# What is cloud computing?

These services include

servers,

storage,

databases,

networking,

software,

analytics,

intelligence.

# How does Azure work?

1. Virtualization-
   1. Separate the coupling between Hardware and OS, using Hypervisor.
2. Hypervisor –
   1. emulate function of real computer and CPU, to optimize capacity of real hardware.
   2. Multiple virtual machines can be used with different OS.
3. Data center-
   1. Racks filled with Server, and each server includes hypervisor to run VMs.
4. Network Switch –
   1. provides connectivity with among servers.
5. Fabric controller –
   1. One server in rack runs a software called fabric controller
6. Orchestrator-
   1. Each fabric controller connects with orchestrator
   2. It manages everything happens in azure, including responding to user request
7. Web APIs-
   1. User makes request using orchestrator web APIs

## When a user requests for VM.

* Orchestrator packages every things needed for VM
* Find the best Rack
* Send request to fabric controller
* Fabric controller will create a Machine

# Key Terms

1. Azure Portal-
2. Azure Market Place
3. Azure Services

* Compute
  + VM
* Networking
  + Helps to connect with on premises
  + VPN
  + Load balancing
* Storage
  + Blob
  + File
  + Queue
  + table
* Mobile
* Databases
  + Sql server
  + SQL server on VM
* Web
* Internet of Things (IoT)
* Big data
* AI
* DevOps

1. Azure subscription

Chart

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# Discuss different types of cloud models

## What are public, private, and hybrid clouds?

### 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.

# cloud computing advantages?

* **High availability**: Depending on the service-level agreement (SLA) that you choose, your cloud-based apps can provide a continuous user experience with no apparent downtime, even when things go wrong.
* **Scalability**: Apps in the cloud can scale vertically and horizontally:
  + Scale vertically to increase compute capacity by adding RAM or CPUs to a virtual machine.
  + Scaling horizontally increases compute capacity by adding instances of resources, such as adding VMs to the configuration.
* **Elasticity**: You can configure cloud-based apps to take advantage of autoscaling, so your apps always have the resources they need.
* **Agility**: Deploy and configure cloud-based resources quickly as your app requirements change.
* **Geo-distribution**: You can deploy apps and data to regional datacenters around the globe, thereby ensuring that your customers always have the best performance in their region.
* **Disaster recovery**: By taking advantage of cloud-based backup services, data replication, and geo-distribution, you can deploy your apps with the confidence that comes from knowing that your data is safe in the event of disaster.

## Capital expenses vs. operating expenses

There are two different types of expenses that you should consider:

* **Capital Expenditure (CapEx)** is the up-front spending of money on physical infrastructure, and then deducting that up-front expense over time. The up-front cost from CapEx has a value that reduces over time.
* **Operational Expenditure (OpEx)** is spending money on services or products now, and being billed for them now. You can deduct this expense in the same year you spend it. There is no up-front cost, as you pay for a service or product as you use it.

# What are cloud service models?

Graphical user interface, application

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Graphical user interface, diagram

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## What is serverless computing?

Like PaaS, serverless computing enables developers to build applications faster by eliminating the need for them to manage infrastructure. With serverless applications, the cloud service provider automatically provisions, scales, and manages the infrastructure required to run the code. Serverless architectures are highly scalable and event-driven, only using resources when a specific function or trigger occurs.

# Azure regions, availability zones, and region pairs

## Azure regions

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

### What is an availability zone?

Availability zones are physically separate datacenters within an Azure region. Each availability zone is made up of one or more datacenters equipped with independent power, cooling, and networking. An availability zone is set up to be an isolation boundary. If one zone goes down, the other continues working. Availability zones are connected through high-speed, private fiber-optic networks.

### What is a region pair?

Each Azure region is always paired with another region within the same geography (such as US, Europe, or Asia) at least 300 miles away. This approach allows for the replication of resources (such as VM storage) across a geography that helps reduce the likelihood of interruptions because of events such as natural disasters, civil unrest, power outages, or physical network outages that affect both regions at once. If a region in a pair was affected by a natural disaster, for instance, services would automatically failover to the other region in its region pair.

# Azure resources and Azure Resource Manager

* **Resource**: A manageable item that's available through Azure. Virtual machines (VMs), storage accounts, web apps, databases, and virtual networks are examples of resources.
* **Resource group**: A container that holds related resources for an Azure solution. The resource group includes resources that you want to manage as a group. You decide which resources belong in a resource group based on what makes the most sense for your organization.