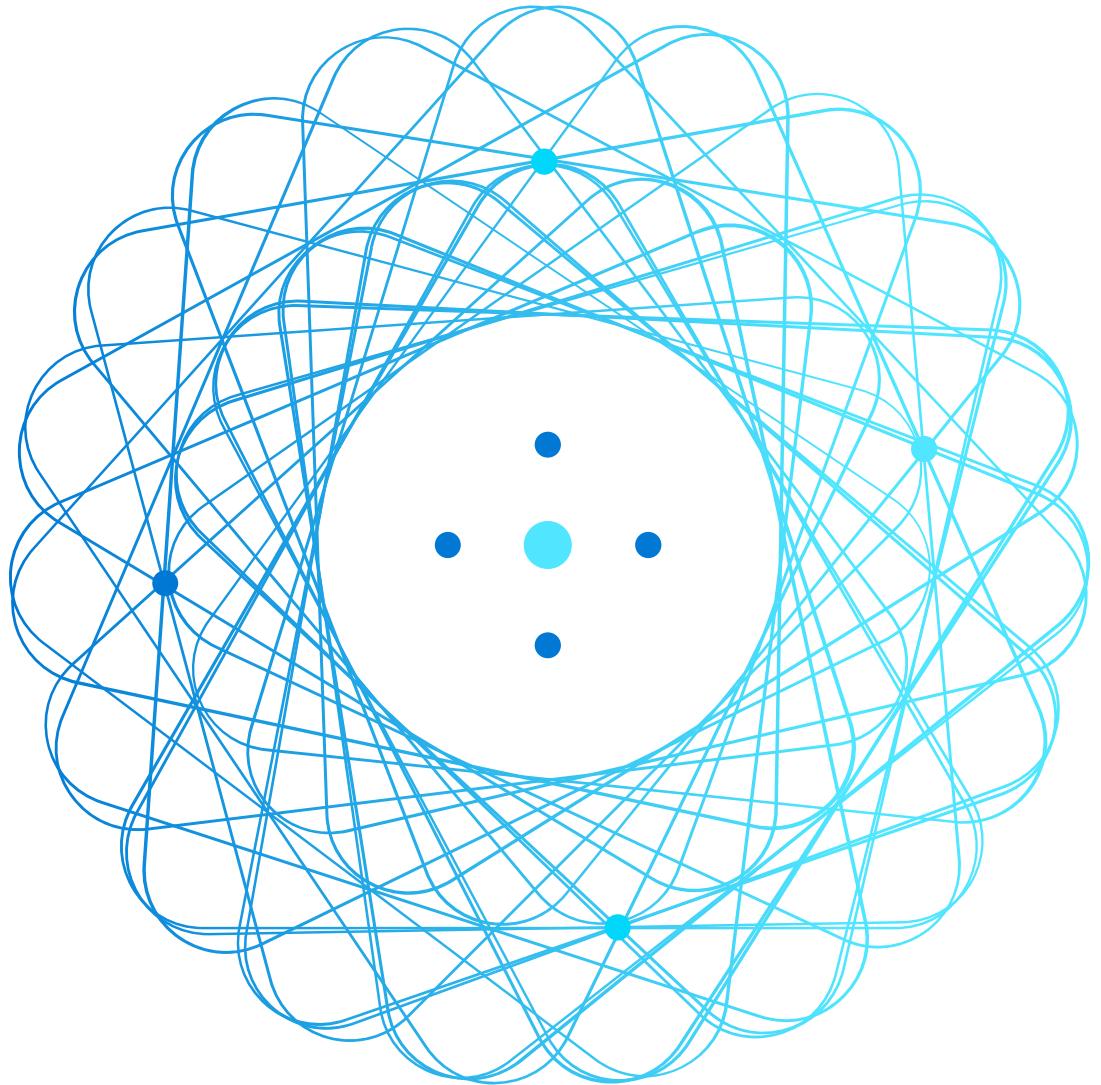
Microsoft Learn Modules
(docs.microsoft.com/Learn)

- Azure Security Center and resource hygiene
- Key Vault, Sentinel, and Dedicated Hosts
- Defense in depth
- DDoS protection

AZ-900

Objective 5:

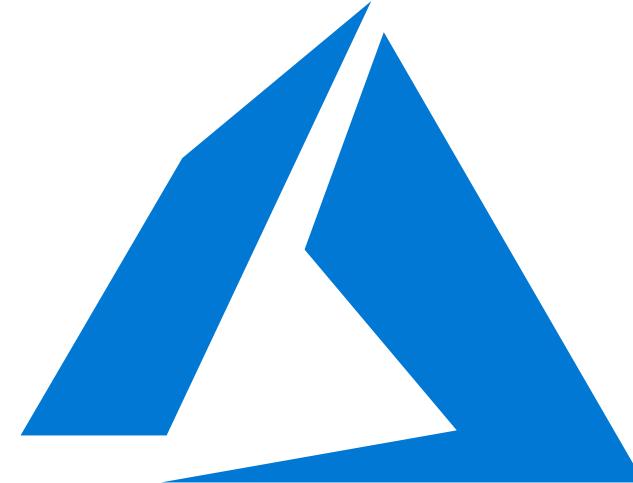
Identity, governance, privacy, and compliance



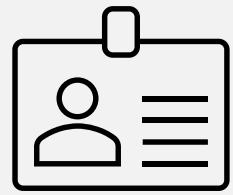
Module 05 – Outline

You will learn the following concepts:

- **Azure identity services**
 - Authentication versus Authorization
 - Azure AD, MFA, SSO and Conditional Access
- **Azure governance features**
 - RBAC
 - Resource locks and tags
 - Policy, Blueprints, and CAF
- **Azure privacy and compliance**
 - Privacy statement and Online Services Terms
 - Trust Center and compliance documentation
 - Azure Sovereign Regions



Core Azure identity services



Azure Identity Services - Objective Domain

- Explain the difference between authentication and authorization
- Define Azure Active Directory
- Describe the functionality and usage of Azure Active Directory
- Describe the functionality and usage of Conditional Access, Multi-Factor Authentication (MFA), and Single Sign-On (SSO)

Compare Authentication and Authorization

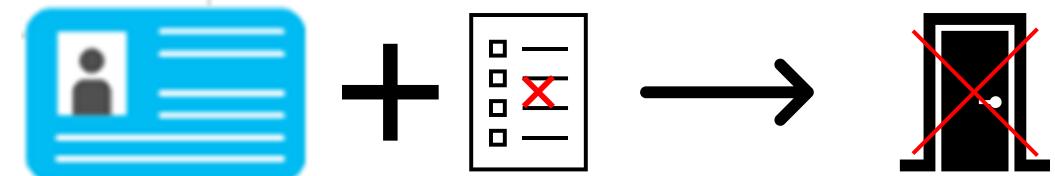
Authentication

- Identifies the person or service seeking access to a resource.
- Requests legitimate access credentials.
- Basis for creating secure identity and access control principles.



Authorization

- Determines an authenticated person's or service's level of access.
- Defines which data they can access, and what they can do with it.



Azure Multi-Factor Authentication

Provides additional security for your identities by requiring two or more elements for full authentication.

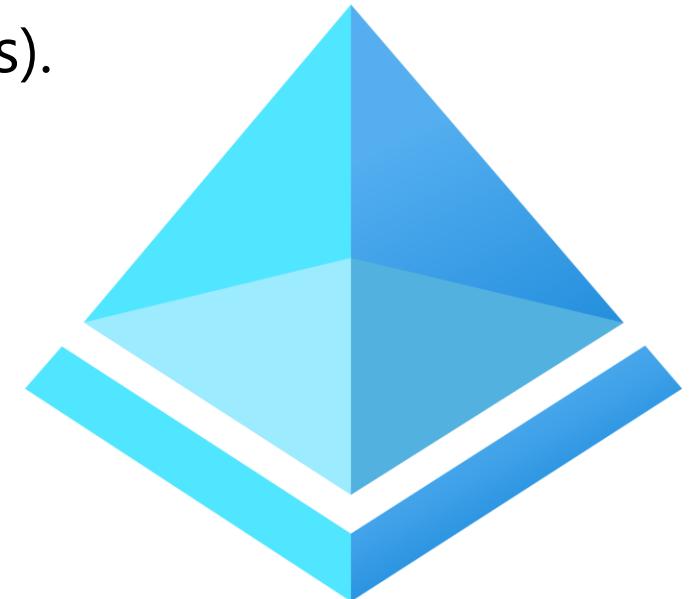
- Something you know \leftrightarrow Something you possess \leftrightarrow Something you are



Azure Active Directory (AAD)

Azure Active Directory (AAD) is Microsoft Azure's cloud-based identity and access management service.

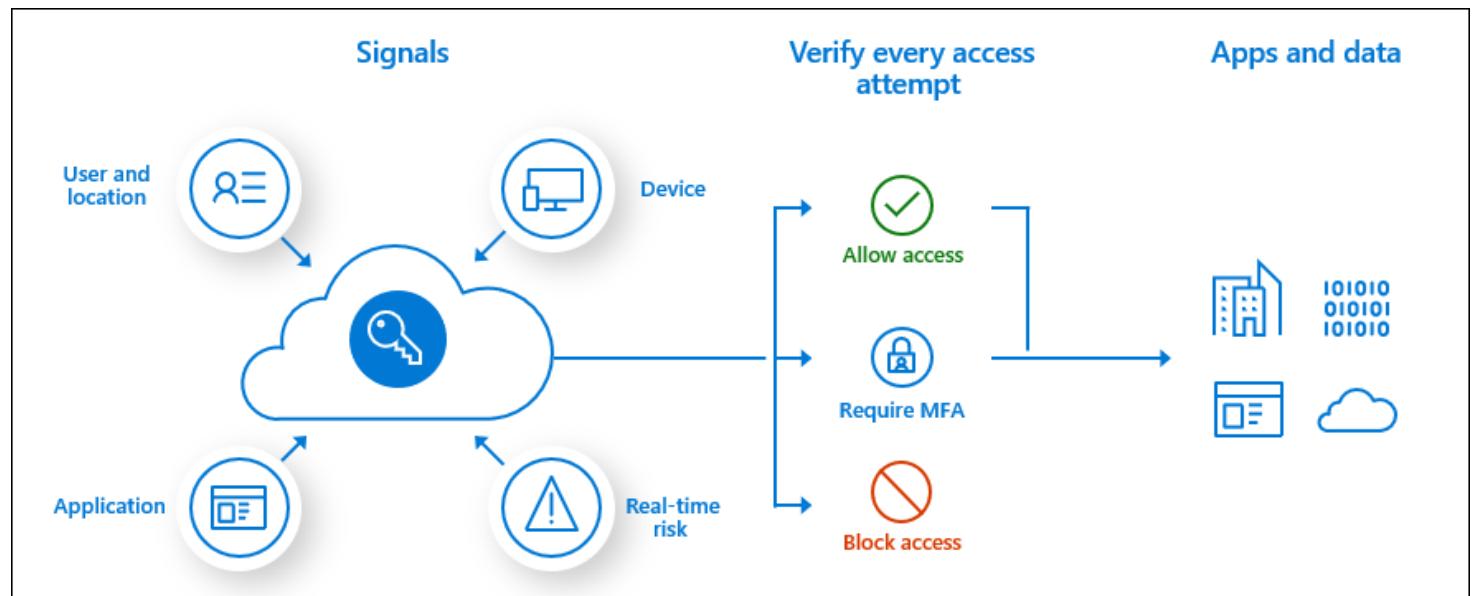
- Authentication (employees sign-in to access resources).
- Single sign-on (SSO).
- Application management.
- Business to Business (B2B).
- Business to Customer (B2C) identity services.
- Device management.



Conditional Access

Conditional Access is used by Azure Active Directory to bring signals together, to make decisions, and enforce organizational policies.

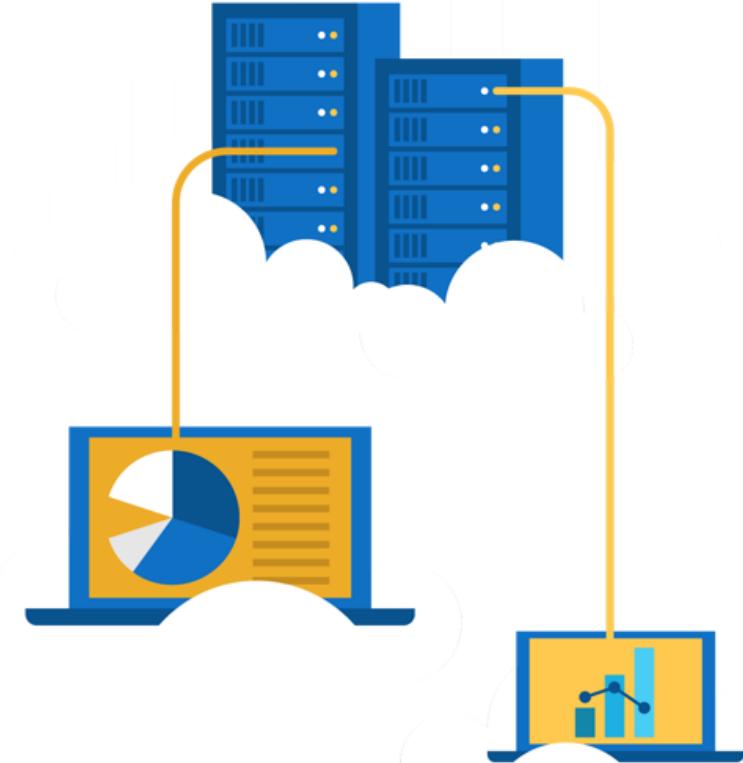
- User or Group Membership
- IP Location
- Device
- Application
- Risk Detection



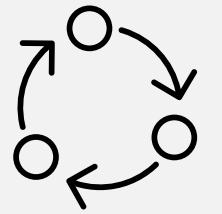
Walkthrough - Manage access with RBAC

Assign roles and view activity logs.

1. View and assign roles.
2. View the activity log and remove a role assignment.



Azure Governance Methodologies

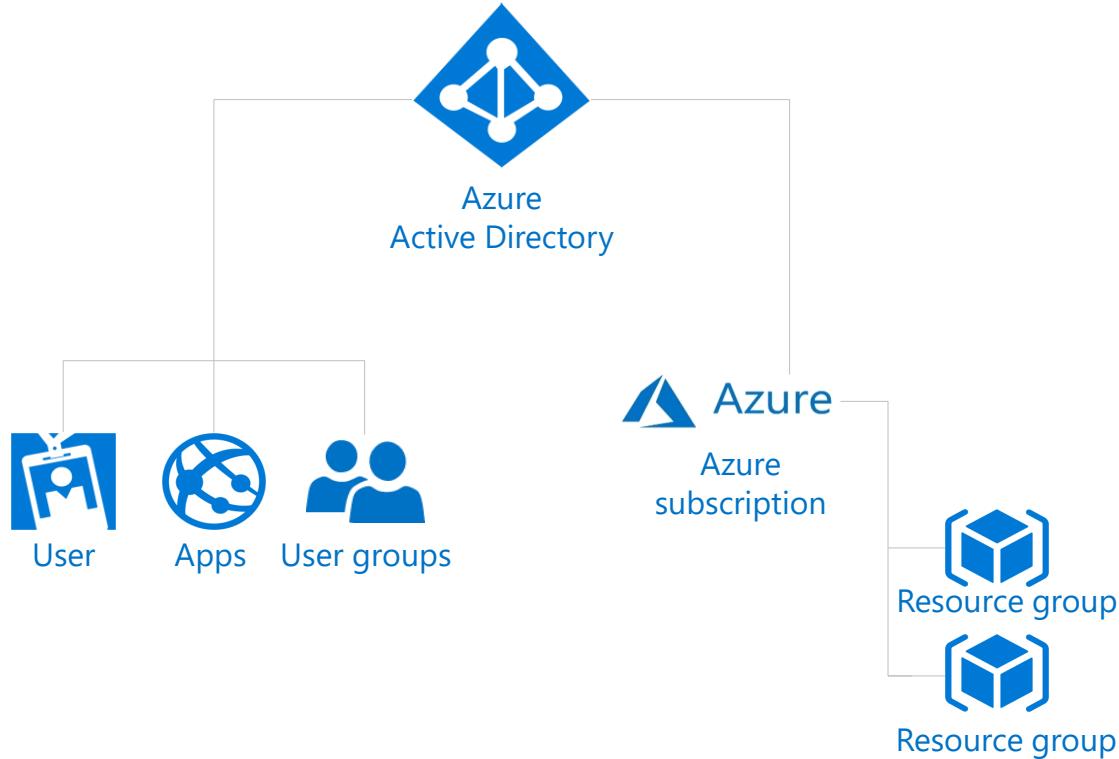


Azure Governance Methodologies - Objective Domain

Describe the functionality and the usage of:

- Role-Based Access Control (RBAC)
- Resource locks
- Tags
- Azure Policy
- Azure Blueprints
- Cloud Adoption Framework for Azure

Explore Role-based access control (RBAC)



- Fine-grained access management.
- Segregate duties within the team and grant only the amount of access to users that they need to perform their jobs.
- Enables access to the Azure portal and controlling access to resources.

Resource locks

- Protect your Azure resources from accidental deletion or modification.
- Manage locks at subscription, resource group, or individual resource levels within Azure Portal.

Lock Types	Read	Update	Delete
CanNotDelete	Yes	Yes	No
ReadOnly	Yes	No	No

Walkthrough - Manage Resource Locks

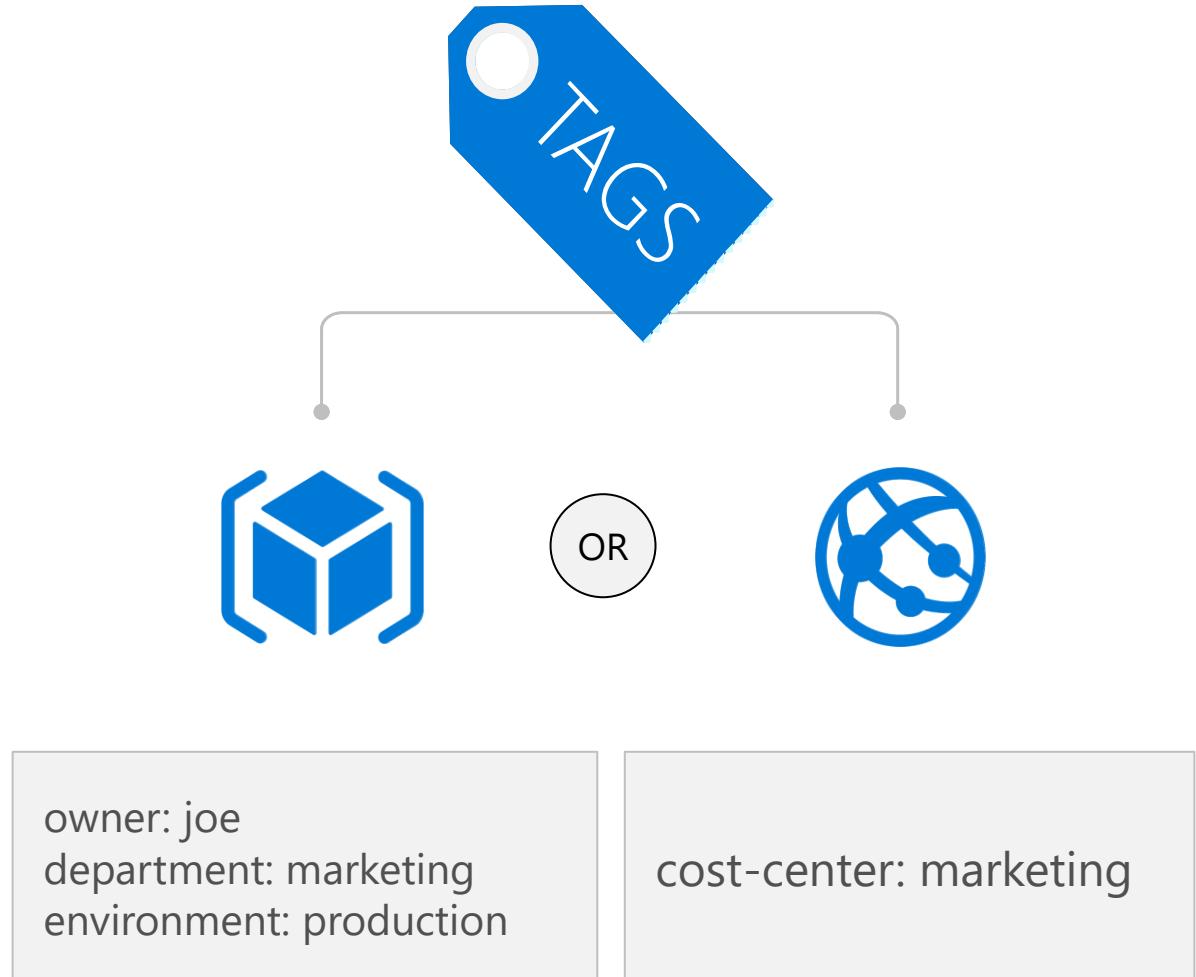
Create a resource group add a lock and test deletion, test deleting a resource in the resource group.

1. Create a resource group.
2. Add a resource lock to prevent deletion of a resource group.
3. Test deleting a member of the resource group.
4. Remove the resource lock.



Tags

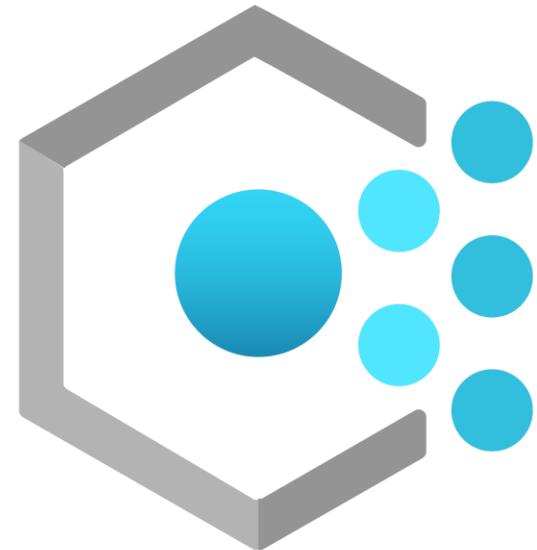
- Provides metadata for your Azure resources.
- Logically organizes resources into a taxonomy.
- Consists of a name-value pair.
- Very useful for rolling up billing information.



Azure Policy

Azure Policy helps to enforce organizational standards and to assess compliance at-scale. Provides governance and resource consistency with regulatory compliance, security, cost, and management.

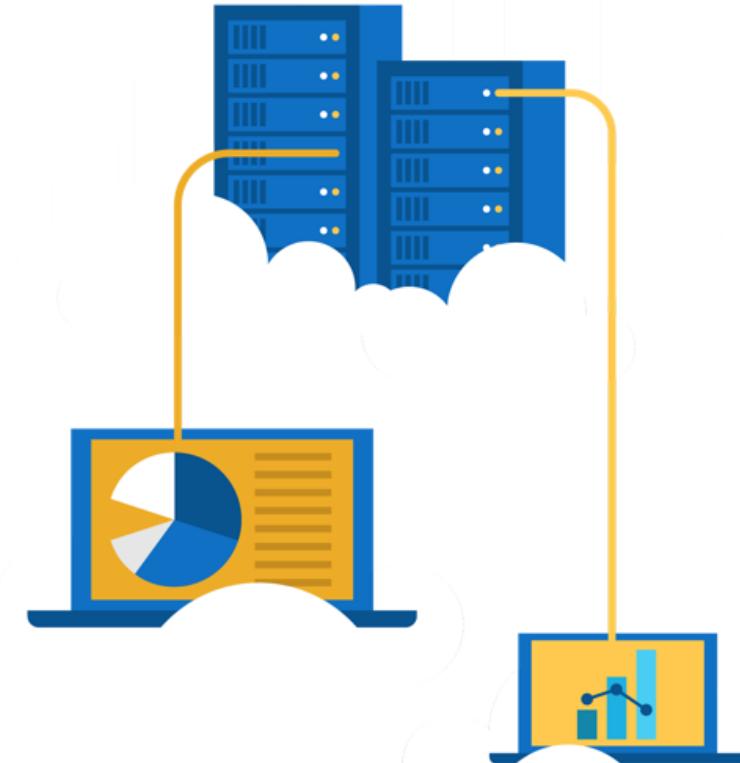
- Evaluates and identifies Azure resources that do not comply with your policies.
- Provides built-in policy and initiative definitions, under categories such as Storage, Networking, Compute, Security Center, and Monitoring.



Walkthrough - Create an Azure Policy

Create an Azure Policy to restrict deployment of Azure resources to a specific location.

1. Create a policy assignment.
2. Test the allowed location policy.
3. Delete the policy assignment.



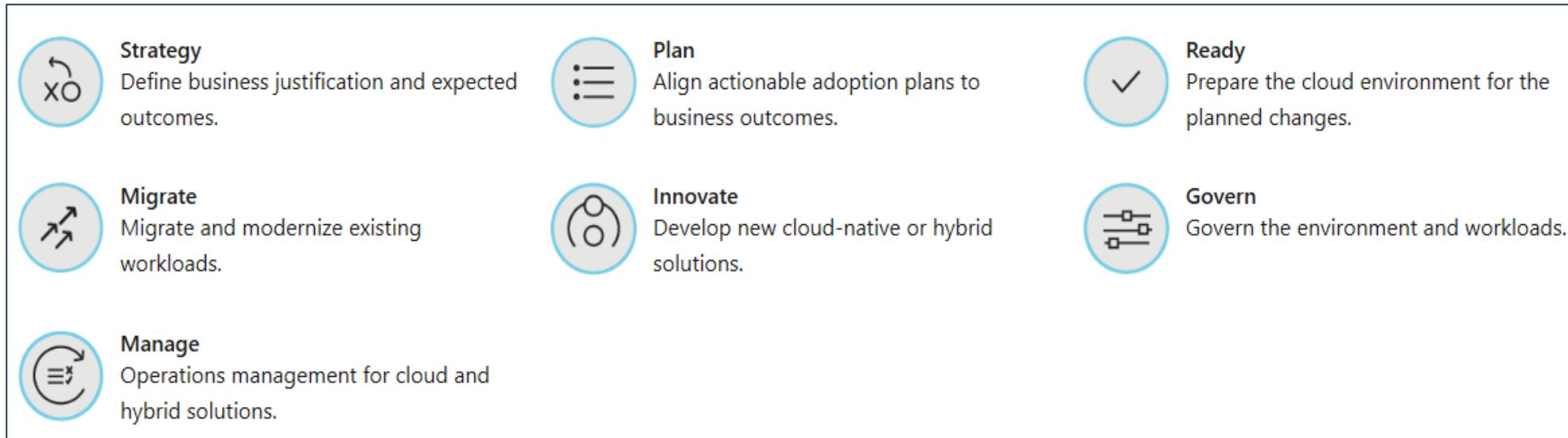
Azure Blueprints

Azure Blueprints makes it possible for development teams to rapidly build and stand up new environments. Development teams can quickly build trust through organizational compliance with a set of built-in components (such as networking) in order to speed up development and delivery.

- Role Assignments
- Policy Assignments
- Azure Resource Manager Templates
- Resource Groups

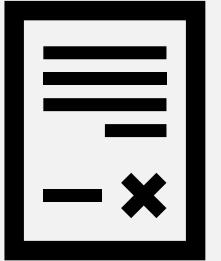


Cloud Adoption Framework



- The One Microsoft approach to cloud adoption in Azure.
- Best practices from Microsoft employees, partners, and customers.
- Tools, guidance, and narratives for strategies and outcomes.

Privacy, compliance, and data protection standards



Privacy, Compliance, and Data Protection - Objective Domain

Describe the purpose of the:

- Microsoft core tenants of Security, Privacy, and Compliance
- Microsoft Privacy Statement, Online Services Terms (OST) and Data Protection Amendment (DPA)
- Trust Center
- Azure compliance documentation
- Azure Sovereign Regions (Azure Government cloud services and Azure China cloud services)

Security, Privacy, and Compliance



Security: Secure by design. With built in intelligent security, Microsoft helps to protect against known and unknown cyberthreats, using automation and artificial intelligence.



Privacy: We are committed to ensuring the privacy of organizations through our contractual agreements, and by providing user control and transparency.



Compliance: We respect local laws and regulations and provide comprehensive coverage of compliance offerings.

Compliance Terms and Requirements

Microsoft provides the most comprehensive set of compliance offerings (including certifications and attestations) of any cloud service provider. Some compliance offerings include.

CJIS Criminal Justice Information Services	HIPAA Health Insurance Portability and Accountability Act
CSA STAR Certification	ISO/IEC 27018
EU Model Clauses	NIST National Institute of Standards and Technology

Microsoft privacy statement

The Microsoft privacy statement provides openness and honesty about how Microsoft handles the user data collected from its products and services.

The Microsoft privacy statement explains:

- What data Microsoft processes.
- How Microsoft processes it.
- What purposes the data is used for.



Online Services Terms and Data Protection Addendum



Online Services Terms: The licensing terms define the terms and conditions for the products and Online Services you purchase through Microsoft Volume Licensing programs.

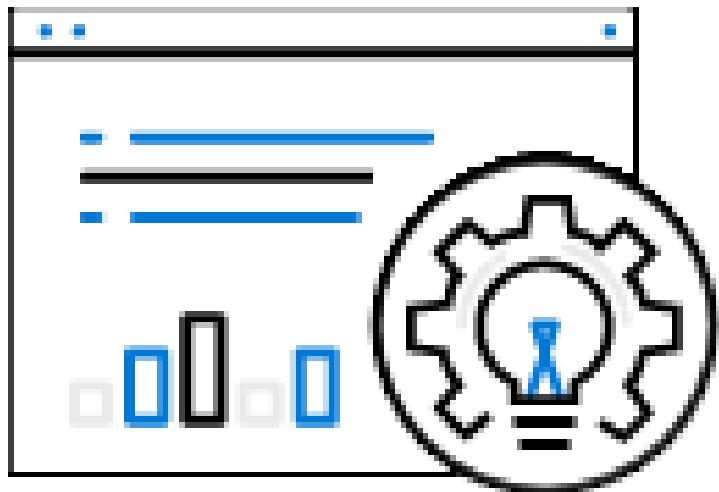


Data Protection Addendum: The DPA sets forth the obligations, with respect to the processing and security of Customer Data and Personal Data, in connection with the Online Services.

Trust Center

Learn about security, privacy, compliance, policies, features, and practices across Microsoft's cloud products.

The Trust Center website provides:

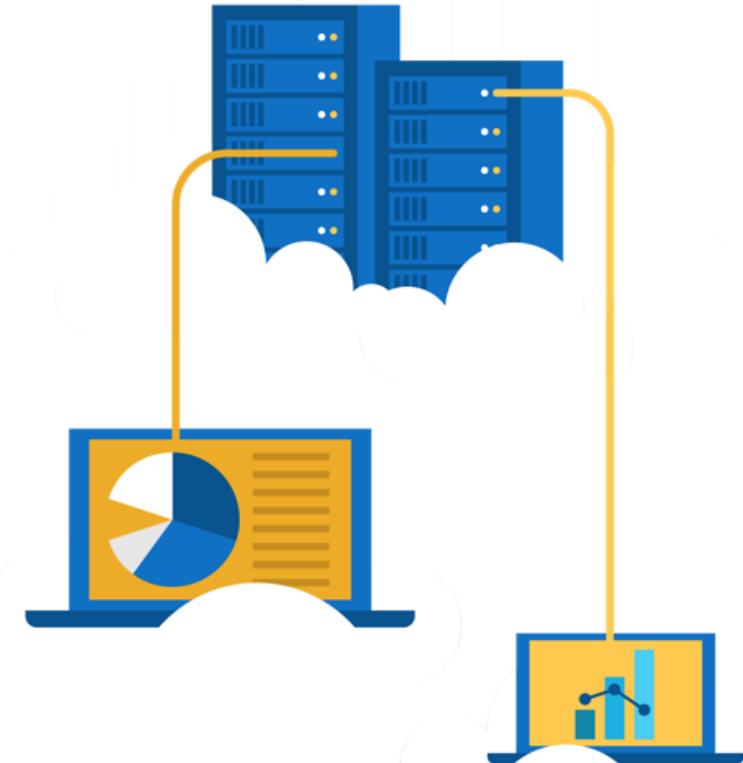


- In-depth, expert information.
- Curated lists of recommended resources, arranged by topic.
- Role-specific information for business managers, administrators, engineers, risk assessors, privacy officers, and legal teams.

Walkthrough – Exploring the Trust Center

Access the Trust Center, Service Trust Portal (STP), and Compliance Manager.

1. Access the Trust Center.
2. Access the Service Trust Portal.
3. Access the Compliance Manager.



Azure Compliance Documentation

Microsoft offers a comprehensive set of compliance offerings to help your organization comply with national, regional, and industry-specific requirements that govern the collection and use of data.

Global



US Government



Industry

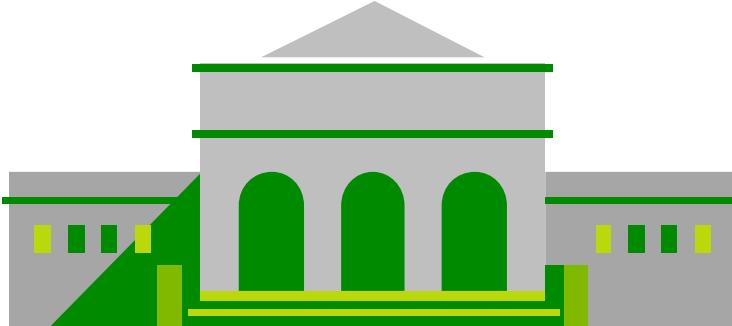


Regional



Azure Sovereign Regions (US Government services)

Meets the security and compliance needs of US federal agencies, state and local governments, and their solution providers.



Azure Government:

- Separate instance of Azure.
- Physically isolated from non-US government deployments.
- Accessible only to screened, authorized personnel.

Examples of compliant standards : FedRAMP, NIST 800.171 (DIB), ITAR, IRS 1075, DoD L2, L4 & L5, and CJIS.

Azure Sovereign Regions (Azure China)

Microsoft is China's first foreign public cloud service provider, in compliance with government regulations.

10101
01010
00100

Azure China features:

- Physically separated instance of Azure cloud services operated by 21Vianet
- All data stays within China to ensure compliance

10101
01010
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Knowledge Check

True or False

Azure Policy is used to control per-user permissions in Azure and control the types of resources that users can deploy.

Answer

False

Policy focuses on resource actions. For example, through policies, you can control the types of resources that can be provisioned or restrict the locations in which the resources can be provisioned regardless of the user.

RBAC focuses on the actions a user can perform. For example, a particular user is added to the Contributor role for a Resource Group so the user can make changes to that Resource Group.

Knowledge Check

True or False

With Infrastructure-as-a-Service you are responsible for the maintenance and patching of physical operating system hosts in Azure.

Answer

False

Microsoft maintains all of the physical infrastructure for Azure, including the datacenters, physical networks, and the physical hosts that host your virtual machines and other Azure services.

Knowledge Check

What would you use if you want to avoid a resource in Azure from being modified or deleted?

- A. Tag
- B. Resource Lock
- C. Policy

Knowledge Check

What would you use if you want to avoid a resource in Azure from being modified or deleted?

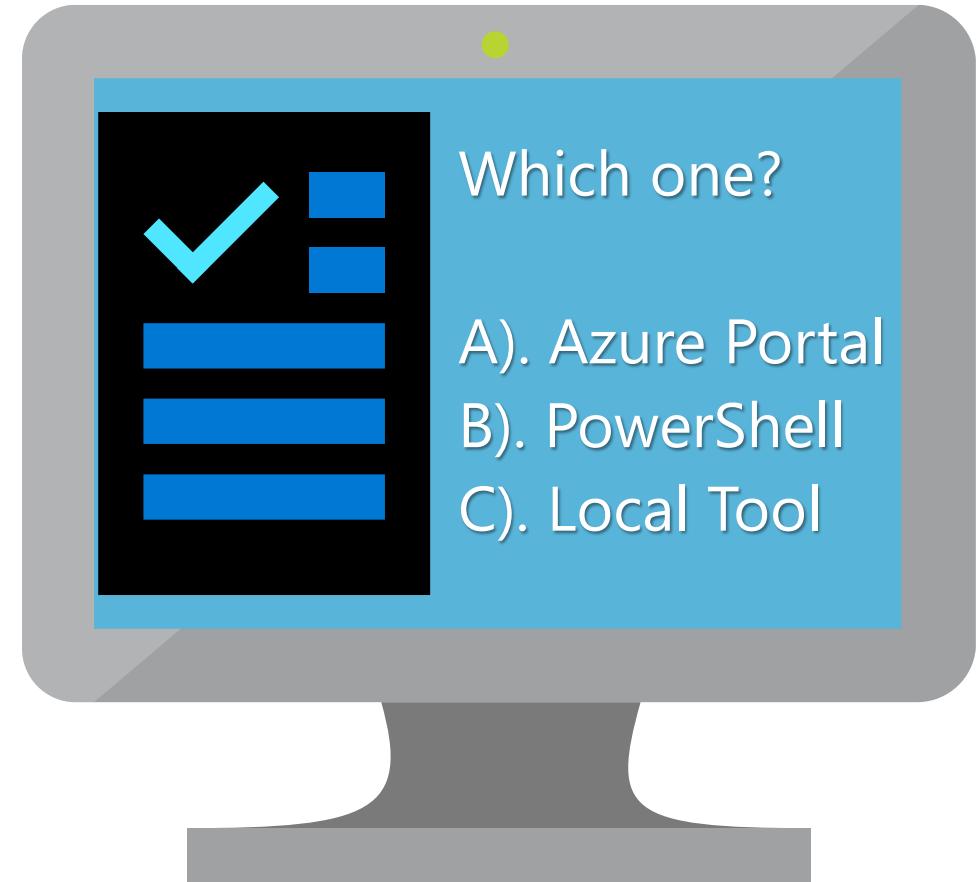
- A. Tag
 - B. Resource Lock
 - C. Policy
- B. Resource Lock is the answer. A Resource Lock for DoNotDelete or ReadOnly can be created to avoid modification or deletion.

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module 5

1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRUMEdaQTVGRVU5OUNBVDBKNFQ0MUxLUlhUQy4u
2. Please participate in the quiz for this section



Module 05 Review



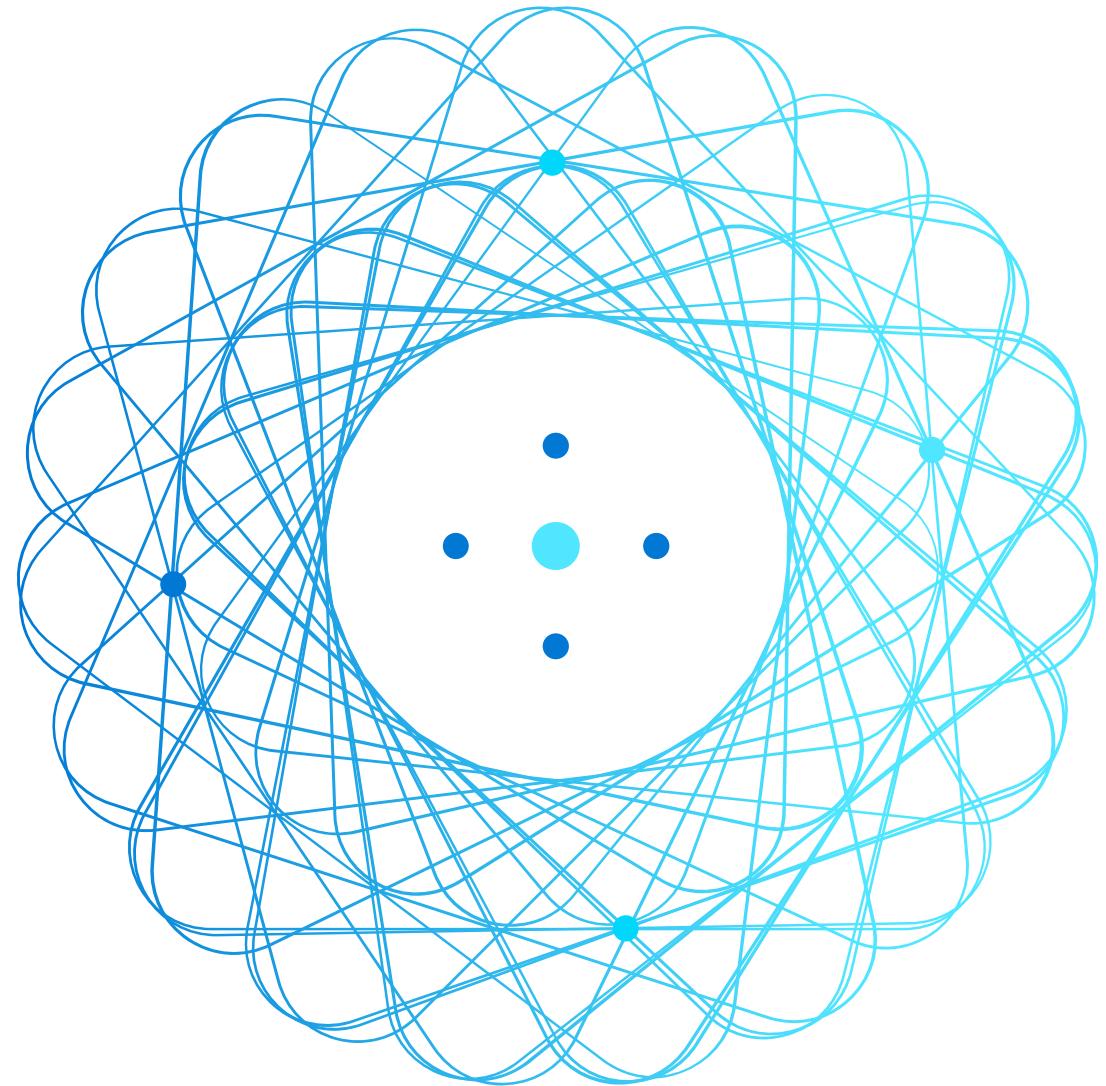
Microsoft Learn Modules
(docs.microsoft.com/Learn)

- Azure identity services
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- RBAC, Resource locks and tags
- Policy, Blueprints, and CAF
- Azure privacy and compliance
- Privacy Statement, Online Services Terms, Trust Center and compliance documentation.
- Azure Sovereign Regions

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Objective 6:

Azure pricing and lifecycle



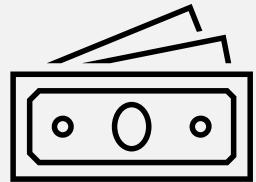
Objective area 6

Includes the following concepts:

- **Methods for managing costs**
 - Factors affecting costs
 - Options to reduce and control costs
 - Azure Cost Management
- **Service Level Agreements and Lifecycles**
 - Azure Service Level Agreement (SLA)
 - Factors impacting SLAs
 - Azure product and feature lifecycle



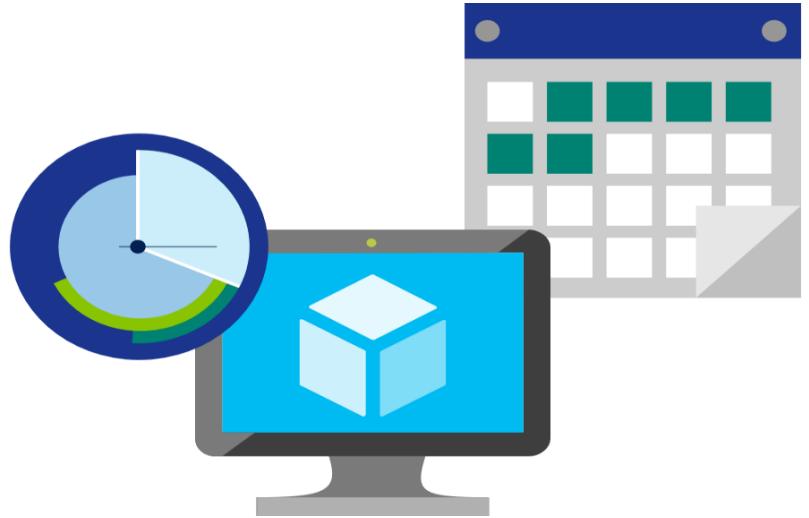
Planning and Cost Management



Planning and Cost Management - Objective Domain

- Identify factors that can affect costs (resource types, services, locations, ingress and egress traffic)
- Identify factors that can reduce costs (reserved instances, reserved capacity, hybrid use benefit, and spot pricing)
- Describe the functionality and usage of the Pricing calculator and the Total Cost of Ownership (TCO) calculator
- Describe the functionality and usage of Azure Cost Management

Factors affecting costs (part 1)



There are [six](#) primary factors affecting costs:

1) Resource Type

Costs are resource-specific, so the usage that a meter tracks and the number of meters associated with a resource, depend on the resource type.

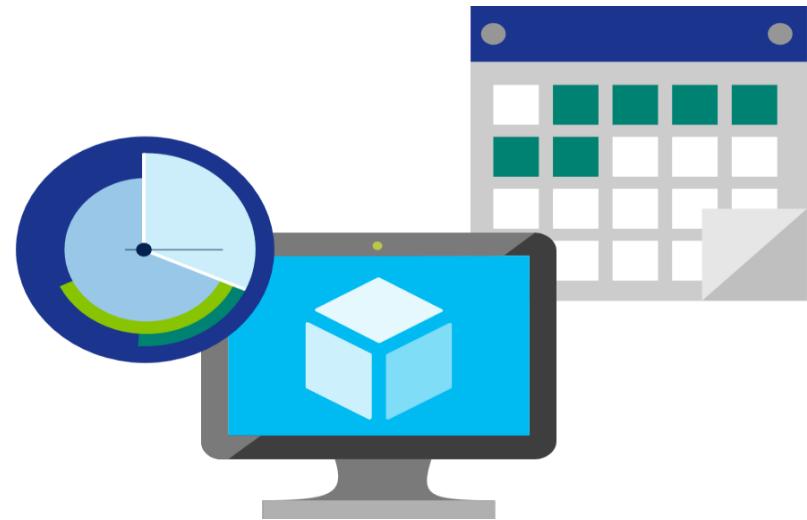
2) Services

Azure usage rates and billing periods can differ between Enterprise, Web Direct, and CSP customers.

3) Location

The Azure infrastructure is globally distributed, and usage costs might vary between locations that offer Azure products, services, and resources.

Factors affecting costs (part 2)



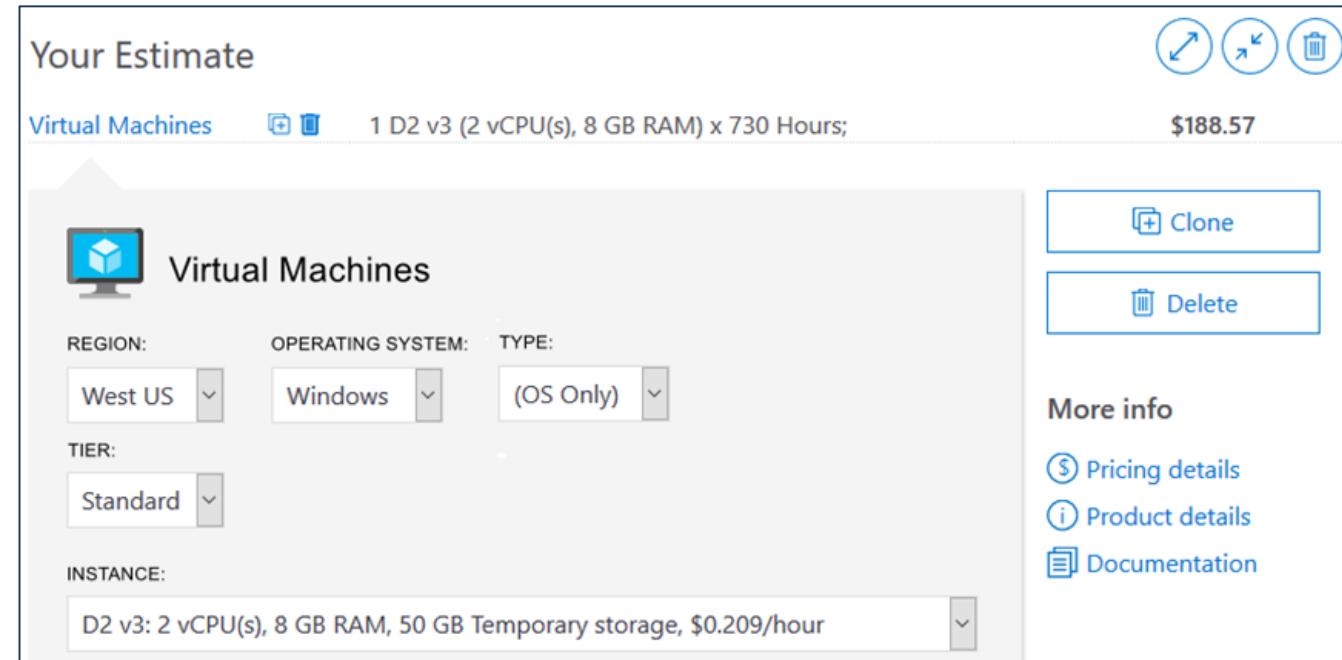
There are [six](#) primary factors affecting costs:

4) Bandwidth	5) Reserved Instances	6) Azure Hybrid Use Benefit
Some inbound data transfers are free, such as data going into Azure datacenters. For outbound data transfers, such as data going out of Azure datacenters, pricing is based on Zones.	With Azure Reservations, you commit to buying one-year or three-year plans for multiple products. Reservations can significantly reduce your resource costs up to 72% on pay-as-you-go prices.	For customers with Software Assurance, Azure Hybrid Benefit allows you to use your on-premises licenses on Azure at a reduced cost.

Pricing Calculator

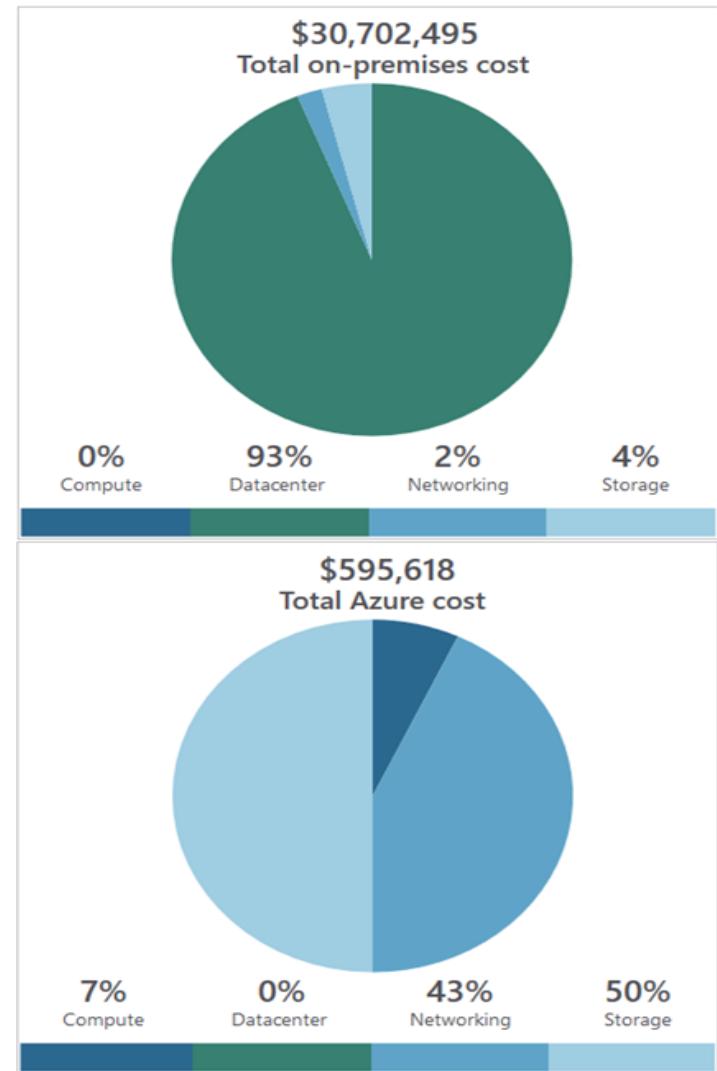
The **Pricing Calculator** is a tool that helps you estimate the cost of Azure products. The options that you can configure in the Pricing Calculator vary between products, but basic configuration options include:

- Region
- Tier
- Billing options
- Support options
- Programs and offers
- Azure dev/test pricing

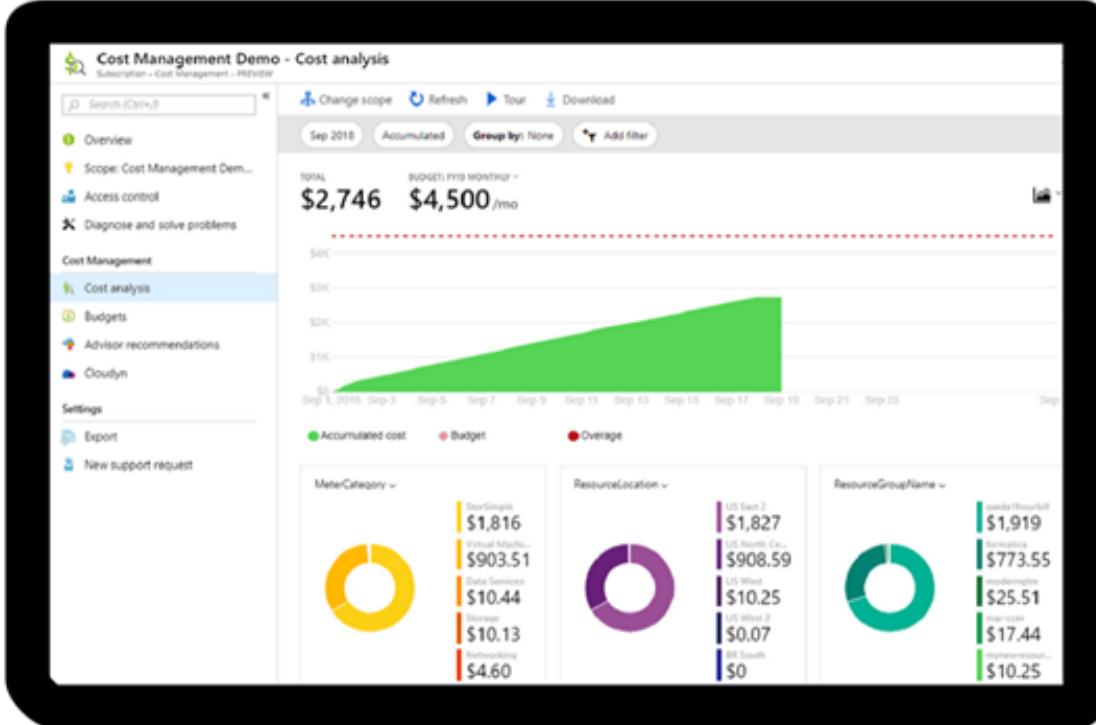


Total Cost of Ownership Calculator

- A tool to estimate cost savings you can realize by migrating to Azure.
- A report compares the costs of on-premises infrastructures with the costs of using Azure products and services in the cloud.

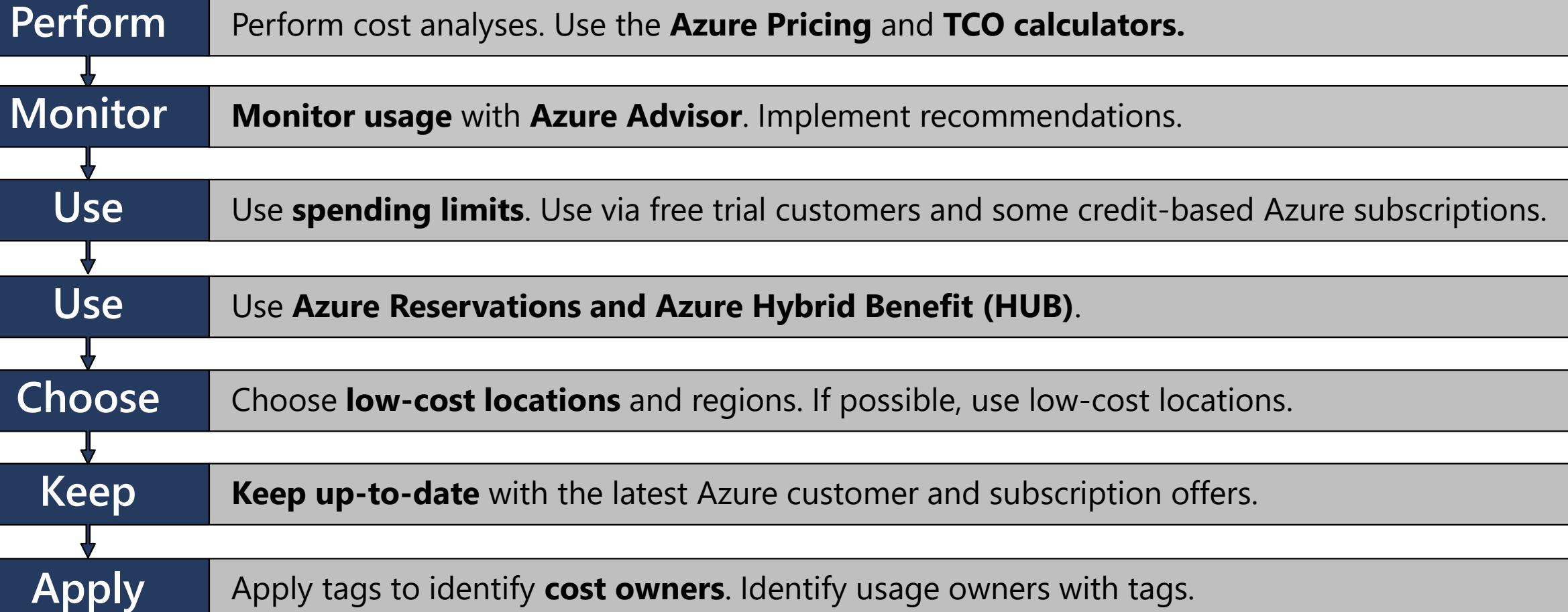


Azure Cost Management



- Reporting – billing reports
- Data enrichment
- Budgets – set spend budget
- Alerting – when cost exceed limits
- Recommendation – cost recommendations

Minimizing costs



Azure SLAs and service lifecycles



Azure SLAs and service lifecycles - Objective Domain

- Describe the purpose of an Azure Service Level Agreement (SLA)
- Identify actions that can impact an SLA (i.e. Availability Zones)
- Describe the service lifecycle in Azure (Public Preview and General Availability)

Service Level Agreements (SLAs)

Service Level Agreements (SLAs) describes Microsoft's commitments for uptime and connectivity.

- SLAs are based on individual products and services.
- Detailed agreements on the service provided, and any exceptions to the SLA.
- Free and preview features/services do not offer SLAs.



SLAs for Azure products and services

- Performance targets are expressed as uptime and connectivity guarantees.
- Performance-targets range from 99% to 99.999%.
- If a service fails to meet the guarantees, a percentage of the monthly service fees can be credited.

SLA	Downtime per month
99%	7h 18m 17s
99.5%	3h 39m 8s
99.9%	43m 49s
99.95%	21m 54s
99.99%	4m 22s
99.999%	26s

Actions that affect SLAs

Lower your SLA

- Adding more services
- Choosing free or non-SLA services

Raise your SLA

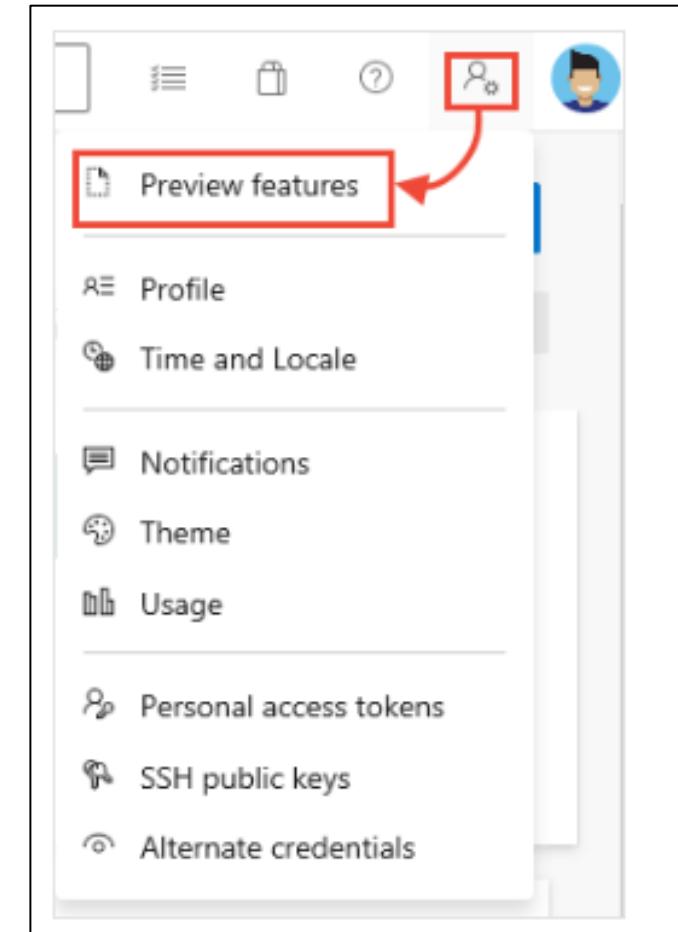
- Availability Zones
- Redundant systems

Many factors can raise or lower your SLA. Design decisions based on business goals will drive your SLA goals.

Azure Preview Program

With Azure previews, users can test beta and other pre-release features, products, services, software, and regions to provide feedback.

- **Public Preview:** all Azure customers can evaluate the new features
- **Generally available (GA):** after public preview is completed, all customers can use the feature, and region availability will vary.



Monitoring service and feature updates

- Azure updates provides information about the Azure products, services, and features, in addition to product roadmaps and availability.
- View details about all Azure updates and their status.
- Browse and search for updates.
- Subscribe to Azure update notifications by RSS.

Azure updates

Get the latest updates on Azure products and features to meet your cloud investment needs. Stay informed with Azure update notifications to stay informed.

[RSS feed](#)

Search all updates

Keyword Search

Status:

   NOW AVAILABLE   IN PREVIEW   IN DEVELOPMENT

Updates

[Release of new Azure CDN \(Microsoft Standard\) capability](#)

 IN PREVIEW

The Azure CDN service, a distributed network of servers that can efficiently deliver web content supports multiple origins.

[Content Delivery Network](#) [Services](#)

Knowledge Check

True or False

An Azure subscription may only have one account owner.

Answer

True

Each Azure subscription can have one account owner. However, each account owner may own multiple subscriptions.

Knowledge Check

Your organization relies on Azure services for hosting a critical application. You need 24x7 support for your Azure services. Which of the following support plans is the most economical option that still provides you with 24x7 support?

- a) Developer
- b) Standard
- c) Professional
- d) Premier

Answer

b) Standard

The standard tier support plan is the most economical offering that would still be appropriate for critical 24x7 operations. The Developer tier would be cheaper but does not provide 24x7 support, the Professional and Premier offerings provide 24x7 support but are significantly more expensive.

Knowledge Check

Your organization relies on Azure services for hosting a critical application. You need 24x7 support for your Azure services. Which of the following support plans is the most economical option that still provides you with 24x7 support?

- a) Developer
- b) Standard
- c) Professional
- d) Premier

Answer

b) Standard

The standard tier support plan is the most economical offering that would still be appropriate for critical 24x7 operations. The Developer tier would be cheaper but does not provide 24x7 support, the Professional and Premier offerings provide 24x7 support but are significantly more expensive.

Answer

False

Each Azure service has its own SLA. Configuration and service tiers may have an impact on the SLA but it is not the only thing to consider.

Knowledge Check

At which stage of the Azure service lifecycle should you consider an Azure service in production?

- a) Development
- b) Public preview
- c) Private preview
- d) General availability

Answer

d) General availability

Only Azure services released for general availability are supported in production environments. Services in general availability are fully supported and honor the SLA.

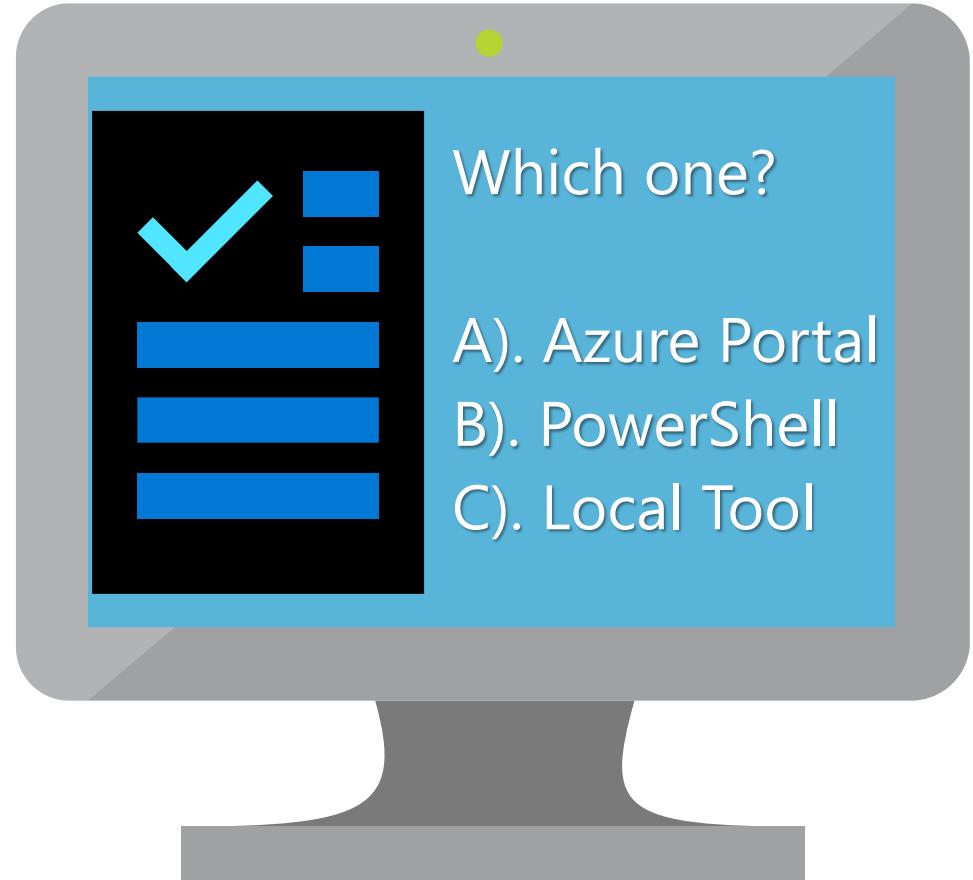
In some special cases you may be explicitly authorized by Microsoft to run a preview feature in production (*i.e.* you are part of an early adopter program).

Knowledge Check

Populate with instructions to use the polling tool of your choice

Module 6

1. Go to
https://forms.office.com/Pages/ResponsePage.aspx?id=DQSIkWdsW0yxEjajBLZtrQAAAAAIAAAAAAAAAO_YxT_jRUNDBTRVM4RkZPQ1IyVjRVWEIxOU5QMkdZMC4u
2. Please participate in the quiz for this section



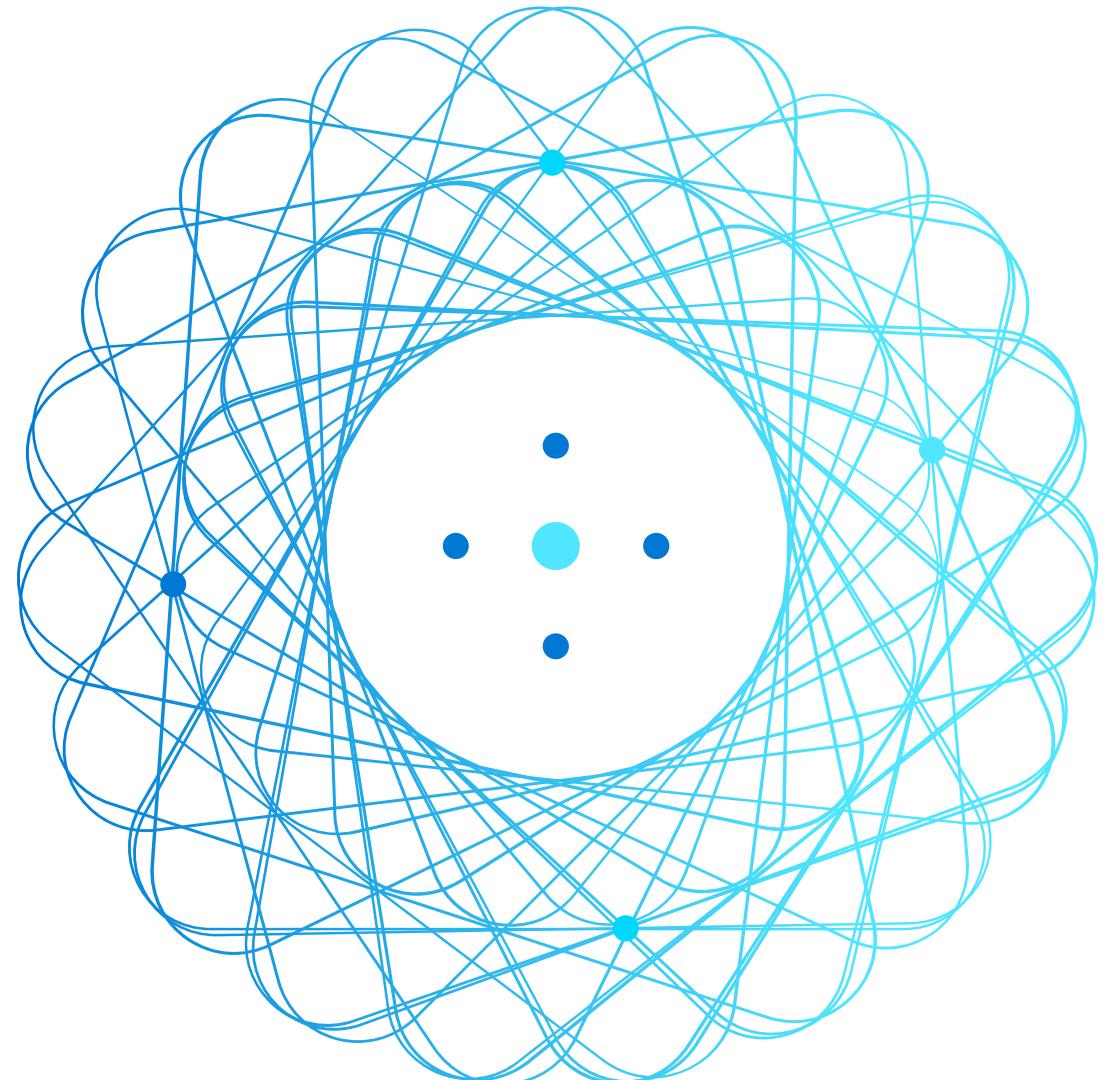
Module 06 Review



Microsoft Learn Modules
(docs.microsoft.com/Learn)

- Factors affecting costs
- Recognize Azure Cost Management
- Azure Service Level Agreement (SLA)
- Factors impacting SLAs
- Azure product and feature lifecycle

Final Thoughts about the Exam and Q&A



THANK YOU!!!

