

**Silicon Institute of Technology**

| An Autonomous Institute |

# **TRAINING DIARY**



Name Priyanshu Mallick

SIC No: 21BCSF11

Regd. No: \_\_\_\_\_

Branch CSE Year 2022

**Silicon Institute of Technology**

Silicon Hills, Patia, Bhubaneswar – 751024

# MEMORANDA

Name Piyush Mallick

SIC No: 21BCSF11

Regd. No: \_\_\_\_\_

Branch: Computer Science and Engineering

Name & Address of Organization:

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Paste your  
Passport Size  
Photograph

Details of Reporting Officer / Training In-Charge:

Name: \_\_\_\_\_

Designation: \_\_\_\_\_ Phone: \_\_\_\_\_

Email Address: \_\_\_\_\_

Period of Training: From \_\_\_\_\_ To \_\_\_\_\_

Total No. of Days \_\_\_\_\_ No. of Days Absent \_\_\_\_\_

Date:

Seal

Signature of Training-In-Charge

## **INSTRUCTIONS & GUIDELINES**

The student is required to adhere to the following instructions during the entire duration of the summer internship / training:

1. S/he must carry this Training Diary with details duly filled up, photograph attested by FIC – II Cell.
2. S/he must carry the Evaluation Form issued by II Cell.
3. S/he must report for the internship / training in time on the day/date specified by the organization.
4. S/he must carry the Institute Identity Card at all times along with any other ID Card/Pass issued by the organization.
5. S/he must get the Training Diary signed by the Training In-Charge on the first day of internship / training.
6. S/he must write the training diary every day and get it countersigned by the Training In-charge.
7. At the end of the internship / training, s/he must get the "Training Completion Certificate" filled in and signed by the Training In-Charge with his/her official seal.
8. The Evaluation Form must be filled in properly by the Training In-Charge on the last day of internship / training and handed over to the student in a sealed envelope.
9. S/he must submit the Training Diary and sealed Evaluation Form to the FIC – II Cell within 7 days of start of the next semester.
10. S/he must submit a Training Report (maximum 5 pages) to the evaluation committee at the time of presentation & viva.

Date 01/08/22

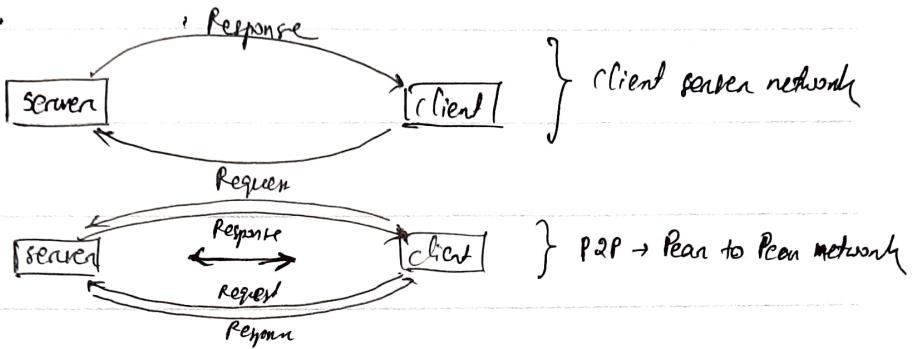
Time from 9.30 to 11.00

## Details of Training / Observations:

What a IT industry does actually? → A IT industry is a industry which solves various type of real life problem by providing software solutions to them.

What a cloud service platform like AWS does? → Cloud service platform manages all the traffic and server level computation of a software solution which has been hosted on that cloud service platform.

Networking: The communication between two or more participant under certain circumstances is called network.



Connecting Devices - Repeater, Hub, Bridge, Switch, Router, ~~Router~~

Single Collision Domain

TCP-IP Protocol :- When a node send any data or message to another node, it follows TCP-IP to transmit the message. TCP stands for Transmission control protocol and IP stands for Internet protocol. TCP breaks the message into small packets and send it to the address by IP.

UDP:- User Datagram protocol is a communications protocol that is primarily used to establish low-latency and loss-tolerating connections between applications on the Internet.

### Internet:

- The Internet is the global system of interconnected computer networks that uses the internet protocol suite (TCP/IP) to link devices worldwide.
- In other words, it is a network of networks that consist of public, private, academic, business and government networks of local to global scope.

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Signature of Trainee

Date 02/08/22

Time from 9.30 to 12.30

## Details of Training / Observations:

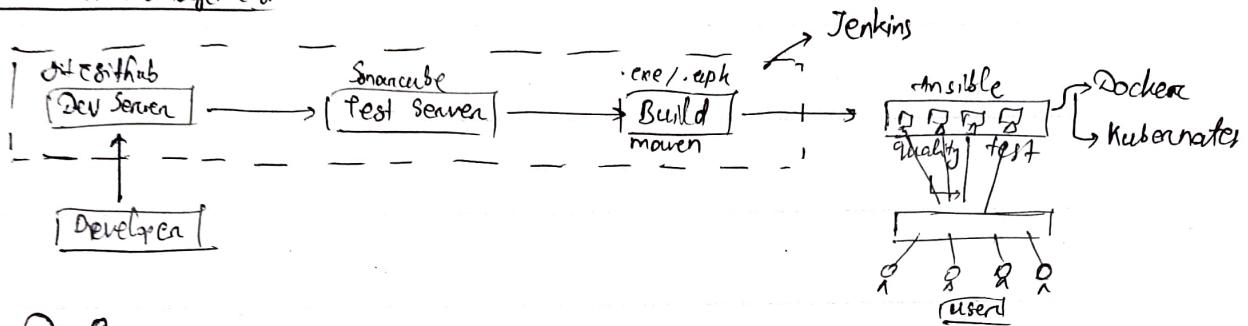
Computing Models :- i) Desktop computing ii) Client-Server computing iii) Cluster computing iv) Grid computing v) Cloud computing.

Hypervisor is used to virtualize any physical system.

AWS - They provide you with the servers and services that you can use on demand and scale easily.

Benefits of Cloud computing :- i) cost ii) speed iii) global scale iv) productivity v) performance vi) reliability.

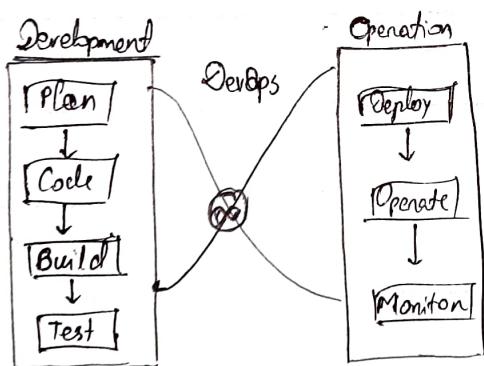
## IT Process Management



## DevOps

- ↳ AWS, Azure, GCP
- ↳ Kubernetes
- ↳ OS Windows
- ↳ Jenkins
- ↳ Git/GitHub
- ↳ Terraform
- ↳ Docker
- ↳ Nagios/Graphana/Kibana/Prometheus/Datadog
- ↳ Ansible

→ Automation implemented at each and every step.



## Cloud Service Model

- IaaS → Infrastructure As A Service
- PaaS → Platform As A Service
- SaaS → Software As A Service

## Type of cloud deployment

- Public Cloud
- Private Cloud
- Hybrid Cloud

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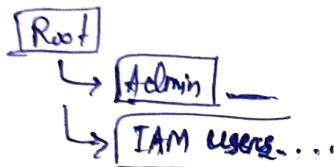
Date 03.08.22

Time from 9.30 to 12.30

Details of Training / Observations:

### Hardening of AWS Account

- To set strong password to our account
- Use MFA (Multi Factor Authentication)
- Login through user account instead of root account in most of the cases.
- IAM - Identity Access Management
- ~~Root~~ IAM User have limited scope as compare to root.



- Created AWS account using debit card.
- Setting MFA in our account.
- Created IAM user and use IAM user ID and password flutter works.
- Deploying ec2 servers and created instances of windows system over northern virginia AWS cloud servers.
- Also created instances of Redhat Linux machine over northern virginia AWS cloud servers.

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Signature of Trainee

Date 04.08.22

Time from 9.30 to 12.30

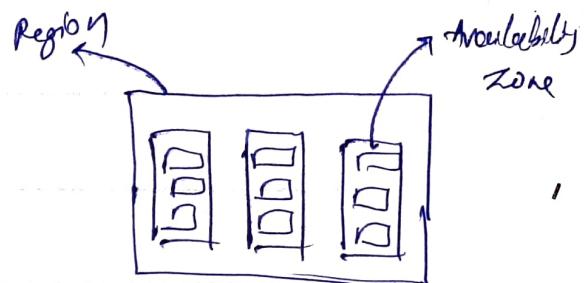
## Details of Training / Observations:

Hierarchy that AWS follow :-

Region

↓  
Availability Zone (AZ)

→ Region :- A region is cluster of data center.



→ AZ :- Each availability zone is one or more discreet data center with redundant power, networking and connectivity.

\* AWS has 26 regions & 84 Availability zone.

→ Each region has many AZ (usually 3, min=2, max=6)

Block Storage :- Block storage, sometimes referred to as block-level storage, is a technology that is used to store data files on Storage Area Networks (SANs) or cloud-based storage environments.

↳ EBS (Elastic Block Storage) ↳ SSD  $\xrightarrow{\text{IOPS}}$  GP2  
↳ FFS (Elastic file system)

↳ HDD  $\xrightarrow{\text{IOPS}}$  ST1  
↳ Magnetic Disk

[IOPS (Input/Output per second)]

↳ Ephemeral Storage

or  
Instance Storage  
or  
Temporary Storage

LAB that doing to Perform

- Delete on termination
- Adding extra disk
- Extending the volume
- Attaching volume to different instance
- Snapshot
- Reduce the volume

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Date 05.08.22

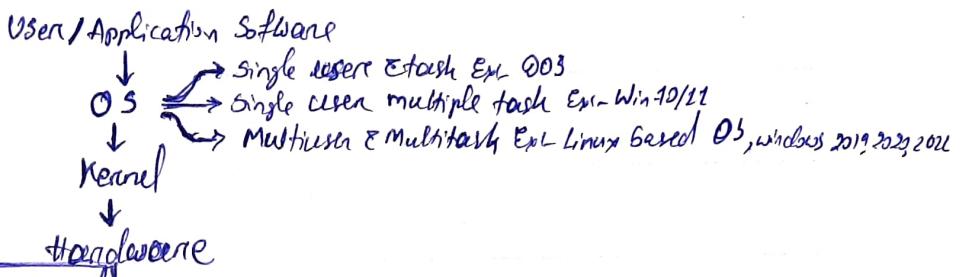
Time from 9.30 to 12.30

Details of Training / Observations:

Permanently mount the extra volume to the server:-

- In general when we attach an extra volume to the host server, it automatically vanishes once the server unmounted once the server is restarted.
- So to overcome this issue we use some different techniques to permanently mount our extra volume.

What is OS:- OS stands for Operating System which is nothing but a system software which act as intermediate between kernel and application software as well as user



Extend the Volume :- Done :- To extend the volume of existing server

Snapshot :- Done :- To attach extra volume which is in different availability zone as of the server where we want to attach that extra volume.

Reduce Volume :- We can not directly reduce the volume, for reducing the volume we have to first create a new volume and after that we have to sync the data ~~of~~ of old volume to new small volume. Often than we can simply delete the old volume.

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Date 08.08.22

Time from 9.30 to 12.30

### Details of Training / Observations:

#### EFS :- Elastic File Service

EFS has more advantage over EBS. EFS can connect with multiple servers at a time where EBS can't be. EFS is based on data sync, changed model.

Security Group (State full firewall): By this we set the inbound and outbound traffic of server. There is security check only on entry of ~~inbound~~ ~~outbound~~ any traffic.

After this we had seen the lab about how to modify security group to NFS type and set-up EFS successfully.

After creating EFS, we attach it to the different instances successfully.

#### Ephemeral Storage or Instance Storage or Temporary Storage

Ephemeral storage is a temporary storage having speed storage drive used for quick data access which may located at the instance space. Once server is restarted, all the data will vanish in the ephemeral storage.

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Date 09.08.22

Time from 9.30 to 12.30

## Details of Training / Observations:

### AWS Instance Family

- ↳ General Purpose (Normal use cases)
- ↳ Compute Optimised (High level of CPU)
- ↳ Memory Optimised (High level of RAM)
- ↳ Accelerated Computing (GPU)
- ↳ Storage Optimised (High level of Storage)

### AWS Instance Pricing Model

#### Free tier

1. On demand → no capacity guarantee, partial hour is converted into full hr.
2. Reserved instance → Capacity guarantee, no cancellation policy, no upfront cost, partial upfront cost
3. Scheduled reserved instance
4. Spot instances

#### Shared tendency model

- 1) Dedicated instance
- 2) Dedicated host

### LAB

Lunch Template - By doing this we have seen that, we can create template of instance type and whenever we want to create instances further we can use that template for creating multiple instances within very less time.  
set Budget:- We can set the threshold limit of our billing in AWS. By enabling this feature, we can set the maximum limit of our ~~the~~ billing charge.

### Difference between Public IP & Private IP in AWS

Using Public IP we can access instances wherever in the internet but using private IP it is not possible. We only connect instances within the AWS network using private IP.  
→ Public IP will get changed once server is restarted.  
→ Private IP will not get changed of a server if it restarted.

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Signature of Trainee

Date 10.08.22

Time from 9.30 to 12.30

## Details of Training / Observations:

- We discussed and learnt ~~fully~~ elaborately about public IP and private IP and industrial uses of public and private IP.
- In industry, generally public IP is assigned to web server and private IP is assigned to the data base server.  
Elastic IP
- We use elastic IP which are called static IP which is provided by AWS for assigning IP to the web server instead of dynamic IP.
- Elastic IP is free when it is attached to the server. If it is not attached to the any instance but created, then AWS will charge for it.

### LAB:

In Lab we have seen how to ~~not~~ create elastic IP and attached it to the instance successfully.

- We again ~~not~~ see that how can we access server having private IP from our local system. For doing that, There are two ways:
  - ① Using jump server (Bastion host)
  - ② Using Open-VPN.
- By using jump server, first we ~~not~~ deploy a instance of very low config. inside the main server network and access the main server having private IP only through that jump server.
- By using Open-VPN, we have to install the openvpn software and set up user ID and password of VPN client, ~~then~~ through that ID & password we can able to setup VPN and even able to be a part of the network of that server having private IP whom which we want to access.

### LAB

→ We have seen how we can use jump server and openvpn to access instance having only private IP.

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Date 11/08/2022

Time from 9:30 am to 12:30 pm

Details of Training / Observations: Web-server deployment -

Webserver deployment is an extensible client-server

tool for syncing content and configuration to IIS.

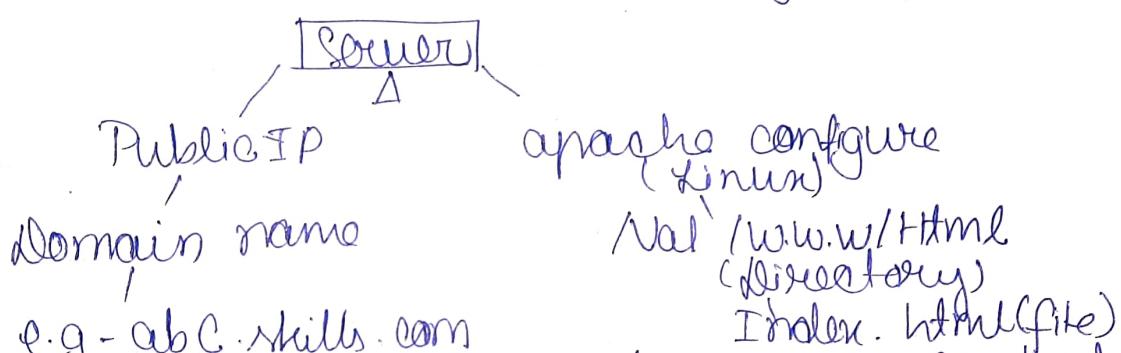
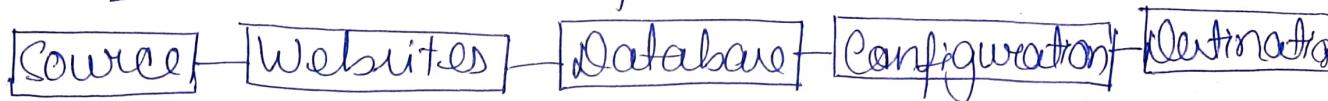
→ Web deploy is used primarily in 2 scenarios.

Developers use it to sync a compiled web application (App. Net, PHP, etc) from developer tools (Visual studio, webmatrix, etc.) to IIS.

→ In linux server we used to configure apache.

→ In windows server we used to configure IIS.

IIS - Internet - Information Services.



→ In AWS webserver deployment is a service that automates code deployment to any instance, including Amazon EC2 instances (and instances running on-premises).

→ So AWS Code Deploy make it easier for you to rapidly release new features, helps you avoid downtime during deployment, and handles the complexity of updating your applications.

→ In AWS web server, ec2 - you can add, delete and edit files in the apache document root enabling you to add content, such as static website or PHP application. A web server running the HTTP protocol provides no transport security for the

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data that it sends or receives.

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Date 12/08/22

Time from 9:30 am to 12:30 pm

IAM users, groups, AWS CLI

Details of Training / Observations:

- root.
- admin (internal user)
- developer (EC2 access)  
DBA (Database access)  
→ IAM user: dev-1 [ec2  
DBA (RDS full access)]

RDS - Relational database service

IAM - Identity and access management

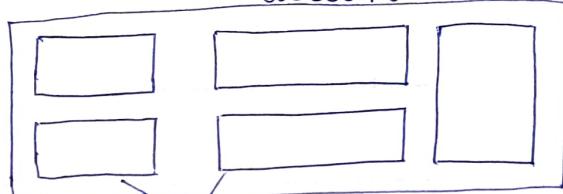
DBA - Database administrator

- for manage and operate databases that are used by applications to store, retrieve and analyze data.

AWS CLI - Command line Interface is a unified tool to manage your AWS services.

- It works on python language.
- Shell scripts make it easy for users to fully automate cloud infrastructure.
- AWS CLI users need a dedicated CLI tool for just the EC2 service.
- AWS CLI is a tool that pulls all the AWS services together in one central console, giving you easy control of multiple AWS services with a single tool.  
→ AWS users operate it from the command line

AWS account



full access → Different services.

IAM group

Developer group (permission attaching)  
added 500 users

DBA group (permission attaching)  
added 500 users.

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Date 14/8/2022

Time from 9.30 AM to 12.30 PM

Details of Training / Observations;  
Test environment

Test - 1

Test - 2

Prod - 1

Prod - 2

~~not  
accessible~~

We can work in this

Production

→ Terraform uses  
HCL language

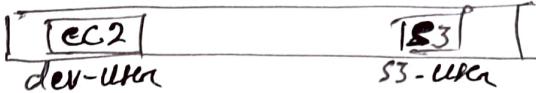
HCL → Hashicorp Configuration language

→ It is meant to strike a balance between human readable and  
editable as well as being machine friendly.

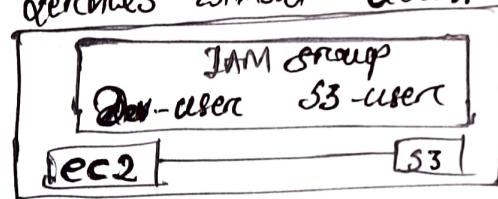
→ For machine-friendliness, Terraform can also read JSON configurations.

Ans account advantage (Terraform)

- ① Accessing resources without access key & secret key
- ② Accessing resources of other AWS accounts



→ Using IAM (Identity & Access Management) we can access the AWS services without access key & secret key



AWS  
account

★ Cron job - Cron is a Linux utility that schedules a command or script on your server to run automatically at a specified time and date.

→ A cron job is the scheduled task itself.

→ Cron job can be very useful to automate repetitive tasks.

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Date 16/8/2022

Time from 9.30 am to 12.30 pm

## CIDB - Classless Inter-Domain Routing

Details of Training / Observations:

- VPC → Virtual Private Cloud - In AWS it is referring to virtual private network.  
→ It is a space where we deploy our resources inside various subnet.  
→ In cloud it is highly available and highly auto-scalable.  
→ It can scale-in & scale-out easily.
- Subnet → It is a part of large network.  
(Subnetwork) ↓ Subnet

### Public Subnet

- The subnet which is directly connected to the internet gateway is called public subnet.  
→ We store EC2 instances & provide public IP & web servers.

Private Subnet → The subnet which is not connected to the internet gateway is called private subnet.

- We store database servers in private network.

- CIDR notation specifies an IP address, a slash ('/') character & a decimal number  
→ It is a method for allocating IP addresses & for IP routing.

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# VPC Peering ⊂ VPC Endpoint

Date 17/8/2022

Time from 9.30AM to 12.30 PM

Details of Training / Observations:

- VPC peering is done for DR (Disaster Recovery)
- Amazon virtual private cloud (Amazon VPC) enables you to launch AWS resources into a virtual network that we have defined.
- A VPC peering connection is a networking connection between 2 VPCs that enables you to route traffic between them using private IPv4 addresses or IPv6 address.
- Instances in either VPC can communicate with each other regardless if they are within the same network.
- The VPCs can be in different regions called inter-region VPC peering connection.
- By VPC Peering we can connect 2 VPCs of different availability zones of a region.
- Inter-Region VPC peering provides a simple and cost-effective way to share resources between regions or replicate data for geographic redundancy.

## VPC Endpoint

- A VPC endpoint enables us to privately connect our VPC to supported AWS services and VPC endpoint services powered by privately link without requiring an internet gateway, NAT device, VPN connection.
- If CIDR range of VPC IP address is same as 10 series or 17 series then it will overlap & will enable to connect 2 VPCs for VPC peering.

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# S3 Deep Dive

Date 18/08/2022

Time from 9.30AM to 12.30 PM

## S3 Bucket

Details of Training / Observations:

- We can use Amazon S3 to store and retrieve any amount of data at any time, from anywhere on the web.
- S3 bucket is a object based storage.
- In S3 bucket operating system can not be installed.
- It is a flat container means one container can not be placed inside another. We have to keep beside of it.
- The maximum capacity of 1 bucket is 5TB but if we want more storage then we can contact AWS support.

## Versioning

- We should enable the version (ON) for data recovery even if we delete the data.
- Bucket versioning can not be disabled. It can either be suspended for sometime or enabled.

## Transfer Acceleration

- It is a bucket level feature that enables fast, easy & secure transfers of files over long distances between your client & an S3 bucket.
- It reduces the variability in internet routing, latency, congestion & speeds that can affect transfers.

## Storage Class

S3 Standard	S3 IA	One Zone IA	S3 Glacier	S3 Glacier Deep Archive	S3 Intelligent Tiering
data storage: 10 retrieval: 1	ds: 8 retrieval: 3	ds: 5 R: 3	ds: 2 R: 8	ds: 1 retrieval: 10	data storage: 14 retrieval: 4

- S3 storage class are purpose built to provide the lowest cost storage for different access patterns.

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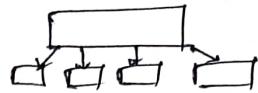
Signature of Trainee

# Load Balancer & Domain Mapping

Date 19/08/2022

Time from 9.30 AM to 12.30 PM

Details of Training / Observations: IP : 3.15.56.85



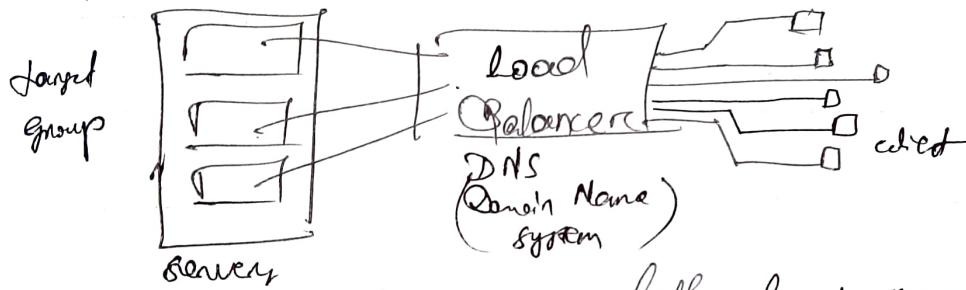
→ A load balancer  
serves as the single point of contact for clients.

Domain  
abc.skill.com

- It distributes incoming application traffic across multiple targets, such as EC2 instances, in multiple availability zones.
- This increases the availability of our application as each one or more listeners to load balancer.

Application load Balancer      Network load Balancer      Classic Load Balancer

→ It improves application & user availability and responsiveness & prevent server over load



- DNS translates human readable domain names to machine readable IP address.

## Route 53

- ① Domain registration
- ② Domain hosting

Amazon Route 53 is a highly available and scalable DNS web service.

- Route 53 connects user requests to internet applications running on AWS or P. On-premises

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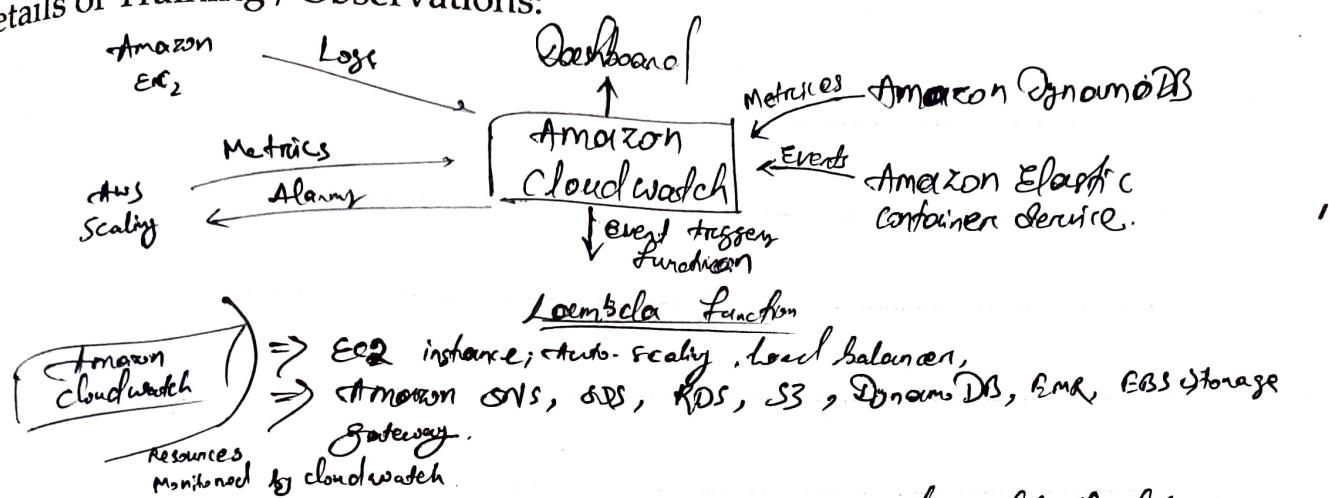
Signature of Trainee

# Cloudwatch

Date 20/08/2022

Time from 9.30 AM to 10.30 PM

Details of Training / Observations:



- Amazon Cloudwatch allows us to collect, access and correlate this data on a single platform from across all our resources, applications, services running on AWS and on-premises, helping us to breakdown data silos to gain system wide visibility & quickly resolve issues.
  - Cloudwatch collects monitoring and operational data in the form of logs, metrics, and events and visualizes it using automated dashboards to get a unified view of our AWS resources, applications, services that run on AWS and on-premises.
- Cloudwatch Options
- Cloudwatch alarms watch our metric values against thresholds that we specify so that it creates using ML models (Machine learning) to detect anomalous behavior.
  - If an alarm is triggered, Cloudwatch can act automatically to enable Amazon EC2 auto scaling or stop an EC2 instance, so we can automate capacity & resource planning.

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# Virtual Hosting

Date 21/08/22

Time from 9.30 AM to 12.30 PM

- Details of Training / Observations: https://www.google.com
- 
- DNS - Domain Name System
- 3rd party domain hosting providers → Godaddy, Freehost, bluehost, hostinger etc.
- HTTP - HyperText Transfer Protocol
- HTTP - HyperText Transfer Protocol secure
- HTTP is a standard application-level protocol used for exchanging files on the world wide web.
  - It is designed for communication between web browsers and web-servers but it can also be used for other purposes.
- HTML - Hyper Text Markup Language
- It is well-known markup language used for web page development.
  - It is commonly used in web-page design.
- Virtual Hosting
- The apache HTTP server supports virtual hosts, meaning that it can respond to requests that are directed to multiple IP addresses that are directed to multiple IP addresses or host names that correspond to the same host machine.
  - We can configure each virtual host to provide different content and to behave differently.
  - On Ubuntu system, apache virtual host configuration files are located in `/etc/apache2/sites-available` directory.
  - Virtual hosting is a web-server that appears as more than one host on the internet.
  - It is a method for hosting multiple domain names.

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Date 22/08/22

Time from 9.30 AM to 12.30 PM

### Details of Training / Observations:

- AWS provides multiple services that we can use to scale our application.
- Auto-scaling is enabled by Amazon CloudWatch and is available at no additional charge beyond other AWS resources that we use.
- We use Amazon EC2 Auto Scaling to automatically scale Amazon EC2 instances either with scaling policies or with scheduled scaling and health checks.
- Amazon EC2 Auto Scaling launch or terminate instances automatically.
- scale-in (server decreases in ec2 instances) → scale-out (server increases in ec2 instances) → Aeld.



### Steps for auto-scaling

- ① Create image (AMI) Amazon Machine Image
- ② To create load balancer and target group.
- ③ Create launch configuration.
- ④ Create Auto Scaling Group (ASG)

### Commands

- \* To increase traffic to the server → Yes → /dev/null &
- \* To delete traffic on to the server → N; dell -p yes

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# RDS, Route 53, Beanstalk, CloudFront & CloudFormation

Date 23/08/2022

Time from 9.30 AM to 12.30 PM

Details of Training / Observations:

## RDS

Relational Database Service is a collection of managed services that make it simple to set up, operate & scale database in the cloud.

Route 53: It is a highly available and scalable DNS web service. It connects user requests to internet applications running on AWS or on-premises.

- ① Domain Registration
- ② Domain Hosting

Industry Practice:- Domain Registration is done from godaddy & domain hosting is on AWS because of various standard routing policies.

## Standard Routing Policies

- ① Simple
- ② Multivalue
- ③ Weighted
- ④ Latency
- ⑤ Geolocation
- ⑥ Failover

## Elastic Beanstalk

→ It is a compute service that makes it easier for the developers to quickly deploy and manage applications that upload code to the AWS cloud using Java, .NET, ~~PHP~~, Python, Go, Docker etc.

CloudFront:- It is a web-service that speeds up distribution of your static and dynamic web content such as, html, css, js & image files to the users.

→ It delivers content through a worldwide network of data centers called edge locations.

CloudFormation:- It is a method of provisioning AWS infrastructure using code.

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# AWS MGN

Date 24/08/22

Time from 9.30 AM to 12.30 PM

Details of Training / Observations:

- ① AWS SMS - AWS server migration service is an agentless service that makes it easier and faster to migrate thousands of on-premises workloads to AWS from a snapshot of the existing server.  
→ It supports the automated migration of multi-server application stacks, from our on-premises data center to Amazon EC2.
- ② Cloud Endure - It is a disaster recovery which enables organization to quickly & easily shift their disaster recovery strategy to AWS from existing physical or virtual data centers, private clouds, public clouds.
- ③ MGN Service - This application migration service (MGN) automatically converts our source servers to run natively on source servers to run natively on AWS, and simplifies our migration by letting us to use the same automated process for a wide range of applications.
  - It quickly realize the benefits of migrating applications to the cloud with minimal downtime.
  - It is a highly automated lift and shift (rehost) solution that reduces the cost of migrating applications to AWS.- ④ When migrating from one database source to a new platform or software version, AWS Database Migration Service (DMS) keeps the source database fully operational during the migration, minimizing downtime to applications that rely on it.

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