Introduction to cloud

Ing. Alejandro Hdez Alamina

# Table of contents

01

What's cloud?

NIST definition

Cloud computing as a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Five essential characteristics

1. On demand self service
2. Broad network access
3. Resource pooling
4. Rapid elasticity
5. Measured service
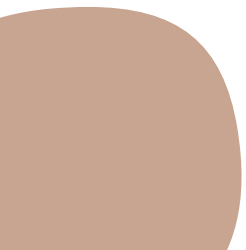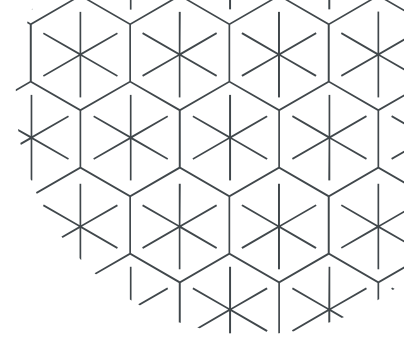
Three Types of Deployment Models

1. **Public** –cloud services are leveraged over the open internet on hardware owned by the cloud provider, but its usage is shared by other companies.
2. **Private** –the cloud infrastructure is provisioned for exclusive use by a single organization. It could run on premise or be owned, managed, and operated by a single operator.
3. **Hybrid** –a computing environment that connects an organization's on-premises private cloud and a third-party public cloud into a single flexible infrastructure for running applications and workloads.

The Three Service Models

1. **Infrastructure-as-a-Service (IaaS)** – provides access to physical computing resources without need to manage or operate.
2. **Platform-as-a-Service (PaaS)** – provides access to hardware and software tools needed to develop and deploy applications to users over the internet.
3. **Software-as-a-Service (SaaS)** – is a software licensing and delivery model in which software and applications are centrally hosted and licensed on a subscription basis.
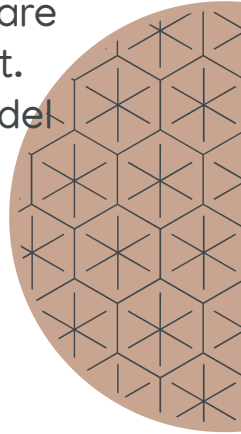
Benefits and Challenges of Cloud Adoption
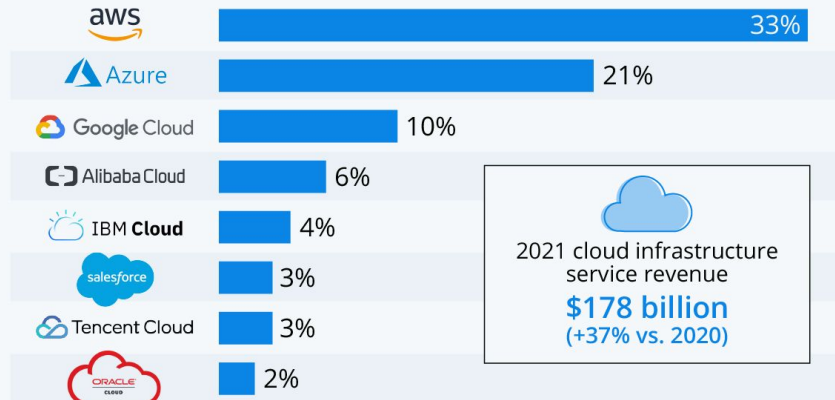
1. Flexibility
2. Efficiency
3. Strategic value

Challenges

- Data security
- Governance and sovereignty issues
- Legal, regulatory, and compliance issues
- Lack of standardization.

Amazon Leads $180-Billion Cloud Market

Worldwide market share of leading cloud infrastructure service providers in Q4 2021*

Provider	Market share
aws	33%
Azure	21%
Google Cloud	10%
Alibaba Cloud	6%
IBM Cloud	4%
salesforce	3%
Tencent Cloud	3%
ORACLE CLOUD	2%

2021 cloud infrastructure service revenue
$178 billion
(+37% vs. 2020)

* includes platform as a service (PaaS) and infrastructure as a service (IaaS) as well as hosted private cloud services

Source: Synergy Research Group

statista

02

Cloud Parts

Infrastructure Layer

It consists of physical resources that are housed in regions, zones and data centers.

1. **Regions** – A geographic area or location where a cloud provider's infrastructure is clustered
2. **Zones** – Each cloud region can have multiple zones which are typically distinct data centers with their own power, cooling, and networking resources
3. **Data Centers** – A huge warehouse or room containing cloud infrastructure equipment

Computing Resources
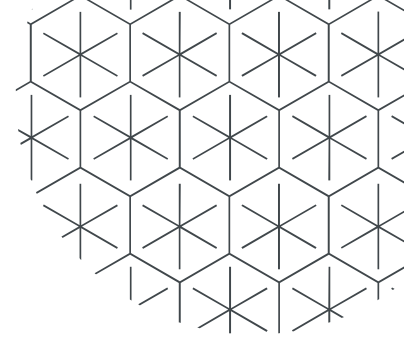
1. **Virtual Servers** – Many of the servers in a cloud data center run hypervisors to create servers or VMs that are software–based computers
2. **Bare Metal Servers** – Many of the servers in a cloud data center run hypervisors to create servers or VMs that are software–based computers
3. **Serverless** – They are considered an abstraction layer on top of VMs
4. **Storage** – Block storage, file storage and object storage options.
5. **Networking infrastructure in a cloud datacenter** – Routers, switches, CDN, Security groups, ACLs, VPNs, VPC, VLANs.

Virtualization

The process of creating a software based or a virtual version of a computing resource or facility, whether it be compute, storage, networks, servers, or applications

1. HyperVisors
   a. Software that runs above the physical server or host.
   b. They essentially pull the resources from the physical server and allocate them to a virtual environment.
   c. They make virtualization possible.
2. Virtual Machines – Software based computer that runs like a physical computer. They are completely independent of one another. Multiple instances can be run on a hypervisor(e.g., one can run on Windows, one on Linux, or another on Unix).
3.

Container

Containers are an executable unit of software in which application code is packaged, along with its libraries and dependencies, in common ways so that it can be run anywhere, whether it be on desktop, traditional IT, or the cloud.

1. **Advantages of Containers –** Portability. Scalability.
2. **Benefits of Containers**
   a. Allows for agile DevOps and continuous integration, and delivery.
   b. Streamline ways to build, test, deploy, and redeploy on multiple environments.

Three-Step Container Deployment Process

| Create the container manifest | Create the image | Upload the image to the container registry |

03

Workshop