Web Services | Amazon EC2

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Amazon EC2 Introduction

"Amazon EC2 stand for (Elastic Compute Cloud). AWS EC2 is a backbone of AWS. AWS EC2 offers scalable computing capacity that allows business subscribers to run application and programs in the Cloud environment."

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Benefits:

ELASTIC WEB-SCALE COMPUTING

Amazon EC2 enables to increase or decrease capacity within minutes, not hours or days.

COMPLETELY CONTROLLED

User have a complete control of the instances including root access and the ability to interact with them as they would any machine.

FLEXIBLE CLOUD HOSTING SERVICES

User have a choice of multiple instance types, operating systems, and software packages.

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Benefits:

INTEGRATED

Amazon EC2 is integrated with most AWS services such as AWS S3, AWS RDS and AWS VPC.

RELIABLE

Amazon EC2 offers a highly reliable environment where replacement instances can be rapidly and predictably commissioned.

SECURE

Cloud security at AWS is the highest priority. AWS gives a benefit of data center and network architecture built to meet the requirements of the most security-sensitive organizations.

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Benefits:

INEXPENSIVE

Amazon EC2 passes on the financial benefits of Amazon's scale. User can pay a very low rate for the compute capacity actually consumed.

EASY TO START

There are several ways to get started with Amazon EC2. User can use the AWS Management Console, the AWS Command Line Tools (CLI), or AWS SDKs.

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Features:

- EC2 virtual computing environments, known as **instances**.
- Preconfigured templates for your instances, known as **Amazon Machine Images (AMI) / Golden AMI**.
- Diverse processor capacity, memory, storage, and networking configurations for the instances, called **instance types**.
- Secure login information for the instances by using **key pairs**.

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Features

- Persistent storage volumes for the data using Amazon Elastic Block Store (Amazon EBS), known as **Amazon EBS volumes**.

- Multiple physical locations for resources, such as Amazon EBS instances and volumes, called regions and availability zones.

- A firewall that allows to specify the source protocols, ports, and IP ranges that can reach the instances by using **security groups**.

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Features:

- Storage volumes for temporary data that's deleted when instance stop or terminate known as **instance store volumes**.

- Hibernation for EC2 Instances giving you the ability to launch EC2 instances, set them up as desired, hibernate them, and then bring them back to life when you need them.

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Amazon EC2 Instances

"An EC2 instance is a virtual server in Amazon's Elastic Compute Cloud (EC2) to run applications on the Amazon Web Services (AWS) infrastructure."

Before launching a production environment on AWS EC2 Instance, user should have the clear business computing requirement.

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For Example:

1. Business Nature, Computing Usage for running the Application
2. Processor Requirement.
3. Memory and storage Requirements.
4. Networking Capacity
5. Most Important: Amazon EC2 different Instance types to enables that meet the Business Requirements.

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EC2 Instance Types

Instance types divided in two different Types or Families

1. Current Generation Instance Types
2. Previous Generation Instance Type

1- General purpose
2- Compute optimized
3- Memory optimized
4. Storage optimized
5. Accelerated computing.

Both Instance Types have same Family/Types Names but Instances distribution is completely different.

Please Read following link to get the Instance Distribution
https://docs.aws.amazon.com/AWSEC2/latest/UserGuide/instance-types.html

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Amazon Machine Image (AMI)

"An Amazon Machine Image (AMI) provides the information required to launch an instance, which is a virtual server in the cloud. You must specify a source AMI when you launch an instance."

An AMI includes the following:

- A template for the root volume for the instance (for example, an operating system, an application server, and applications).
- Launch permissions that control which AWS accounts can use the AMI to launch instances.
- A block device mapping that specifies the volumes to attach to the instance when it's launched.

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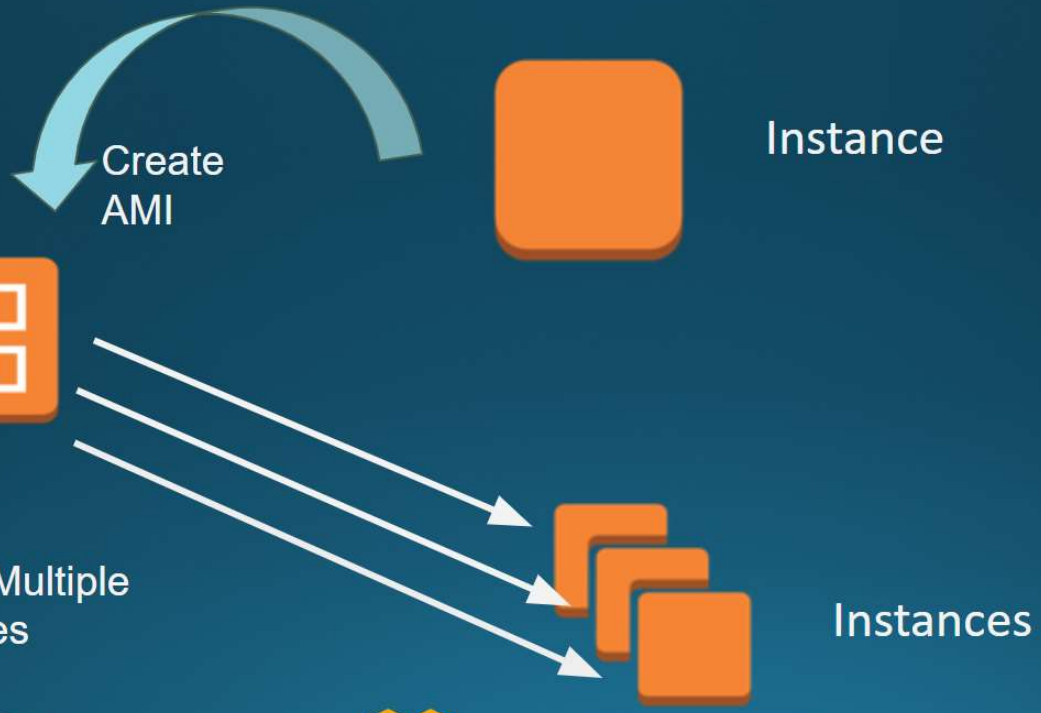
Amazon Machine Image (AMI)



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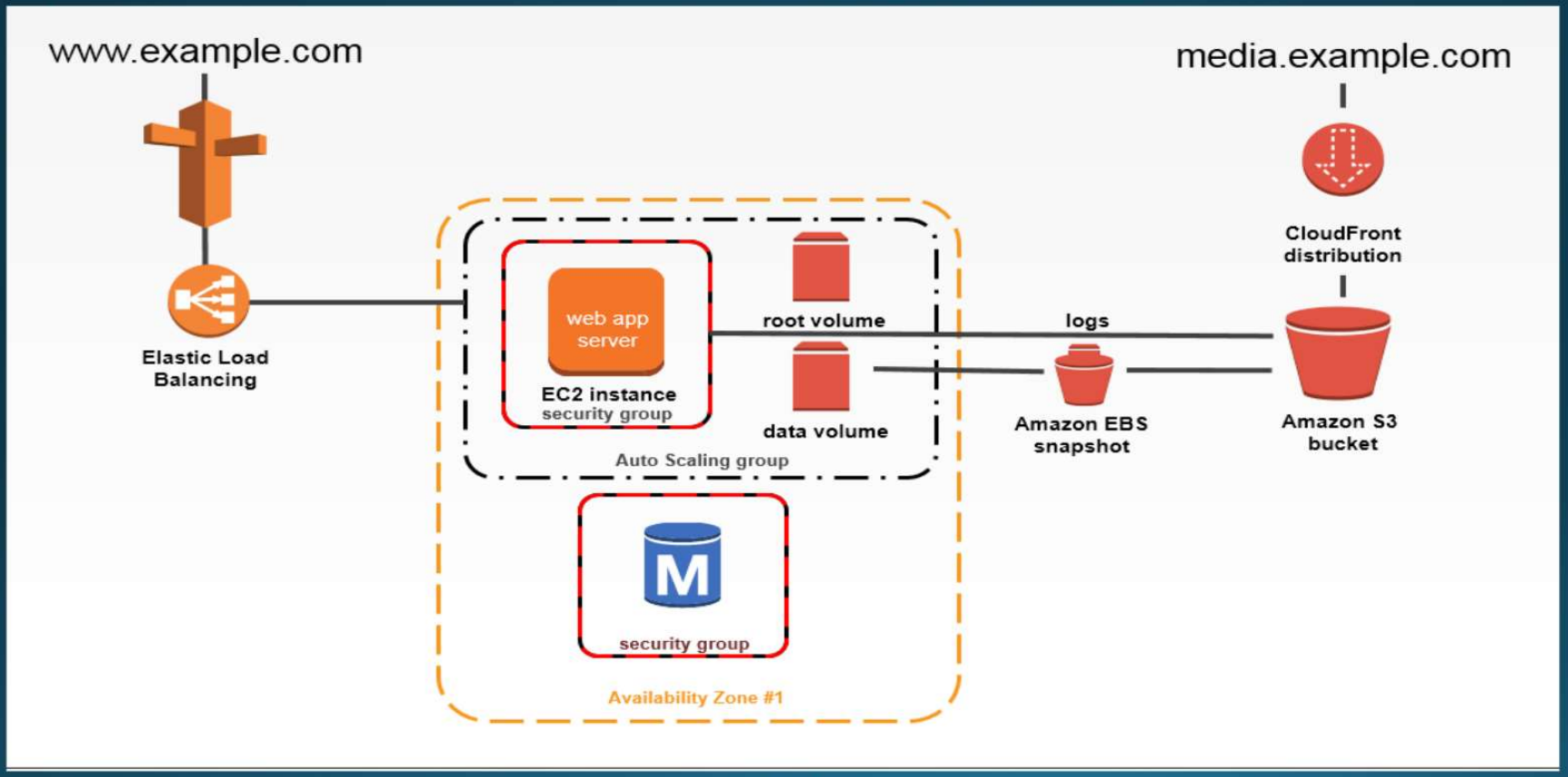
www.example.com
media.example.com
Elastic Load Balancing
web app server
EC2 instance
security group
root volume
data volume
Auto Scaling group
logs
Amazon EBS snapshot
CloudFront distribution
Amazon S3 bucket
M
security group
Availability Zone #1

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Amazon Elastic Block Store (EBS)

"Amazon EBS provides persistent, highly available, consistent, low-latency block storage volumes for use with Amazon EC2 instances.

Each Amazon EBS volume is automatically replicated within its Availability Zone to protect you from component failure, offering high availability and durability.
It is designed for an application managers who need to tune workloads for capacity, performance and cost."

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EBS Features:

- **High Performance Volumes:**
  Whether its SSD-backed or HDD-backed volumes, EBS deliver **High Performance Volumes** that needed the most demanding applications.

- **Availability:** EBS volume is designed for 99.999% **Availability** .

- **Encryption:** EBS **Encryption** provides seamless support for data-at-rest and data-in-transit between EC2 instances and EBS volumes.

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EBS Features:

- **Snapshot:** Protect the data by creating point-in-time **Snapshots** of EBS volumes.
- **Access Management:** Amazon's flexible access control policies allows to specify who can **Access** which EBS volumes ensuring secure **Access** to the data.
- **Elastic Volumes:** Dynamically increase capacity, tune performance, and change the type of live EBS volumes.

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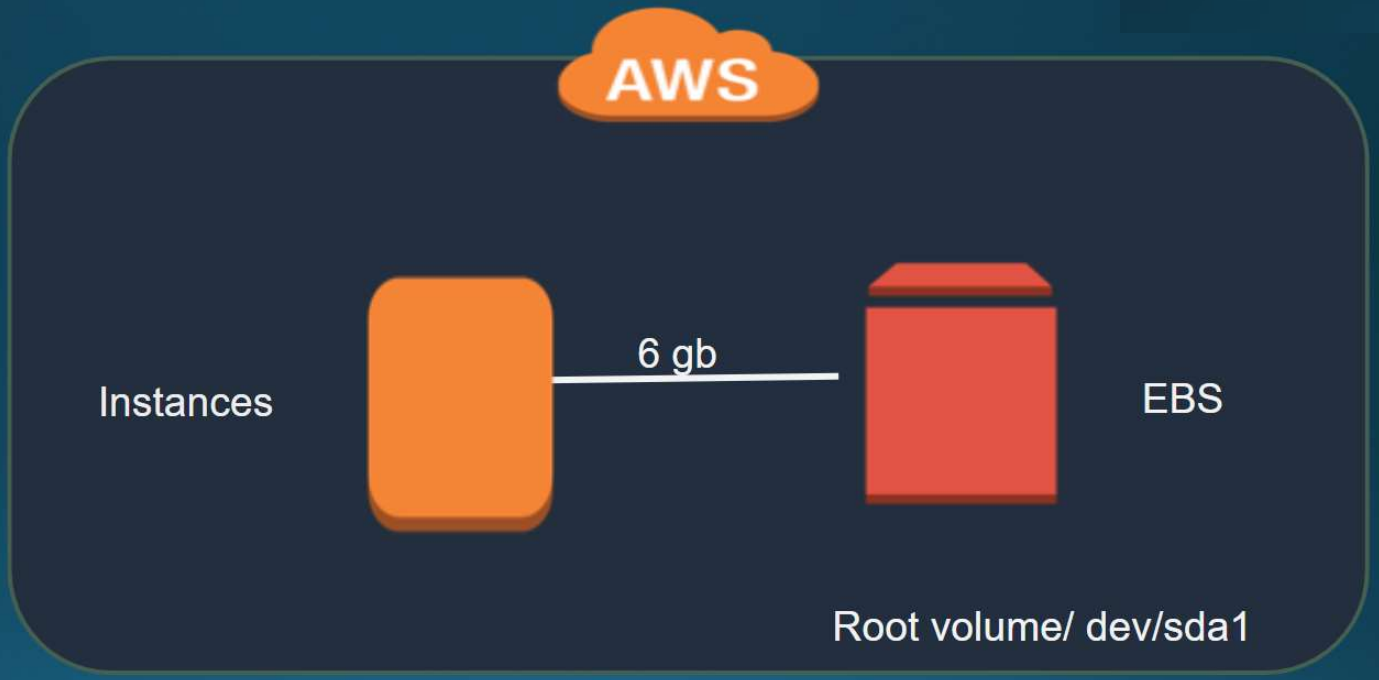
Amazon EBS

IOPS / Throughput:
IOPS measures the number of read and write operations per second, while throughput measures the number of bits read or written per second.



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Amazon EC2 Pricing

Amazon EC2 is free to try. There are five ways to pay for Amazon EC2 instances:

On-Demand

With On-Demand instances, user can pay for compute capacity by per hour or per second depending on which instances you run. No longer-term commitments or upfront payments are needed.

Spot Instances

Amazon EC2 Spot instances allow user to request spare Amazon EC2 computing capacity for up to 90% off the On-Demand price.

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Amazon EC2 Pricing

Reserved Instances

Reserved Instances provides a significant discount (up to 75%) compared to On-Demand instance pricing.

Dedicated Hosts

A Dedicated Host is a physical EC2 server dedicated for use. Dedicated Hosts can helps to reduce costs by allowing user to use existing server-bound software licenses, including Windows Server, SQL Server, and SUSE Linux Enterprise Server.

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Amazon EC2 Pricing

Savings Plans

Savings Plans is a flexible pricing model that provides savings of up to 72% on your AWS compute usage. This pricing model offers lower prices on Amazon EC2 instances usage, regardless of instance family, size, OS, tenancy or AWS Region, and also applies to AWS Fargate and AWS Lambda usage.

Savings Plans offer significant savings over On Demand, just like EC2 Reserved Instances, in exchange for a commitment to use a specific amount of compute power (measured in $/hour) for a one or three year period.

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Amazon EC2 Pricing

Per Second Billing

1. With per-second billing, pay for only what is in use. It takes cost of unused minutes and seconds in an hour off of the bill.

2. EC2 usage are billed on one second increments, with a minimum of 60 seconds. Similarly, provisioned storage for EBS volumes will be billed per-second increments, with a 60 second minimum.
3. Amazon Linux, Windows, and Ubuntu.

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Hands-On Lab:

1. Create & Download Key Pair (.PEM)
2. Create Security Group with RDP & SSH ports
3. Create EC2 based Windows (2016) & Linux (Ubuntu) Ec2 T2.micro Instance.
4. Take windows & Linux VM remote using RDP & SSH.
5. Create EC2 Template & Launch Ec2 Instance from template.
6. Create AMI & Snapshot.
7. Terminate All EC2 Instances.

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