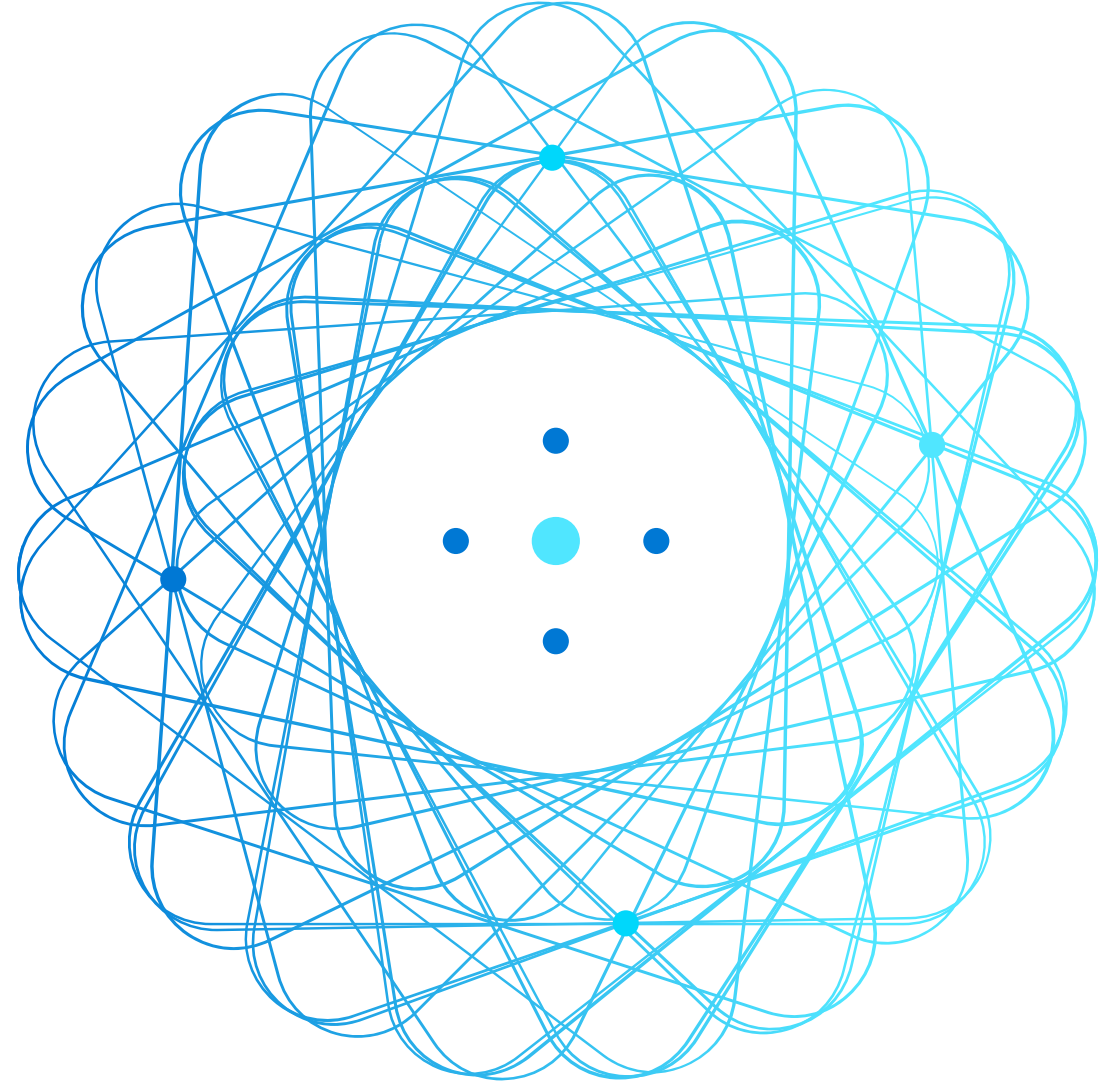


# AZ-900T00: Microsoft Azure Fundamentals

Dr. Junaid S. Qazi, PhD



# About this course

- This course provides foundational level knowledge on cloud concepts; core Azure architecture and services; and Azure management and governance.
- The audience for this course is just beginning to learn about cloud computing and how Microsoft Azure provides that service.
- The content aligns to the AZ-900 exam objective domain.
- It's recommended that you have an IT background for this course.

# Course Agenda

Learning Path 01 – Cloud concepts

Learning Path 02 – Azure architecture and services

Learning Path 03 – Azure management and governance

# Certification areas (AZ-900)

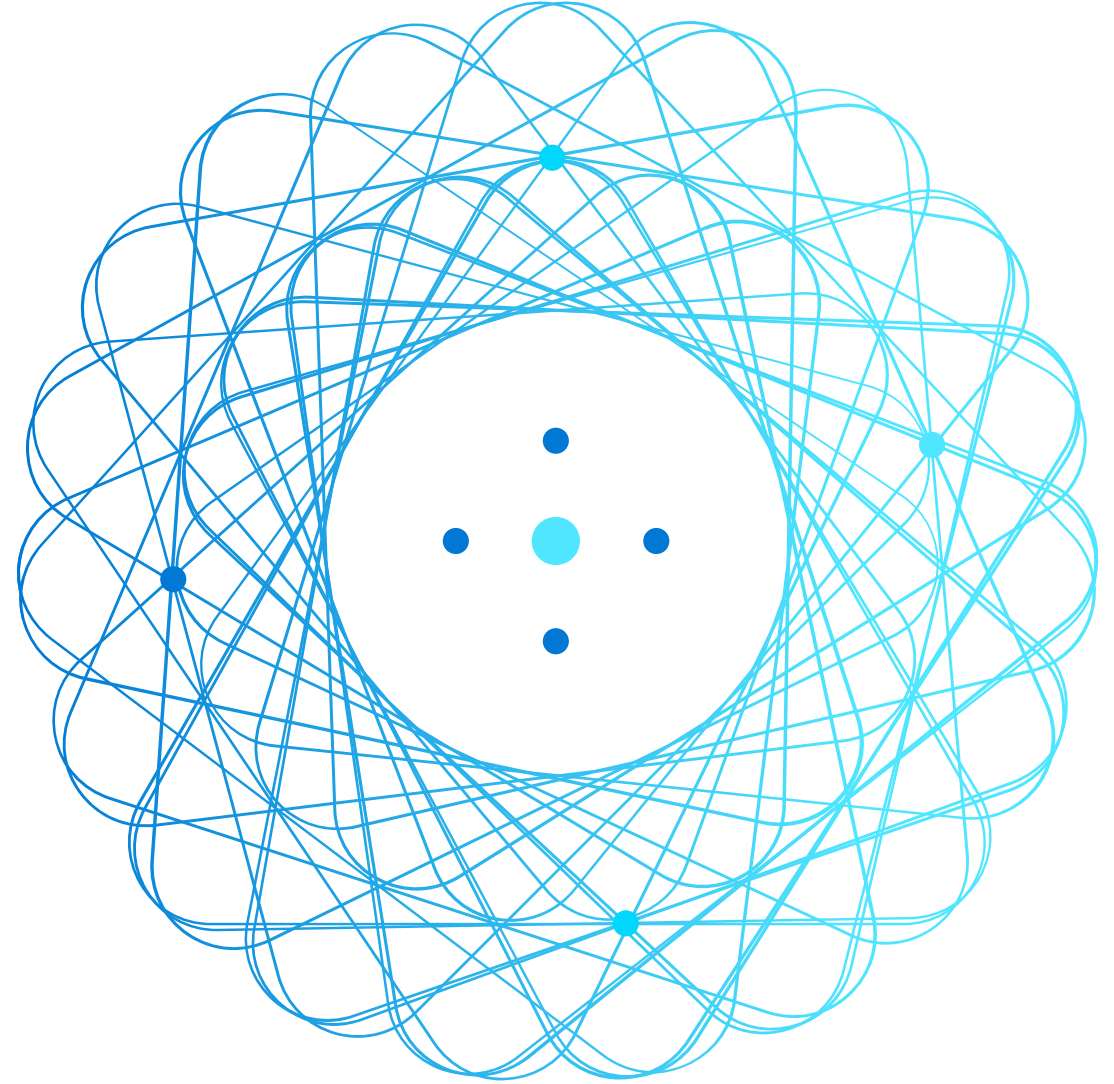
Study areas	Weight
Describe Cloud Concepts	25-30%
Describe Azure architecture and services	35-40%
Describe Azure management and governance	30-35%

- 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.

# AZ-900T00

## Learning Path 01:

### Cloud concepts



# Learning Path Outline



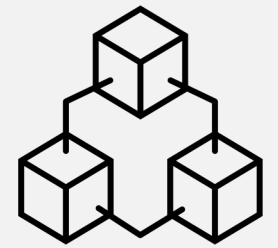
# Learning Path 01 - Outline

You will learn the following concepts:

- **Cloud Computing**
  - What is cloud computing
  - Shared responsibility
  - Cloud models
  - Capital vs Operational costing
- **Cloud Benefits**
  - Benefits of the cloud
- **Cloud Service Types**
  - IaaS, PaaS, and SaaS



# Cloud Computing





# Cloud computing - Objective Domain

- Define cloud computing
- Describe the shared responsibility model

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- Define cloud models, including public, private, and hybrid
- Identify appropriate use cases for each cloud model
- Describe the consumption-based model
- Compare cloud pricing models

# What is cloud computing?

## Abstract:

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.

## PUBLICATIONS

### NIST SP 800-145

## The NIST Definition of Cloud Computing



**Date Published:** September 2011

### Author(s)

Peter Mell (NIST), Tim Grance (NIST)

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This cloud model is composed of :

- **five** essential characteristics,
- **three** service models, and
- **four** deployment models.

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## Essential Characteristics:

### 1: On-demand self-service.

- Such as server time and network storage,
- as needed automatically without requiring human interaction with each service provider.

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- Available over the network and
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### 2: Broad network access.

- Available over the network and
- accessed through standard mechanisms (e.g., mobile phones, tablets, laptops, and workstations).

### 3: Resource pooling.

- To serve multiple consumers using a multi-tenant model, with
- different physical and virtual resources
- dynamically assigned and reassigned according to consumer demand. (e.g., storage, processing, memory, and network bandwidth)

<https://doi.org/10.6028/NIST.SP.800-145>



# What is cloud computing?

## Essential Characteristics:

### 4: Rapid elasticity.

- To scale rapidly outward and inward commensurate with demand.
- Often appear to be unlimited and can be appropriated in any quantity at any time.

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## Essential Characteristics:

### 4: Rapid elasticity.

- To scale rapidly outward and inward commensurate with demand.
- Often appear to be unlimited and can be appropriated in any quantity at any time.

### 5: Measured service.

- Automatically control and optimize resource,
- a metering capability
  - Resource usage can be monitored, controlled, and reported, providing transparency for both the provider and consumer of the utilized service.

<https://doi.org/10.6028/NIST.SP.800-145>

# What is cloud computing?

## Service models:

1. Software as a service (SaaS)
2. Platform as a service (PaaS)
3. Infrastructure as a service (IaaS)

**NIST**  
Information Technology Laboratory  
**COMPUTER SECURITY RESOURCE CENTER**

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# What is cloud computing?

## Service models:

1. Software as a service (SaaS)
2. Platform as a service (PaaS)
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## Deployment models:

1. Private cloud
2. Community cloud
3. Public cloud
4. Hybrid cloud

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# What is cloud computing?

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- the delivery of **computing services over the internet**,

## Enabling:

- **faster innovation,**
- **flexible resources,** and
- **economies of scale.**

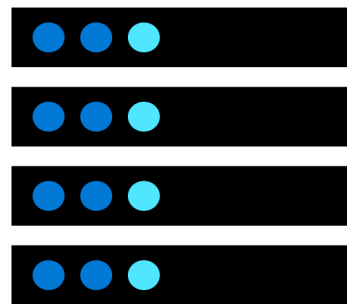
# What is cloud computing?

## Cloud Computing:

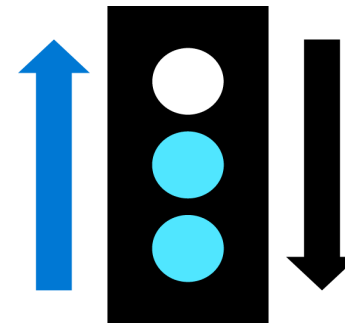
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**Compute**

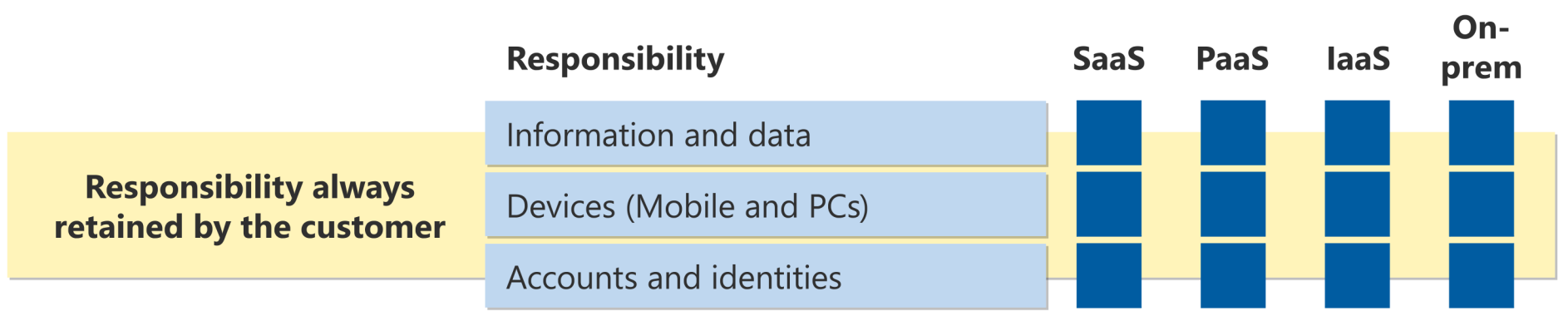


**Networking**



**Storage**

# Shared responsibility model



 Customer



# Shared responsibility model

	Responsibility	SaaS	PaaS	IaaS	On-prem
Responsibility always retained by the customer	Information and data	Customer	Customer	Customer	Customer
	Devices (Mobile and PCs)	Customer	Customer	Customer	Customer
	Accounts and identities	Customer	Customer	Customer	Customer
Responsibility varies by type	Identity and directory infrastructure	Shared	Shared	Customer	Customer
	Applications	Microsoft	Shared	Customer	Customer
	Network controls	Microsoft	Shared	Customer	Customer
	Operating system	Microsoft	Microsoft	Customer	Customer



Microsoft

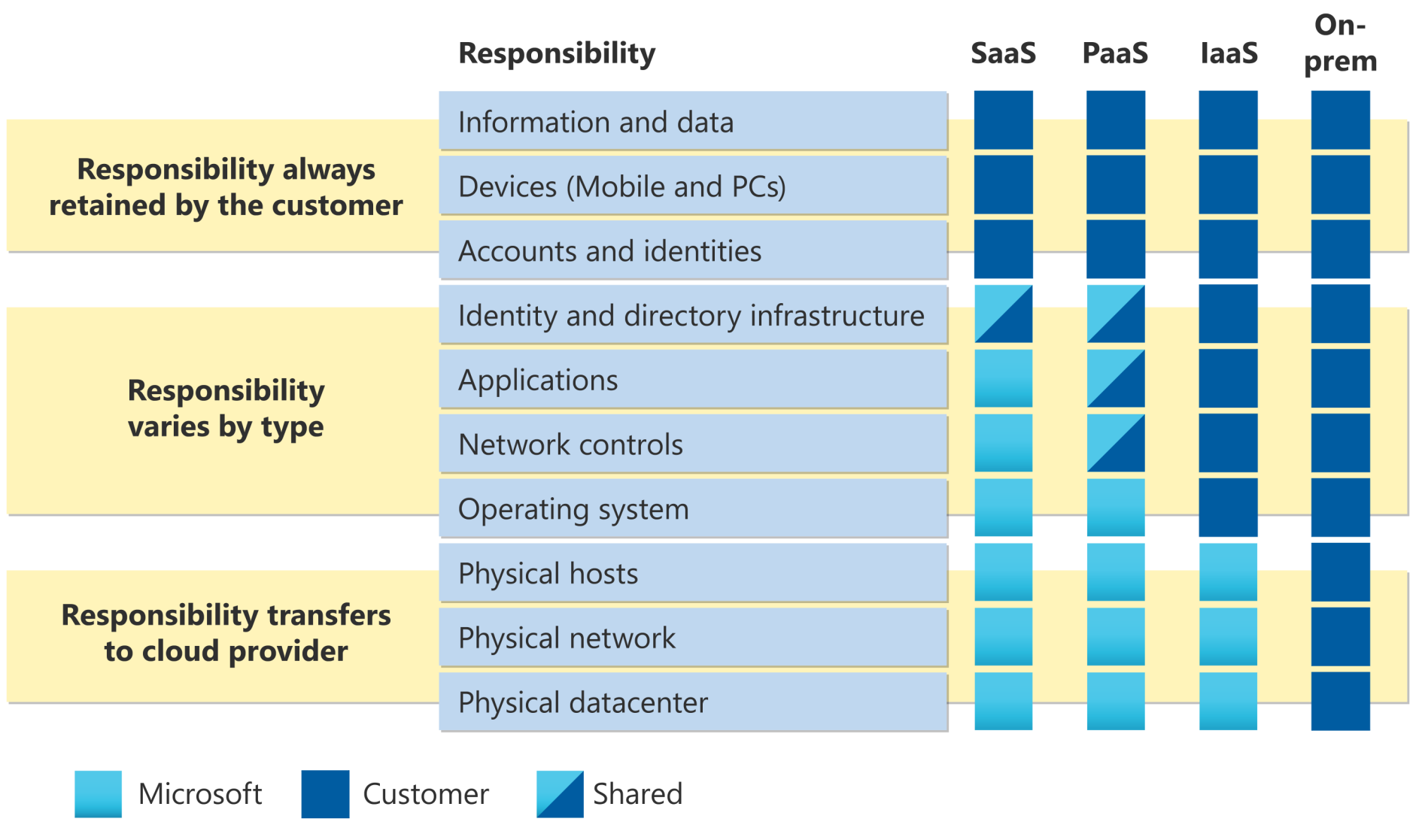


Customer



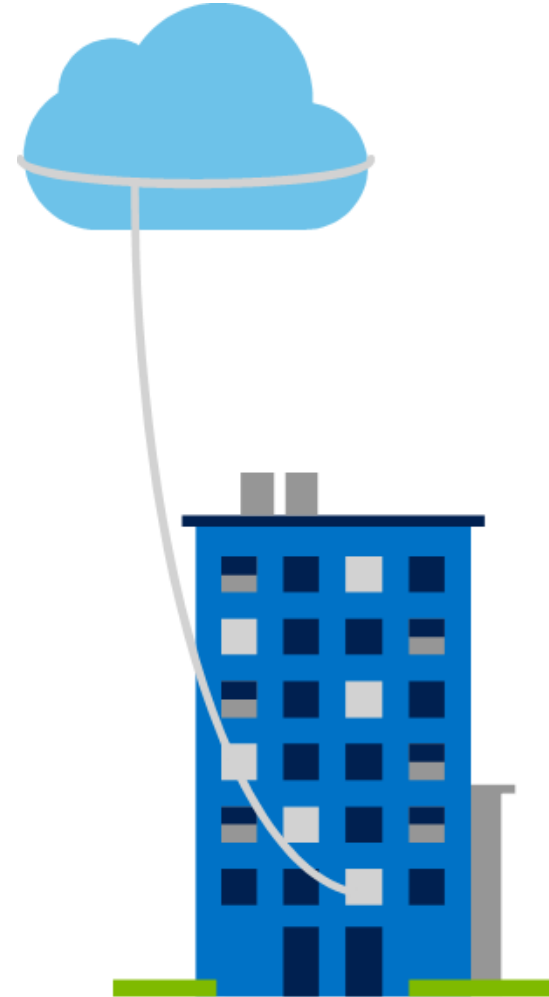
Shared

# Shared responsibility model



# Private cloud

**Owned and operated by the organization** that uses cloud resources.

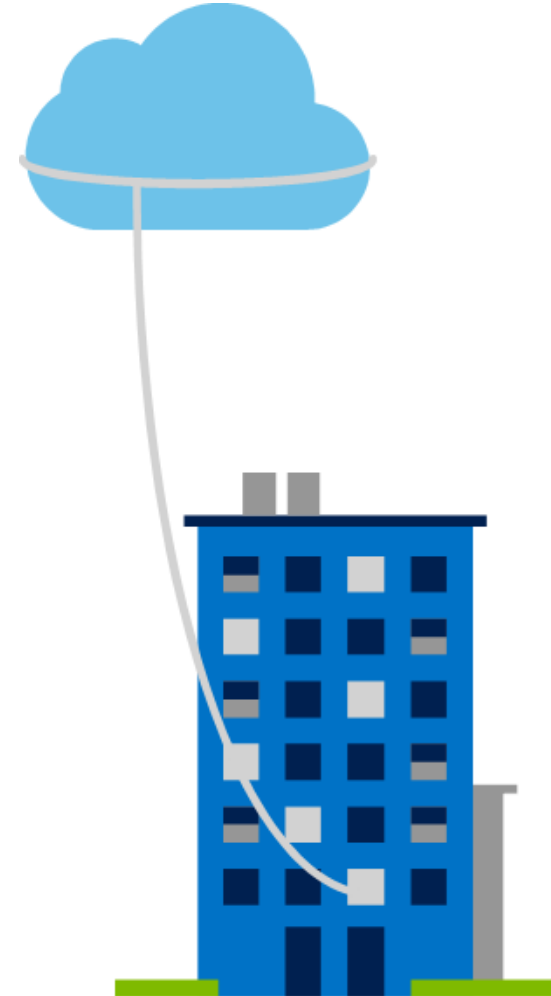


<https://docs.microsoft.com/learn/modules/describe-cloud-compute/5-define-cloud-models>

# Private cloud

**Owned and operated by the organization** that uses cloud resources.

- 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.



<https://docs.microsoft.com/learn/modules/describe-cloud-compute/5-define-cloud-models>

# 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).



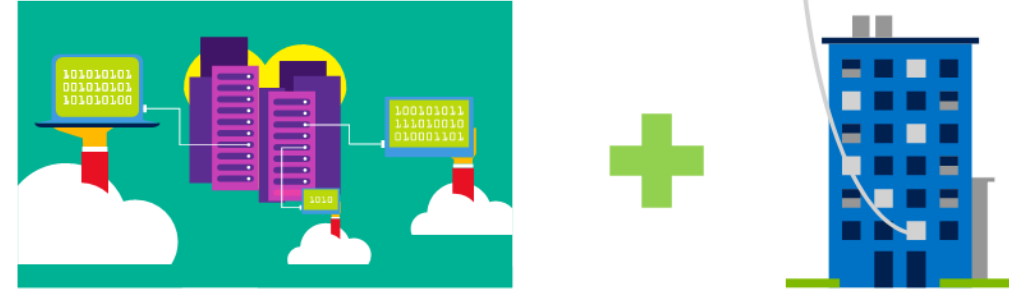
<https://azure.microsoft.com/en-us/overview/what-are-private-public-hybrid-clouds/>

# Hybrid cloud

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

Hybrid cloud models have the following characteristics:

- **Resource location.**
  - Specific resources run or are used in a public cloud, and others run or are used in a private cloud.
- **Cost and efficiency.**
  - Hybrid cloud models allow an organization to leverage some of the benefits of cost, efficiency, and scale that are available with a public cloud model.
- **Control.**
  - Organizations retain management control in private clouds.
- **Skills.**
  - Technical skills are still required to maintain the private cloud and ensure both cloud models can operate together.



<https://azure.microsoft.com/en-us/overview/what-are-private-public-hybrid-clouds/>

# 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.

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# Cloud model comparison

## Public Cloud

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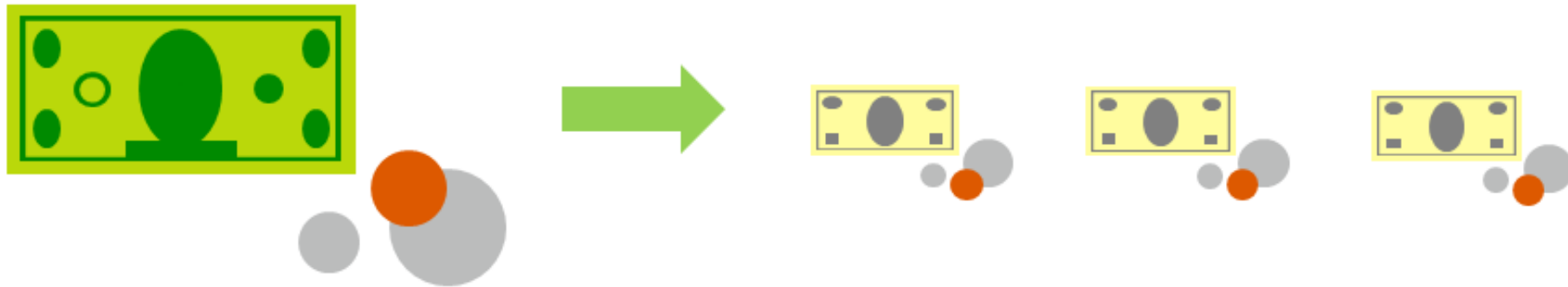
## Hybrid Cloud

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

# 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**.



# 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.



# 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 benefits



# Cloud Benefits - Objective Domain

- Describe the benefits of high **availability** and **scalability** in the cloud.
- Describe the benefits of **reliability** and **predictability** in the cloud.
- Describe the benefits of **security** and **governance** in the cloud.
- Describe the benefits of **manageability** in the cloud.

<https://docs.microsoft.com/en-us/learn/modules/describe-benefits-use-cloud-services/1-introduction>

# Cloud Benefits

**High availability**

**Scalability**

**Predictability**

**Governance**

**Elasticity**

**Reliability**

**Security**

**Manageability**

<https://docs.microsoft.com/learn/modules/describe-benefits-use-cloud-services/2-high-availability-scalability-cloud>

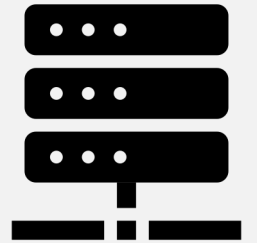
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<https://docs.microsoft.com/learn/modules/describe-benefits-use-cloud-services/4-security-governance-cloud>

<https://docs.microsoft.com/learn/modules/describe-benefits-use-cloud-services/5-manageability-cloud>



# Cloud service types

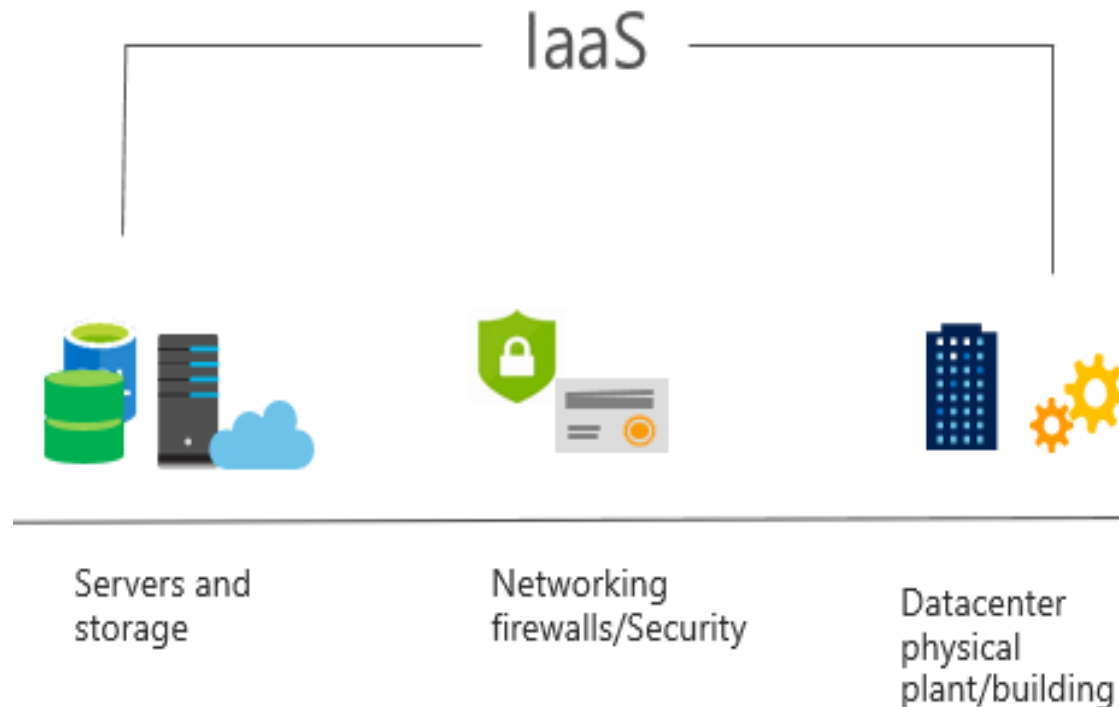


# Cloud Services - Objective Domain

- Describe Infrastructure as a Service (IaaS)
- Describe Platform as a Service (PaaS)
- Describe Software as a Service (SaaS)
- Identify appropriate use cases for each cloud service (IaaS, PaaS, SaaS)

# Infrastructure as a Service (IaaS)

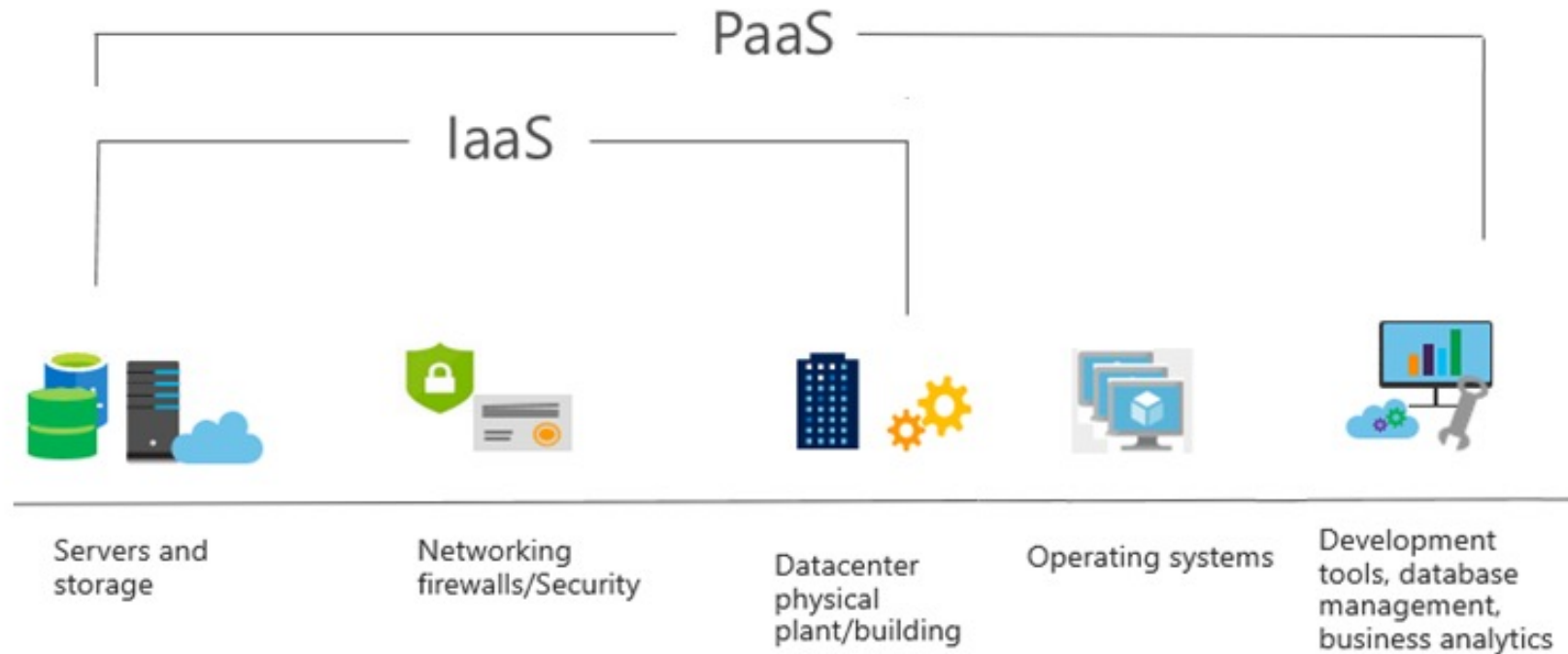
Most **basic** services, **Instant**, Build **pay-as-you-go IT infrastructure** by renting servers, virtual machines, storage, networks, and operating systems from a cloud provider.



For more information on IaaS, visit <https://azure.microsoft.com/en-us/overview/what-is-iaas/>

# Platform as a Service (PaaS)

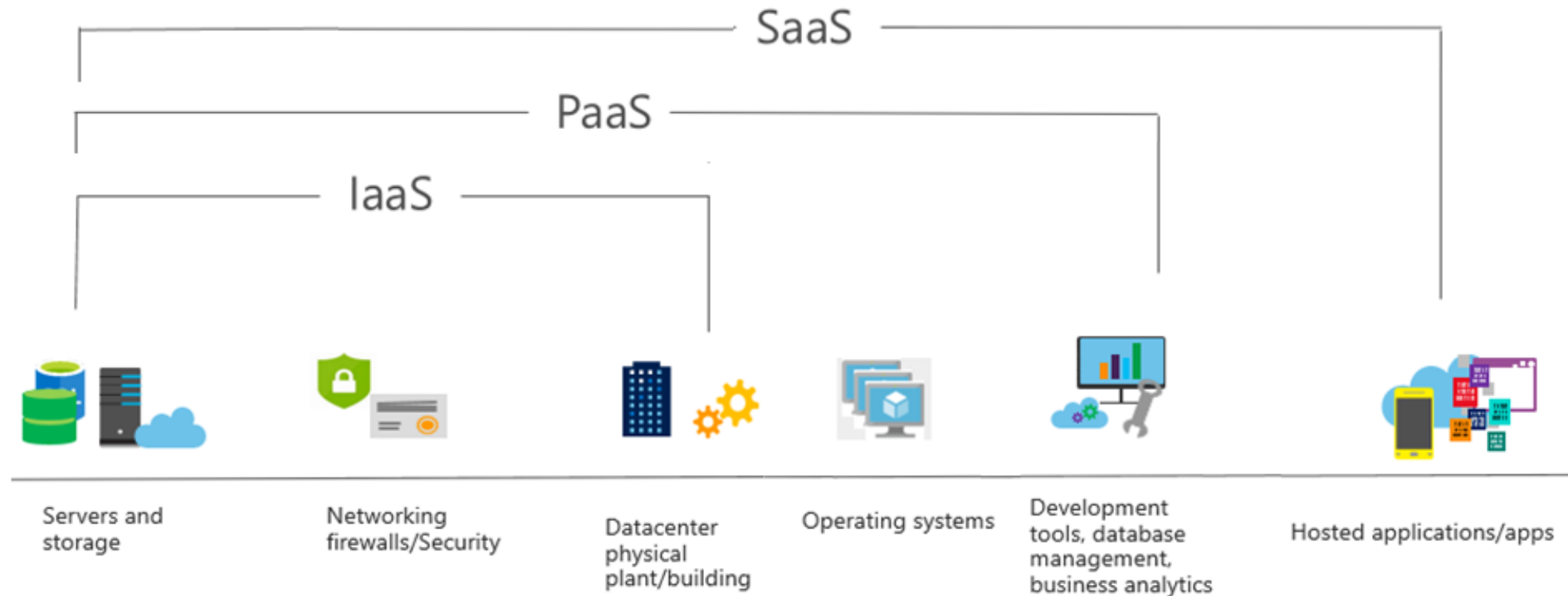
- Provides environment for **building, testing, and deploying software applications**
- Helps create applications **quickly**, without focusing on managing underlying infrastructure.



For more information on PaaS, see <https://azure.microsoft.com/en-us/overview/what-is-paas/>

# Software as a Service (SaaS)

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



For more information on SaaS, see <https://azure.microsoft.com/en-us/overview/what-is-saas/>

# Cloud service comparison

IaaS

The **most flexible** cloud service.

You configure and manage the hardware for your application.

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## IaaS

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## PaaS

Focus on **application development**.

Platform management is handled by the cloud provider.

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## SaaS

**Pay-as-you-go** pricing model.

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

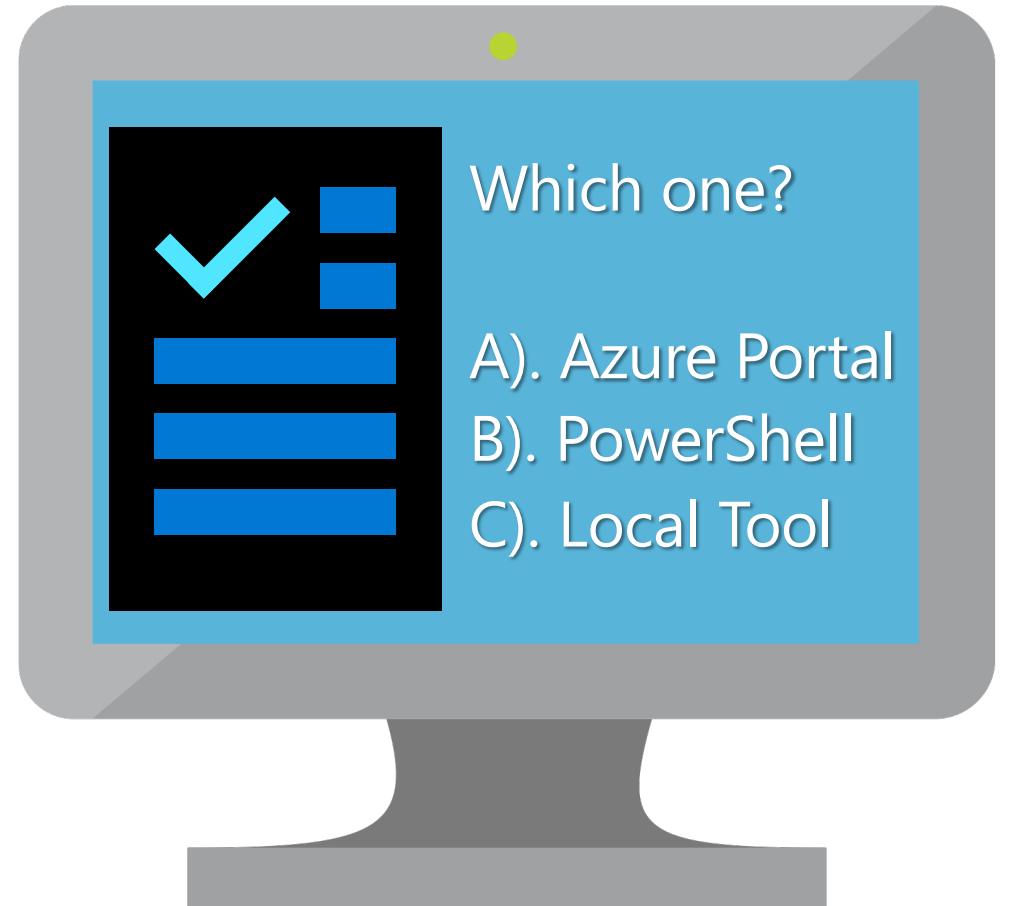


# Knowledge Check

*Populate with instructions to use the polling tool of your choice*

## Learning Path 1

1. Use your Smartphones or Mobile Devices
2. Go to (*insert polling app link of your choice*)
3. Enter Code: **123-45-678**
4. Please participate in the quiz for this section



# Learning Path 01 **Review**

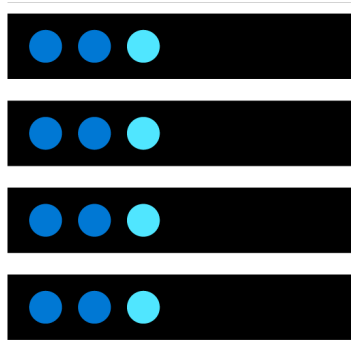


Microsoft Learn Modules  
([docs.microsoft.com/Learn](https://docs.microsoft.com/Learn))

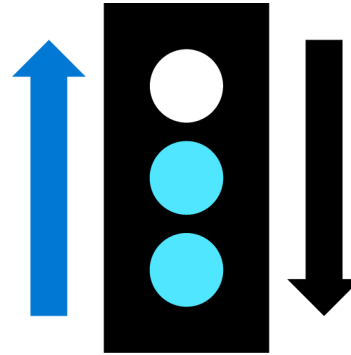
- The **shared responsibility** model
- **Public, private, and hybrid-cloud**
- **Benefits** of cloud computing
- Cloud **service types**

# 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