ZOOM
TECHNOLOGIES

AWS | Amazon Web Services

Course Presentation

DAY 1
Introduction to Cloud Computing with Amazon Web Services

AWS Cloud Computing
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Introduction to Cloud Computing with Amazon Web Services

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Agenda

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What is cloud ?

Cloud Deployment Model

Cloud Service Model

Advantage of Cloud

Cloud Market and scope

AWS certification

Course content of AWS

Cloud Definition

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What is cloud ?

- **IBM**

Cloud computing, often referred to as simply "the cloud," is the delivery of on-demand computing resources—everything from applications to data centers—over the Internet on a pay-for-use basis.

- **NIST**

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.

Cloud Definition

Definitions:

In the simplest terms, cloud computing means it provides services to access programs, application, storage, network, servers over the Internet through browser or client-side application on your PC or Laptop, Mobile, TAB, or Smart TV , by the end user without installing, updating and maintaining them.

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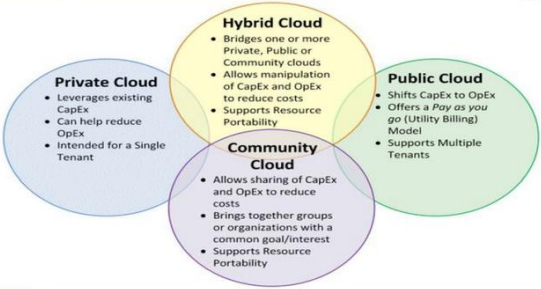
Cloud Deployment Models



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Cloud Services Models

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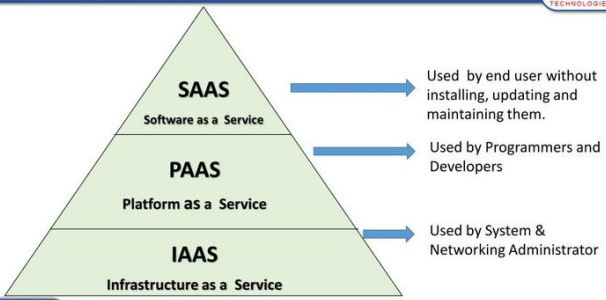

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Software as a Service (SaaS)

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Software as a Service (SaaS) is software distribution model in which applications are hosted by a vendor over the Internet for the end users freeing end users from complex software and hardware management.

Users can subscribe to the service and use the app, normally through a web browser or by installing a client-side app.

SaaS Providers

- Google – Mail, Calendar, docs, presentation etc..
- Microsoft - Mail, MSword, paint
- Twitter,
- Facebook
- Flipkart
- Paypal
- Gotomeeting
- Pixlr (image editor)
- Jaycut (video editor), Aviary (photo editor)

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Platform as a Service (PaaS)

Platform as a service (PaaS) is a category of cloud computing that provides a platform and environment to allow developers to build applications. It frees developers without going into the complexity of building and maintaining the infrastructure.

With PaaS, developers and organizations can create highly scalable custom apps without having to provision and maintain hardware and operating system resources.

PaaS Providers

- AWS beanstalk
- Google App Engine
- Windows Azure
- Force.com from salesforce
- IBM Bluemix
- RedHat OpenShift open source PaaS
- Pivotal CF from VMware

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Infrastructure As A Service (IaaS)

Infrastructure as a service (IaaS) is a form of cloud computing that provides virtualized computing resources, over the internet. Like CPU, harddisk, memory, switches, routers, firewall, DNS, DHCP, Load Balancer, Autoscaling etc...

IaaS Providers

- Amazon AWS.
- Windows Azure.
- Google Compute Engine.
- Rackspace Open Cloud.
- IBM SmartCloud Enterprise.
- HP Enterprise Converged Infrastructure.
- GoGrid,
- Joyent,
- AppNexus

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Advantages of Cloud Computing

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- Scalability/Elasticity
  - Demand on cloud infrastructures

- Cost saving
  - Reducing up-front IT cost buy server machines, no need for hiring/training manpower.

  - Pay as u go , charges are applied hourly, monthly and yearly basis.

- Disaster recovery and Back up
  - Cloud Services have very high availability of ~99.9999%, by proactively by taking backups, having stand-by virtual resources in place and moving failed instances of Virtual resources across seamlessly

Cloud examples

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For Example

DropBox	https://www.dropbox.com/home
Google drive	https://drive.google.com/drive/my-drive
Google Docs	https://docs.google.com/document/u/0/
Google presentation	https://docs.google.com/presentation/u/0/
Google Calendar	https://calendar.google.com/calendar

AWS Certification

AWS

Course covered

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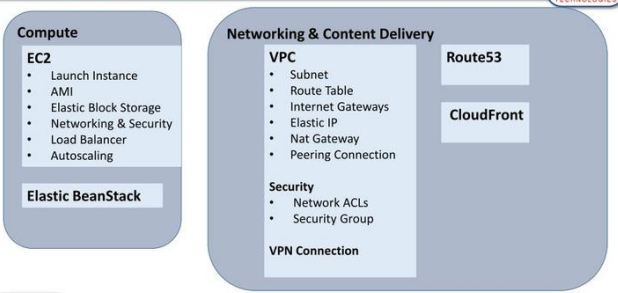

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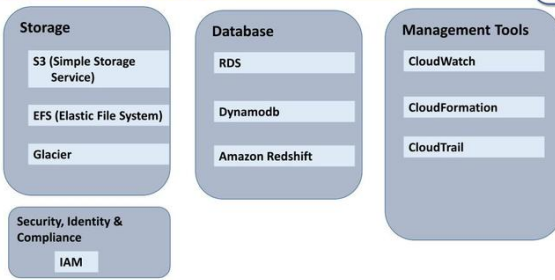

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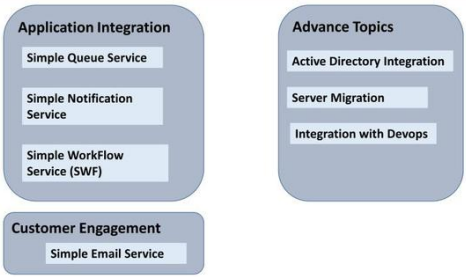
Course Content of AWS



AWS future and Job Scope

http://www.financialexpress.com/industry/tech/what-the-future-holds-for-india-in-cloud-computing/108207/

http://www.zdnet.com/article/predictions-2017-three-reasons-businesses-cant-ignore-the-rapidly-growing-cloud-market/

http://www.cxotoday.com/story/global-public-cloud-market-to-reach-over-200-bn-in-2016-gartner/

https://www.quora.com/What-is-the-future-of-cloud-computing-in-India

DAY 2

AWS Infrastructure

Launching of Windows and Linux instance

What is AWS ?

Amazon Web Services (AWS) is a secure cloud services platform, offering compute power, database storage, content delivery and other functionality to help businesses scale and grow.

The first AWS offerings were launched in 2006 with S3 storage service.

How did Amazon... get into cloud computing?

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?

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AWS global infrastructure over the map

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AWS Global Infrastructure

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- 16 Geographic Regions

Name	Code Name
US East (N. Virginia)	us-east-1
US East (Ohio)	us-east-2
US West (N. California)	us-west-1
US West (Oregon)	us-west-2
Canada (Central)	ca-central-1
EU (Ireland)	eu-west-1
EU (Frankfurt)	eu-central-1
EU (London)	eu-west-2
Asia Pacific (Tokyo)	ap-northeast-1
Asia Pacific (Seoul)	ap-northeast-2
Asia Pacific (Singapore)	ap-southeast-1
Asia Pacific (Sydney)	ap-southeast-2
Asia Pacific (Mumbai)	ap-south-1
South America (São Paulo)	sa-east-1

- 44 Availability Zones
- Coming soon 17 more Availability Zones and six more Regions in Bahrain, China, France, Hong Kong, Sweden, and a second AWS GovCloud Region in the US.
- 90 Edge Location by November 6, 2017

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AWS Region, Availability Zones, Edges

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Regions

An independent collection of AWS resources in a defined geography
A solid foundation for meeting location-dependent privacy and compliance requirements

Availability Zones

Designed as independent failure zones
Physically separated within a typical metropolitan region

Edge Locations

To deliver content to end users with lower latency
A global network of edge locations
Supports global DNS infrastructure (Route53) and Cloud Front CDN

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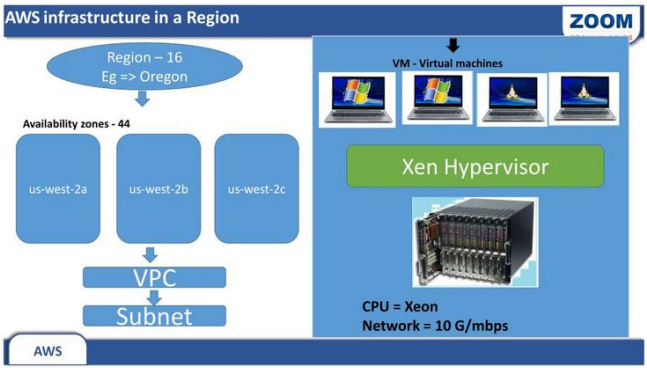
AWS infrastructure in a Region
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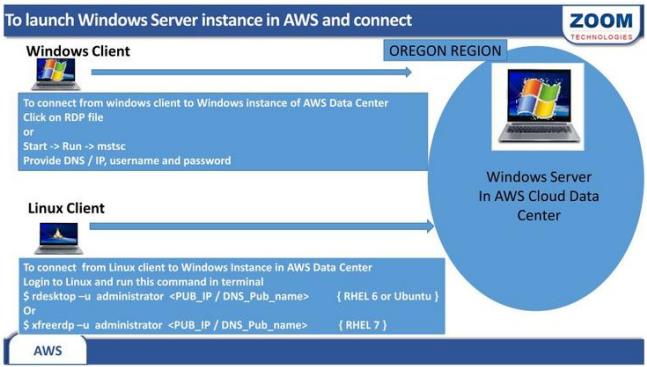
Region – 16
Eg => Oregon
Availability zones - 44
us-west-2a
us-west-2b
us-west-2c
VPC
Subnet
VM - Virtual machines
Xen Hypervisor
CPU = Xeon
Network = 10 G/mbps
AWS


To launch Windows Server instance in AWS and connect
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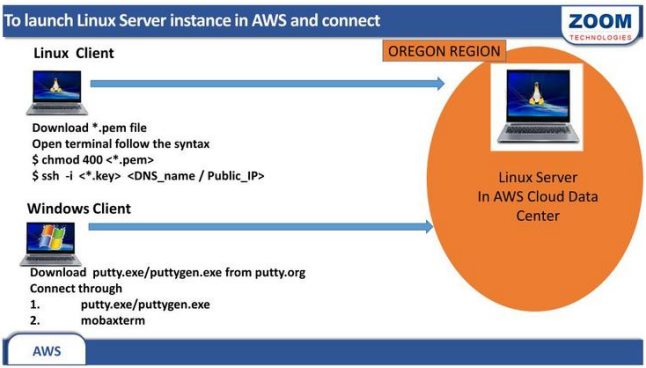
Windows Client
OREGON REGION
To connect from windows client to Windows instance of AWS Data Center
Click on RDP file
or
Start -> Run -> mstsc
Provide DNS / IP, username and password
Windows Server
In AWS Cloud Data
Center
Linux Client
To connect from Linux client to Windows Instance in AWS Data Center
Login to Linux and run this command in terminal
$ rdesktop –u administrator <PUB_IP / DNS_Pub_name> { RHEL 6 or Ubuntu }
Or
$ xfreerdp –u administrator <PUB_IP / DNS_Pub_name> { RHEL 7 }
AWS



DAY 3

Amazon Elastic Block Storage

Amazon Elastic Block Storage

Types of Storage

- Direct-attached storage (DAS)
- Network attached storage (NAS)
- Storage area network (SAN)
- Cloud Storage i.e. storage over Internet

Direct attached storage (DAS)

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- **Direct-attached storage (DAS)**

Direct-attached storage (DAS) is attached directly to the computer system mother board connectors or through usb. Examples of DAS include hard drives, CDROM/DVD , external hard drives, optical disc drives, pendrive etc.

Amazon provide these facility through **EBS (Elastic Block Storage service)**

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Network-attached storage (NAS)

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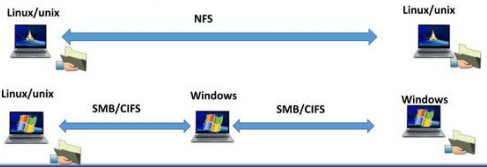
- **Network-attached storage (NAS)**
  - NAS uses file-based protocols for sharing folders using NFS for Linux/UNIX, SMB/CIFS for windows.
  - It is a shared folder over the network.
  - Amazon provide these facility through **EFS (Elastic File system)** service.
  - A shared folder cannot be formatted.



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Storage Area Network (SAN)

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- **Storage Area Network (SAN)**

  A storage-area network (SAN) is a dedicated high-speed network block level data storage, It can be formatted.
  It provide shared pools of storage devices to multiple servers in the form of LUN.
  Fiber cable, bus adapters (HBAs) and fiber switches are used to provide SAN storage.
  ISCSI target make use of normal network over cat5/6 cables to provide LUN over SAN storage.

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Cloud Storage

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- **Cloud storage**

  Cloud storage is a storage over internet provided by cloud service venders.
  It is not a block level storage i.e. cannot be formatted.
  Eg.
  Google drive
  One drive
  Dropbox

  Amazon provides this services through
  - S3 (Simple storage service)
  - Glacier service

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Elastic Block Storage

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- Elastic Block Store (EBS)

Amazon Elastic Block Store (EBS) is a block level storage volumes which can be formatted according to required filesystem, for e.g. In Windows FAT32, NTFS, in Linux ext3, ext4, resirfs etc.

Data on EBS volume are persistence, they are not lost if a instance is started/stopped or restarted.

When an instance is launched by default it contains an EBS volume which is called as root volume, where operating system is installed.

These EBS root volumes are highly available because AWS by default automatically creates a snapshot of launched instance which are used to recover if any disaster or failover occurs.

Elastic Block Storage

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With Amazon EBS, you can scale your usage up or down within minutes.

Software's like Oracle, SAP, Big Data workloads, Data warehouses, Log processing, Boot Volume are used on EBS volumes.

EBS volumes are 99.9999% Availability, with 0.1% to 0.2% Annual Failure Rate (AFR)

Elastic Block Storage

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EBS volumes are specific to their Availability Zones

An instance can have Multiple EBS volume attached.

These EBS volumes can be attached as well as detached from an instance without any data loss.

EBS volumes at one particular time can be attached to only one instance, it cannot be used with two or more instance at the same time.

EBS volume can be attached to an instance which is in same Availability zone, it cannot be attached to an instance which is another availability zone.

Each EBS volume will have a volume id, which will be used by cloudwatch and other services.

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EBS snapshot

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EBS Snapshot

Snapshot are used to take EBS point-in-time backup.

Snapshot are incremental back up of the EBS volume.

Snapshots are region specific, where as volumes are specific to availability zones.

EBS volumes cannot be increased directly through volumes.

To increase the size of EBS Volumes first create the snapshots, then from this snapshot create the required size of volume.

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EBS snapshot

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EBS Snapshot

Volume size cannot be decrease lesser than the snapshot size

Volumes in another Availability zones can be created using snapshot

To have the same volume in another region, first copy the snapshot in other region, then from this snapshot create the volume in required availability zones .

Volumes are not deleted if snapshots are removed, similarly snapshots are not deleted if volumes are removed

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IOPS / Throughput

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IOPS

Input/output operations per second (#)
After ~33 GB adds 3 IOPS for each GB in general purpose volume

Throughput

Read/write rate to storage (MB/s)

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Types of EBS Volumes

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Volume Types	Hardware Type	Minimum Size	Maximum Size	Max IOPS/Vol's	Max Throughput MB/s	Price
EBS Provisioned IOPS SSD (io1)	SSD	4 GB	16 TB	20,000	Not applicable	$0.125/GB-month $0.065/provisioned IOPS
EBS General Purpose SSD (gp2)*	SSD	1 GB	16 TB	10000	Not applicable	$0.10/GB-month
Throughput Optimized HDD (st1)	HDD	500 GB	16 TB	500	500 MB/s	$0.045/GB-month
Cold HDD (sc1)	HDD	500 GB	16 TB	250	250 MB/s	$0.025/GB-month
Magnetic	HDD	1GB	1 TB	Not applicable	Not applicable	$0.05/GB-month

Costing of EBS snapshot

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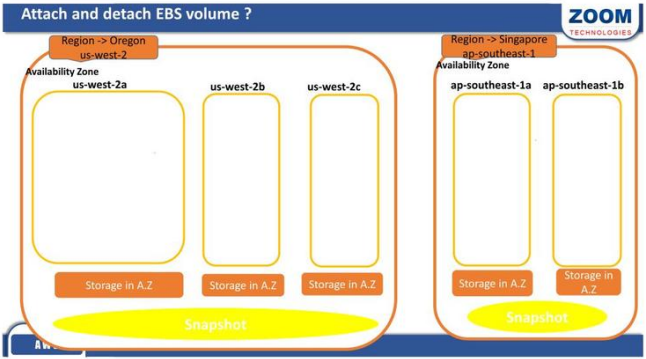
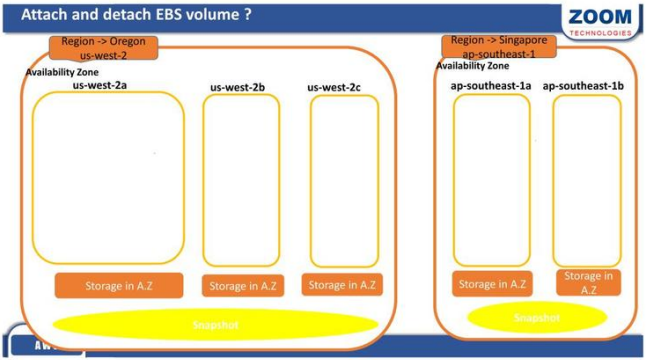
Snapshot are charged around the same as storage for your EBS volumes

Prices are calculated depending on the type of Volumes.

Scenario

If you take 1TB of local snapshots every day for one month with 3% daily increment changes and a 30-day retention period, it will cost you the same as snapshots for 2TB per month. With $0.10 per GB-month of snapshots, it will cost around $200 ($0.1/GB x 2TB) per disk.


Attach and detach EBS volume ?
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
us-west-2b
us-west-2c
Storage in A.Z
Storage in A.Z
Storage in A.Z
Snapshot
Region -> Singapore
ap-southeast-1
Availability Zone
ap-southeast-1a
ap-southeast-1b
Storage in A.Z
Storage in A.Z
Snapshot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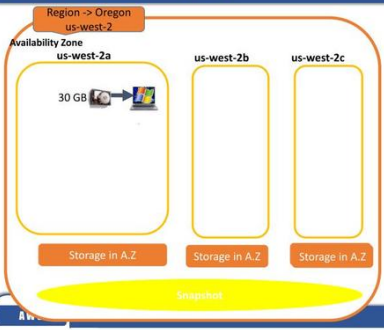
Attach and detach EBS volume ?

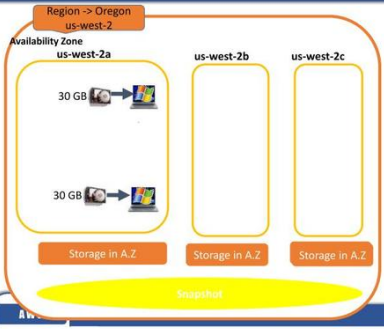
ZOOM TECHNOLOGIES



- Launch an instance in one A.Z

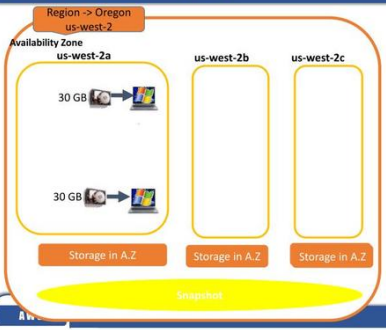
Attach and detach EBS volume ?

ZOOM TECHNOLOGIES



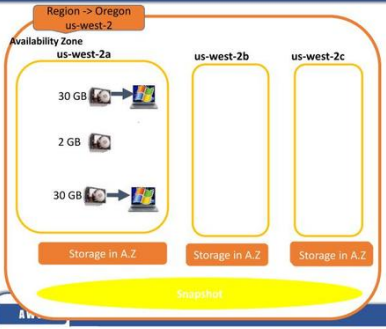
- Launch another instance in the same A.Z

Attach and detach EBS volume ?



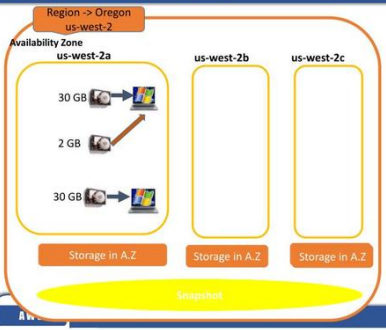
- Create a volume of 2 GB

Attach and detach EBS volume ?



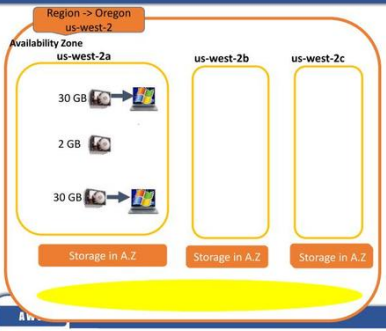
- 2 GB volume got created

Attach and detach EBS volume ?



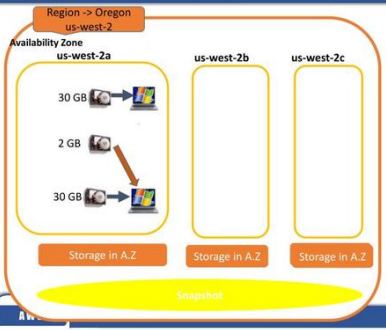
- Attach the volume to an instance
- EBS volume can be attached to only one instance at one time
- Same volume if u want to use with other instance then, first detach from existing instance and attach to another instance.

Attach and detach EBS volume ?



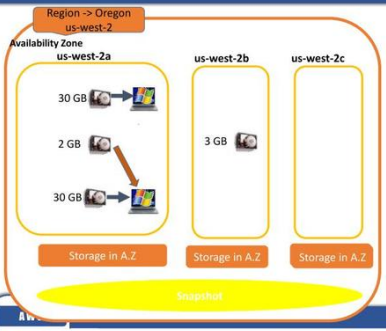
- Now volume is detached.
- Now it could be attached to another instance.

Attach and detach EBS volume ?



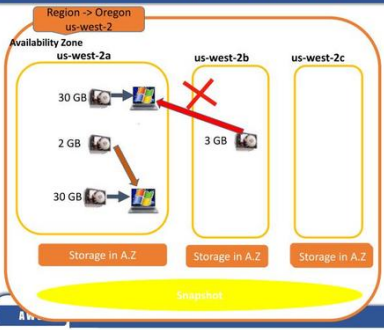
- Attached to another instance.

Attach and detach EBS volume ?



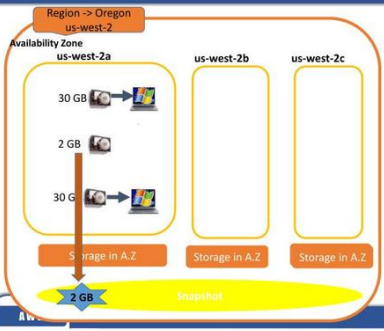
- Create a volume in another A.Z
- A volume of one A.Z cannot be attached to instance in another A.Z

Attach and detach EBS volume of other region S?



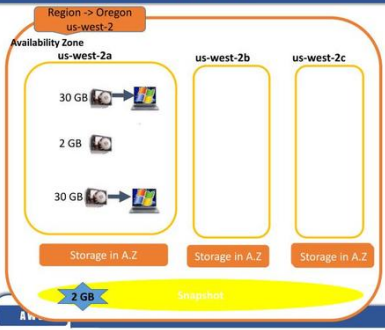
- A volume of one A.Z cannot be attached to instance in another A.Z

To Increase the size of the Volume



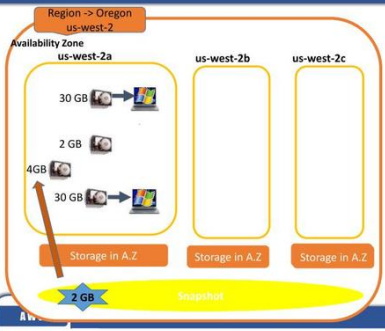
- Snapshots are specific to the region
- To increase the size of the volume first take the snapshot
- Now from this snapshot create a volume of required size.

To Increase the size of the Volume

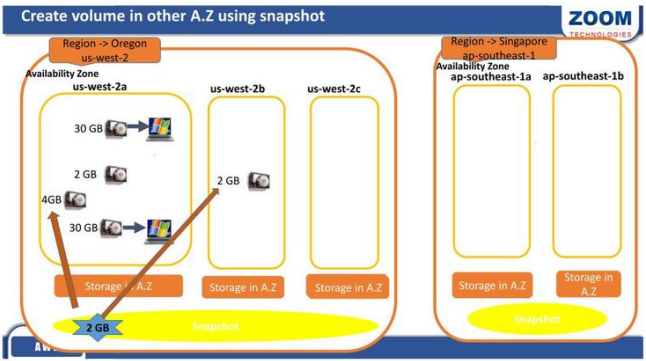


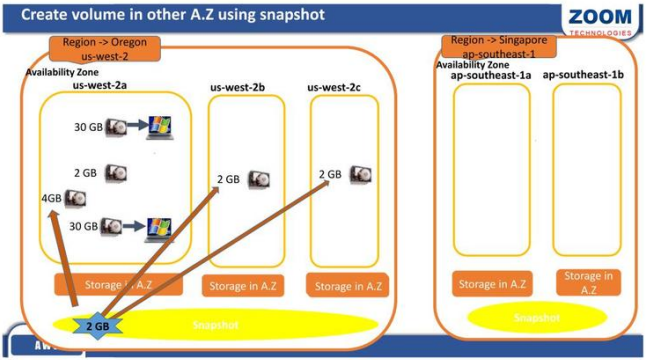
- Snapshot is created
- Snapshot belongs to whole region

Attach and detach EBS volume ?



- Now from this snapshot create a volume of required size.


Create volume in other A.Z using snapshot
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
us-west-2b
us-west-2c
30 GB
2 GB
4GB
30 GB
2 GB
Storage in A.Z
Storage in A.Z
Storage in A.Z
2 GB
Snapshot
Region -> Singapore
ap-southeast-1
Availability Zone
ap-southeast-1a
ap-southeast-1b
Storage in A.Z
Storage in A.Z
Snapshot


Create volume in other A.Z using snapshot
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
us-west-2b
us-west-2c
30 GB
2 GB
4GB
30 GB
2 GB
2 GB
Storage in A.Z
Storage in A.Z
Storage in A.Z
2 GB
Snapshot
Region -> Singapore
ap-southeast-1
Availability Zone
ap-southeast-1a
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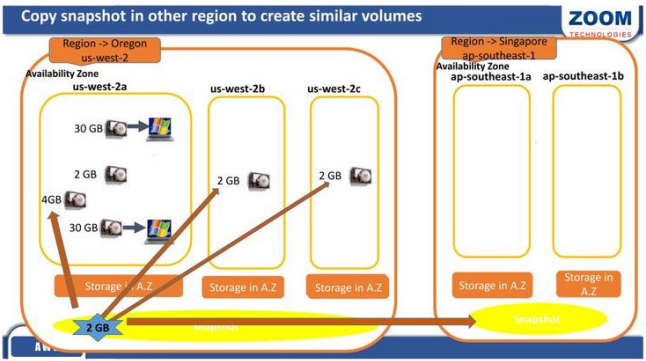
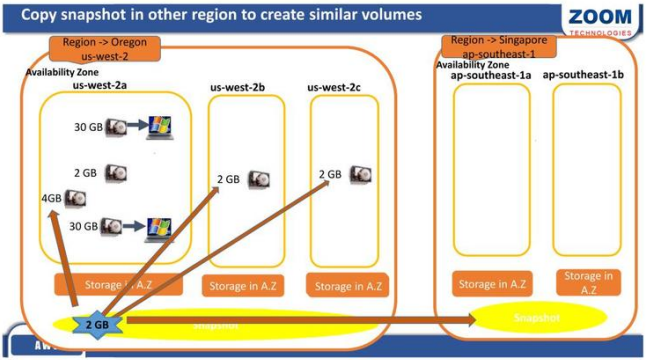
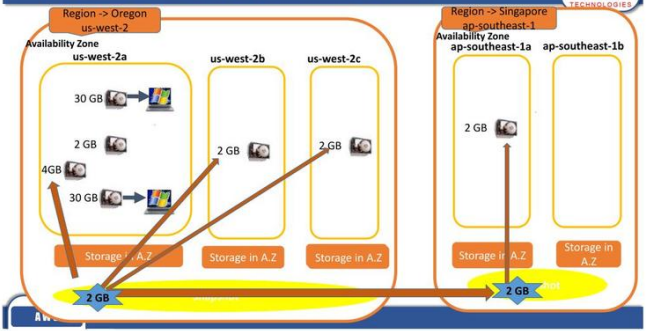
Storage in A.Z
Storage in A.Z
Snapshot


Copy snapshot in other region to create similar volumes
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
us-west-2b
us-west-2c
30 GB
2 GB
4GB
30 GB
2 GB
2 GB
Storage in A.Z
Storage in A.Z
Storage in A.Z
2 GB
Region -> Singapore
ap-southeast-1
Availability Zone
ap-southeast-1a
ap-southeast-1b
Storage in A.Z
Storage in A.Z
Snapshot


Copy snapshot in other region to create similar volumes
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
us-west-2b
us-west-2c
30 GB
2 GB
4GB
30 GB
2 GB
2 GB
Storage in A.Z
Storage in A.Z
Storage in A.Z
2 GB
Region -> Singapore
ap-southeast-1
Availability Zone
ap-southeast-1a
ap-southeast-1b
Storage in A.Z
Storage in A.Z
Snapshot

Copy snapshot in other region to create similar volumes



Managing partitions

- In windows by using diskmgmt.msc drives and partitions can be managed.
- In linux to manage drive and partition use fdisk.

DAY 4

Identity and Access Management (IAM)

Identity and Access Management (IAM)
ZOOM TECHNOLOGIES

Identity and Access Management (IAM)

AWS

Agenda

ZOOM TECHNOLOGIES

IAM (Identity and Access Management)

IAM Users

IAM Groups

IAM Roles

IAM Polices

Multi-Factor Authentication

AWS

What is IAM ?

ZOOM TECHNOLOGIES

- **What is IAM ?**
  - By default when AWS account is created it treats that user as a root user who has the access to all AWS services and resources, but to give the access to AWS services to other users, group members, applications, or instances IAM users, groups and roles are created.
  - (IAM) is a web service that helps you securely control access to AWS resources
  - IAM is a global service, it's free.
  - A primary use for IAM users is to give people the ability to sign in to the AWS Management Console for interactive tasks and to make programmatic requests to AWS services using the API or CLI.

AWS

Main components of IAM

ZOOM TECHNOLOGIES

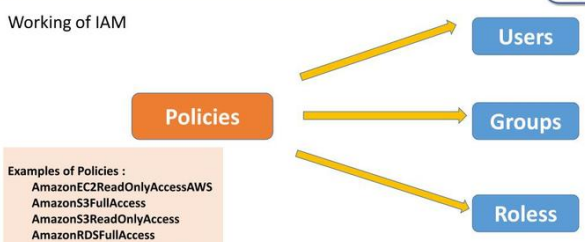
- **The main components of IAM**
  - IAM Users
  - IAM Groups
  - IAM Roles
  - IAM Polices

AWS

IAM

ZOOM TECHNOLOGIES

Working of IAM



Examples of Policies :

AmazonEC2ReadOnlyAccessAWS
AmazonS3FullAccess
AmazonS3ReadOnlyAccess
AmazonRDSFullAccess
AmazonRDSReadOnlyAccess

AWS

IAM Users

ZOOM TECHNOLOGIES

- **IAM users**
  - IAM users can manage AWS service and resources either through Console access or programmatic Access.
  - If an IAM user is not having any policy attached then that user cannot do any task that means an IAM user without policy is of no use.
  - IAM user requires a username/password to login to console or access/secret key to connect programmatically to use AWS services.
  - An IAM User with only AWS creds can be created so the creds can be used by an application to make API calls into AWS.
  - Multiple policies can be attached to a Single IAM users
  - An IAM user can belong to multiple Groups

AWS

IAM Groups

ZOOM TECHNOLOGIES

- **IAM Groups**
  - An IAM group is a collection of IAM users.
  - Groups let you specify permissions (policy) for multiple users, which can make it easier to manage the permissions for those users
  - Permissions assigned to groups are inherited to all the users in that group
  - Groups can't be nested; they can contain only users, not other groups.
  - IAM user can be a member of 10 Groups

AWS

IAM Roles

ZOOM TECHNOLOGIES

- **IAM Roles**
  - When a policies are applied on an AWS ec2 instance or AWS application or service then it is called as roles.
  - . An IAM role is very similar to a user, in that it is an identity with permission policies that determine what the identity can and cannot do in AWS.
  - Roles do not use username and password but they use access key and secret key in order to use the services like ec2, lambda, s3, RDS, autoscaling etc.
  - Scenario

    Suppose you had configured any server and now u want to upload the data to s3 without any user interaction then if that EC2 instance is having a role of s3 then it can automatically upload with the help of script without users interaction.

IAM Policy

ZOOM TECHNOLOGIES

- **IAM Policy**
  - Permissions that we grant to users, groups, and roles are called as policies.
  - These policies will give the access to that service or resource to read, write, or fullaccess.
  - IAM Polices are JSON formatted

Elements of IAM policy

ZOOM TECHNOLOGIES

- Elements of IAM policy
  - Version
  - Statement
  - Contains an array of statements

- Each statement defines whether permissions are allowed or denied

  These are defined by the values of the following elements in each statement:
  - Effect – Allow or Deny
  - Action – array of service actions
  - Resource – array of ARNs that actions can occur on
  - Principal – identifies who/what is allowed/denied access

AWS

Example Policies

ZOOM TECHNOLOGIES

- Allows an Amazon EC2 instance to attach or detach volumes

```
{
 "Version": "2012-10-17",
 "Statement": [
  {
   "Effect": "Allow",
   "Action": [
    "ec2:AttachVolume",
    "ec2:DetachVolume"
   ],
   "Resource":
       [arn:aws:ec2:<REGION>:<ACCO
UNTNUMBER>:volume/*",
"arn:aws:ec2:<REGION>:<ACCOUNTNUMBER
>:instance/*"
    ],
    "Condition": {
     "ArnEquals": {
      "ec2:SourceInstanceARN":
"arn:aws:ec2:<REGION>:<ACCOUNTNUMBER
>:instance/<INSTANCE-ID>"
     }
    }
   }
  ]
}
```

AWS

Security firsts for new AWS accounts

ZOOM TECHNOLOGIES

- For AWS root account:
  - Store username/password somewhere safe and secure
  - Setup multi-factor authentication
- Create IAM User(s) with "least privileges" necessary
  - Least privilege = only the permissions necessary to accomplish needed tasks

AWS

Multi factor authentication (MFA)

ZOOM TECHNOLOGIES

- MFA provides added security for AWS resources and account settings.
- It is a two factor authentication
- First factor i.e. it asks for username and password, and the second factor is it ask for MFA code.
- If a user logs in to AWS account he will be prompted for username, password and Multi factor authentication code.
- AWS does not charge any additional fees for using MFA.

AWS

Multi factor authentication (MFA)

ZOOM TECHNOLOGIES

Virtual MFA applications are available for smartphones including Android, iOS and Windows.

❑ These are the list of authenticated mobile application

Android	Google Authenticator; Authy 2-Factor Authentication
iPhone	Google Authenticator; Authy 2-Factor Authentication
Windows Phone	Authenticator
Blackberry	Google Authenticator

AWS

Limits of IAM

ZOOM TECHNOLOGIES

Limits :

- **User name 64 characters**
- **Group name 128 characters**
- **Role name 64 characters**
- **Policy name 128 characters**

- **Groups in an AWS account 300**
- **Roles in an AWS account 1000**
- **Users in an AWS account 5000**

AWS

DAY 5

Amazon S3 (Simple Storage Service)
&
Glacier

Amazon S3 (Simple Storage Service)
– Object storage

Amazon Simple Storage service (S3)

ZOOM TECHNOLOGIES

- Agenda

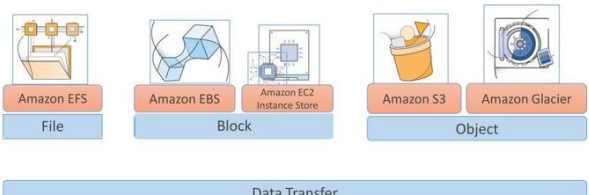
  Cloud Storage
  S3
  Object
  Bucket
  Keys
  Static Web Hosting
  Versioning
  Replication

AWS

Cloud Storage

ZOOM TECHNOLOGIES

Storage is a platform: AWS Storage



AWS

Cloud Storage

ZOOM TECHNOLOGIES

- **Cloud Storage**

Storage over the internet is called as Cloud storage or Object Storage.

Every file on cloud storage is called an object.

Cloud storage differs from block storage (i.e. cannot be formatted) and file storage (i.e. shared folders.)

It is a model in which data is maintained, managed, backed up remotely and made available to users over network (typically the Internet).

Cloud Storage

ZOOM TECHNOLOGIES

Cloud storage is based on a virtualized infrastructure with accessible interfaces, elasticity and scalability, multi-tenancy and metered resources.

Under hood architecture is used to provide highest reliability by replicating objects across multiple servers and hardware and disk drives form the same or different locations.

To configure Cloud storage minimum 3 to 5 nodes are required to maintain multiple copies across the nodes.

Example of Cloud Storage

ZOOM TECHNOLOGIES

Examples of Cloud or Object storage services

- Amazon S3
- Google Drive
- One Drive
- DropBox
- Microsoft Azure Storage
- Openstack Swift
- EMC Atmos, EMC ECS
- Hitachi Content Platform
- OceanStore
- VISION Cloud

AWS

Amazon Simple Storage service (S3)

ZOOM TECHNOLOGIES

• S3 (Simple Storage Service)

Amazon S3 is a cloud or object storage service, started in 2006 as a first service.

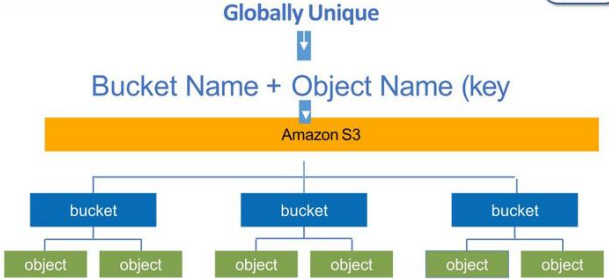
By the end of 2012, 1.3 trillion objects were stored in Amazon S3, the world's largest and most widely known object storage system. Now, that number was growing faster, so the 2 trillion mark is right around the corner.

S3 is a Global service.

S3 enables a customer to upload, store and download practically any file or object .

AWS

Hierarchy of object storage



AWS

Bucket

- **Bucket**

  A bucket is a logical unit of storage in Amazon Web Services (AWS) object storage service,

  Instead of organizing files in a directory hierarchy, object storage systems store files in a flat organization of containers (called "buckets" in Amazon S3) and use unique IDs (called "keys" in S3) to retrieve them.

  Buckets are used to store objects, which consist of data and metadata that describes the data.

  There is no limit to the number of objects a customer can store in a bucket, but each AWS account can only have 100 buckets at one time.

AWS

Object Keys & Metadata

ZOOM TECHNOLOGIES

- **Object Keys**
  When you create an object, you specify the key name, which uniquely identifies the object in the bucket. These names are the object keys.

  The name for a key is a sequence of Unicode characters (UTF-8 encoding) is at most 1024 bytes long.

- **Object Metadata**
  For each object stored in a bucket, Amazon S3 maintains a set of system metadata, which contains object creation date and size, last modified date, etc and uses this information as part of object management.

AWS

S3 Standard and IA

ZOOM TECHNOLOGIES

Amazon S3 comes in two storage classes:

- S3 Standard and ,
- S3 Infrequent Access.

Amazon S3 Standard – Any time could be retrieved or uploaded,

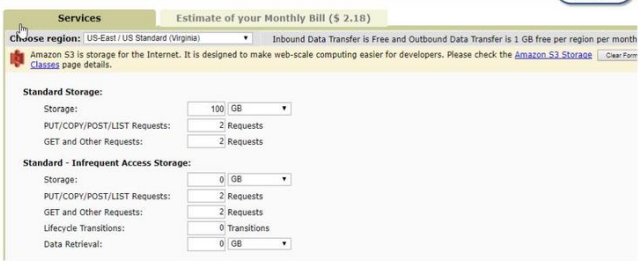
Infrequent Access (Standard - IA) is an Amazon S3 storage class for data that is accessed less frequently, but requires rapid access when needed, retrieval of data should be at least after 30 days.

Amazon does not impose a limit on the number of items that a subscriber can store.
A subscriber can choose to keep data private or make it publicly accessible

AWS

Pricing of S3 Standard

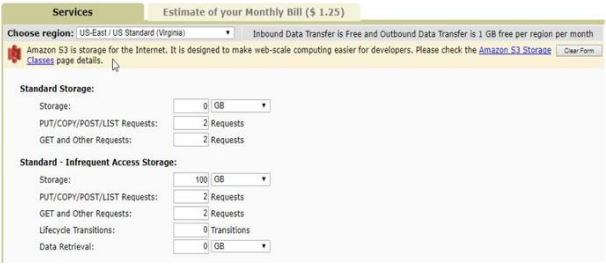
ZOOM TECHNOLOGIES



AWS

Pricing of S3 Infrequent Access storage

ZOOM TECHNOLOGIES



AWS

Key features of S3

ZOOM TECHNOLOGIES

- Data Management
  Cost monitoring and controls Lifecycle management
- Ease of use
  Programmatic access using AWS SDKs & REST APIs
  Management Console, AWS CLI
- Event Notifications
  Delivered using SQS, SNS, or Lambda

AWS

Key features of S3

ZOOM TECHNOLOGIES

- Data protection
  Versioning
  Cross-region replication
- Security
  Flexible access control mechanisms
  Time-limited access to object
  Access logs

AWS

Static Website Hosting

ZOOM TECHNOLOGIES

- **Static Website Hosting**

Amazon allow to configure static website on Amazon s3.

It can contains client-side scripts comprised of only HTML, CSS, and/or javaScript at client side, but Amazon S3 does not support server-side scripting.

To configure Static website first create a bucket , then upload all your website code into that bucket.

Add a bucket policy so that all folders, files and subfolders in that bucket can have access.

Enable Static Website Hosting providing index document and error document page.

Provide Endpoint url in brower and check the site.

AWS

Bucket Policy

ZOOM TECHNOLOGIES

```
---------- To create Bucket policy------
{
        "Version": "2012-10-17",
        "Statement": [
                {
                        "Sid": "PublicReadForGetBucketObjects",
                        "Effect": "Allow",
                        "Principal": "*",
                        "Action": "s3:GetObject",
                        "Resource": "arn:aws:s3:::www.indiahydameerpet.com/*"
                }
        ]
}
```

AWS

Versioning is S3

ZOOM TECHNOLOGIES

- Versioning offers an additional level of protection.
- Once versioning is enabled on s3 bucket, then it allows you to preserve, retrieve, and restore every version of every object stored.
- It protects from unintended user actions and application failures,

AWS

Cross-region Replication

ZOOM TECHNOLOGIES

With cross-region replication, every object uploaded to an S3 bucket is automatically replicated to a destination bucket in a different AWS region that you choose.

Copies of replicated objects inside a bucket are identical to the ones in the destination bucket.

Versioning is required

AWS

S3 in CLI mode

ZOOM TECHNOLOGIES

1) First create IAM user with S3fullaccess policy.

Select AWS access type

Programmatic access

AWS Management Console access

2) In windows install AWSCLI64.msi

3) Configure aws cli providing IAM user access key & secret key

c:> aws configure

Access Key : *********

Secret Key : *********

Region : us-west-2

Note : o/p format are's

a) text

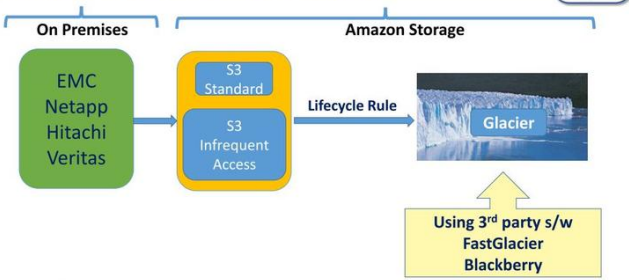
b) table

c) json

AWS

Transferring data to S3 then to Glacier

ZOOM TECHNOLOGIES



AWS

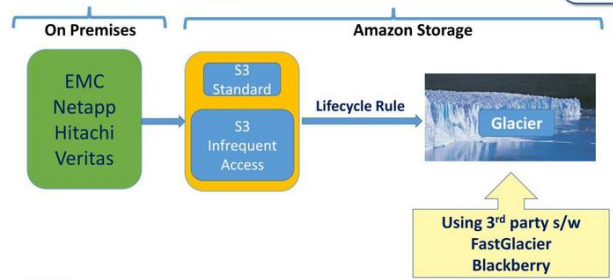
Amazon Glacier

- **Agenda**

  Glacier
  Vault
  Archive
  Tools to use Glacier

Transferring data to Glacier

ZOOM TECHNOLOGIES



AWS

Glacier Definition

ZOOM TECHNOLOGIES

- Glacier is extremely low cost cloud storage, with average annual durability of 99.999999999%.
- It also stores data on multiple facilities before running success on uploaded archives similar to s3, it has built in mechanism for data integrity check.
- It reduces burdens of operating and scaling storage to AWS, without having to worry about capacity planning, hardware provisioning, data replication, hardware failure detection and recovery, or time-consuming hardware migrations.

AWS

Glacier Definition

ZOOM TECHNOLOGIES

- Data which are not used frequently should be uploaded in glacier, minimum retention period is 90 days, If any data is retrieved or deleted before 90 days extra charges are applied.

- When the data is uploaded it cannot be accessed immediately it takes minimum 3 to 5 hr. to retrieve data from standard Glacier.

- Amazon does not provides direct access to glacier storage, either should be uploaded from s3 using lifecycle properties or use third party software's like fastglacier or blackberry.

Components of Glacier

ZOOM TECHNOLOGIES

- Components of Glacier
  - Vault
  - Archive

Vault

ZOOM TECHNOLOGIES

- Vault

  It is logical container where data i.e. archives are stored, similar to bucket in s3.

  It is region specific.

  Max 1000 vaults can be created per account

  The largest archive that can be uploaded in a single Upload request is 4 gigabytes. For items larger than 100 megabytes, customers should consider using the Multipart upload capability.

  Vault can be deleted, but before deleting remove all archives in it.

AWS

Archives

ZOOM TECHNOLOGIES

- Archives

  A file or object stored in Vault is called as archive.

  The total volume of data and number of archives you can store are unlimited.

  Individual Amazon Glacier archives can range in size from 1 byte to 40 terabytes

AWS

S3 vs Glacier

ZOOM TECHNOLOGIES

Reference Point	S3	Glacier
Data are stored in.	Bucket	Vault
Object	Key	Archive
Total number	100 Bucket per account	1000 Vault per account
Redundancy	99.999999999 %	99.999999999 %
Object size	128 KB	Not applicable
Minimum storage retrieval	Immediate	3-5 hrs.
Cost	$0.005 per GB put $0.004 per GB get	$0.005 per GB put $0.012 per GB get
Max file size in single upload	Earlier 5 GB now 5 TB	4 GB up to 40 TB (multipart upload 4 GB)
Free tier	5GB	10GB

AWS

Elastic Load Balancer (ELB)

ZOOM TECHNOLOGIES

DAY 6

Elastic Load Balancer (ELB)

AWS

Elastic Load Balancer (ELB)

Agenda

- Cluster
- Types of Cluster
- What is Elastic Load Balancer (ELB)
- Types of Load Balancer
- Features
- Advantage of Load Balancer

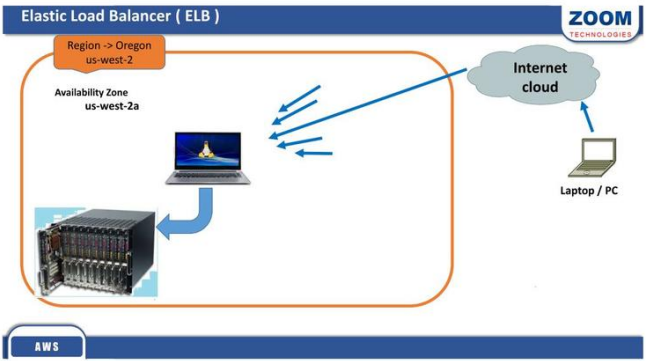
Cluster

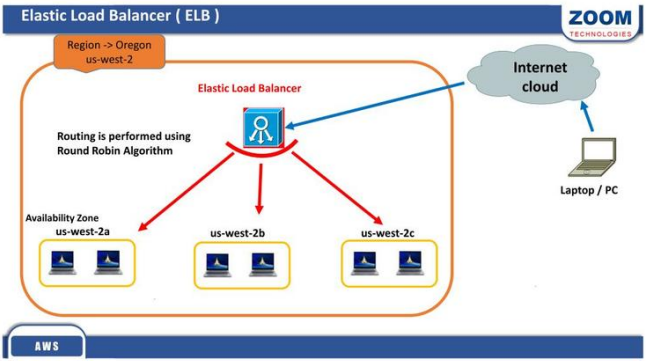
- In a computer system, a cluster is a group of servers and other resources that act like a single system and enable high availability and load balancing or parallel processing

Types of Cluster

- **Load Balancing**
  - Multiple Nodes are added and scales horizontally
  - Used with Front End Application servers i.e web servers
    - IIS, Apache, NginX, Wordpress, Tomcat , MiddleWare

- **High Availability**
  - More Compute and Memory is added scales vertically
  - Used with Backend Application servers i.e data base servers
    - Oracle , MS-SQL, mysql, mariadb, PostgreSQL etc.


Elastic Load Balancer (ELB)
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Availability Zone
us-west-2a
Internet
cloud
Laptop / PC
AWS


Elastic Load Balancer (ELB)
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
Elastic Load Balancer
Routing is performed using
Round Robin Algorithm
Internet
cloud
Laptop / PC
Availability Zone
us-west-2a
us-west-2b
us-west-2c
AWS

Definition

ZOOM TECHNOLOGIES

Elastic Load Balancer

- Elastic Load Balancer (ELB) is one of the key architecture component inside the AWS cloud.
- Elastic Load Balancing automatically distributes incoming web traffic across multiple applications and containers hosted on Amazon EC2 instances
- With Elastic Load Balancing, you can add and remove EC2 instances as your needs change without disrupting the overall flow of information

Definition

ZOOM TECHNOLOGIES

- Scaling up and down can be automated by integrating with AutoScaling
- If an EC2 instance fails, ELB automatically reroutes the traffic to the remaining running healthy EC2 instances.
- If a failed EC2 instance is restored, Elastic Load Balancing restores the traffic to that instance.
- It is elastic, which means that it will automatically scale to meet your incoming traffic.
- Load Balancers only work across AZs within a region

ZOOM TECHNOLOGIES

Type of Load Balancer

- **Internet Load Balancer**
  - An Internet-facing load balancer takes requests from clients over the Internet and distributes them across the EC2 instances that are registered with the load balancer
- **Internal Load Balancer**
  - Internal load balancer routes traffic to EC2 instances in private subnets

ZOOM TECHNOLOGIES

Routing Algorithm

- Routing is performed using the round robin routing algorithm

Features of ELB

ZOOM TECHNOLOGIES

Main Features of Load Balancer

- **Failover Handling**
  - Avoid single point of failure by hosting multiple instances of a given service.
- **Auto-scaling**
  - Manage number of instances of an application according to the incoming traffic.

Advantage of ELB

ZOOM TECHNOLOGIES

Advantage of Load Balancer

- Optimize resource usage
  - Start and stop resources on demand.
- Maximize the throughput
  - Increase the average rate of successful message delivery.
- Minimize the response time
  - Reduce the time it takes to process a message and send a response back

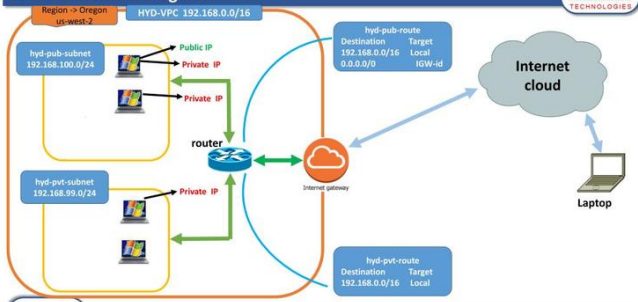
DAY 7,8

Amazon VPC (Virtual Private Cloud)

Introduction to
Amazon
Virtual Private Cloud (VPC)

VPC Architecture Diagram

ZOOM TECHNOLOGIES



AWS

VPC Definition

ZOOM TECHNOLOGIES

- **Amazon VPC is a network infrastructure architecture within the AWS cloud, which closely resembles a traditional network. It isolates your network infrastructure under your account from others account, other wise all network will conflict with each other.**
- **It is Based on CIDR/ VLSM subnet networking concept.**
  - CIDR [Classless Inter Domain Routing]
  - VLSM [Variable Length Subnet Mask]
- **A user can create his own VPC which is highly customizable.**
- **By default every Region will have Default VPC with predefined subnets in each zone.**
- **As an extension of the corporate network – access through a VPN**

AWS

VPC components

- Subnet
- Route tables
- Internet Gateway
- Nat Gateway
- Network ACLs
- Security Groups
- Peering Connections
- VPN

VPC components

Subnet

A range of IP addresses in your VPC

Type of Subnet

Public Subnet

If a subnet has a route to an AWS Internet Gateway it is called a *public subnet.*

Private Subnet

If there is no route from a subnet to an AWS Internet Gateway it is a *private subnet*

- ***Instances in a VPC communicate based on Route Table, VPC Security Groups and Access Control Lists***

VPC components

ZOOM TECHNOLOGIES

Route tables

Applied to subnet(s) specifying route policies.

VPC automatically comes with a main route table.

Every route table contains a local route for communication within the VPC over IPv4.

IGW

Internet gateway is attached to a VPC.

It provide access to the internet for instances in a VPC subnet.

NAT Gateway

NAT gateway provides Internet to your private instances

VPC components

ZOOM TECHNOLOGIES

Security groups

Specify inbound and outbound access policies for an Amazon EC2 instance

Network ACLs

Network access control lists acts as a firewall for controlling traffic in and out of one or more subnets within the VPC

VPC peering

Enables you to route traffic between two or more VPC within the same region

VPN

Bridge your VPC and your onsite IT infrastructure with private connectivity

VPC Architecture Scenarios

ZOOM TECHNOLOGIES

- VPC with a Public Subnet Only
- VPC with Public and Private Subnets
- VPC with Public and Private Subnets and VPC Peering Access
- VPC with Public and Private Subnets and VPN Access
- VPC with a Private Subnet Only and VPN Access

Amazon VPC Products

ZOOM TECHNOLOGIES

Products currently available in Amazon VPC are

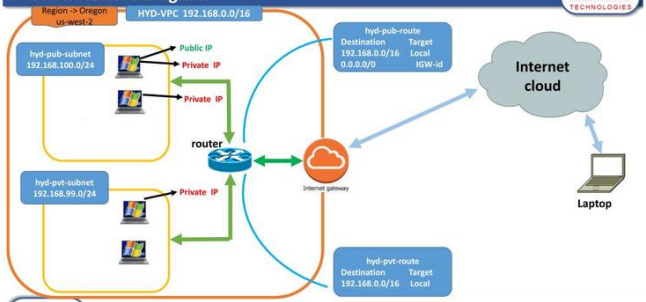
- Amazon EC2
- Amazon RDS
- Auto Scaling
- Elastic Load Balancing
- Elastic Beanstalk
- ElastiCache

Steps to Create VPC infrastructure

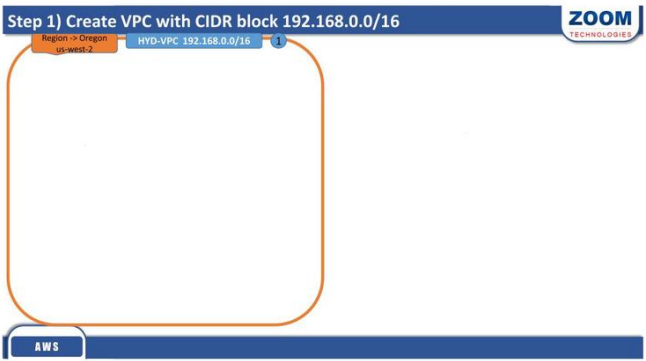
Step 1) Create VPC with a particular subnet range (max 16 to 28 bit)
Step 2) Create public subnet
Step 3) Create private subnet
Step 4) Create IGW and attach to your VPC
Step 5) Create pub route and Associate respective subnet and add route to IGW
Step 6) Create private route and Associate respective subnet Don't add IGW,
Nat-GW or NAT-instance can be added.
Step 7) Launch VM in Public subnet
Step 8) Launch VM in Pvt subnet
Step 9) Check connectivity

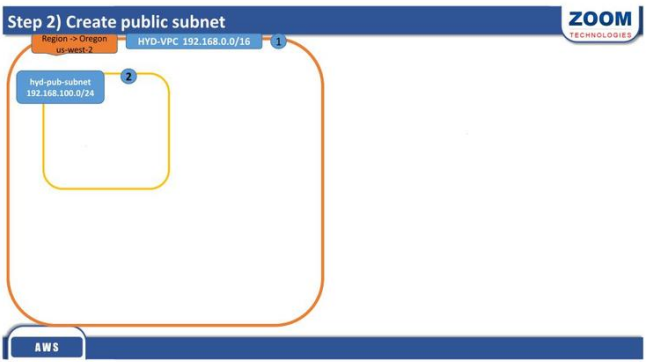
AWS

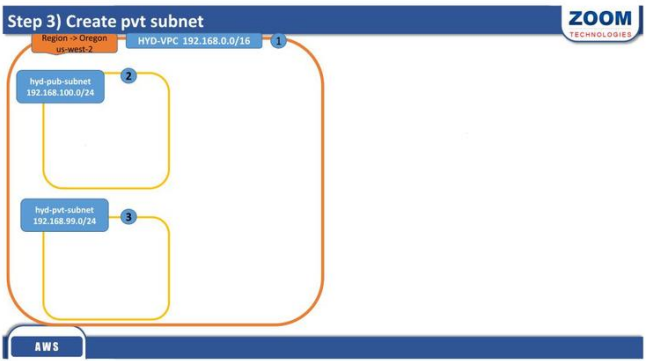
VPC Architecture Diagram

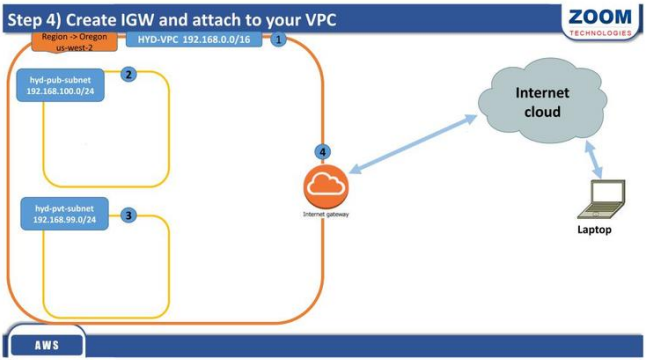


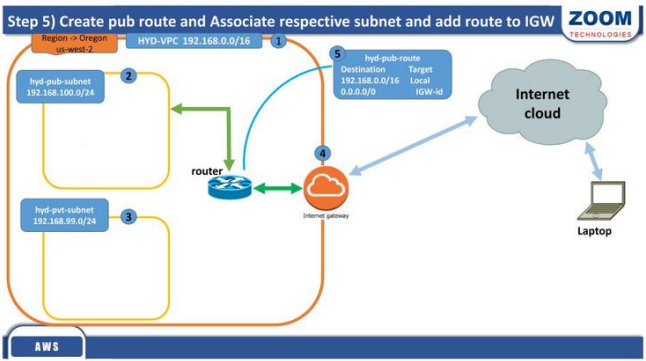
AWS

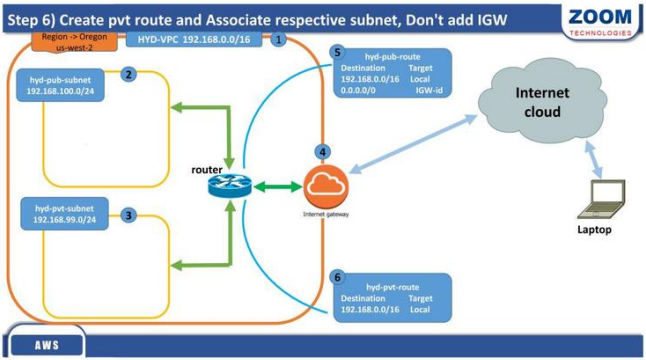

Step 1) Create VPC with CIDR block 192.168.0.0/16
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
AWS

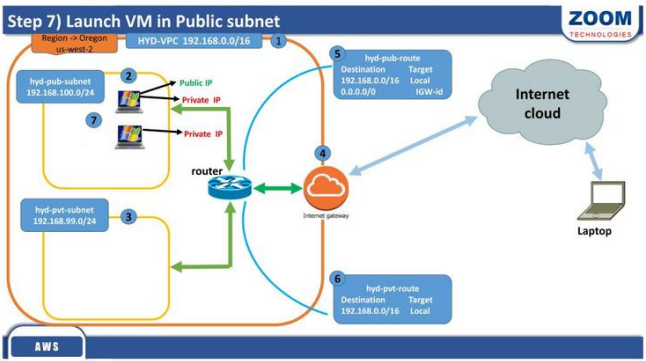

Step 2) Create public subnet
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
AWS

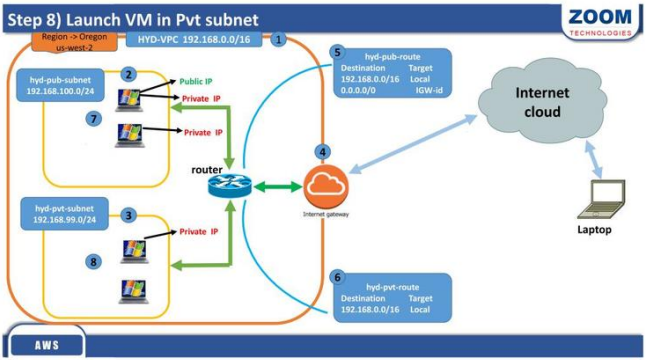

Step 3) Create pvt subnet
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
hyd-pvt-subnet
192.168.99.0/24
3
AWS

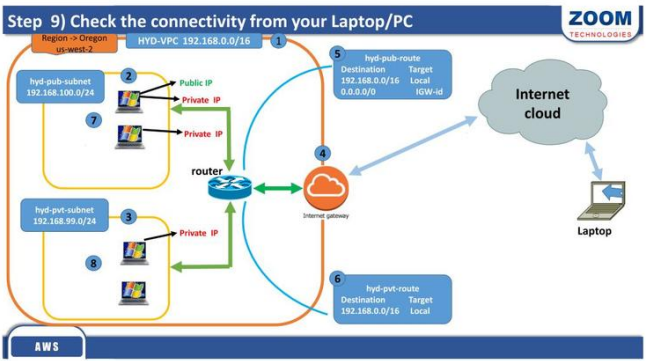

Step 4) Create IGW and attach to your VPC
ZOOM
TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
hyd-pvt-subnet
192.168.99.0/24
3
4
Internet gateway
Internet
cloud
Laptop
AWS

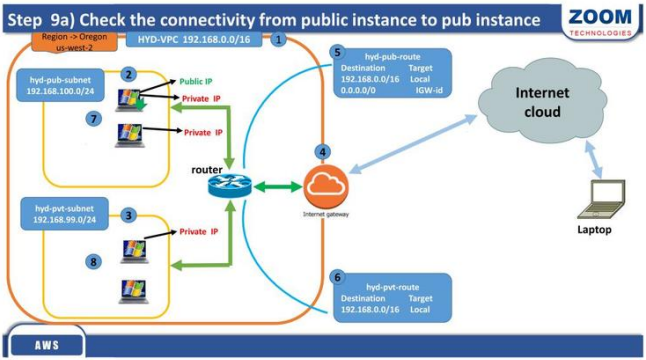

Step 5) Create pub route and Associate respective subnet and add route to IGW
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
hyd-pvt-subnet
192.168.99.0/24
3
router
4
Internet gateway
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
Laptop
AWS

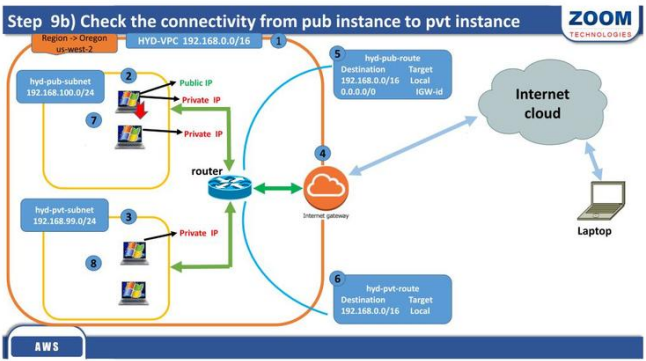

Step 6) Create pvt route and Associate respective subnet, Don't add IGW
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
hyd-pvt-subnet
192.168.99.0/24
3
router
4
Internet gateway
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
Internet cloud
Laptop
AWS

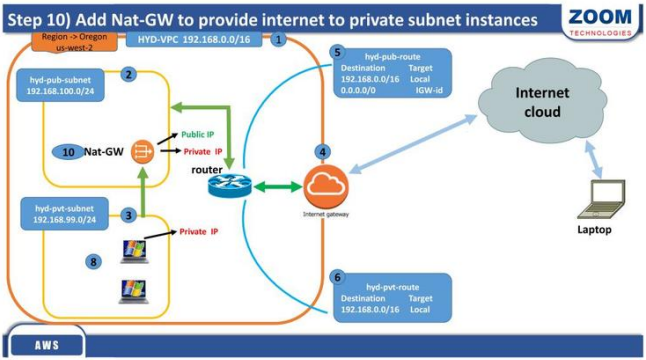

Step 7) Launch VM in Public subnet
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
Public IP
Private IP
7
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
Laptop
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
AWS

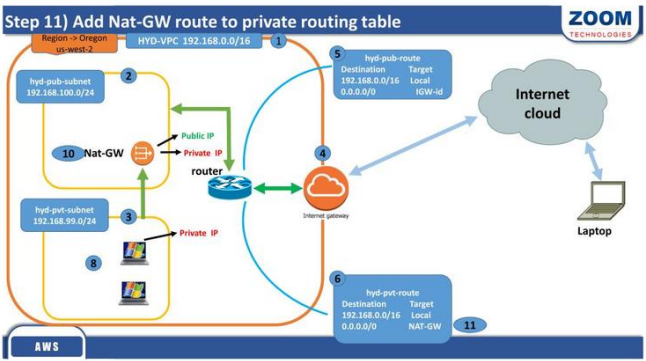

Step 8) Launch VM in Pvt subnet
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
Public IP
Private IP
7
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
8
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
Laptop
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
AWS

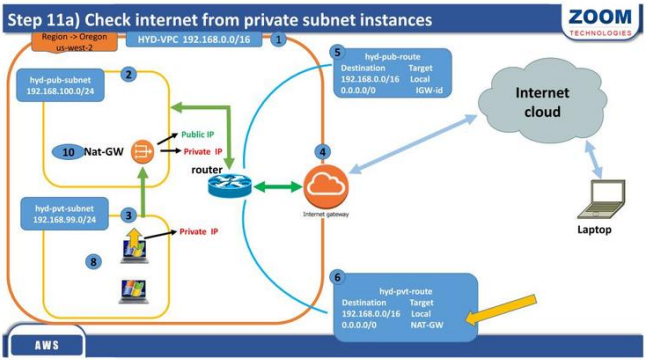

Step 9) Check the connectivity from your Laptop/PC
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
Public IP
Private IP
7
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
8
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
Internet cloud
Laptop
AWS

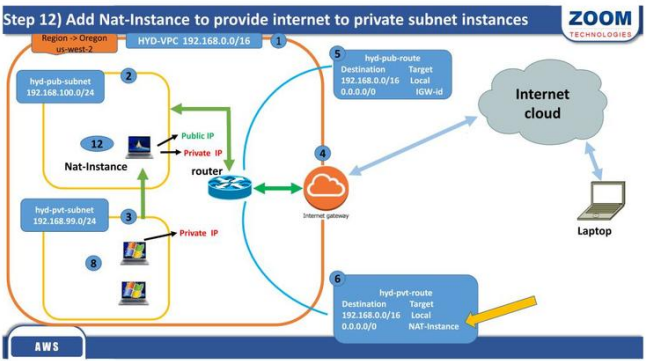

Step 9a) Check the connectivity from public instance to pub instance
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
Public IP
Private IP
7
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
8
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
Internet cloud
Laptop
AWS

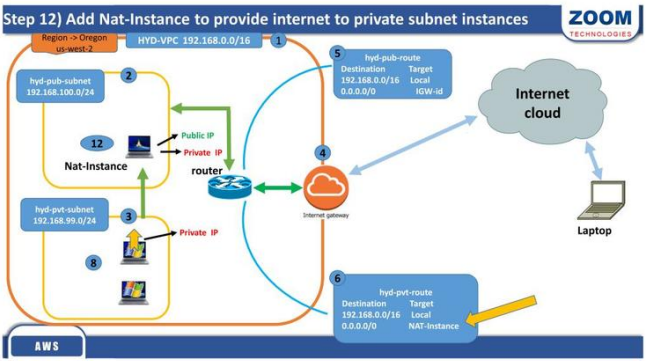

Step 9b) Check the connectivity from pub instance to pvt instance
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
Public IP
Private IP
7
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
8
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
Internet cloud
Laptop
AWS


Step 10) Add Nat-GW to provide internet to private subnet instances
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
10 Nat-GW
Public IP
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
8
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
Internet cloud
Laptop
AWS


Step 11) Add Nat-GW route to private routing table
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
10 Nat-GW
Public IP
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
Laptop
8
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 NAT-GW
11
AWS


Step 11a) Check internet from private subnet instances
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
10 Nat-GW
Public IP
Private IP
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
Laptop
8
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 NAT-GW
AWS


Step 12) Add Nat-Instance to provide internet to private subnet instances
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
12
Public IP
Private IP
Nat-Instance
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
Laptop
8
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 NAT-Instance
AWS


Step 12) Add Nat-Instance to provide internet to private subnet instances
ZOOM TECHNOLOGIES
Region -> Oregon
us-west-2
HYD-VPC 192.168.0.0/16
1
hyd-pub-subnet
192.168.100.0/24
2
5
hyd-pub-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 IGW-id
Internet cloud
12
Public IP
Private IP
Nat-Instance
router
4
Internet gateway
hyd-pvt-subnet
192.168.99.0/24
3
Private IP
Laptop
8
6
hyd-pvt-route
Destination Target
192.168.0.0/16 Local
0.0.0.0/0 NAT-Instance
AWS

VPC Peering

ZOOM TECHNOLOGIES

- VPC peering is used to have communication across multiple VPC's within the same or different region.
- Peering can be done within your own account or other AWS account.
- Transitive peering is not supported.

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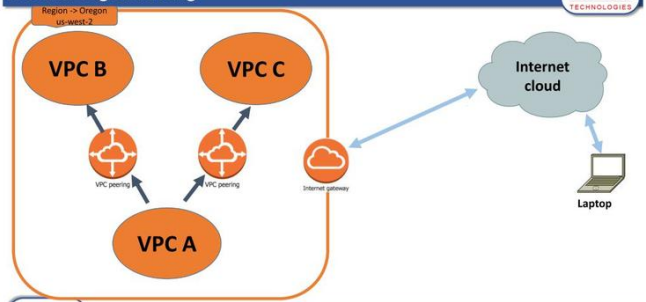
VPC Inter Region Peering

ZOOM TECHNOLOGIES



AWS

VPC Cross Region Peering

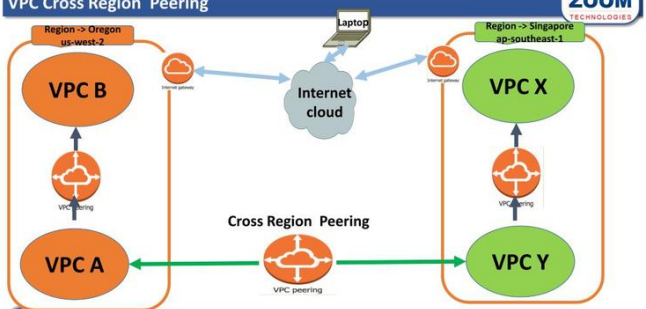
ZOOM TECHNOLOGIES

- Cross Region peering is used to have communication across multiple VPC's across two or more different regions.

AWS

VPC Cross Region Peering

ZOOM TECHNOLOGIES



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DAY 9

Amazon Route53

Amazon Route53

Agenda

ZOOM TECHNOLOGIES

- **What is Route53**
- **Key Features**
- **Routing Policies**

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Amazon Route53 ?

ZOOM TECHNOLOGIES

- DNS is a client/server network communication systems.
- The Domain Name System (DNS) translates Internet domain and host names to IP addresses and vice versa.
- Amazon route 53 is a DNS service Provided by AWS.
- It is an authoritative DNS service.
- **Route 53 is built using AWS's highly available and reliable, global infrastructure of amazon.**
- Improves your availability and application performance at lower cost with Amazon Route 53

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Amazon Route53

ZOOM TECHNOLOGIES

- It uses a global anycast network of DNS servers around the world.
- Anycast is a networking and routing technology that helps your end users' DNS queries get answered from the optimal Route 53 location given network conditions. As a result, your users get high availability and improved performance with Route 53.
- Amazon Route 53 is designed to propagate updates within 60 seconds under normal conditions
- Amazon also supports Private DNS, that lets you have authoritative DNS within your VPCs without exposing your DNS records (including the name of the resource and its IP address(es) to the Internet.

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Amazon Route53 record types

ZOOM TECHNOLOGIES

- Amazon Route 53 DNS record types:
  - A (address record)
  - AAAA (IPv6 address record)
  - CNAME (canonical name record)
  - MX (mail exchange record)
  - NS (name server record)
  - PTR (pointer record)
  - SOA (start of authority record)
  - SRV (service locator)
  - TXT (text record)

AWS

Route53 Health check

ZOOM TECHNOLOGIES

Health Check

- To route the traffic to the end points amazon can perform health checks.
- A health check tells Amazon Route 53 how to send requests to the endpoint.
- A health check is performed using (HTTP, HTTPS, or TCP) protocols, over IP address and ports.
- Amazon Route 53 cannot check the health of endpoints for which the IP address is in local, private, nonroutable, or multicast ranges.

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Amazon Route53 Features

ZOOM TECHNOLOGIES

- Reliable
- Fast
- Integrated with AWS
- Easy to use
- Cost Effective
- Flexible

AWS

Amazon Route 53 Routing Policies

ZOOM TECHNOLOGIES

- **Simple Routing:**
  - With simple routing, Amazon Route 53 responds to DNS queries based only on the values in the resource record set (i.e., the IP).
- **Weighted routing policy**
  - Weighted routing policy is used when multiple resources performs the same function, and you want Amazon Route 53 to route traffic to those resource6 in proportions that you specify. For example, sending 30% of queries to one server, and 70% to the other.
  - For example while testing new versions of software or under load balancer
- **Latency routing policy**
  - Use when you have resources in multiple locations and you want to route traffic to the resource that provides the best latency.

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Amazon Route 53 Routing Policies

ZOOM TECHNOLOGIES

- **Failover Routing:**
  - In Failover routing Route 53 performs the health check , and route traffic to a primary and secondary resource record set.
  - If Primary resource is down the it sends the traffic to secondary resource record set.
- **Geolocation Routing**
  - Geolocation works by mapping IP addresses to locations from where the DNS queries originated from.
  - Example If you have a website on different language then from that region that website can be access
  - To improve the accuracy of geolocation routing, Amazon Route 53 supports the edns-client-subnet extension of EDNS0 (Extension Mechanisms for **DNS** (**EDNS0**).

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Amazon Route 53 Pricing

ZOOM TECHNOLOGIES

- $0.50 per hosted zone / month for the first 25 hosted zones
- $0.10 per hosted zone / month for additional hosted zones

Standard Queries

- $0.400 per million queries – first 1 Billion queries / month
- $0.200 per million queries – over 1 Billion queries / month

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Steps to host a domain in Route 53

ZOOM TECHNOLOGIES

Step 1) Register your domain name with local ISP.

Eg. godaddy.com

Step 2) Host your domain name in Route 53, it adds minimum 4 AWS DNS server of amazon.

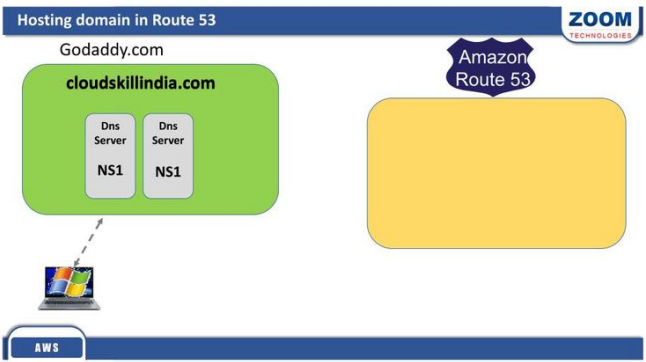
Step 3) Remove the DNS NS record from local ISP and replace with AWS DNS NS record.

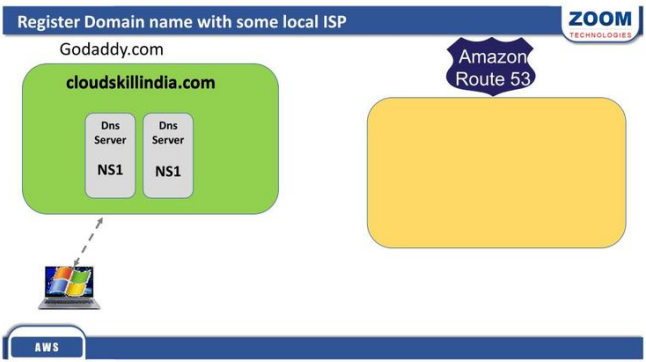
Step 4) Now configure a instance with web server and elastic IP.

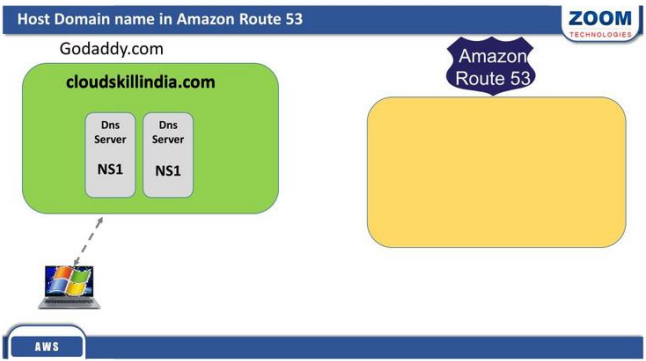
Step 5) Now add your record set (A record, CNAME record) in Route 53.

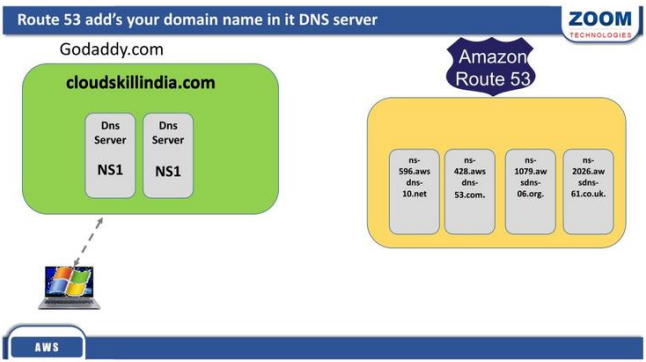
Step 6) Check the site with name instead of IP.

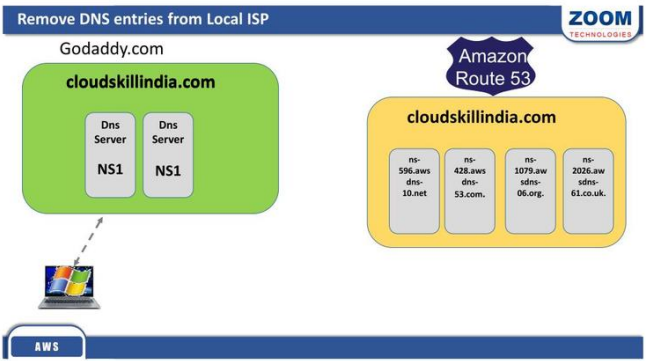
AWS

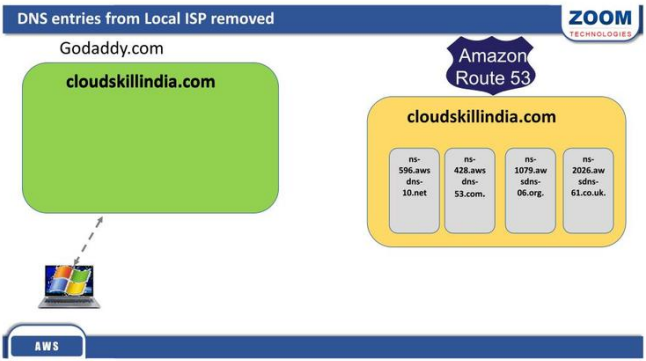

Hosting domain in Route 53
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Dns Server
NS1
Dns Server
NS1
Amazon Route 53
AWS

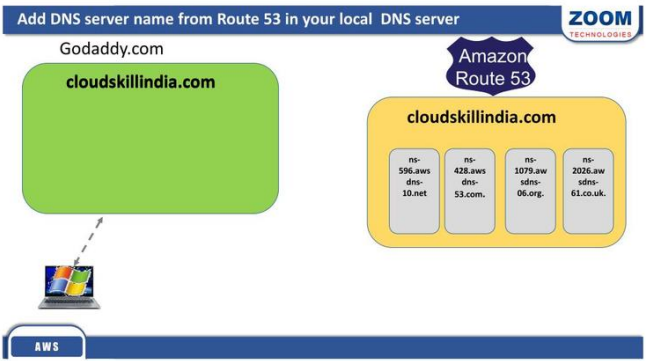

Register Domain name with some local ISP
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Dns Server
NS1
Dns Server
NS1
Amazon Route 53
AWS

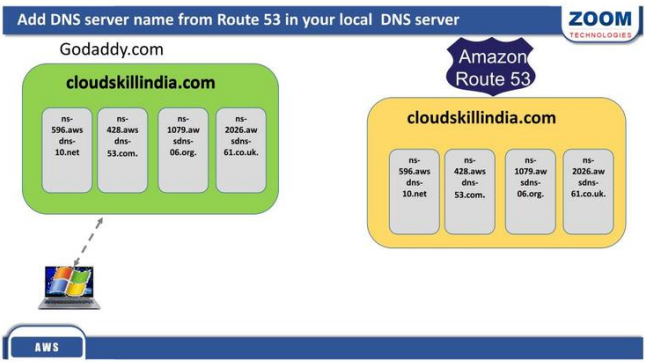

Host Domain name in Amazon Route 53
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Dns Server
NS1
Dns Server
NS1
Amazon Route 53
AWS


Route 53 add's your domain name in it DNS server
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Dns Server
NS1
Dns Server
NS1
Amazon Route 53
ns-596.aws dns-10.net
ns-428.aws dns-53.com.
ns-1079.aw sdns-06.org.
ns-2026.aw sdns-61.co.uk.
AWS


Remove DNS entries from Local ISP
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Dns Server
NS1
Dns Server
NS1
Amazon Route 53
cloudskillindia.com
ns-596.aws dns-10.net
ns-428.aws dns-53.com.
ns-1079.aw sdns-06.org.
ns-2026.aw sdns-61.co.uk.
AWS


DNS entries from Local ISP removed
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Amazon Route 53
cloudskillindia.com
ns-596.aws dns-10.net
ns-428.aws dns-53.com.
ns-1079.aw sdns-06.org.
ns-2026.aw sdns-61.co.uk.
AWS


Add DNS server name from Route 53 in your local DNS server
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
Amazon
Route 53
cloudskillindia.com
ns-596.aws dns-10.net
ns-428.aws dns-53.com.
ns-1079.aw sdns-06.org.
ns-2026.aw sdns-61.co.uk.
AWS


Add DNS server name from Route 53 in your local DNS server
ZOOM
TECHNOLOGIES
Godaddy.com
cloudskillindia.com
ns-596.aws dns-10.net
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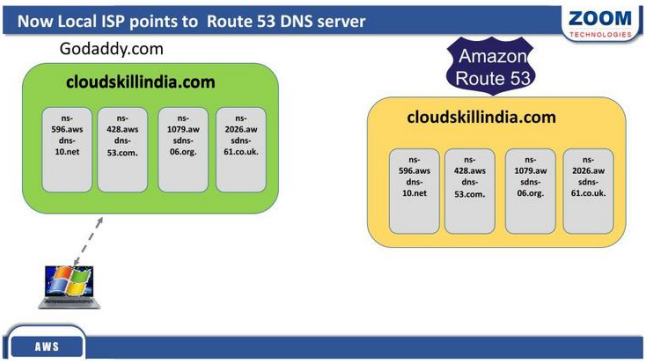
AWS


Now Local ISP points to Route 53 DNS server
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TECHNOLOGIES
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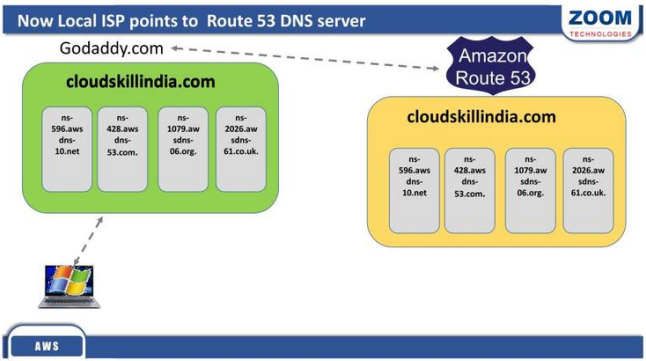
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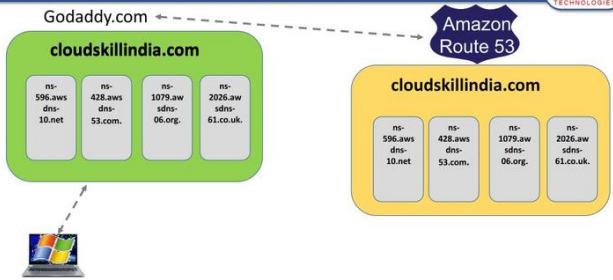


Amazon VPC (Virtual Private Cloud)

Day 10
SNS (Simple Notification Service)
Cloudwatch
Autoscaling

AWS SNS
(Simple Notification Service)

- SNS service is used to deliver or sending notification to subscribed endpoints or clients by using push messaging mechanism.

- Service like CloudWatch, Load Balancer, RDS, dynamodb and other aws services uses SNS to send alerts and alarms to the endpoints i.e. through API, HTTP/HTTPS, SQS, EMAIL, AWS Lambda, Mobile Push Notifications, Email, Email-JSON.

AWS Simple Notification Service(SNS)

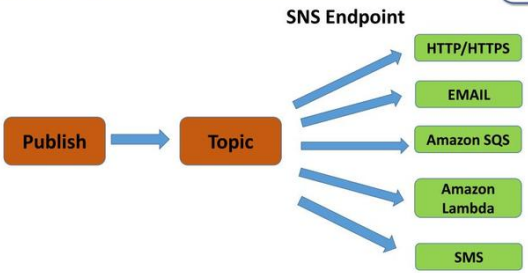
ZOOM TECHNOLOGIES

- Topics are created which is a logical access point.
- Defines Subscriber to whom messages should be published.
- SNS can only guarantee a single delivery to each subscriber of a given topic. This means that if there was a bug or a problem processing the message and there was no specific code to save it somewhere, then the message lost.

AWS

SNS WORK FLOW

ZOOM TECHNOLOGIES



AWS

AWS Simple Notification Service(SNS)

ZOOM TECHNOLOGIES

- Topic names are limited to 256 characters.
- By default, SNS offers 10 million subscriptions per topic, and 100,000 topics per account.
- Amazon SNS messages can contain up to 256 KB of text data, including XML, JSON and unformatted text.
- Each 64KB chunk of published data is billed as 1 request.
- Each SMS message can contain up to 140 bytes,

AWS

Amazon SNS Pricing

ZOOM TECHNOLOGIES

Endpoint Type	Free Tier	Price
Mobile Push Notifications	million	$0.50 per million
Worldwide SMS	100 (US)	Learn more [Charges are applied countries wise]
email/email-JSON	1,000	$2.00 per 100,000
HTTP/s	100,000	$0.60 per million
Simple Queue Service (SQS)	No charge for deliveries to SQS Queues	
Lambda functions	No charge for deliveries to Lambda	

AWS

Amazon CloudWatch

Cloud watch is not going to monitor your on premises Data Center infrastructure. For that we use traditional monitoring tools like :

- Nagios
- Zabbix
- Bigbrother
- MRTG , CACTI
- Airwatch
- Wireshark
- Zenoss
- ps, kill, nice, renice
- vmstat, iostat , Syslog
- Iptraf, netcool
- HPserviceManager
- Windows Task Manager

What Cloud Watch is going to do ?

- Cloud watch is going to monitor only Service and Resource of AWS infrastructure.
- Monitoring is done based on Metrics.
- Metrics is collection of data through which amazon keeps track of all services and resources.
- Each region contains its own metrics, and are stored for only 14 days, then it gets expire automatically.

AWS

Retention period changd

- From November 1, 2016 retention period of all metrics changed from 14 days to 15 months.
- Data points with a period of
  - Less than 60 sec 3 hrs.
  - 1 min 16 days
  - 5 min 63 days
  - 1 hr 455 days (15 months)

AWS

Metrics frequency and charges

ZOOM TECHNOLOGIES

Monitored AWS resources	Frequency	Charge
EC2 instance (basic)	every 5 mins	free
EC2 instance (detail)	every 1 min	additional
EBS volumes	every 5 mins	free
Elastic Load Balancers	every 5 mins	free
RDS DB instance	every 1 min	free
SQS queues	every 5 mins	free
SNS topics	every 5 mins	free

AWS

Default Metrics

ZOOM TECHNOLOGIES

- **EC2 instance**
  - CPUUtilization
  - DiskReadBytes
  - DiskReadOps
  - DiskWriteBytes
  - DiskWriteOps
  - NetworkIn
  - NetworkOut
- **RDS**
  - BinLogDiskUsage
  - CPUUtilizati
  - DatabaseConnection
  - DiskQueueDepth
- **S3**
  - BucketSizeBytes
  - NumberOfObjects

AWS

Metrics Description

ZOOM TECHNOLOGIES

Metrics Name	Description	Units
CPUUtilization	The percentage of allocated EC2 compute-units	*Percent*
DiskReadOps	Completed read operations from all ephemeral disks available to the instance	*Count*
DiskWriteOps	Completed write operations to all ephemeral disks available to the instance.	*Count*
DiskReadBytes	Bytes read from all ephemeral disks available to the instance	*Bytes*
DiskWriteBytes	Bytes written to all ephemeral disks available to the instance.	*Bytes*
NetworkIn	The number of bytes received on all network interfaces by the instance.	*Bytes*
NetworkOut	The number of bytes sent out on all network interfaces by the instance.	*Bytes*

AWS

CloudWatch Alaram

ZOOM TECHNOLOGIES

- Alarms exist only in the region in which they are created.
- Alarm actions must reside in the same region as the alarm
- Alarm watches a single metric over a specified time period.
- Based on the value of the metric relative to a given threshold over a number of time periods takes Action.
- Action can be a
  - SNS notification
  - Auto Scaling policies
  - EC2 action – stop or terminate EC2 instances

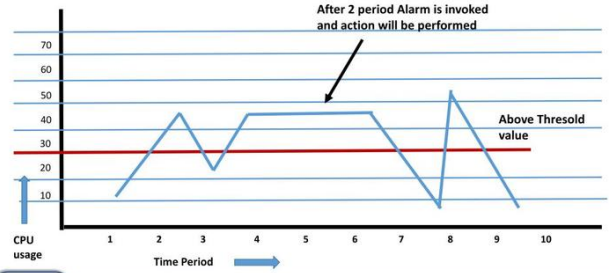
AWS

Alarm State

- **OK**
  - The metric is within the defined threshold
- **ALARM**
  - The metric is outside of the defined threshold
- **INSUFFICIENT_DATA**
  - the metric is not available, alarm started
  - not enough data is available for the metric to determine the alarm state
  - Can create up to 400 alarms per AWS account

AWS

CloudWatch Graph



AWS

Amazon Autoscaling

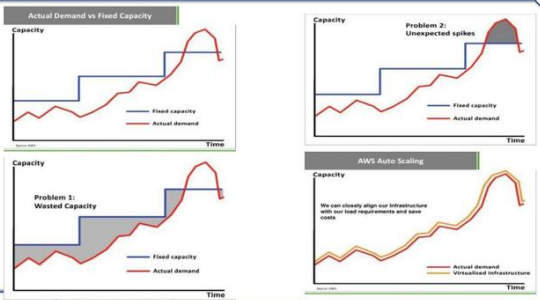
- What is Autoscaling ?
- Autoscaling supported application
- Benefits of Autoscaling
- Pricing of Autoscaling
- Autoscaling Implementation

Autoscaling ?

- Whenever load increase on the server related with compute power, network, or storage then to balance that load or distribute the load technologies like clustering, load balancing, high availability are implemented.
- These loads can be managed by using either vertical scaling or horizontal scaling, both type of scaling have there pros and cons.
- Autoscaling is one of the tool provided by amazon which is broadly and widely used in cloud computing.
- In amazon cloud computing it is one of the best tool to scale up or down the resources based on load patterns.

AWS

Load pattern



AWS

Autoscaling

ZOOM TECHNOLOGIES

- Amazon Auto scaling uses Horizontal scaling to add number of ec2 instances (i.e. number of nodes) dynamically whenever the load on your application increases.
- It is fully designed to launch or terminate the correct number of EC2 instances to handle the load of your application
- Amazon Autoscaling uses Fleet management technique
  - Fleet management is a functionality that checks the health of EC2 instances and automatically replaces unhealthy instances with new instance
  - If any instance faces any problem then instead of recovering or restoring that instance a new instance is launched.

AWS

Autoscaling

ZOOM TECHNOLOGIES

- Autoscaling takes the advantage of amazon infrastructure where it can span ec2 instances across multiple AZs.
- It can add or terminate the ec2 instances in the period of 30 seconds to 180 secs.
- If the AZs are not available or unhealthy then it redistributes the traffic across all the healthy AZs
- Autoscaling is Region specific means it can scale only within the regions.
- Cross region scaling is not supported by Autoscaling.

AWS

Autoscaling supports

ZOOM TECHNOLOGIES

- **Autoscaling supports only frontend application like**
  - ✓**Apache**
  - ✓**IIS**
  - ✓**Nginx**
  - ✓**Wordpress**
  - ✓**Tomcat or middleware applications (Jboss)**

AWS

Autoscaling does not supports

ZOOM TECHNOLOGIES

- Autoscaling does not supports backend application, i.e. cannot used with database application.
  - Oracle
  - Mysql
  - Mariadb,
  - MS-SQL
  - NoSQL (mongodb, rediss)

AWS

Benefits of Auto Scaling

ZOOM TECHNOLOGIES

- **Better fault tolerance.**

  It automatically terminates or launches an ec2 instance when an instance or AZs are unhealthy

- **Better availability**

  Always ensures the right amount of capacity to handle the current traffic demands.

- **Better cost management.**

  Saves money by launching or terminating instances when they are actually needed.

Pricing for Auto Scaling

ZOOM TECHNOLOGIES

- **Pricing for Auto Scaling**
  - Auto Scaling carries no additional fees.
  - Autoscaling depends on Cloudwatch services, so Coudwatch billing will be applied.
  - Ec2 instance charges will be applied.

Components of Autoscaling

ZOOM TECHNOLOGIES

- **Launch Configuration**

  ➢It creates a template containing following information :
  Amazon Machine Image (AMI)
  Instance type
  Key pair
  Security groups
  Block device mapping.

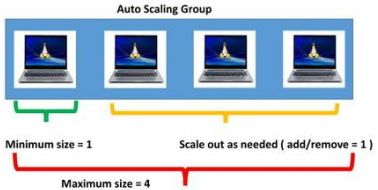
AWS

Autoscaling Group

ZOOM TECHNOLOGIES

- **Autoscaling group**

  ➢Auto Scaling group you can specify the minimum and maximum number of instance to ensure that instance in the group never goes above or below the required size



AWS

Autoscaling Policy

ZOOM TECHNOLOGIES

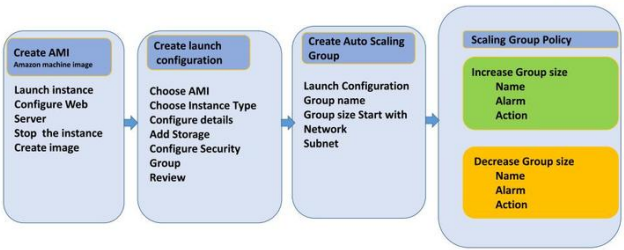
- **Autoscaling Policy**

  - Autoscaling Policy defines rules for dynamically increase or decrease the EC2 instance count based on Cloudwatch Alarms.

AWS

AWS Autoscaling Configuration

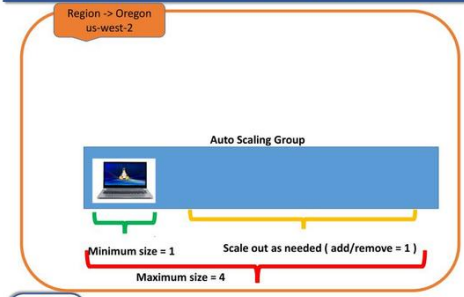
ZOOM TECHNOLOGIES



AWS

Auto Scaling with Elastic Load Balancer (ELB)

ZOOM TECHNOLOGIES



AWS

Auto Scaling with Elastic Load Balancer (ELB)

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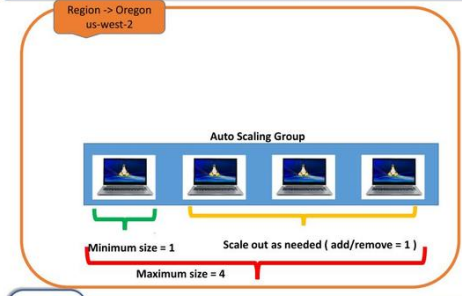

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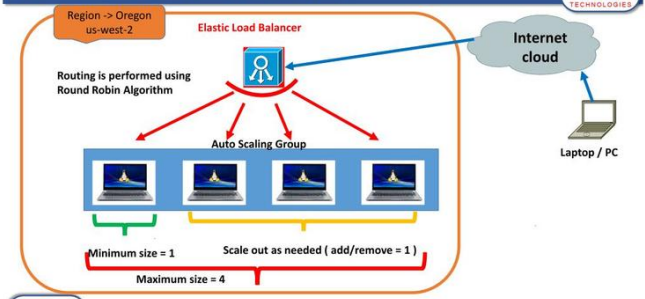


DAY 11

RDS, Dynamodb, Redshift

Amazon RDS
Relational Database Service

- Overview RDS
- RDS Engine
- Benefits
- Backup
- Multi Availability Zones
- Storage Type

- To configure Database over AWS cloud you have two options:

  a) Launch an instance and install database software over the instance from scratch where you are responsible of software, backups, high availability and all.

  b) Amazon provides database service where instance, software, updates, patches, scalability, high availability all will be maintained by amazon.

- Amazon provides these database services through RDS, dynamodb and Redshift, these are PAAS service.

What is RDS ?

- Amazon Relational Database Service (or Amazon RDS) is a distributed relational database service
- Amazon RDS was first released on 22 October 2009, supporting MySQL databases.
- It simplifies the setup, operation, and scaling of a relational database for use in applications.
- It automatically manages and updates patches, backups and enabling point-in-time recovery.
- You do not have access to the operating system, access is given to only Relational Database, which can be managed by console or client application or AWS-cli.

What is RDS ?

ZOOM TECHNOLOGIES

- CPU, memory, storage, and IOPS can be scaled independently.
- In addition to the security in the database package, IAM users and permissions can help to control who has access to the RDS databases

- Amazon RDS supports Amazon Aurora, MySQL, MariaDB, Oracle, SQL Server, and PostgreSQL database engines.

AWS

Currently Supported Database Engines

ZOOM TECHNOLOGIES

- Amazon Aurora
- MySQL
- MariaDB
- Oracle
- SQL Server
- PostgreSQL

AWS

Amazon RDS engines

ZOOM TECHNOLOGIES

Commercial	Open source	Amazon Aurora
ORACLE	MySQL	Amazon Aurora
Microsoft SQL Server	PostgreSQL	
	MariaDB	

AWS

Benefits of RDS

ZOOM TECHNOLOGIES

- No infrastructure management
- Cost-effective
- Application compatibility
- Instant provisioning
- Scale up/down
- Automatic minor updates
- Automatic backups
- Not required to manage operating system
- Multi-AZ with 1 click
- Automatic recovery in event of failover

AWS

Backups

- Daily Automated Backups
- RDS provides backup storage up to 100% of the provisioned database storage at no additional charge for e.g., if you have 10 GB-months of provisioned database storage, RDS provides up to 10 GB-months of backup storage at no additional charge.
- Most databases require less raw storage for a backup than for the primary dataset, so if multiple backups are not maintained, you will never pay for backup storage.

AWS

Multi-AZ Deployment

- Automatically replicates data to a secondary AZ
- During maintenance or "Unavailable" times AWS automatically routes traffic to the secondary instance and replicates the data back to primary

AWS

Storage type

ZOOM TECHNOLOGIES

- Standard : Utilizes AWS EBS Volumes
- Provisioned IOPS: Optimized EBS volumes and optimized for IOP

AWS

Client Application

ZOOM TECHNOLOGIES

- To connect to RDS database

Using mysql-client for mysql database.

```
# mysql  -h  <rds_endpoint>  -u <username>  -p<password>
        mysql >  show databases;
              > use <database_name>
              > show <tables>
```

- Using WorkBench

AWS

Selected RDS customers

ZOOM TECHNOLOGIES

AWS

Amazon Dynamodb

ZOOM TECHNOLOGIES

Amazon DynamoDB

AWS

Amazon Dynamodb

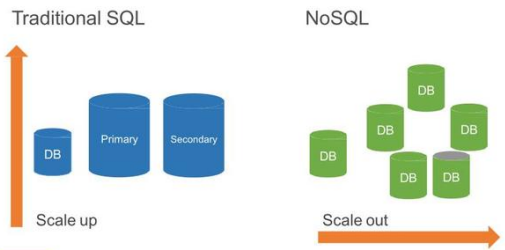
- Relational (SQL) *vs.* non-relational (NoSQL)
- Dynamodb

AWS

Relational (SQL) vs. non-relational (NoSQL)

SQL	NoSQL
SQL databases are primarily called as Relational Databases (RDBMS)	NoSQL database are primarily called as non-relational or distributed database
Represent data in form of tables which consists of n number of rows	Collection of key-value pair, documents, graph databases or wide-column , without standard schema
Vertically scalable (increasing the hardware)	Horizontally scalable increasing the databases servers in the pool of resources
MySql, Oracle, Sqlite, Postgres and MS-SQL	MongoDB, BigTable, Redis, RavenDb, Cassandra, Hbase, Neo4j and CouchDb.
SQL databases are good fit for the complex query	NoSQL databases are not good fit for complex queries

Vertical and Horizontal Scaling



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Amazon Dynamodb

- Amazon DynamoDB is a fully managed NoSQL database service that provides fast and predictable performance with seamless scalability.
- DynamoDB makes it simple and cost-effective to store and retrieve any amount of data.
- Serves any level of request traffic.
- Hardware provisioning, setup and configuration, replication, software patching, or cluster scaling is taken care by Amazon.

AWS

Amazon Dynamodb

ZOOM TECHNOLOGIES

- DynamoDB enforces replication across three availability zones in one or more global geographic locations for high availability, durability and read consistency , which creates backup copy of a DynamoDB table.
- There are two types of indexes in DynamoDB, a
  - Local Secondary Index (LSI)
    In an LSI, a range key is mandatory.
  - Global Secondary Index (GSI)
    GSI you can have either a hash key or a hash+range key

AWS

Amazon Dynamodb

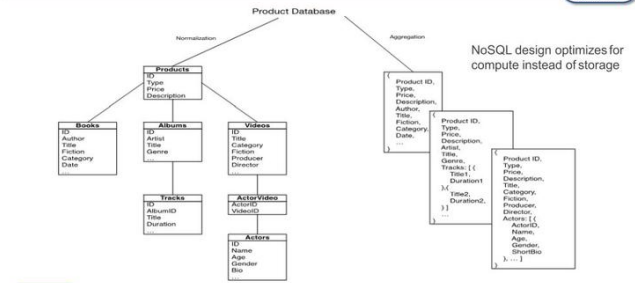
ZOOM TECHNOLOGIES

DynamoDB uses three basic data model units.

- Tables
  Tables are collections of Items, and tables do not have fixed schemas associated with them.
- Attributes
  Attributes are basic units of information, like key-value pairs.
- Items
  Items are collections of Attributes they are like rows in an RDBMS table, except that DynamoDB requires a Primary Key.

AWS

SQL vs. NoSQL schema design



AWS

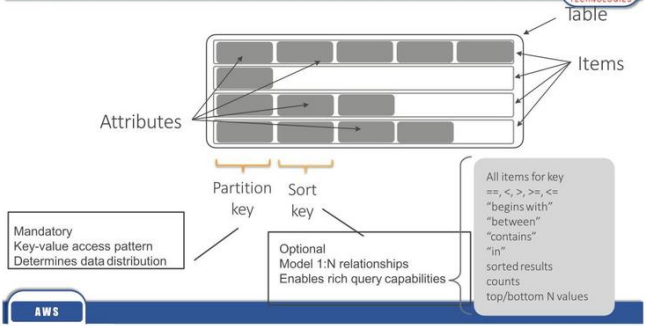
Benefits of Dynamodb

- Fully managed
- Fast, consistent performance
- Highly scalable
- Flexible
- Event-driven programming
- Fine-grained access control

AWS

Dynamodb Table Structure

ZOOM TECHNOLOGIES



AWS

Amazon Redshift

ZOOM TECHNOLOGIES

Amazon RedShift

AWS

Amazon Redshift

ZOOM TECHNOLOGIES

- Amazon Redshift gives you fast querying capabilities over structured data using familiar SQL-based clients and business intelligence (BI) tools using standard ODBC and JDBC connections.
- Columnar Data Storage

  Instead of storing data as a series of rows, Amazon Redshift organizes the data by column.
- Unlike row-based systems, which are ideal for transaction processing, column-based systems are ideal for data warehousing and analytics, where queries often involve aggregates performed over large data sets.

AWS

Amazon Redshift

ZOOM TECHNOLOGIES

- Since only the columns involved in the queries are processed and columnar data is stored sequentially on the storage media, column-based systems require far fewer I/Os, greatly improving query performance.
- Queries are distributed and parallelized across multiple physical resources.
- uses replication and continuous backups to enhance availability and improve data durability and can automatically recover from node and component failures.
- Redshift only supports Single-AZ deployments

AWS

Redshift Single vs Multi-Node Cluster

ZOOM TECHNOLOGIES

- Single Node

  Enables getting started quickly and cost-effectively & scale up to a multi-node configuration as the needs grow

- Multi-Node

  Requires a leader node that manages client connections and receives queries, and two or more compute nodes that store data and perform queries and computations.

Redshift Clients

ZOOM TECHNOLOGIES

- Amazon does not provide any SQL client tools, but they recommend SQL Workbench/J.
- Though you can connect to your cluster using psql or any SQL IDE that supports PostgreSQL JDBC or ODBC drivers.

DAY 12

EFS (Elastic File System)
SQS (Simple Queue Service)
SES (Simple Email Service)

Amazon EFS (Elastic File system)

AWS Elastic File system (EFS)

ZOOM TECHNOLOGIES

Amazon EFS is a NAS file system i.e. Network file system.

With Amazon EFS, storage capacity is elastic, growing and shrinking automatically as you add and remove files, so your applications have the storage they need, when they need it.

AWS

Amazon EFS

ZOOM TECHNOLOGIES

Can scale up to petabytes.

Can support thousands of concurrent NFS connections.

Amazon EFS supports the Network File System versions 4.0 and 4.1 (NFSv4).

With Amazon EFS, you pay only for the storage used by your file system

AWS

Amazon EFS

ZOOM TECHNOLOGIES

It can only be used with EC2 instances in your VPC.

It cannot be used with on premises Data Center server.

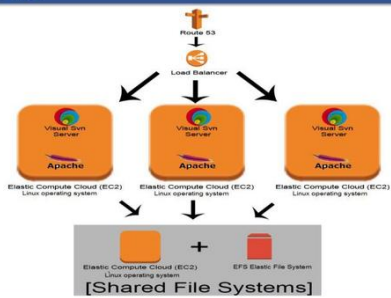
If EFS is created in particular A.Z then the instances of that zone can only mount it.

It provides a end point with DNS name through which it can be mounted.

AWS

Amazon EFS

ZOOM TECHNOLOGIES



AWS

AWS SQS
Simple Queue Service

- Amazon Simple Queue Service (SQS) is a fast, reliable, scalable & affordable message queuing service.
- Message queues are software-engineering components used for inter-process communication, or for inter-thread communication within the same process.
- Many implementations of message queues function internally within an operating system or within an application.

AWS Simple Queue Service (SQS)

ZOOM TECHNOLOGIES

- It is a temporary repository for messages waiting for processing and acts as a buffer between the component producer and the consumer.
- SQS ensures delivery of each message at least once
- Queues can configured to retain messages for 1 minute to 14 days after the message has been sent.
- Your messages can be up to 256 KB in size

AWS

Type of Queue SQS

ZOOM TECHNOLOGIES

- Standard Queue
  A message is delivered at least once
- FIFO Queue
  First-In-First-Out Delivery – The order in which messages are sent and received is strictly preserved.

AWS

Other Queue service providers

ZOOM TECHNOLOGIES

- IBM WebSphere MQ
- Oracle Advanced Queuing (AQ)
- Microsoft Message Queuing
- Apache Qpid
- RabbitMQ

AWS

Amazon Simple Email Service (SES)

ZOOM TECHNOLOGIES

Amazon SES
SIMPLE EMAIL SERVICE

AWS

Amazon Simple Email Service (SES)

ZOOM TECHNOLOGIES

- SES is a SMTP/MTA server provided by amazon which is designed to send bulk mails to customers in a quick and cost-effective manner.
- SES does not allows to configure mail server.
- It also does not allows public email accounts like gmail.com, yahoo.com rediff.com ... to send bulk mails through SES.

AWS

Amazon Simple Email Service (SES)

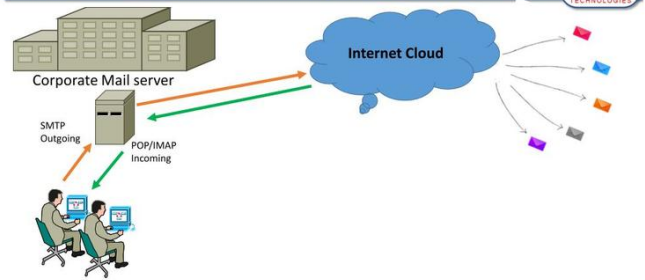
ZOOM TECHNOLOGIES

- Companies or corporate should have their own mail server in order to use SES, then SES will work as Outgoing mail server on behave of your Domain name
- Applications can send email using a single API call in Java, .NET, PHP, Perl, or HTTPS
- Mail clients like Outlook, Thunderbird, Evolution, SendBlaster then can be integrated with SES to send mails.

AWS

Amazon Simple Email Service (SES)

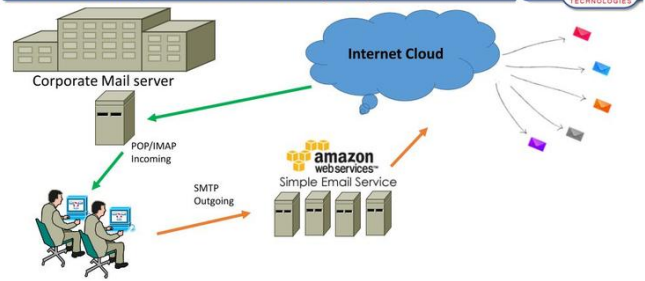
ZOOM TECHNOLOGIES



AWS

Amazon Simple Email Service (SES)

ZOOM TECHNOLOGIES



AWS

DAY 13

CloudFromation
CloudFront
CloudTrail

AWS Cloud Formation

AWS CloudFormation

ZOOM TECHNOLOGIES

- AWS CloudFormation is a service which create the AWS infrastructure using code.
- It is also referred as code as a service.
- It helps to reduce time for managing resources so that you can focus more on application rather than managing amazon infrastructure and their resources.
- Cloudformation uses a template that describes all the AWS resources that you want (like Amazon EC2 instances or Amazon RDS DB instances), and AWS CloudFormation takes care of provisioning and configuring those resources for you.

AWS CloudFormation

ZOOM TECHNOLOGIES

- Cloud Formation provisions AWS resources in order using Cloudformation stack, this model removes opportunities for manual error, increases efficiency, and ensures consistent configurations over time.
- It provisions AWS resources based on dependency needs gets integrated with development and management tools such as version control and continuous integration (CI/CD), devops etc.

AWS CloudFormation

ZOOM TECHNOLOGIES

- CloudFormation consists of Template and Stack
  - Template

    It is a JSON or YAML-format, text-based file that describes all the AWS resources you need to deploy to run your application
  - Stack

    Stack is the set of AWS resources that are created and managed as a single unit when CloudFormation instantiates a template.

AWS CloudFormation benefits

ZOOM TECHNOLOGIES

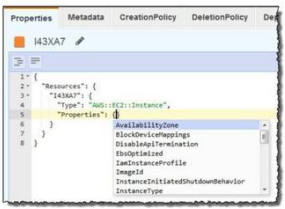
- Simplify Infrastructure Management
- Quickly Replicate Your Infrastructure
- Easily Control and Track Changes to Your Infrastructure
- You don't need to individually create and configure AWS resources and figure out what's dependent on what, AWS CloudFormation handles all of that.

Ctrl+Space : Within the Properties key of a resource, lists all the available properties for the resource

Ctrl+F : Search for a value in the JSON editor.

Ctrl+\ : Formats the text with proper indentation and new lines

Ctrl+Shift+\ : Removes all white space



AWS CloudFront

CloudFront

ZOOM TECHNOLOGIES

- To provide faster access to website to the end user, websites contents are globally distributed at different geographical location.
- Route53 and cloudfront services are added at multiple location through a worldwide network of amazon data centers called edge locations.
- Web contents are replicated across multiple edge location of Amazon infrastructure by cloudfront service.

AWS

CloudFront

ZOOM TECHNOLOGIES

- It helps businesses and web application developers an easy and cost effective way to distribute content with low latency and high data transfer speeds across the globe.
- It also increases the reliability and availability by copying the web content across multiple edge location.
- CloudFront keeps persistent connections with the origin servers so that those files can be fetched from the origin servers as quickly as possible.

AWS

CloudFront

ZOOM TECHNOLOGIES

- If a user wants to download any web content like images, videos etc. it could be accessed very fastly because they are near to edge location.
- In India Mumbai is a region, but Delhi and Chennai are working as a edge location.
- Cloudfront only replicates the website content if website is hosted under s3 bucket as a static website or through Elastic load balancer.
- Cloudfront cannot be configured to provided directly website if website are running over Ec2 instances.

AWS

CloudFront

ZOOM TECHNOLOGIES

Delivery Methods

- Web distributions

  for e. g. html, css, js, images etc. using HTTP or HTTPS.

- RTMP distributions

  Supports streaming of media files using Adobe Media Server and the Adobe Real-Time Messaging Protocol (RTMP)

AWS

Amazon CloudTrail

- AWS CloudTrail is an AWS service that allows to track actions taken by a user, role, AWS Management Console, AWS Command Line Interface, AWS SDKs, APIs or an AWS service.
- CloudTrail is used to view, search, download, archive, analyze, and respond to account activity across your AWS infrastructure.
- CloudTrail Event History will only show the results for the current region you are viewing for the last 90 days.

Amazon CloudTrail

ZOOM TECHNOLOGIES

- For a complete record of account activity, including all management events, data events, and read-only activity, you'll need to configure a CloudTrail trail.
- 5 Trails per region can be configure in your account by default, this limit cannot be increased.
- CloudTrail delivers log files to your S3 bucket approximately every 5 minutes. CloudTrail does not deliver log files if no API calls are made on your account.

AWS

Amazon CloudTrail

ZOOM TECHNOLOGIES

- Amazon SNS notifications can be turn on so that you can take immediate action on delivery of new log files.
- There is no charge from AWS CloudTrail for creating a CloudTrail trail and the first copy of management events within each region is delivered to the S3 bucket specified in your trail free of charge.
- Once a CloudTrail trail is setup, Amazon S3 charges apply based on your usage.

AWS

Amazon CloudTrail

ZOOM TECHNOLOGIES

- Log management tools available in the market to read the logs stored by Cloudtrail.
  - Loggy
  - SumoLogic
  - CloudTrailViewer
  - Splunk

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