

Introduction to Cloud Computing

GR 5072

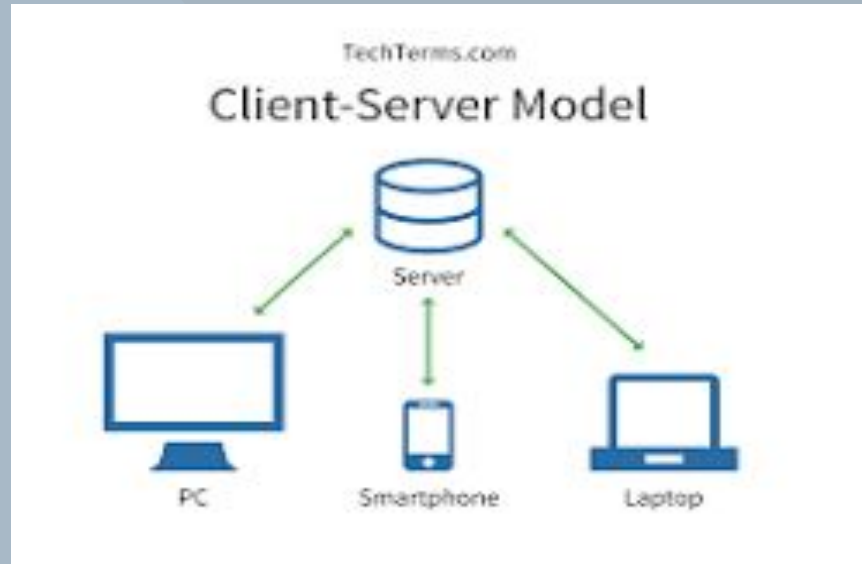
Nick Anderson

TERMINOLOGY

CLIENT SERVER MODEL

Client is what is
interacted with to
make requests

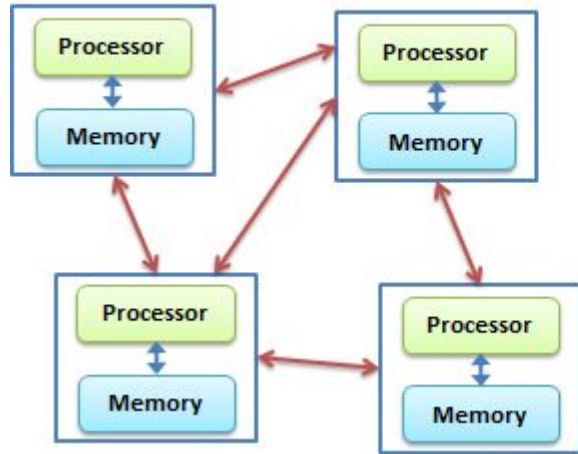
Server validates the
request and **returns**
information



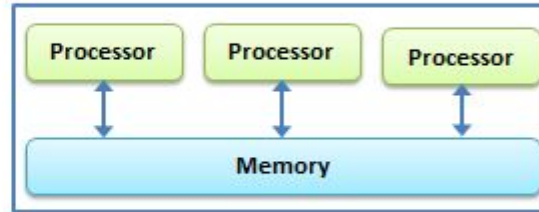
TERMINOLOGY


PARALLEL + DISTRIBUTED COMPUTING

Distributed Computing



Parallel Computing



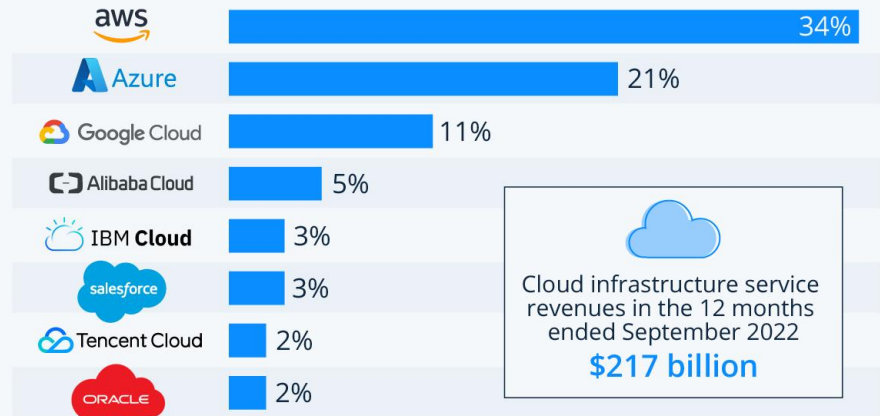


WHAT IS CLOUD COMPUTING?

The
on-demand
delivery of IT
resources over
the internet
with pay as
you go pricing

Amazon, Microsoft & Google Dominate Cloud Market

Worldwide market share of leading cloud infrastructure service providers in Q3 2022*



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

Source: Synergy Research Group



TERMINOLOGY

Infrastructure as a Service (IaaS):

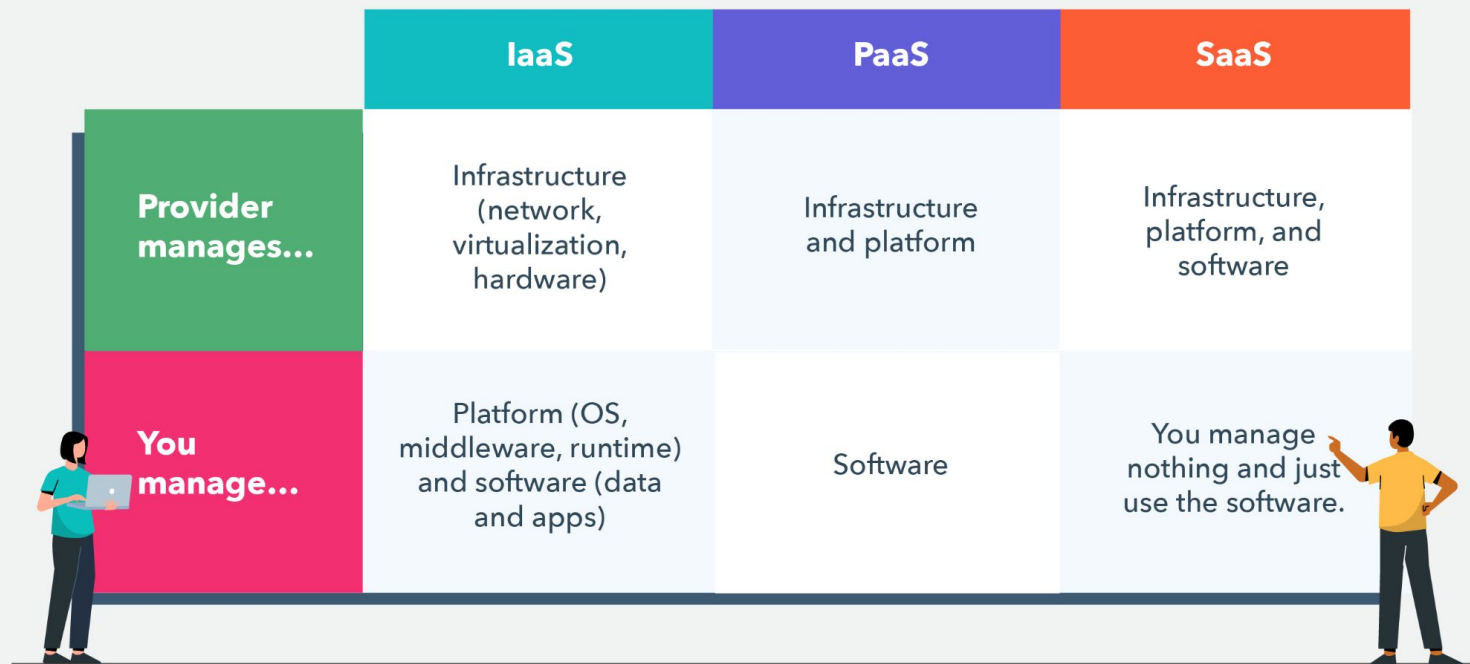
Contains basic building blocks for IT. Access to networking gestures, hardware, data storage space. Highest level of flexibility and control over IT resources

Platform as a Service (PaaS):

The underlying infrastructure is installed, configured, and maintained by the provider. Allows for focus on deployment and management of apps.

Software as a Service (SaaS):

Provides users with cloud-based applications that can be accessed on demand from the internet without maintenance of software.



The diagram illustrates the responsibilities of the provider and the user across three cloud service models: IaaS, PaaS, and SaaS. It is structured as a 2x3 grid. The columns represent the service models, and the rows represent the management responsibilities. Two stylized human figures are positioned at the bottom of the grid, one on the left and one on the right, representing the provider and the user respectively.

	IaaS	PaaS	SaaS
Provider manages...	Infrastructure (network, virtualization, hardware)	Infrastructure and platform	Infrastructure, platform, and software
You manage...	Platform (OS, middleware, runtime) and software (data and apps)	Software	You manage nothing and just use the software.

Pizza as a service

Traditional On-Premises

(On-Prem)

Dining Table

Soda

Electric/Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Made at home

Infrastructure as a service

(IaaS)

Dining Table

Soda

Electric/Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Take and Bake

Platform as a service

(PaaS)

Dining Table

Soda

Electric/Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Pizza Delivered

Software as a service

(SaaS)

Dining Table

Soda

Electric/Gas

Oven

Fire

Pizza Dough

Tomato Sauce

Toppings

Cheese

Dined Out

 You Manage

 Vendor Manages

Deployment Models

1. Cloud-Based Deployment

- Run all parts of the app in the cloud
- Migrate existing apps to the cloud
- Design and build new apps in the cloud

2. On-Premises Deployment

- Deploy resources by using virtualization and resource management tools
- AKA private cloud deployment

Deployment Models

3. Hybrid Deployment

- Connect cloud-based resources to on-premises infrastructure
- Integrate cloud-based resources with legacy IT apps on premise whereas analytics are on the cloud

MOTIVATION

- **Access your Python code/data** from anywhere and do your **analysis from any device**, be it a PC, tablet or even smartphone.
- **Instantaneously augment your CPU and memory** with a click. Cheaper than buying a faster machine.
- Instantaneously **switch between operating systems and system configurations**.
- Ability to **load multiple Python sessions** at once, or **parallelize your code**.

Benefits of Cloud Computing

VARIABLE EXPENSE

Pay for what you
consume as you go

SAVINGS

No time and money
needed to maintain
data centers

DATA STORAGE

Stop guessing data
capacity

LOWER VARIABLE COST

Benefit from
massive economics
of scale

ACCESSIBILITY

Increase speed and
access to resources

WORLDWIDE

Go global in minutes

FURTHER LEARNING

<https://aws.amazon.com/education/awseducate/>