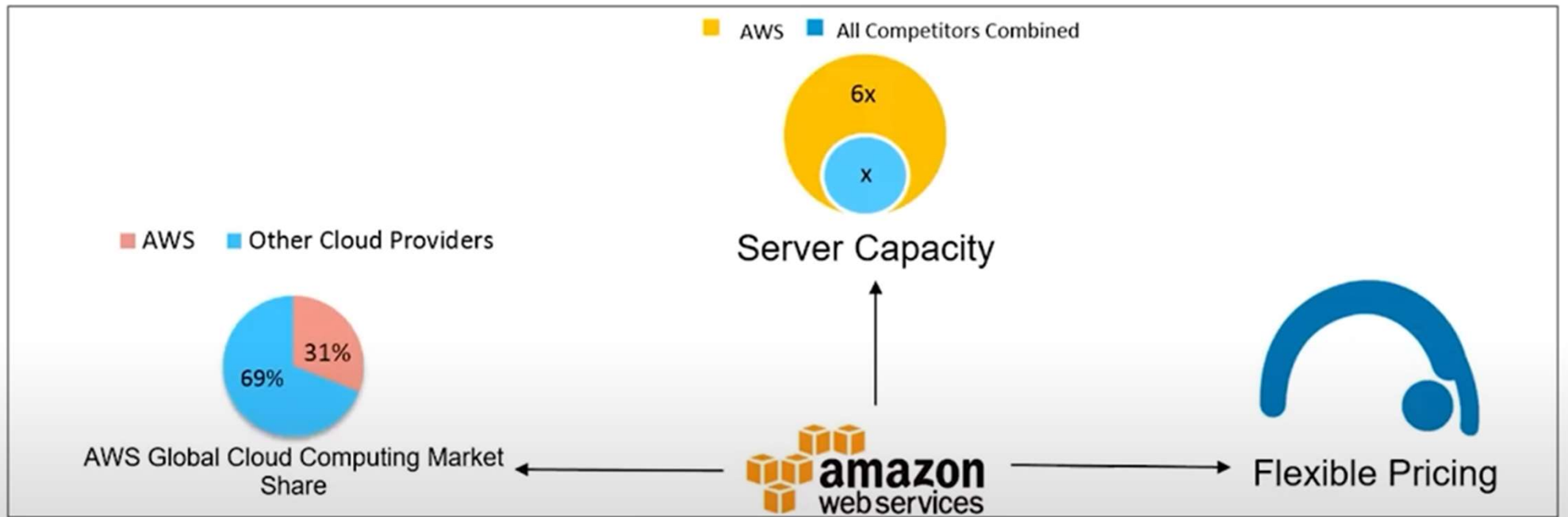


AWS

Amazon Web Services

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Assistant Professor
SCSDF, NFSU

Why AWS



Amazon Web Service (AWS)

Amazon Web Services (AWS) is a bundled remote computing service that provides cloud computing infrastructure over the Internet with:

- Storage
- Bandwidth
- Customized support for application programming interfaces (API)



Who Is Using AWS?

The Cloud Scales: Customers in 190 Countries



Benefits Of AWS



Service Comparison: AWS, Azure And GCP

Amazon AWS	Microsoft Azure	GCP
S3	Blob Storage	Storage
EC2	Virtual Machines	Compute Engine
EC2 Container Service	Container Service	Kubernetes Engine
Elastic Beanstalk	Azure App service	App Engine
DynamoDB	Cosmos DB	Cloud Datastore
RDS	SQL Database	BigQuery
Lambda	Azure Functions	Cloud Functions

World map showing regions and number of availability zones. Blue circles with numbers indicate existing regions, and red circles indicate new regions coming soon.

Legend:

- Blue circle with #: Regions and Number of Availability Zones
- Red circle: New Regions (Coming Soon)

Example: Mumbai is a Region with 2 Availability Zones

How To Choose A Right Region?

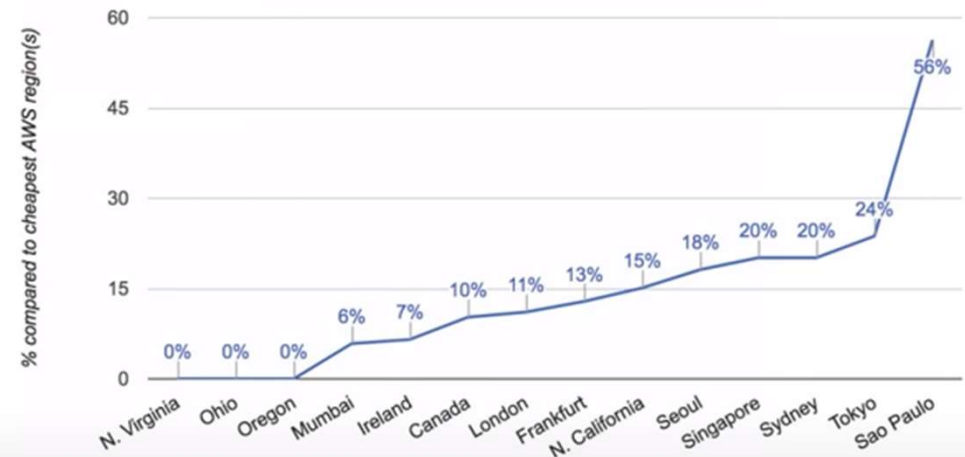


How To Choose A Right Region?

Cost by AWS region: 10 t2.medium, 20GB gp2 EBS storage each, 1 ELB, 11TB data processed



Cost % comparison by AWS region: 10 t2.medium, 20GB gp2 EBS storage each, 1 ELB, 11TB data processed



Sao Paul is 56% costlier than N. Virginia
N Virginia is the cheapest one among all

What Is Availability In AWS?

The term **Availability** refers to the ability of a system or component to be operational and accessible anytime

It ensures that data and service is available in normal and even in disaster recovery operations

It always answers the question *"Can I access my data right now"*

It is achieved by maintaining reliable engineering, service management techniques and redundancy so as to minimize system failures and time to repair

Considering, all these aspects AWS provides optimum services to its customers via **High Availability**



AWS Availability Zones (AZs)

01

Availability Zones are locations carrying data centers in a **Region** which are used by customers and each Region has **two or more AZs**

AWS Availability Zones offer their customers a simple and more effective way to design and operate applications and databases

02

03

Availability Zones make these applications and databases more highly available, fault tolerant and scalable than traditional data centres



Note: AWS Global Infrastructure has 60 Availability Zones



Services ▾

Resource Groups ▾



EC2 Dashboard

Events

Tags

Reports

Limits

INSTANCES

Instances

Launch Templates

Spot Requests

Reserved Instances

Dedicated Hosts

Scheduled Instances

Capacity Reservations

IMAGES

AMIs

Bundle Tasks

ELASTIC BLOCK STORE

Volumes

Snapshots

Lifecycle Manager

Service Health

Service Status:

✓ US East (N. Virginia):

Availability Zone Status:

✓ us-east-1a:
Availability zone is operating normally

✓ us-east-1b:
Availability zone is operating normally

✓ us-east-1c:
Availability zone is operating normally

✓ us-east-1d:
Availability zone is operating normally

✓ us-east-1e:
Availability zone is operating normally

✓ us-east-1f:
Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

US East (N. Virginia):



Services ▾

Resource Groups ▾



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Lifecycle Manager

Create Instance

To start using Amazon EC2 you will want to launch a virtual server, known as an Amazon EC2 instance.

[Launch Instance](#) ▾

Note: Your instances will launch in the Asia Pacific (Mumbai) region

Service Health

Service Status:

✓ Asia Pacific (Mumbai):

Availability Zone Status:

✓ ap-south-1a:
Availability zone is operating normally

✓ ap-south-1b:
Availability zone is operating normally

[Service Health Dashboard](#)

Scheduled Events

Asia Pacific (Mumbai):

No events

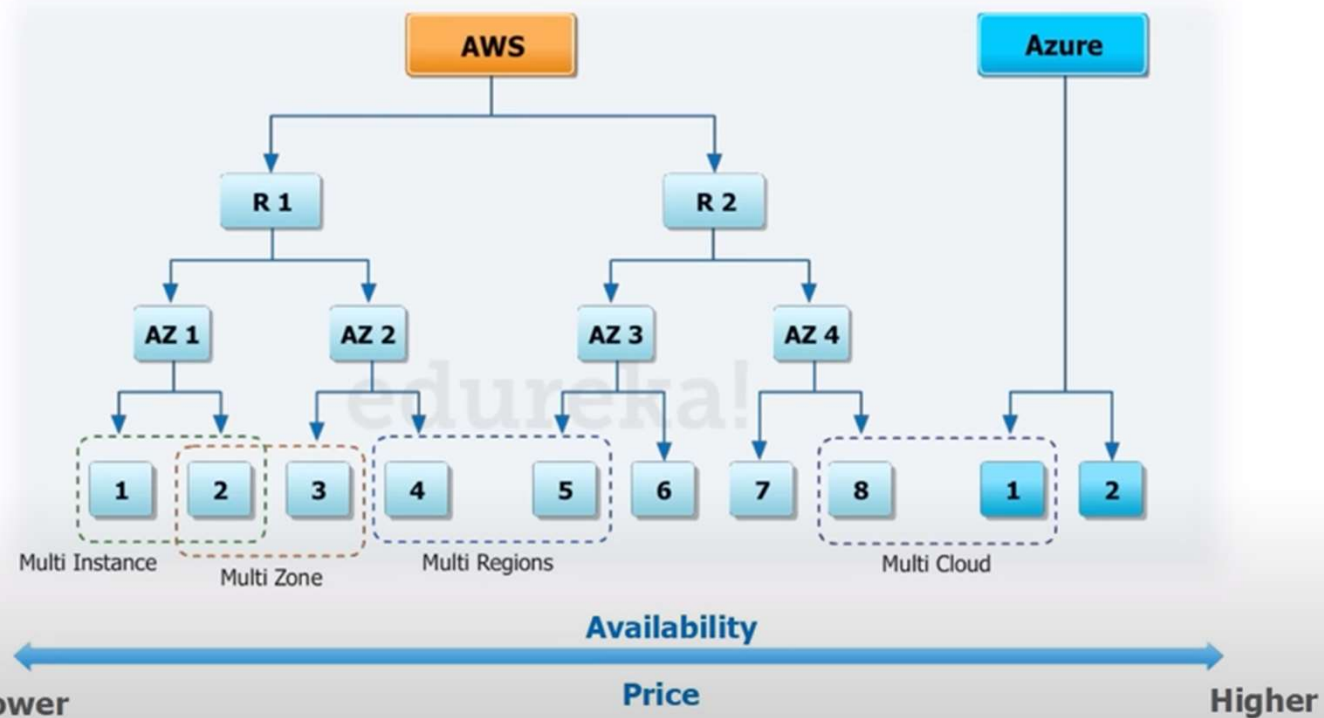
What Is High Availability (HA)?

High Availability refers to a system or component that is continuously operational for a desirably long duration of time

- In order to get High availability users deploy their servers in two **Availability Zones**, so that in case one AZ goes down then still the application remains on by using other AZ
- High Availability ensures ***fault tolerance*** and ***low latency*** in a particular Region



Ways To Implement High Availability



In case of launching/planning a second instance in a new region the instance price will differ and also an additional charges for region data transfer will be added

How To Measure Availability?

- Downtime Per Year (Hours) = $(1 - \text{Uptime Ratio}) \times 365 \times 24$
- Where Uptime ratio or Availability = $\text{MTBF} / (\text{MTBF} + \text{MTTR})$
- MTBF : Mean Time Between Failures
- MTTR : Mean Time To Repair
- $\text{MTBF} = \text{Hours in Year} / \text{No. of Failure}$
- $\text{MTTR} = (\text{No. of Device} \times \text{Time to Repair the Device}) / \text{Total No. of Failures}$

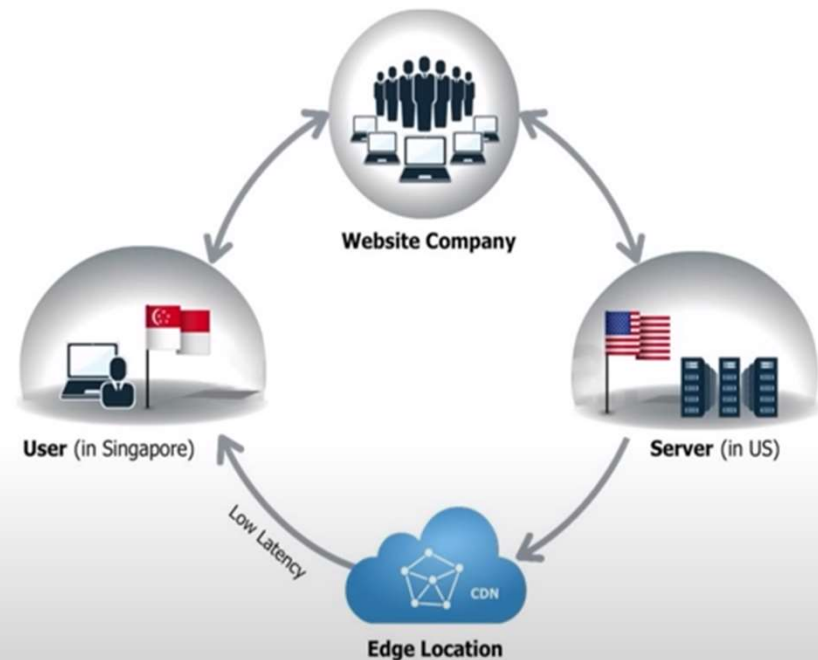
Calculating the availability of a system -

$$A = (\text{Uptime} / \text{Uptime} + \text{Downtime}) \times 100\% = X\%$$

Where: A = the percentage of time that the system is operational

What Is Edge Location?





- **Edge Location** is an intermediate between the end users and servers to access the services from AWS
- It is a small setup in different location to provide low latency connection by caching static content
- Basically, it's a Content Delivery Network and used with AWS CloudFront Service



Demo – Signing Up For Free Tier Account With AWS

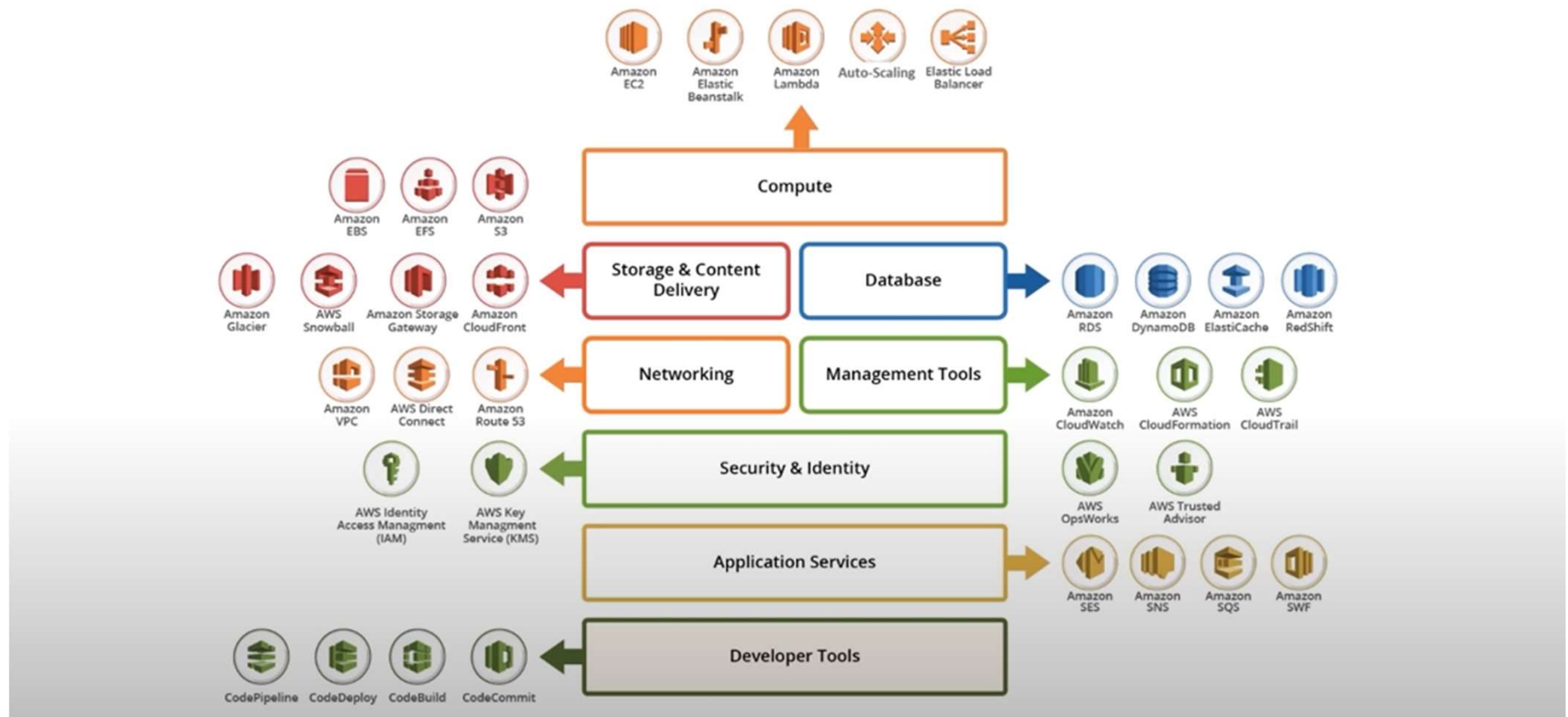
1. AWS provides 12 months free account including all basic services like S3, EC2, DynamoDB etc.
2. Open <https://portal.aws.amazon.com/billing/signup#/start> and fill basic details to create an account
3. Click on continue and Select account type as personal
4. Fill all mandatory fields and click on proceed
5. Proceed to payment gateway to map your credit card
6. Don't panic, only 2 Rupees will get deducted from your account and you will get all basic services free for 12 months

What Do You Get In Free Tier Account?

Services	Benefits(1 Year)
Amazon Elastic Cloud Compute 	» 750 hours/month of Linux, RHEL or SLES t2.microinstance usage » 750 hours/month of Windows t2.micro instance usage
Elastic Load Balancer 	» 750 hours + 15 GB Data Processing
Elastic Block Storage 	» 30GB in combination of SSD/Magnetic + 2 million I/O and 1 GB of snapshot storage
Amazon Web Services 	» 15GB of Bandwidth aggregated across all Services » 1GB of Regional Data Transfer

Free-Tier Account
provides all the
necessary Services
for practicing the
hands on for AWS
Architect

AWS Services



Compute Services



Amazon
EC2



Amazon
Elastic
Beanstalk



Amazon
Lambda



Auto-
Scaling



Elastic Load
Balancer

Compute

Storage And Content Delivery Services



Amazon
EBS



Amazon
EFS



Amazon
S3



Amazon
Glacier



AWS
Snowball



Amazon
Storage
Gateway



Amazon
CloudFront

Storage & Content Delivery

Database Services



RDS



Amazon
DynamoDB



Amazon
ElastiCache



Amazon
Redshift

Database

Management Tools



Amazon
CloudWatch



AWS
CloudFormation



AWS
CloudTrail



AWS
OpsWorks



AWS Trusted
Advisor

Management Tools