



ECAP470: CLOUD COMPUTING

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Learning Outcomes

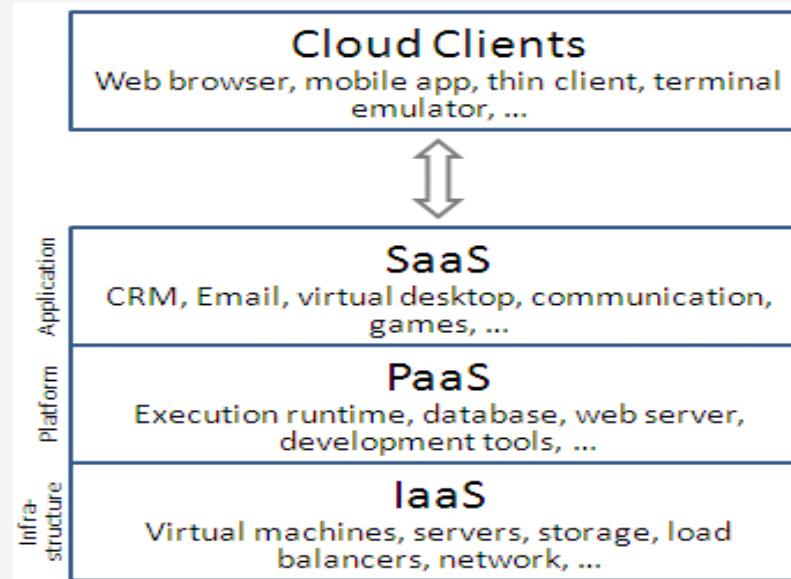


After this lecture, you will be able to,

- ✓ Know about different services offered by Amazon Web Services (AWS).

Infrastructure-as-a-Service (IaaS)

Category of cloud services which provides capability to provision processing, storage, intra-cloud network connectivity services, and other fundamental computing resources of the cloud infrastructure.



Highlights of IaaS

- On demand computing resources
 - Eliminate the need of far ahead planning
- No up-front commitment
 - Start small and grow as required
 - No contract, Only credit card!

Highlights of IaaS

- Pay for what you use
- No maintenance
- Measured service
- Scalability
- Reliability

Infrastructure-as-a-Service (IaaS)- Amazon EC2



AWS EC2

- Amazon Elastic Compute Cloud (EC2) is a web service that provides resizeable computing capacity that one uses to build and host different software systems.
- Designed to make web-scale computing easier for developers.
- A user can create, launch, and terminate server instances as needed, paying by the hour for active servers, hence the term "elastic".
 - Provides scalable, pay as-you-go compute capacity
 - Elastic - scales in both direction

EC2 Concepts

AMI & Instance

Region & Zones

Storage

Networking and Security

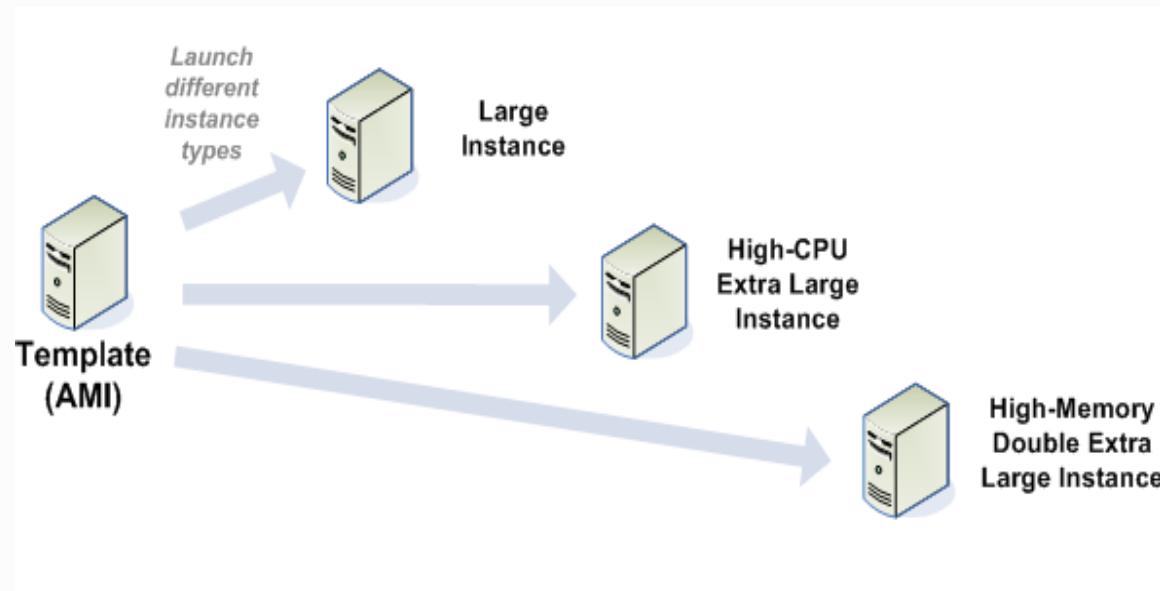
Monitoring

Auto Scaling

Load Balancer

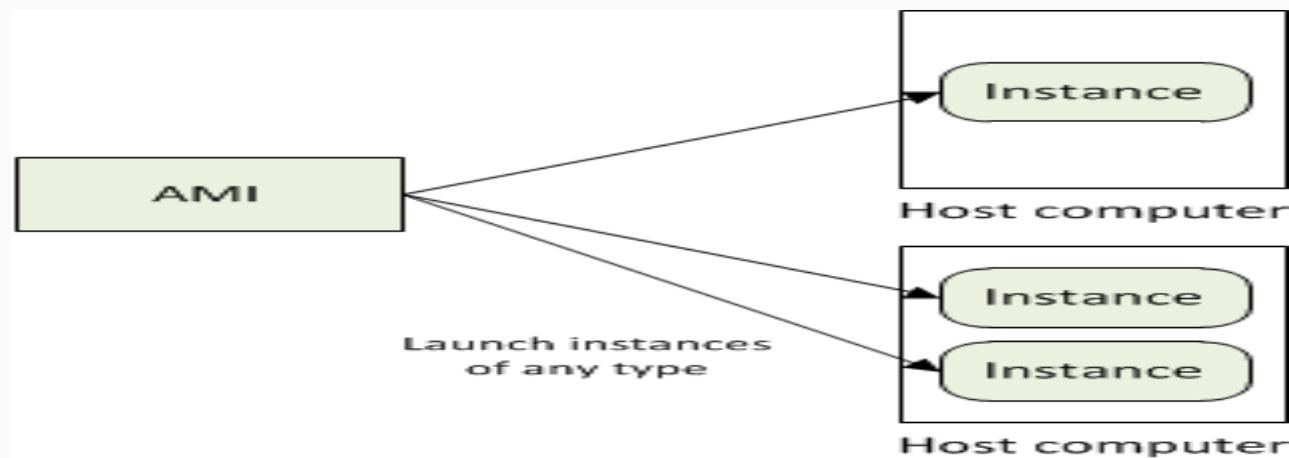
Amazon Machine Images (AMI)

- An immutable representation of a set of disks that **contain an operating system, user applications and/or data**.
- From an AMI, one can launch multiple instances, which are running copies of the AMI.



AMI and Instance

- Amazon Machine Image (AMI) is a template for software configuration (Operating System, Application Server, and Applications).
- Instance is a AMI running on virtual servers in the cloud.
- Each instance type offers different compute and memory facilities.



Region and Zones

- Amazon have **data centers in different region** across the globe
- An instance can be launched in different regions depending on the need.
 - Closer to specific customer
 - To meet legal or other requirements

Region and Zones

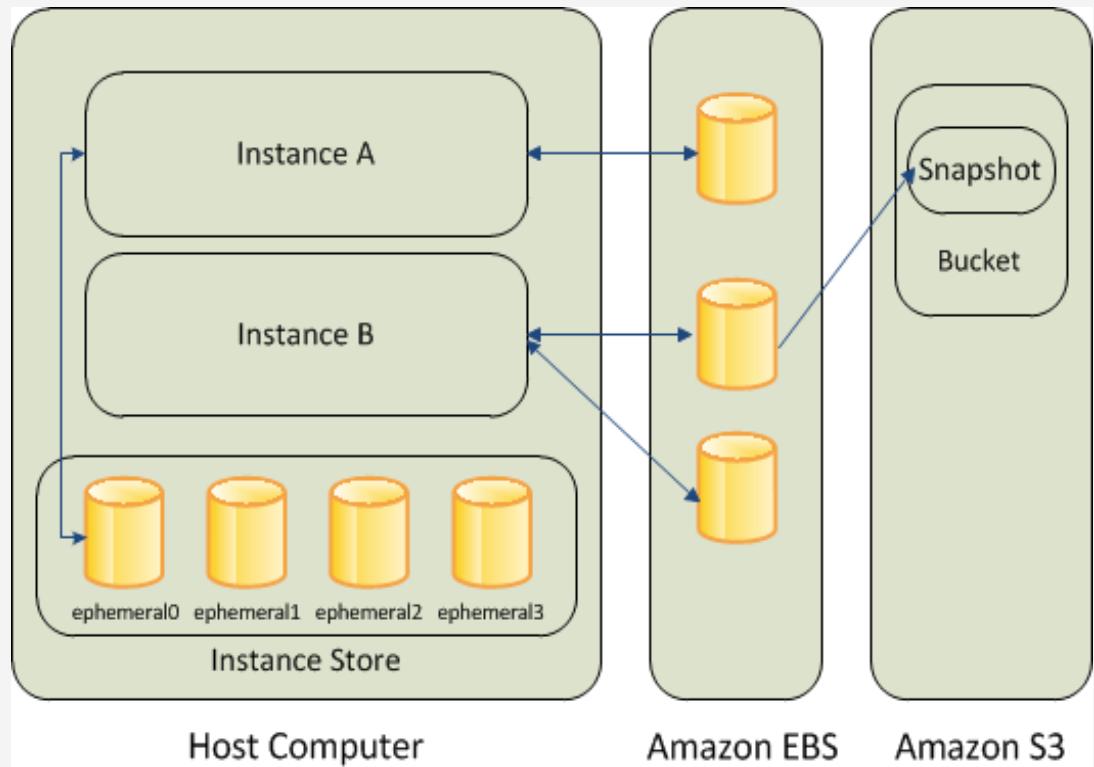
Each region has set of zones

- Zones are isolated from failure in other zones
- Inexpensive, low latency connectivity between zones in same region

Storage

Amazon EC provides
**three type of storage
option:**

- Amazon EBS
- Amazon S3
- Instance Storage



Networking and Security

- Instances can be launched on one of the two platforms
 - EC2-Classic
 - EC2-VPC
- Each instance launched is assigned two addresses a private address and a public IP address.
- A replacement instance has a different public IP address

Networking and Security

- Instance IP address is dynamic:
 - new IP address is assigned every time instance is launched
- Amazon EC2 offers Elastic IP addresses (static IP addresses) for dynamic cloud computing
 - Remap the Elastic IP to new instance to mask failure
 - Separate pool for EC2-Classic and VPC
- Security Groups to access control to instance

Monitoring, Auto Scaling and Load Balancing

Monitor statistics of instances and EBS

- **CloudWatch** (monitor, manage and publish various metrics; configure alarms based on metrics)

Monitoring, Auto Scaling and Load Balancing

Automatically scales amazon EC2 capacity up and down based on rules

- Add and remove compute resource based on demand
- Suitable for businesses experiencing variability in usage

Monitoring, Auto Scaling and Load Balancing

Distribute incoming traffic across multiple instances

- Elastic Load Balancing

Amazon S3

- S3 stands for = Simple Storage Service
- SOA- Service Oriented Architecture which provides online storage using web services.
- Allows read, write and delete permissions on objects.
- Uses REST and SOAP protocols for messaging.

Amazon SimpleDB

- Amazon SimpleDB is a highly available, flexible, and scalable **non-relational data store** that offloads the work of database administration.
- Creates and manages **multiple geographically distributed replicas** of your data automatically to enable high availability and data durability.
- The service charges you only for the resources actually consumed in storing your data and serving your requests.

AWS Lambda

- Truly Serverless.
- You no longer have the overhead of administration.
- No need to manage any servers.
- Focus is entirely on your business logic.

AWS DynamoDB

- Database that delivers single-digit millisecond performance at any scale.
- Fully managed, cost effective, durable, multi-region NoSQL database.

AWS Amazon API Gateway

- Fully managed service.
- Simple way to create, publish, maintain, monitor, and secure APIs at any scale. RESTful APIs and WebSocket APIs are types of APIs you can create using API Gateway.

AWS EC2 Practical

- Launching an Instance
- Connecting
- Terminating
- Stop
- Budget & Preferences setting

AWS Management Console

S3 EC2 VPC Elastic MapReduce CloudFront RDS SNS

Navigation

Region: US East

> EC2 Dashboard

INSTANCES

> Instances

> Spot Requests

IMAGES

> AMIs

> Bundle Tasks

ELASTIC BLOCK STORE

> Volumes

> Snapshots

NETWORKING & SECURITY

> Elastic IPs

> Security Groups

> Placement Groups

> Load Balancers

> Key Pairs

My Instances

Launch Instance Instance Actions Reserved Instances

Viewing: All Instances All Instance Types

Show/Hide Refresh Help

Name	Instance	Type	Status	Lifecycle	Public DNS
<input checked="" type="checkbox"/> Web Server	i-841948e9	m1.small	running	normal	ec2-67-202-15-66.compute-1...

1 EC2 Instance selected

EC2 Instance: i-841948e9

Description Monitoring Tags

AMI ID:	ami-08728661	Zone:	us-east-1b
Security Groups:	80_22_open	Type:	m1.small
Status:	running	Owner:	043708602122
VPC ID:	-	Subnet ID:	-
Virtualization:	paravirtual	Placement Group:	
Reservation:	r-7de68517	RAM Disk ID:	-
Platform:	-	Key Pair Name:	GSG_Keypair
Kernel ID:	aki-407d9529	Monitoring:	basic
AMI Launch Index:	0	Elastic IP:	-
Root Device:	/dev/sda1	Root Device Type:	ebs

AWS Management Console- All Services

★ Favorites

Add favorites by clicking on the star next to the service name.

Recently visited

- EC2
- Console Home
- Billing
- Cloud9
- Elastic Beanstalk
- Support

All services

Compute

- EC2
- Lightsail
- Lambda
- Batch
- Elastic Beanstalk
- Serverless Application Re...
- AWS Outposts
- EC2 Image Builder
- AWS App Runner

Containers

- Elastic Container Registry
- Elastic Container Service
- Elastic Kubernetes Service
- Red Hat OpenShift Servic...

Storage

- S3
- EFS

Developer Tools

- CodeStar
- CodeCommit
- CodeArtifact
- CodeBuild
- CodeDeploy
- CodePipeline
- Cloud9
- CloudShell
- X-Ray
- AWS FIS

Customer Enablement

- AWS IQ
- Support
- Managed Services
- Activate for Startups

Robotics

- AWS RoboMaker

Machine Learning

- Amazon SageMaker
- Amazon Augmented AI
- Amazon CodeGuru
- Amazon DevOps Guru
- Amazon Comprehend
- Amazon Forecast
- Amazon Fraud Detector
- Amazon Kendra
- Amazon Lex
- Amazon Personalize
- Amazon Polly
- Amazon Rekognition
- Amazon Textract
- Amazon Transcribe
- Amazon Translate
- AWS DeepComposer
- AWS DeepLens
- AWS DeepRacer
- AWS Panorama

AWS Cost Management

- AWS Cost Explorer
- AWS Budgets
- AWS Marketplace Subscri...
- AWS Application Cost Pro...
- AWS Amplify
- Mobile Hub
- AWS AppSync
- Device Farm
- Amazon Location Service

Front-end Web & Mobile

- AWS Amplify
- Mobile Hub
- AWS AppSync
- Device Farm
- Amazon Location Service
- Amazon Sumerian

AR & VR

- Step Functions
- Amazon AppFlow
- Amazon EventBridge

Application Integration

That's all for now...