



Welcome to Cloud Computing Class

Where We Make the Cloud Rain. 😊

Meet Me



Mrs Mary Ajayi, a Teacher turned Techie
B.Ed, Nursery and Primary Education.

Currently, a Cloud DevOps Engineer.

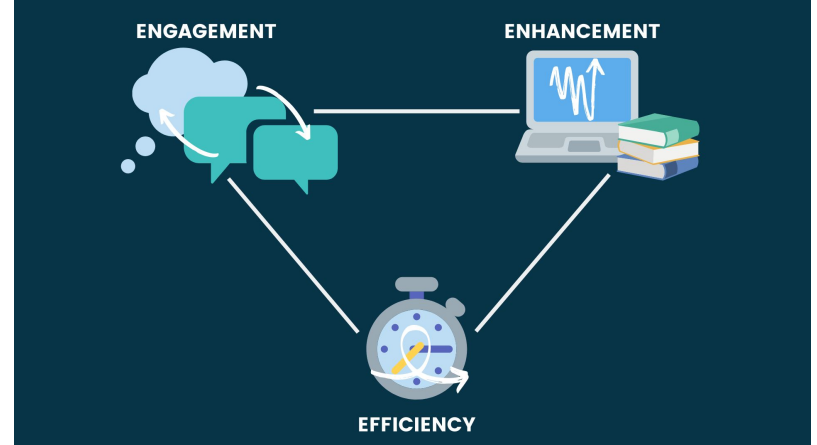
Hold several certifications - AWS Cloud Practitioner,
Azure Applied Skills, Github Foundations, Github
Administrator and many others.



<https://www.linkedin.com/in/mary-yourtechie/>

Requirements

- ★ Attention
- ★ Punctuality
- ★ Participation
- ★ Persistence
- ★ Communicate



Introduction to Cloud Computing



Contents

- Overview of Cloud Computing
- Benefits of Cloud Computing
- Cloud Service Models
- Cloud Deployment Models
- Key Cloud Providers
- Use Cases and Examples
- Summary and Q&A

"You don't have to
be great to start,
but you have to
start to be great."

- Zig Ziglar

What is Cloud Computing?

Cloud vs Traditional Datacenters



What is Cloud Computing?

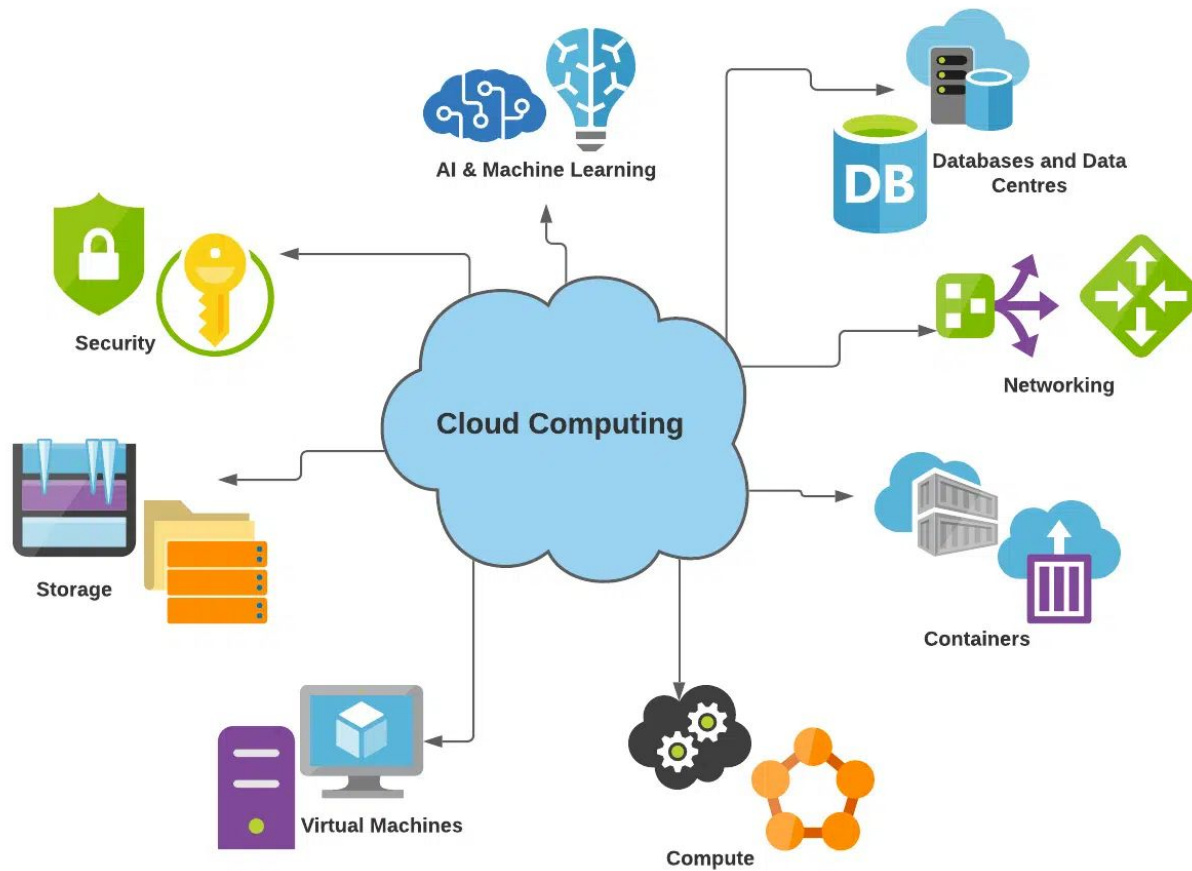


Cloud computing is the delivery of computing services – servers, storage, databases, networking, software, analytics and more – over the Internet (“the cloud”).

Companies offering these computing services are called cloud providers and typically charge for cloud computing services based on usage, similar to how you’re billed for gas or electricity at home.

Cloud computing is defined as **the use of hosted services, such as data storage, servers, databases, networking, and** software over the internet.

Cloud computing in simple terms is **renting your data storage, applications and other computing services over** the internet.



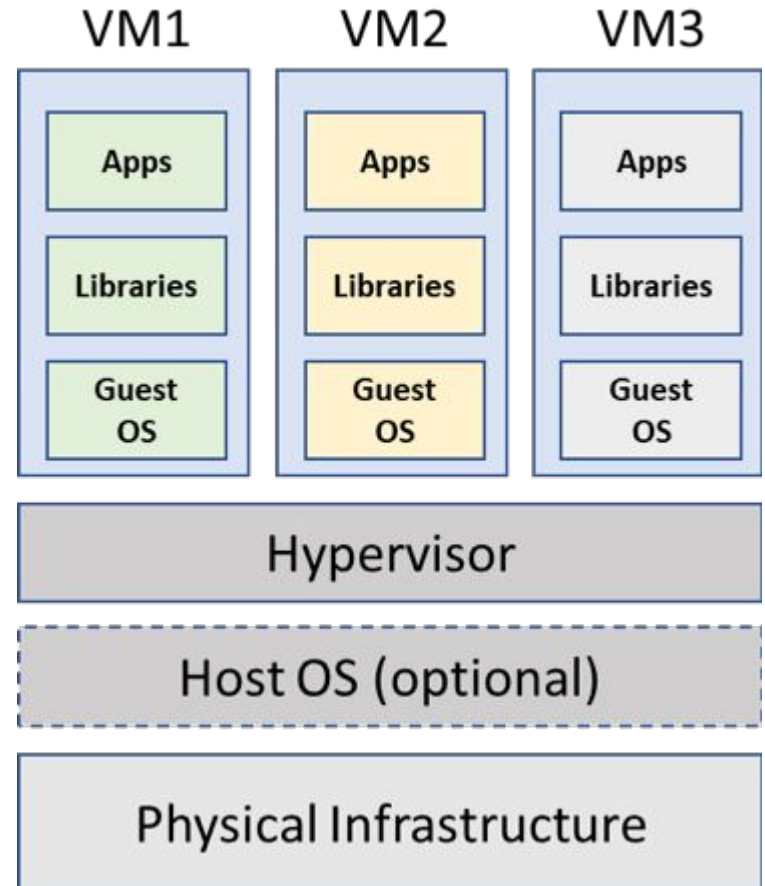


Components of Cloud Computing?

- Compute: Virtual machines, containers
- Storage: Object storage, block storage
- Networking: Virtual networks, load balancers
- Databases: SQL, NoSQL
- Security: Identity management, encryption
- Analytics: Data lakes, machine learning tools

Virtualization

Virtualization in cloud computing is a technology that allows the creation of a virtual (rather than physical) version of something, such as an operating system, a server, a storage device, or network resources.



Characteristics of Cloud Computing?



1. **On-Demand Self-Service:** Users can provision computing capabilities as needed automatically.
2. **Broad Network Access:** Capabilities are accessible over the network via standard mechanisms.
3. **Resource Pooling:** Provider's resources are pooled to serve multiple consumers.
4. **Rapid Elasticity:** Capabilities can be elastically provisioned and released.
5. **Measured Service:** Resource usage can be monitored, controlled, and reported.

Benefits of Cloud Computing?



1. **Cost Efficiency**

- Reduced Upfront Costs: Minimal initial investment in hardware and infrastructure.
- Pay-as-You-Go: Pay only for the resources you use, reducing waste and optimizing spending.

2. **Scalability**

- On-Demand Resources: Easily scale resources up or down based on demand.
- Flexibility: Adapt quickly to changing business needs without significant delays or expenses



3. Accessibility:

- Remote Access: Access applications and data from anywhere with an internet connection.
- Global Collaboration: Facilitate teamwork across different geographical locations.

4. Reliability:

- High Uptime: Cloud providers offer robust infrastructure with redundancy and failover mechanisms.
- Disaster Recovery: Built-in disaster recovery solutions ensure data safety and business continuity.



5. Speed and Agility

- **Rapid Deployment:** Quickly launch and iterate on new applications and services.
- **Development Efficiency:** Access to a wide range of development tools and platforms accelerates the software development lifecycle.

6. Performance

- **Optimized Resources:** Cloud providers use high-performance servers and infrastructure, often outperforming on-premises setups.
- **Regular Upgrades:** Continuous performance improvements and updates by the providers



7. Security:

- Advanced Security Measures: Cloud providers implement strong security protocols and compliance measures.
- Data Protection: Regular backups and encryption ensure data integrity and confidentiality.

8. Innovation

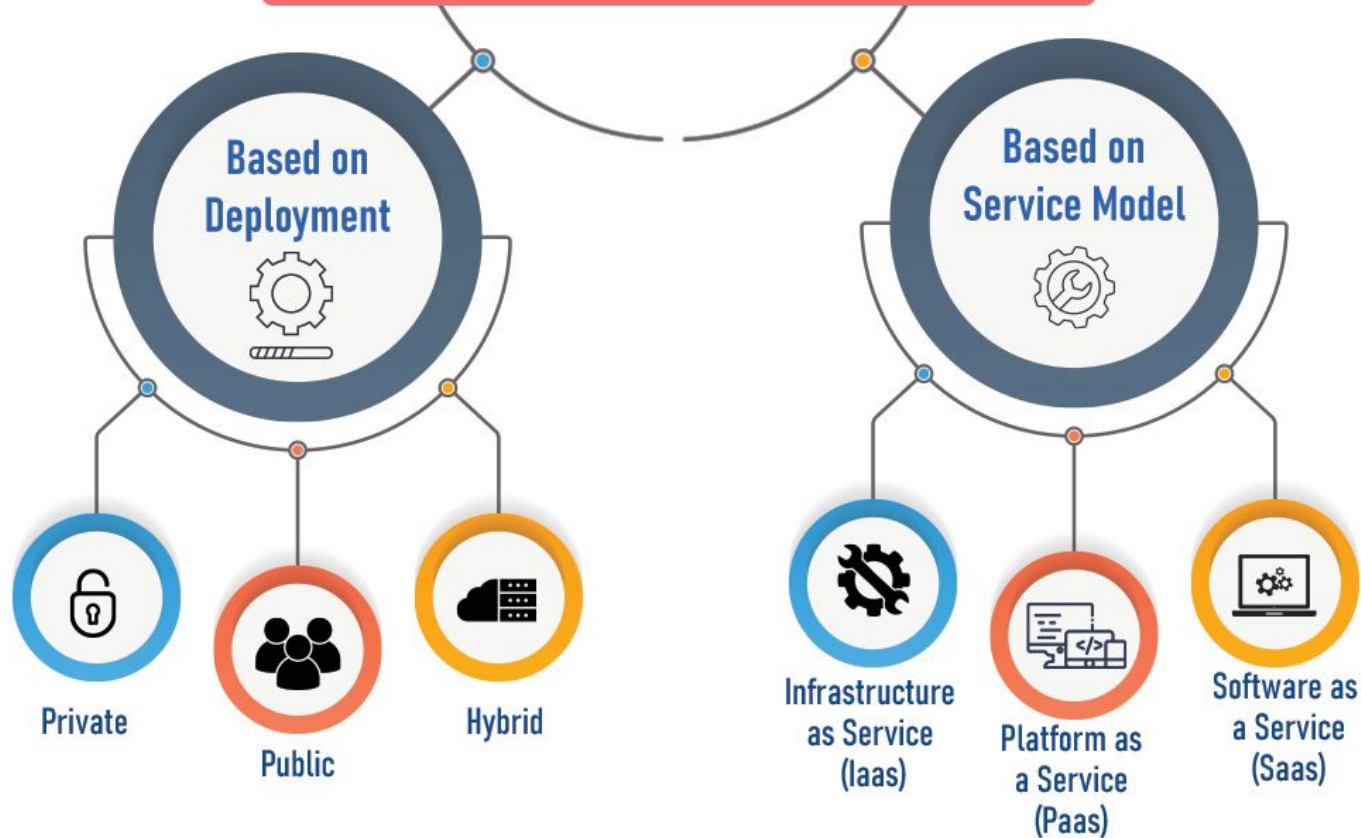
- Access to Latest Technologies: Continuous access to cutting-edge technologies and services, like AI, machine learning, and big data analytics.
- Focus on Core Business: Allows organizations to focus on their core activities without worrying about IT infrastructure management.

Cloud Deployment Models



1. Public Cloud - the infrastructure is made available to the general public or a large industry group and is owned by the organization selling cloud services.
2. Private Cloud – the infrastructure is operated solely for an organization.
3. Hybrid Cloud - composition of two or more Clouds (public, private, or community) as unique entities but bound by a standardised technology that enables data and application portability.

TYPES OF CLOUD COMPUTING



Cloud Service Models



IaaS:

Definition: Provides virtualized computing resources over the internet.

Examples: Azure VMs, Azure Storage, Azure VNet

PaaS:

Definition: Provides a platform allowing customers to develop, run, and manage applications.

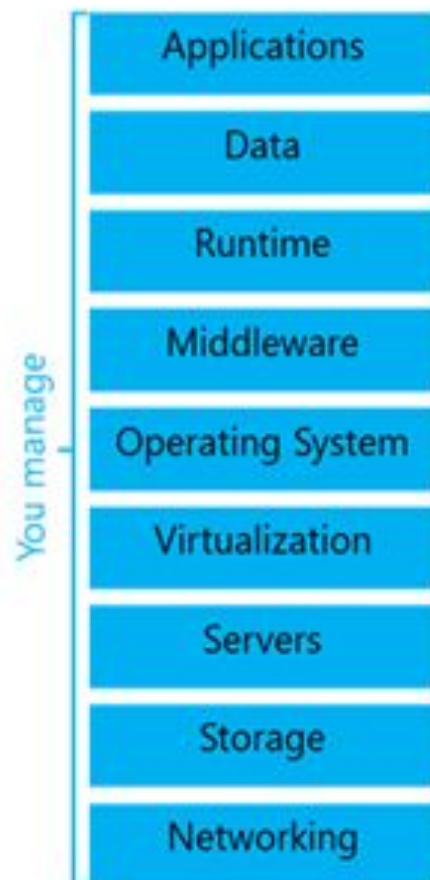
Examples: Azure App Service, Azure SQL DB, Azure Functions

SaaS:

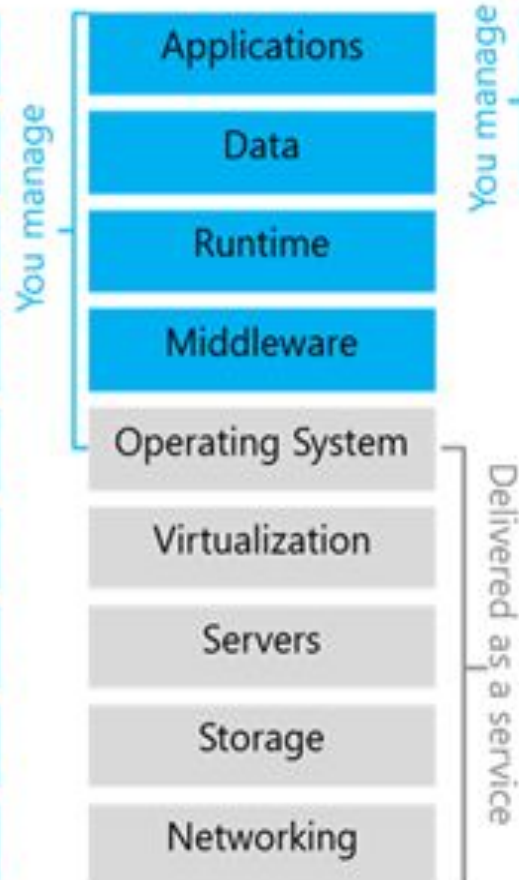
Definition: Delivers software applications over the internet on a subscription basis.

Examples: Microsoft Office 365, Google Workspace, Azure DevOps

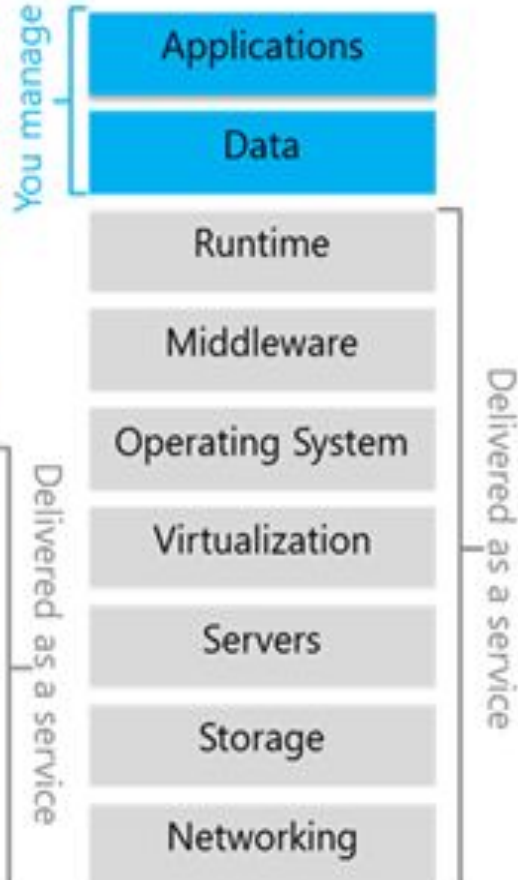
Traditional IT



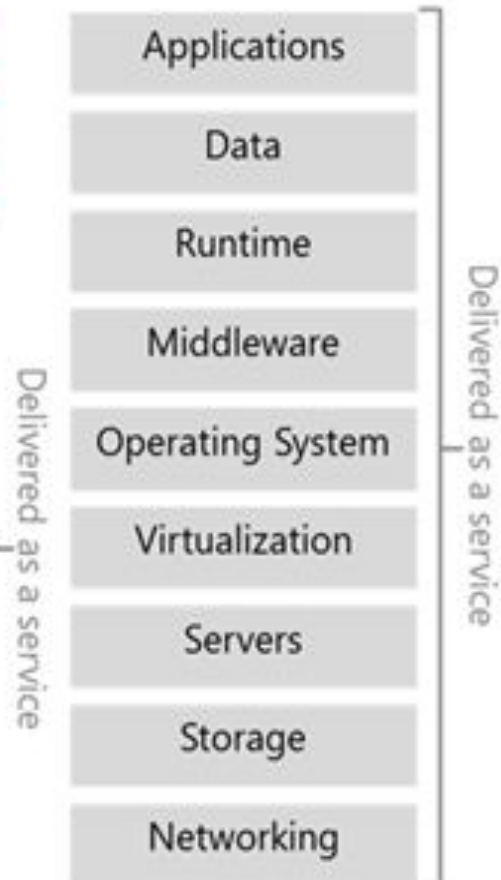
Infrastructure (as a Service)



Platform (as a Service)



Software (as a Service)



Key Cloud Providers

Top 10 Cloud Providers



<https://medium.com/@talktorahul.b/top-10-cloud-service-providers-in-the-world-2924abec80cc>

Use Cases and Examples



Scalability and Elasticity: Handling variable workloads and spikes in demand.

- Example: An e-commerce website experiencing a surge in traffic during holiday sales scales its infrastructure dynamically using cloud auto-scaling services.

Disaster Recovery and Business Continuity: Ensuring data and application availability in case of disasters.

- Example: A company replicates its critical data and applications to the cloud for backup and failover, ensuring business continuity in case of on-premises infrastructure failure.



Data Analytics and Machine Learning: Extracting insights from large volumes of data.

- Example: A retail company analyzes customer purchase patterns using cloud-based data analytics tools to personalize marketing campaigns and improve customer experience.

DevOps and Continuous Integration/Continuous Deployment (CI/CD): Streamlining software development and deployment processes.

- Example: A software development team implements CI/CD pipelines on cloud platforms, enabling automated testing and deployment for rapid and reliable software releases.



Case 1

Case: A retail company experiences fluctuating demand throughout the year, with peak seasons during holidays.



Case 1 - Scalability and Elasticity

Case: A retail company experiences fluctuating demand throughout the year, with peak seasons during holidays.

Scenario: By leveraging cloud computing, the company can dynamically scale its resources up or down based on demand. During peak seasons, additional compute and storage resources can be provisioned to handle increased traffic, while scaling down during off-peak periods to optimize costs.

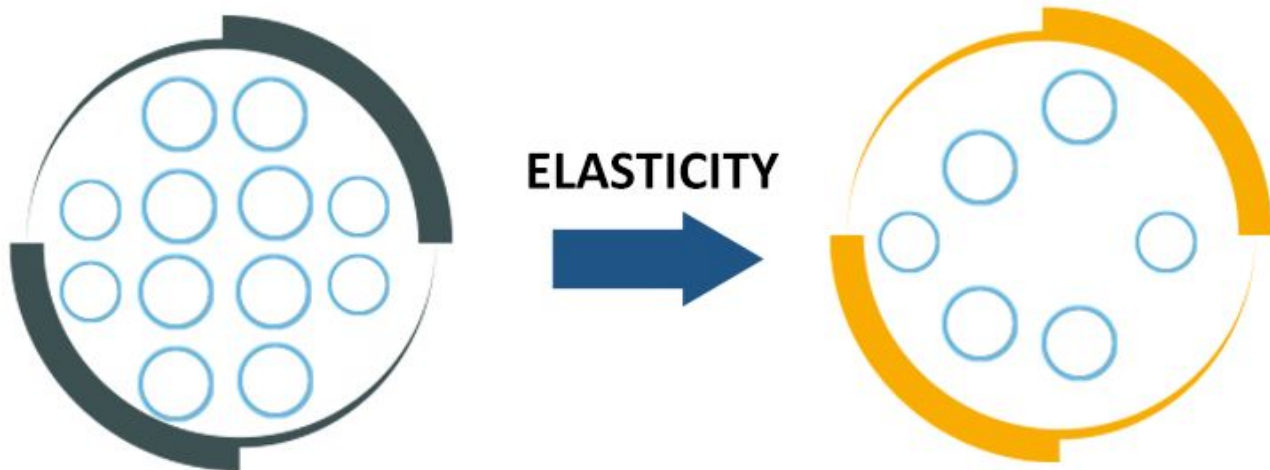
CLOUD ELASTICITY



Ability to adapt
workload changes



Dynamically
grow or shrink





Case 2

- A financial institution needs a robust disaster recovery solution to protect its critical data and applications.



Case 2 - Reliability

Scenario: Financial Institution Disaster Recovery

- Context: A financial institution needs a robust disaster recovery solution to protect its critical data and applications.
- Advantage: Utilizing Azure Site Recovery, the institution can replicate its on-premises data to the cloud, ensuring quick recovery in case of a disaster.
- Outcome: The institution achieves high reliability and business continuity, minimizing downtime and data loss



Case 3 - Cost Efficiency

- A start-up needs to deploy its new application quickly and with minimal upfront costs.



Case 3 - Cost Efficiency

Scenario: Start-up Deployment

- Context: A start-up needs to deploy its new application quickly and with minimal upfront costs.
- Advantage: By using AWS or Azure, the start-up avoids the high costs of purchasing and maintaining physical servers. They can deploy their application using cloud services, paying only for the resources they use.
- Outcome: The start-up reduces initial expenses, allowing them to allocate more funds to development and marketing.

Quiz Time



★ <https://forms.gle/R8tcaPBiVQ9wuHCK8>

Assignment



- ★ Write a blog on the advantages and disadvantages of cloud computing.

"You are braver
than you believe,
stronger than you
seem and
smarter than you
think" — A.A. Milne

Core Architectural Components of Azure



Contents

- Overview of Azure's Architecture
- Azure Regions
- Azure Availability Zones
- Resource Groups
- Azure Resource Manager (ARM)
- Summary and Q&A

"The beautiful
thing about
learning is that no
one can take it
away from you." —
B.B. King



Introduction to Azure

- Microsoft's cloud computing platform
- Offers a wide range of services including computing, analytics, storage, and networking
- Supports IaaS, PaaS, and SaaS models



Regions



Geographical areas where Azure data centers are located.

Key Points:

- Each region is a set of data centers deployed within a specific geographic location
- Over 60 regions worldwide
- Allows customers to deploy services closer to their users for improved performance and compliance

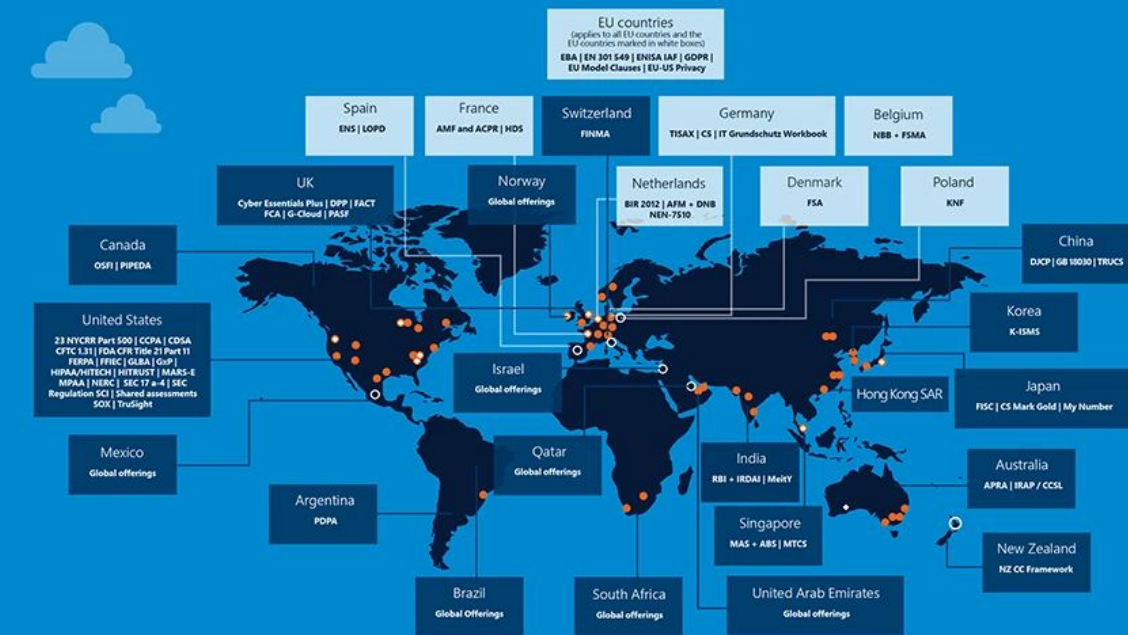
Examples are East US, West Europe, Southeast Asia

Azure global compliance



The following compliance standards apply globally

CIS Benchmark | CSA-STAR attestation | CSA-STAR certification
CSA-STAR self-assessment | ISO 20000-1:2011 | ISO 22301 | ISO 27001
ISO 27017 | ISO 27018 | ISO 27701 | ISO 9001 | PCI DSS | SOC | WCAG



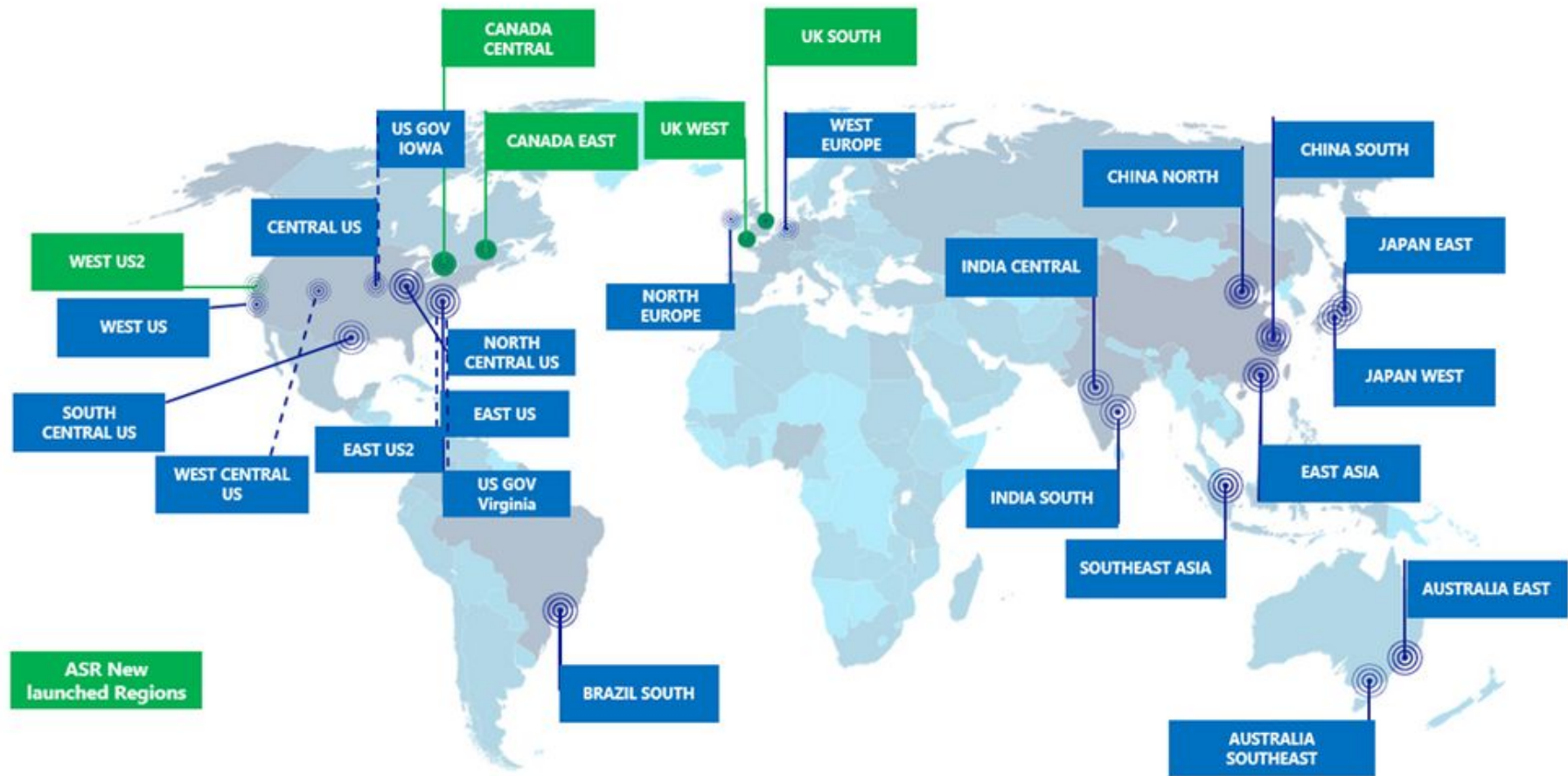
Azure regions

Azure has more global regions than any other cloud provider—offering the scale needed to bring applications closer to users around the world, preserving data residency, and offering comprehensive compliance and resiliency options for customers.

over
60 regions
worldwide

140 available in
140 countries

- Available region
- Announced region
- ◆ Availability zones



Availability Zones



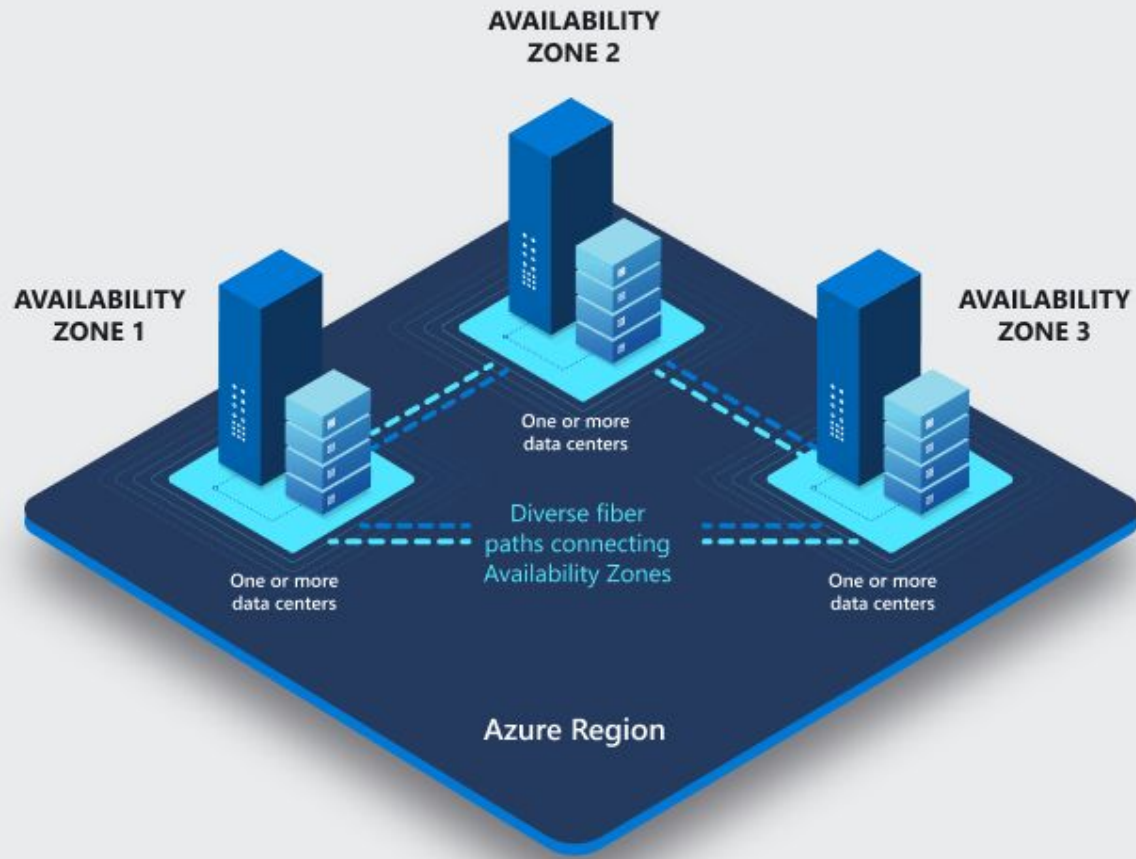
Physically separate locations within an Azure region.

Key Points:

- Each zone has its own independent power source, network, and cooling
- Designed to protect applications and data from datacenter failures
- High availability through redundancy

Usage: Distribute resources across multiple zones to ensure high availability and resilience

Example: In a region like East US, there can be multiple availability zones



Resource Groups



- A logical container for Azure resources

Key Points

- Resources within a group share the same lifecycle and management
- Simplifies management and deployment
- Can group resources by application, environment, or department

Benefits

- Easier to manage costs
- Simplified resource management and organization



Example

- A resource group for a web app could include the app service, database, and storage accounts.



Azure Resource Manager (ARM)



The deployment and management service for Azure

Key Points

- Provides a unified way to manage Azure resources
- Allows users to create, update, and delete resources as a group
- Uses templates to automate deployment

Azure Resource Manager (ARM)

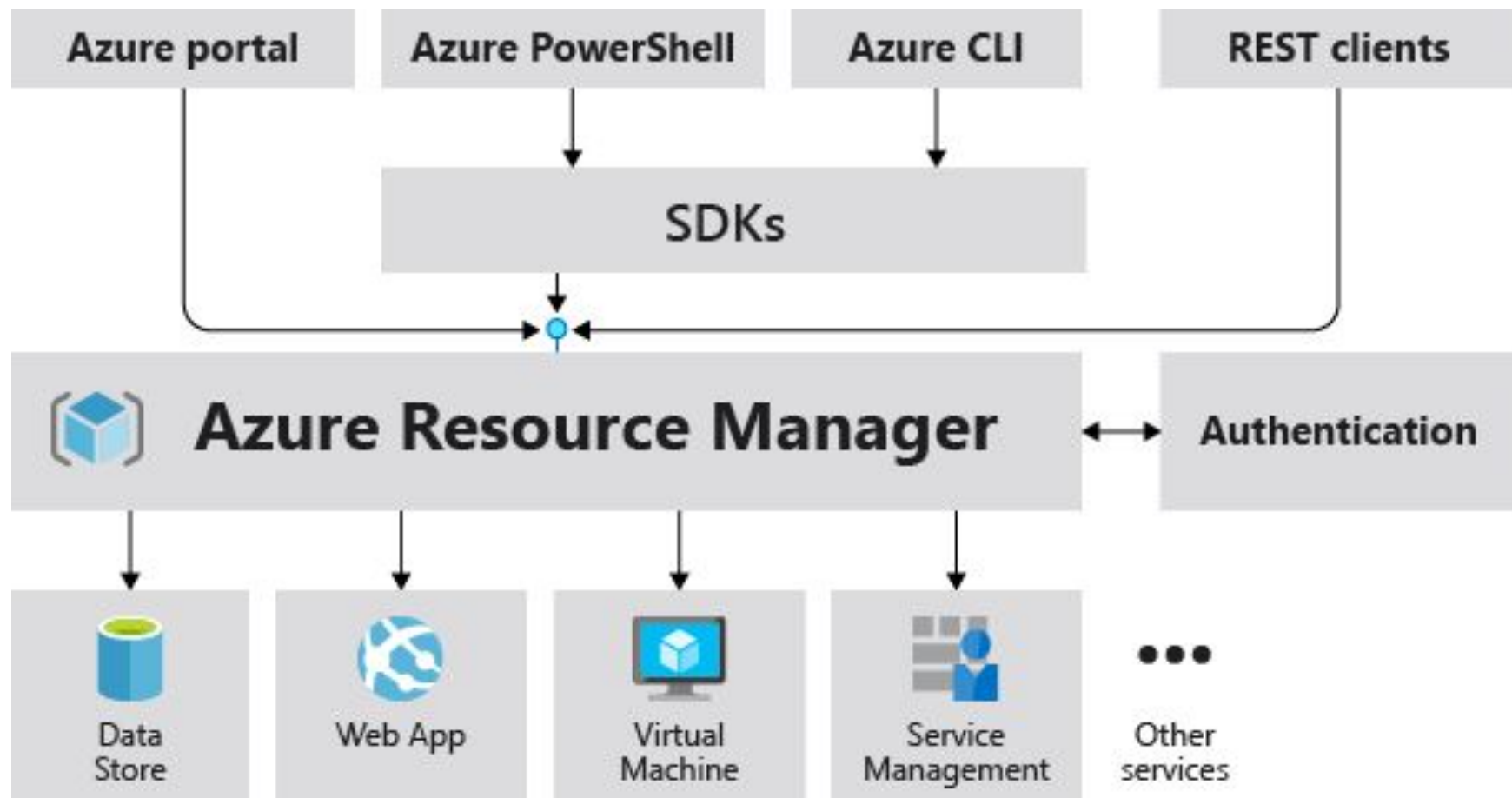


Features

- Role-based access control (RBAC)
- Tagging for resource organization
- Audit logs for tracking changes

Benefits

- Consistent management layer
- Facilitates automation and orchestration



Relationship and Interaction



- Regions and Availability Zones
 - Regions contain multiple Availability Zones for fault tolerance
- Resource Groups and ARM
 - Resources are managed and organized in Resource Groups through ARM

Summary



- Azure's architecture ensures high availability, scalability, and efficient resource management
- Key components: Regions, Availability Zones, Resource Groups, ARM

Introductory Lab.



- Explore Azure and its resources.
- Deploy a Virtual Machine (VM) in different Azure regions and availability zones.

Quiz Time



- <https://quizizz.com/admin/quiz/665c47b03abb6f2a9b9bdc84>

Assignment



- Write a blog on the core architectural components of Azure.

Assignment is due by next Friday.

Submit via this link - <https://forms.gle/FXeUsUMGAcRCwkxd6>

"Procrastination
makes easy things
hard and hard
things harder." —
Mason Cooley