

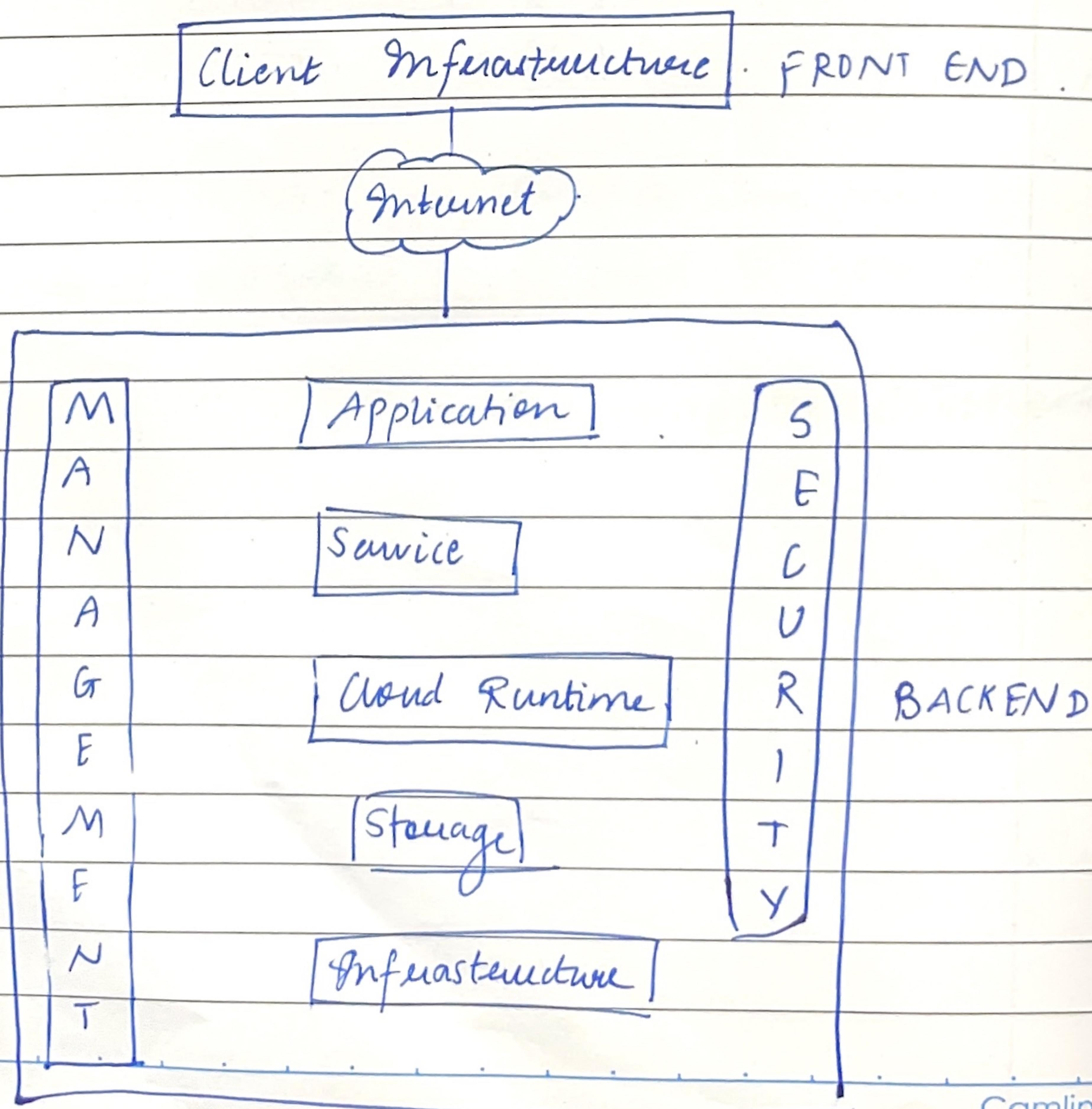
Cloud Computing Architecture

Architecture of cloud computing is the combination of both SOA (Service oriented Architecture) and EDA (Event driven architecture). Client infrastructure, application, service, runtime cloud, storage, infrastructure, management and security all these are the components of cloud computing architecture.

The cloud architecture is divided into 2 parts i.e.

1. Frontend
2. Backend

Internal architectural view of cloud computing -



- Frontend

Frontend of the cloud architecture refers to the client side of cloud computing system. Means it contains all the user-interface & applications which are used by the client to access the cloud computing service resources. For example - use of a web-browser to access the cloud platform.

- Backend

Backend refers to the cloud itself which is used by the service provider. It contains the resources as well as manages the resources & provides security mechanisms. Along with this, it includes huge storage, virtual applications, virtual machines, traffic control mechanisms, deployment model, etc.

Components of CC Architecture:

1. Client Infrastructure
2. Application
3. Service
4. Runtime Cloud
5. Storage
6. Infrastructure
7. Management
8. Security
9. Internet
10. Database
11. Networking
12. Analytics

* IAAS

Infrastructure as a service (IaaS) is a type of cloud computing service that offers essential computing, storage & networking resources on demand, on a pay-as-you-go basis. IaaS is one of the four types of cloud services, along with (SaaS) ~~&~~ (PaaS) and serverless.

Migrating your organization's infrastructure to an IaaS solution helps you reduce maintenance of on-premises data centers, save money on hardware costs, and gain real time business insights. IaaS gives you the flexibility to scale your IT resources up and down with demand. They also help you quickly provision new applications & increase the reliability of your underlying infrastructure.

Why is it important?

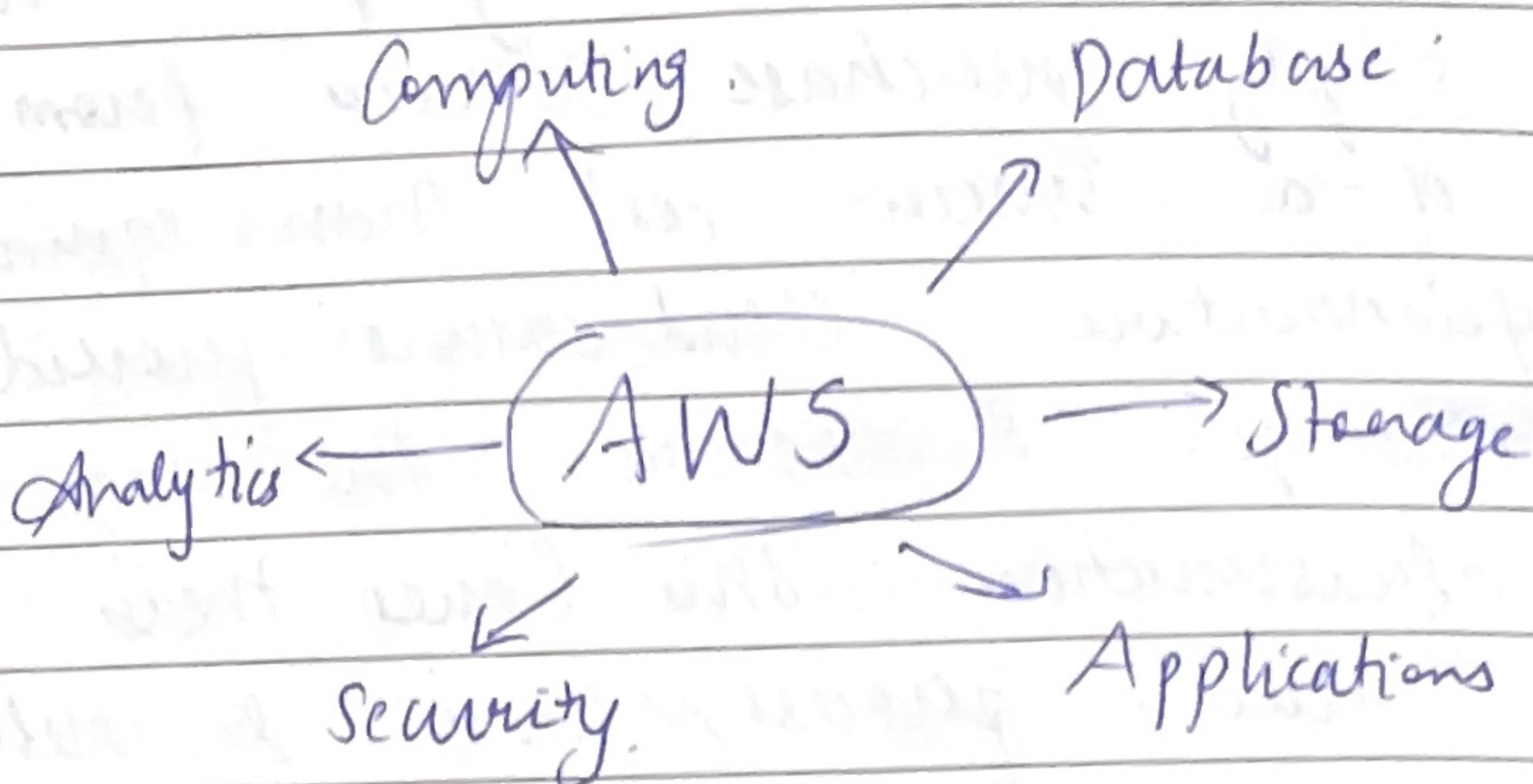
IaaS has risen to prominence as enterprises have sought alternative to deploying & maintaining their own on-premises infrastructures. Cloud services have provided an alternative to the high-cost computing equipment required for in-house data centers. Before cloud computing, organizations had few options besides investing in their own servers, networking equipment & storage devices, with the capital expenditure & maintenance costs that entailed.

Now when tasks require high-power computing, companies simply purchase services from a cloud provider of a lower cost than equivalent in-house infrastructure. Cloud service providers procure, manage & serve the required hardware & infrastructure. This leaves their customers free to collect, process, store & examine data sent without having to buy and managing the computer hardware. This is useful for small & midsize companies.

* AWS

AWS is the world's most comprehensive & broadly adopted cloud, offering over 200 fully featured services from data centers globally. Millions of customers - including the fastest growing startups, largest enterprises & leading government agencies - are using AWS to lower cost, become more agile & innovate faster.

AWS has significantly more services, and more features within those services, than any other cloud-provider - from infrastructure technologies like compute, storage & databases - to emerging technologies such as ML & AI, data lakes & analytics & Internet of things. This makes it faster & easier & more effective to move your existing applications to the cloud & build nearly anything you can imagine.



— AWS pricing model is very cost-effective which makes it more reliable. For instance, if a user wants to use a cloud server for an hour. There is no such long term commitment as 5 years or 10 years and pay accordingly. Besides, there is an AWS free tier service to increase potential customers affordability by offering free services with AWS, between upto 58 products that help users gain some experience with the AWS platform.

— Companies using AWS

- Netflix
- Intel
- Coinbase
- Jabra
- Johnson & Johnson
- Capital one
- Adobe
- Sieubnb
- AOL
- Hitachi

FC2

EC2 stands for Elastic Cloud Computing.

EC2 provides on-demand Scalable computing capacity in the Amazon web-services cloud. Using Amazon EC2 reduces hardware costs so you can develop & deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need. Configure security & networking and manage storage. You can add capacity (scale up) to handle compute-heavy tasks, such as monthly or yearly processes or spike in website traffic. When usage decreases, you can reduce capacity (scalability).

An EC2 instance is a virtual server in the AWS cloud. When you launch an EC2 instance, the instance type that you specify determine the hardware available to your instance. Each instance type offers a different balance of compute, memory, network, & storage resources.

* Features-

i) Instances - Virtual Servers

ii) Amazon Machine Images (AMIs) -

Preconfigured templates for your instances that package the components you need for your server (including the operating system & additional software).

ii) Instance Types -

Various configurations of CPU, memory
storage, networking capacity & graphics
hardware for your instances.

iv) Keypairs -

Secure login information for your instance.
AWS stores the public key & you store
the private key in a secure place.

v) Security groups -

A virtual firewall that allows you to specify
the protocols, ports and source IP ranges that
can reach your instances & the destination
IP ranges to which your instances can connect.

Amazon EC2 supports the processing, storage &
transmission of credit card data by a merchant
or service provider, & has been validated as
being compliant with payment & industry
(PCI) Data security standard (DSS).

WITH PEM

The screenshot shows the AWS Console Home page. At the top, there's a navigation bar with the AWS logo, a 'Services' dropdown, a search bar, and account information for 'Stockholm' and 'Farida_Attar'. Below the navigation is a sidebar with 'Recently visited' services like EC2. The main content area is titled 'Applications (0)' and shows a message: 'No applications. Get started by creating an application.' It includes a 'Create application' button and links to 'View all services' and 'Go to myApplications'. At the bottom of the main content area, there are cards for 'Welcome to AWS', 'AWS Health', and 'Cost and usage'.

The screenshot shows the AWS search results for the query 'ec2'. The search bar at the top contains 'ec2'. The results are categorized under 'Services' (13) and 'Features' (59). Under 'Services', the top result is 'EC2' (Virtual Servers in the Cloud), which has a 'Top features' section listing 'Dashboard', 'Launch templates', 'Instances', 'Spot Instance requests', and 'Savings plans'. Other services listed include 'EC2 Image Builder', 'Recycle Bin', and 'Amazon Inspector'. Under 'Features', there is a single result: 'Dashboard'.

EC2 Dashboard

EC2 Global View

Events

Instances

- Instances
- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances
- Dedicated Hosts
- Capacity Reservations

Images

- AMIs
- AMI Catalog

Elastic Block Store

- Volumes
- Snapshots
- Lifecycle Manager

CloudShell Feedback

Resources

You are using the following Amazon EC2 resources in the Europe (Stockholm) Region:

Instances (running)	0	Auto Scaling Groups	0	Dedicated Hosts	0
Elastic IPs	0	Instances	0	Key pairs	0
Load balancers	0	Placement groups	0	Security groups	1
Snapshots	0	Volumes	0		

Launch instance

To get started, launch an Amazon EC2 instance, which is a virtual server in the cloud.

Service health

AWS Health Dashboard

Region: Europe (Stockholm)

Status: This service is operating normally.

Zones

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EC2 Free Tier

Offers for all AWS Regions.

0 EC2 free tier offers in use

End of month forecast

⚠️ Offers forecasted to exceed free tier limit.

Exceeds free tier

⚠️ Offers exceeded and is now pay-as-you-go pricing.

[View Global EC2 resources](#)

[View all AWS Free Tier offers](#)

Account attributes

Default VPC

vpc-0a9295301686402a8

Settings

Data protection and security

Name and tags

Name: CC_SDS

Add additional tags

Application and OS Images (Amazon Machine Image)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

Search our full catalog including 1000s of application and OS images

Quick Start

Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux

Browse more AMIs

Including AMIs from AWS, Marketplace and the Community

Summary

Number of instances: 1

Software Image (AMI): Canonical, Ubuntu, 24.04 LTS, ...read more

ami-07c8c1b18ca66bb07

Virtual server type (instance type): t3.micro

Firewall (security group): New security group

Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t3.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Launch instance Review commands

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Instance type

Instance type: t3.micro

Family: t3 2 vCPU 1 GiB Memory Current generation: true

On-Demand RHEL base pricing: 0.0398 USD per Hour

On-Demand SUSE base pricing: 0.0108 USD per Hour

On-Demand Linux base pricing: 0.0108 USD per Hour

On-Demand Windows base pricing: 0.02 USD per Hour

Additional costs apply for AMIs with pre-installed software

Key pair (login)

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - required

Select Create new key pair

Network settings

Network

Summary

Number of instances: 1

New security group

Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t3.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GiB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Launch instance Review commands

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Create key pair



Key pair name

Key pairs allow you to connect to your instance securely.

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

RSA

RSA encrypted private and public key pair

ED25519

ED25519 encrypted private and public key pair

Private key file format

.pem

For use with OpenSSH

.ppk

For use with PuTTY

⚠️ When prompted, store the private key in a secure and accessible location on your computer. **You will need it later to connect to your instance.** [Learn more](#)

[Cancel](#)

[Create key pair](#)

Allow SSH traffic from
Helps you connect to your instance

Anywhere
0.0.0.0/0

Allow HTTPS traffic from the internet
To set up an endpoint, for example when creating a web server

Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server

⚠️ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only. **X**

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.



Cancel

Launch instance

Review commands

The screenshot shows the AWS EC2 Instances Launch an Instance process. The top part is a modal window with a blue header containing the title "Launch an instance". Inside the modal, there is a large text area describing the Free tier benefits. At the bottom right of the modal is a yellow "Launch instance" button. Below the modal is a progress bar indicating "79%". The main page has a blue header "Launching instance" and a progress bar. Below the header, there is a "Details" section with a "Launch initiation" status. A message says "Please wait while we launch your instance. Do not close your browser while this is loading." At the bottom of the main page, there is a green success message: "Success Successfully initiated launch of instance (i-0cbde1dde857e6993)". There is also a "Launch log" link. On the right side, there is a "Next Steps" section with several options: "Create billing and free tier usage alerts", "Connect to your instance", "Connect an RDS database", and "Create EBS snapshot policy". Each option has a corresponding button or link. At the very bottom of the page, there are links for "CloudShell", "Feedback", and copyright information: "© 2024, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences".

Screenshot of the AWS EC2 Instances page showing a single running instance named CC_SDS.

Instances (1) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IP
CC_SDS	i-0cbde1dde857e6993	Running	t3.micro	Initializing	View alarms +	eu-north-1a	ec2-51-21-130-248.eu-north-1.compute.amazonaws.com

Select an instance

i-0cbde1dde857e6993 (CC_SDS)

Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags

Instance summary

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0cbde1dde857e6993 (CC_SDS)	51.21.130.248 open address	172.31.31.37
IPv6 address	Instance state	Public IPv4 DNS
-	Running	ec2-51-21-130-248.eu-north-1.compute.amazonaws.com open address
Hostname type	Private IP DNS name (IPv4 only)	
IP name: ip-172-31-31-37.eu-north-1.compute.internal	ip-172-31-31-37.eu-north-1.compute.internal	

Connect | **Instance state ▾**

All states ▾

IS | **Availability Zone ▾** | **Public IPv4 DN**



Port 22 (SSH) is currently open to all IPv4 addresses, indicated by **0.0.0.0/0** in the inbound rule in [your security group](#). For increased security, consider restricting access to only the EC2 Instance Connect service IP addresses for your Region: 13.48.4.200/30. [Learn more.](#)

Instance ID

[i-0cbde1dde857e6993 \(CC_SDS\)](#)

Connection Type

Connect using EC2 Instance Connect

Connect using the EC2 Instance Connect browser-based client, with a public IPv4 address.

Connect using EC2 Instance Connect Endpoint

Connect using the EC2 Instance Connect browser-based client, with a private IPv4 address and a VPC endpoint.

Public IP address

51.21.130.248

Username

Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username, `ubuntu`.

Note: In most cases, the default username, `ubuntu`, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

[Cancel](#)

Connect

AWS Services Search [Alt+S] Stockholm Farida_Attar

Usage of /: 22.7% of 6.71GB Processes: 113
Memory usage: 22% Users logged in: 0
Swap usage: 0% IPv4 address for ens5: 172.31.31.37

Expanded Security Maintenance for Applications is not enabled.
0 updates can be applied immediately.
Enable ESM Apps to receive additional future security updates.
See <https://ubuntu.com/esm> or run: sudo pro status

The list of available updates is more than a week old.
To check for new updates run: sudo apt update

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-31-37:~\$

i-0cbde1dde857e6993 (CC_SDS)
PublicIP: 51.21.130.248 PrivateIP: 172.31.31.37

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WITH PUTTY

The screenshot shows the AWS Lambda console with a search result for 'putty'. It lists various Putty-related files (putty.exe, putty-0.81-installer.msi, etc.) for different architectures. Below this, a 'Putty Configuration' dialog is open, showing the 'Session' tab with fields for Host Name (or IP address) and Port (set to 22). The 'Connection type' is set to SSH. The 'Category' sidebar includes options like Logging, Terminal, Keyboard, Features, Appearance, Selection, Colours, Connection, Data, Proxy, SSH, Serial, Telnet, Rlogin, and SUPDUP.

Key pair name

Key pairs allow you to connect to your instance securely.

Keypk

The name can include up to 255 ASCII characters. It can't include leading or trailing spaces.

Key pair type

RSA

RSA encrypted private and public key pair

ED25519

ED25519 encrypted private and public key pair

Private key file format

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For use with OpenSSH

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⚠️ When prompted, store the private key in a secure and accessible location on your computer. You will need it later to connect to your instance. [Learn more ↗](#)

Cancel

Launch instance

