* **AWS**

**Types of applications**

**=====================**

We have two types of applications.

1) Client base applications

2) Web base applications

1) Client base applications

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Applications which are running a user's computer/machine is called client based applications.

In general, applications which need to installed in a user's computer is called client based applications.

Client based application can be used by perticular user.

All client based applications are ruled out.

ex:

VLC Media player

2) Web base applications

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Applications which can be accessible from anywhere over the network are called web base applications.

ex:

Amazon

flipkart

Facebook

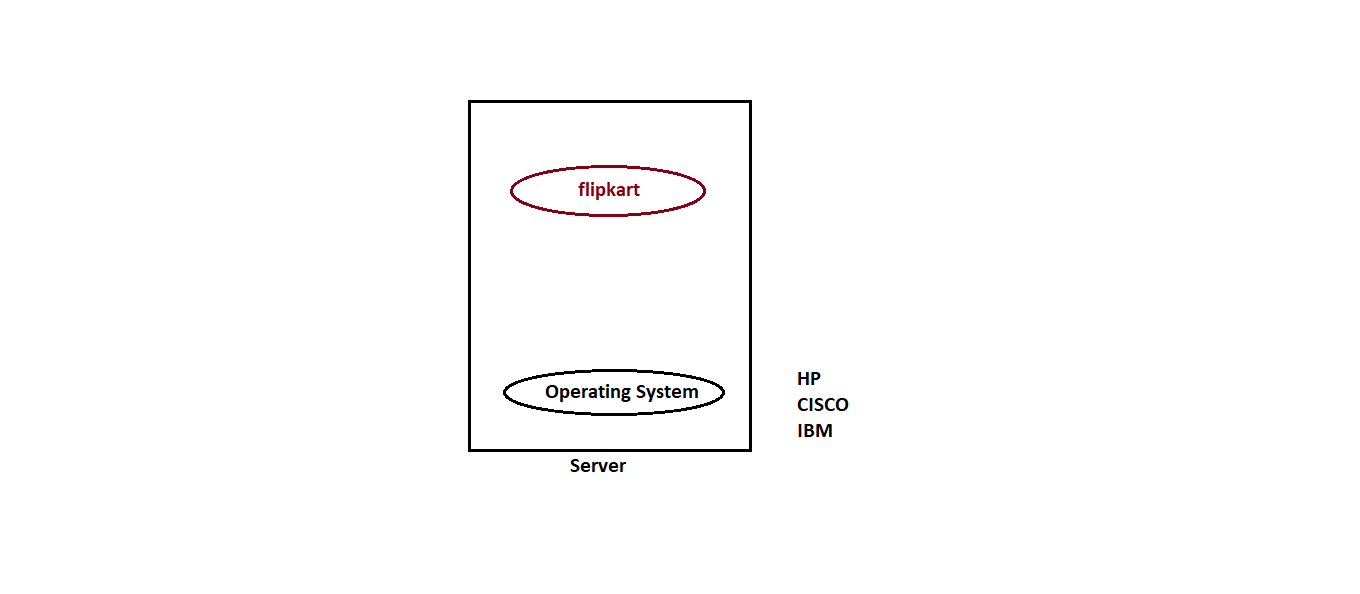
and etc.

**Q) How can we make an application accessible by thousands of users?**

Initially , developer has to develop the application.

Later the application need to be hosted on a server.

Diagram: aws1.1



**Q) What is the difference between PC and Server?**

PC Server

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PC is designed for perticular user. Server is designed to operate

multiple users.

It contains simple structure. It contains complex structure.

Low network capability. High network capability.

It contains less storage from It contain more storage from

gigabytes to terabytes. tera bytes to petabytes.

It contains single processor. It contains multiple processors.

**Q) Company will use one server or multiple servers?**

It depends upon scale of a company.

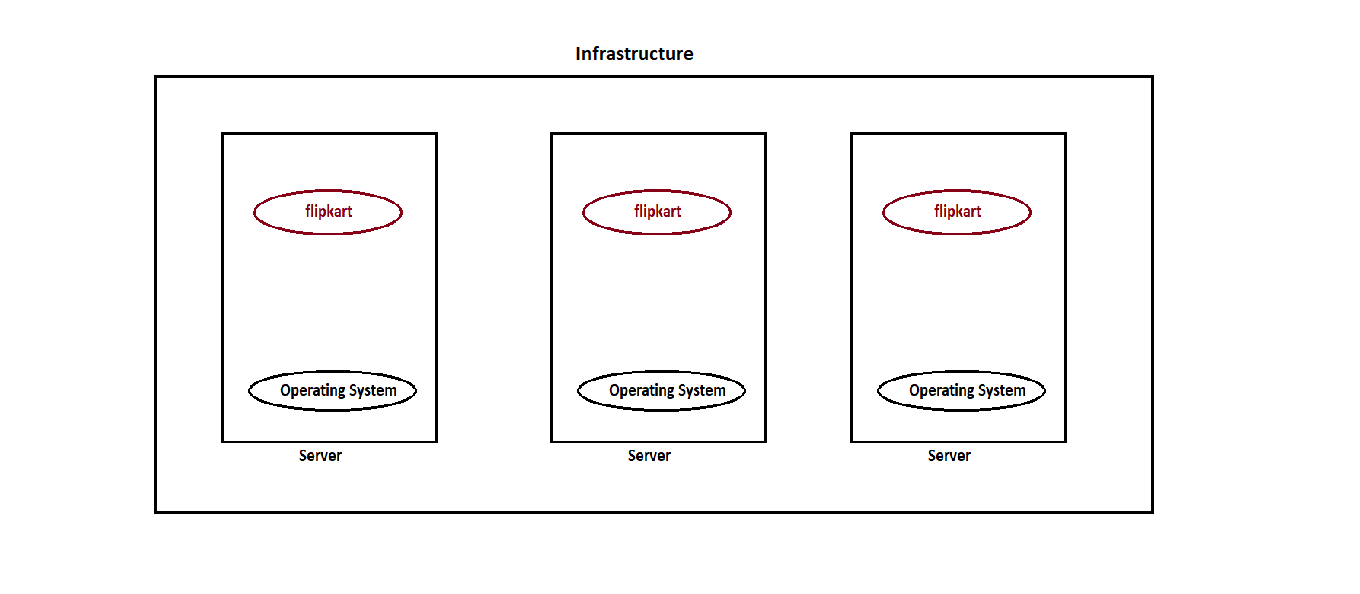
Companies revenue is relay on these servers and company people ensure that these servers operator all the times.

To build an application on the top of the servers we need organize the infrastructure.

Each and every IT company will have their own data center.

A data center is a place where we host our servers.

Diagram: aws1.2



Maintaining a data center is a very big deal.

1. Required private and secure place

2. Server maintainence team (database admin,network admin,monitoring team and etc).

3. 24/7 we need to maintain temperature 16 to 19 degree celsius.

4. 24/7 Dual power supply (government and private power supplier)

5. 24/7 Dual Network (ISP)

6. Need to follow geographical orders/standards to protect customer data which contains physical security and network security.

7. Hardware Refresh

**Q)Do you think is it easy to organize data center?**

No, it is not easy to organize the data center.

Specially startup's can't be proceeded because data center is a capital intensive.

If we see, From 2009 to 2022 number of IT companies are drastically increases

due to cloud.

**Q)What is Cloud computing ?**

Cloud computing is the on-demand delivery of IT resources over the Internet with pay-as-you-go model.

Example:

Assume that my business is a e-commerce.

During christmas or festival time I need thousands of servers and

those servers i am using only for limited days.

**Q)Do you think it is wise to buy thousands of servers only for limited days and keeping them ideal for rest of the days?**

**OR**

**Q)I can lease them for few days and return them once it is done?**

answer : lease .

That's where cloud providers came into the picture.

ex:

Amazon

Microsoft

IBM

Google

Alibaba

and etc.

In 2002,2003 , Amazon they starting their e-commerce , keeping the future demands in mind they got extends amount of hardware and their calculation absolute went wrong.

Whatever the forecasting they have done with respective to utilization it really went bad and they felt that only 20% to 30% of servers they are using.Almost 70% of their prediction went wrong and they left with no choice.

One of the intern of amazon got an idea , why don't we give our excess amount of server on lease for the people who want.In that way idea of cloud came to a picture.

ex:

AWS

Azure

GCP

alibaba cloud

IBM cloud

Diagram: aws1.3

In 2004 the concept of cloud started.

**Q)What is AWS?**

AWS stands for Amazon Web Services.

It offers infrastructure as a service.

From 2004 to 2014 they are monopoly in industry.

AWS was a leader for almost 10 years.

Almost 75% to 80% of market occupied by AWS i.e Out of 100 , 75 to 80 customers are aws customers.

It is one of the leading cloud service provider accross the world.

In 2014 , microsoft Azure came in to a picture.

**Types of Cloud Business/Service Models**

**======================================**

We have three types of cloud business/service models.

1) IaS (Infrastructure as a Service)

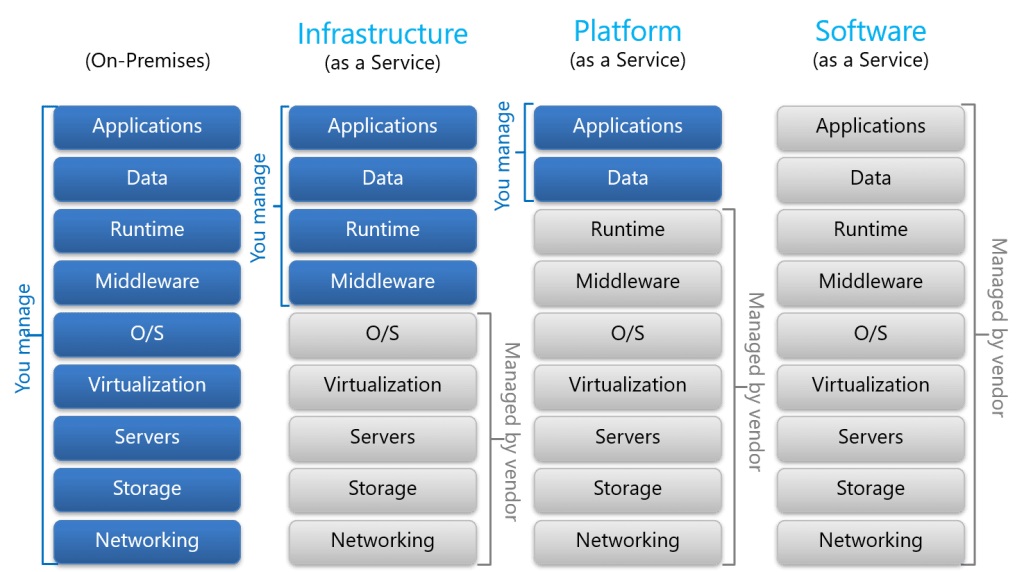
2) PaS (Platform as a Service)

3) SaS (Software as a Service)

All the cloud provides deals with above business/service models.

They comes up and ends up with shared responsibility model.

Some group of expertise engineers will decide which model they need to use for organization.

Diagram: aws2.1

**How to create account in AWS**

**============================**

To create account in AWS we required followings.

1) Debit/Credit card

2) Email Id

3) Maintain minimum 2 rupees in account

Note:

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If we use debit card to create an account then it will take less 24 hours.

If we use credit card to create an account then it will take less then 2 to 3 hours.

Diagram: aws2.2 to aws2.22

**Types of Operating System**

**==========================**

Operating system is a mediator or interface between a user and hardware component.

We have two types of operating system.

1) GUI (Graphical User Interface)

--------------------------------

ex:

windows

2) CLI (Command Line Interface)

------------------------------

ex:

linux

Note:

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In the space of operating , linux is widely used.

99% of enterprise infrastructure is CLI and that to linux.

**Importance of linux**

**===================**

Q) Who is the richest person for a longer time?

Ans) Bill Gates (It's because of licencing model of windows).

Linus Torwalds is a man behind the linux OS.

He thought, to run operating system why should I buy hardware from you and why have to pay for licencing to it.By keeping these aspects in mind he created an Operating system which is free for every one and everyone should have capability to access code of it.

He started an open source project called linux (linux kernel).

kernel is a first layer of the OS.

Every OS is having it's own kernel.

ex:

Linux kernel : it is a piece of software which interacts with hardware.

> He wants to make a free CLI OS

> Should run on any hardware

> OS should be open source

> GNUX (Generally Not Unix)

There are 300+ flavours / Distributions in linux(vendors).

All the 300+ operating system are clone either from "RedHat OS" or "Debian".

**How can we learn linux**

**=======================**

1) You can have linux laptop.

2) You can have a VM on your computers on top of Oracle Box.

3) Katakoda Sandbox (Test Environment)

4) Create a server on AWS cloud and start learning linux.

**Linux Server in AWS**

**====================**

Linux provide two ways authentication.

1) Username and password : Recommanded

2) Username with keys : Not recommanded (only for learning purpose)

Assume if your manager say to upgrade,install,uninstall or to do some task in a server then how we will connect to the server.

Key based Authentication or SSH key pair

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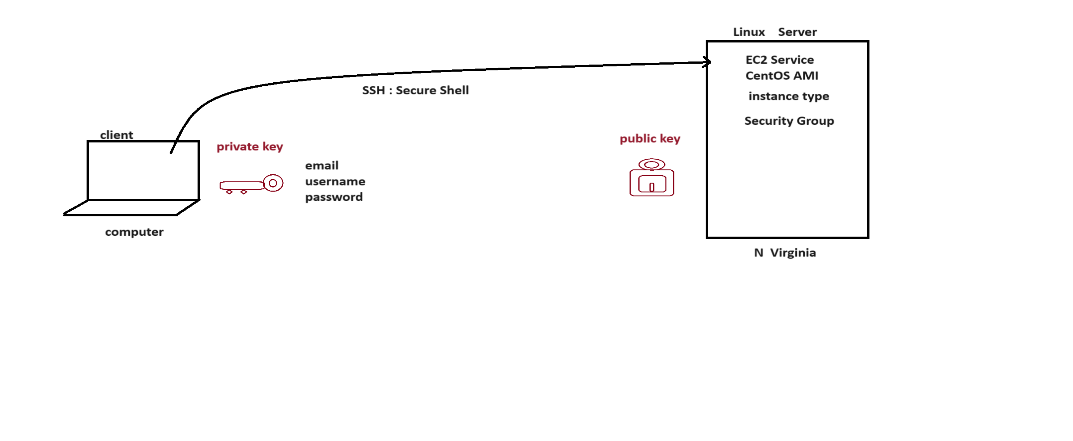
SSH key pair contains two files.

1) public key

2) private key

Diagram: aws3.1

In order to use SSH mechanism we need to install putty in our computer(For windows user).



**How to create a linux server in AWS using username with key**

**============================================================**

step1:

-------

Download and Install Putty software for windows OS.

ex:

https://www.chiark.greenend.org.uk/~sgtatham/putty/latest.html

Diagram: aws3.2 to aws3.6

step2:

------

Login in AWS account to create a linux server.

step3:

-----

Select "US EAST (North Virginia)" as a region.

step4:

-----

Now Launch EC2 Instance using CentOS 7 and SSH key.

step5:

------

Copy the Public IPv4 address from AWS account.

step6:

------

Open the putty from your computer.

step7:

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Paste the Public IPv4 address in putty and select SSH private key then open.

step8:

-------

Login to putty terminal as centos after clicking accept button.

step9:

------

Once the practice is completed terminate the server.

Diagrams: aws3.7 to aws3.32

**AWS Security group**

**===================**

To connect any EC2 instance we need create a security group otherwise instance created will failed.

How to create a linux server in AWS using username with password

============================================================

step1:

-------

Download and Install xShell software for windows OS.

ex:

https://www.netsarang.com/en/free-for-home-school/

step2:

------

Login in AWS account to create a linux server.

step3:

-----

Select "US EAST (North Virginia)" as a region.

step4:

-----

Now Launch EC2 Instance "Linux-Server-02" using CentOS 7 .

ex:

Region : N Virginia

AMI : DevOps-LabImage-Centos7

username : centos

password : DevOps321

step5:

------

Copy the Public IPv4 address from EC2 Instance.

step6:

------

Open the xShell from your computer.

step7:

-------

Type below command in xShell terminal.

ex:

$ ssh centos@54.147.252.74

step8:

-------

Enter the password.

ex:

password: DevOps321

step9:

------

Once the practice is completed terminate the server.

Note:

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If we want to connect with putty we can do it.

Open the putty and type the IPv4 address.

Diagram: aws4.2 to aws4.34

**Types of instances in AWS**

**========================**

We have three types of instances.

1) On-demand instance

2) Reserved instance

3) spot instance

1) On-demand Instance:

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In this case we are not ensure when we are going create server and terminate server.

On adopt basis , we are creating servers and terminating servers.

Here billing is very high (> high)

2) Reserved Instance :

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Whenever we have a vision to stay for a long term then we need to use reserved instance.

Typically when we joined a company, our company product manager or company representative talk to AWS TAM (Techical Account Manager).

ex:

we will use 1000 cpu and 2TB memory for 3 years

3) Spot Instance:

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Here we will get 95% to 98% discount.

spot instance is gold in company.

**AWS Tenancy**

**===========**

1) Shared instances :

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Here amazon is not having any visibility on flipkart and vice versa.

> Dedicated instances :

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In dedicated instance , banks and insaurance companies don't want other

servers should run in the harware where they are running.

It is costly to the company.

> Dedicated Hosts :

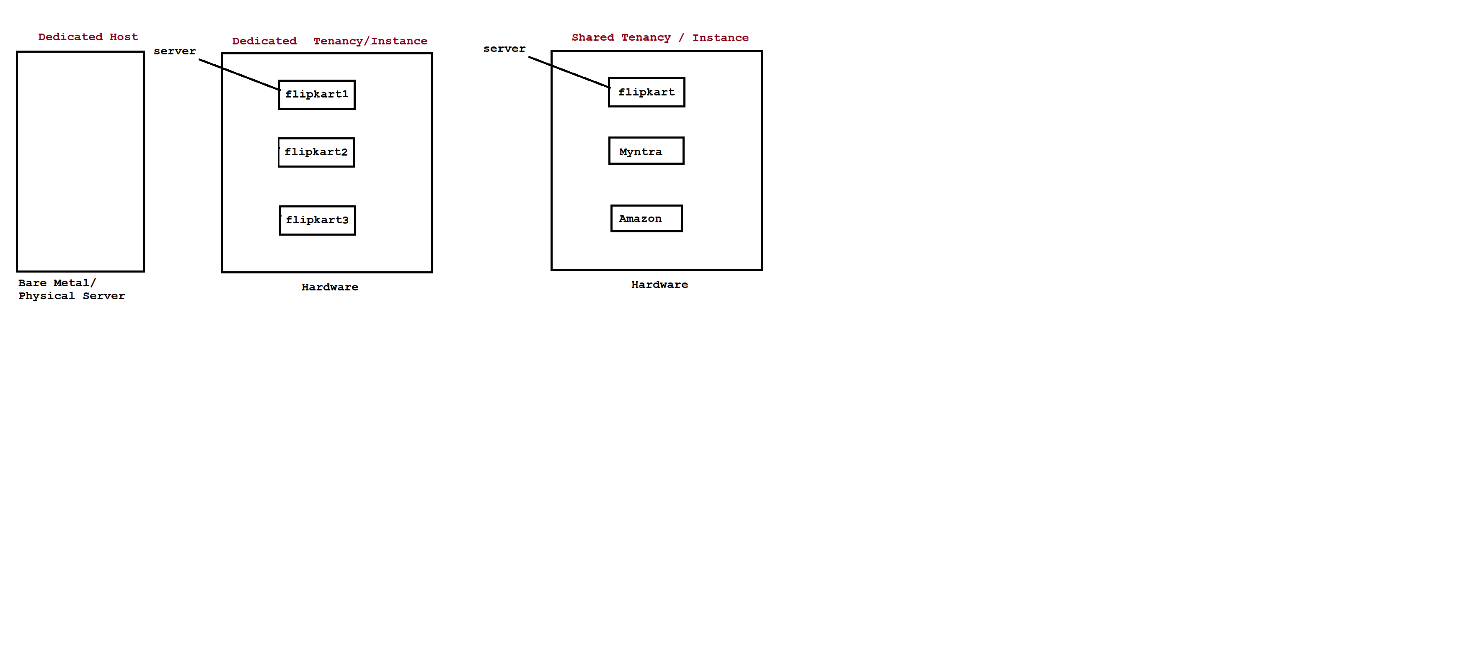
---------------------

Applications which are developed on-premises need dedicated server like physical server of a data center.

It describes how much cpu and storage required . It specially designed for you.

It is also known as Bare Metal / Physical server.

Diagram: aws4.1



AWS Launch Template

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To create a linux server we need to do lots of configurations and multiple clicks then our sever will be ready.

To overcome this limitation we need to use lauch template.

Using launch template we can create a server in just one click.

A launch template is similar to a launch configuration

It contains instance configuration information to launch an instance.

It includes the ID of the Amazon Machine Image (AMI), the instance type, a key pair, security groups, and other parameters used to launch EC2 instances.

Diagram: aws5.1 to aws5.33

JDBC Application To interact with AWS MySQL Database

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step1:

------

Download and Install MySQL work bench.

ex:

https://dev.mysql.com/downloads/

step2:

------

Connect to AWS account.

step3:

------

Select the region as US East (N. Virginia).

step4:

------

Goto services option and click to database i.e RDS.

step5:

-----

Click to create database button and do the configuration for MySQL DB.

step6:

-----

Click to DB Identifier name to get the endpoint of MySQL DB.

step7:

-----

Add VPC security group for MYSQL database.

step8:

-----

Now launch MySQL workbench and create a connection with AWS MySQL DB end point.

step9:

------

create schema in workbench.

ex:

create schema ihubdb;

step10:

------

Use the schema.

ex:

use ihubdb;

step11:

------

Create a table student table and insert the records.

ex:

create table student(sid int(3),sname varchar(10),sadd varchar(12));

insert into student values(101,'raja','hyd');

insert into student values(102,'ravi','delhi');

insert into student values(103,'ramana','vizag');

commit;

step12:

------

Launch eclipse IDE.

step13:

------

Create a java project i.e AWSJDBCProj.

step14:

------

Add mysql-connection-java.jar file inside project build path.

step15:

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Create a SelectApp.java file inside "com.ihub.www" package.

SelectApp.java

--------------

package com.ihub.www;

import java.sql.Connection;

import java.sql.DriverManager;

import java.sql.ResultSet;

import java.sql.Statement;

public class SelectApp

{

public static void main(String[] args)

{

final String DRIVER="com.mysql.cj.jdbc.Driver";

final String URL="jdbc:mysql://database-1.c30c66ia0at5.us-east-1.rds.amazonaws.com:3306/ihubdb";

final String USERNAME="admin";

final String PASSWORD="adminadmin";

final String QUERY="select \* from student";

Connection con=null;

Statement st=null;

ResultSet rs=null;

try

{

Class.forName(DRIVER);

con=DriverManager.getConnection(URL,USERNAME,PASSWORD);

st=con.createStatement();

rs=st.executeQuery(QUERY);

while(rs.next())

{

System.out.println(rs.getInt(1)+" "+rs.getString(2)+" "+rs.getString(3));

}

rs.close();

st.close();

con.close();

}

catch(Exception e)

{

e.printStackTrace();

}

}

}

step16:

-------

Run the JDBC Application and see the output.

Elastic BeanStalk

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AWS Elastic Beanstalk is an AWS-managed service for web applications.

Elastic Beanstalk is a Platform As A Service (PAAS) as it allows users to directly use a pre-configured server for their application.

First, create an application and select an environment, configure the environment, and deploy the application.

Steps to deploy war file in Tomcat server using Elastic BeanStalk

==================================================================

Step1:

--------

Create a Dynamic web application i.e LoginApp.

Deployment Directory Structure

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AWSApp

|

|---Java Resources

|

|

|---WebContent

|

|----index.jsp

|

|----WEB-INF

|

|----web.xml

Note:

-----

In above application we need to add "servlet-api.jar" file in project build path.

index.jsp

---------

<center>

<h1 style="color:blue">

Current Date and Time : <br>

<%

java.util.Date d=new java.util.Date();

out.println(d);

%>

</h1>

</center>

web.xml

--------

<?xml version="1.0" encoding="UTF-8"?>

<web-app xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns="http://java.sun.com/xml/ns/javaee" xsi:schemaLocation="http://java.sun.com/xml/ns/javaee http://java.sun.com/xml/ns/javaee/web-app\_3\_0.xsd" id="WebApp\_ID" version="3.0">

<welcome-file-list>

<welcome-file>index.jsp</welcome-file>

</welcome-file-list>

</web-app>

step2:

------

Convert dynamic web project to war file.

step3:

-----

Create a role for Identity and Access Management (IAM).

step4:

------

Create a a application and deploy the war file using elastic beanstalk.