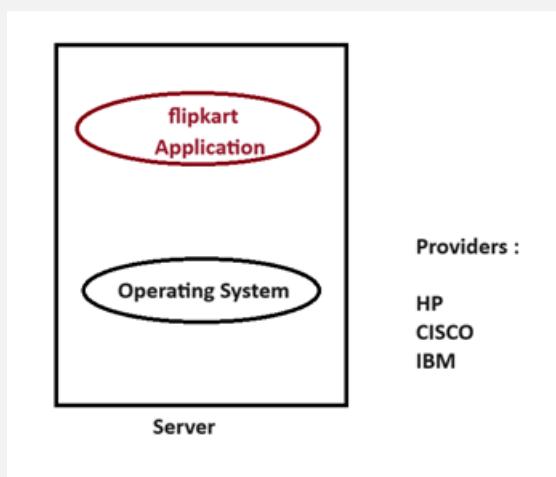


## Rest API's

- REST means REpresentational State Transfer.
- API means Application Programming Interface.
- REST is a architectural style which defines set of constraints that used to develop web services.
- REST API is a way of accessing webservices in a simple and flexible manner without having any processing.
- API which follows REST standards is called restfull API.
- RESTful API is an interface where two systems can exchange the information over the network securely.
- All the communication we can perform by using HTTP request.

### Diagram: REST-API



We have following list of HTTP methods to make a REST API call.

Method	Description
GET	It is used to read the resources
POST	is used to create the resources
PUT	It is used to update the existing resources.
DELETE	IT is used to delete the resources.

We have following REST annotation.

- `@RestController`
- `@GetMapping`
- `@PostMapping`
- `@PutMapping`
- `@DeleteMapping`

We have four types of REST API's.

- Public/Open API:
- Partner API
- Private API
- Composite API

## AWS

**Q) Types of applications ?**

We have two types of applications.

- 1) Client based application
- 2) Web based application

### 1) Client based application

- Application which is running in a user's computer is called client based application.
- In general, An application which need to be installed in a user's computer is called client based application.
- Client based application can be used by particular user.

All client based applications are ruled out.

ex:

VLC Media player

### 2) Web based application

- An application which can be access from anywhere over the network is called web based application.

ex:

Flipkart

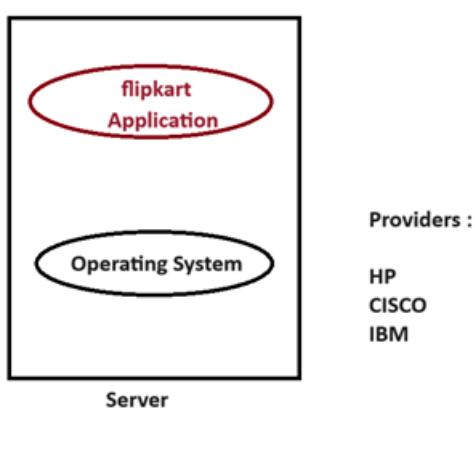
Amazon

**Q) Who can we develop an application which can be accessible by thousands and lakhs of users?**

First a software developer need to develop an application.

Later that application need to be host on the top of the server.

## Diagram: aws1.1



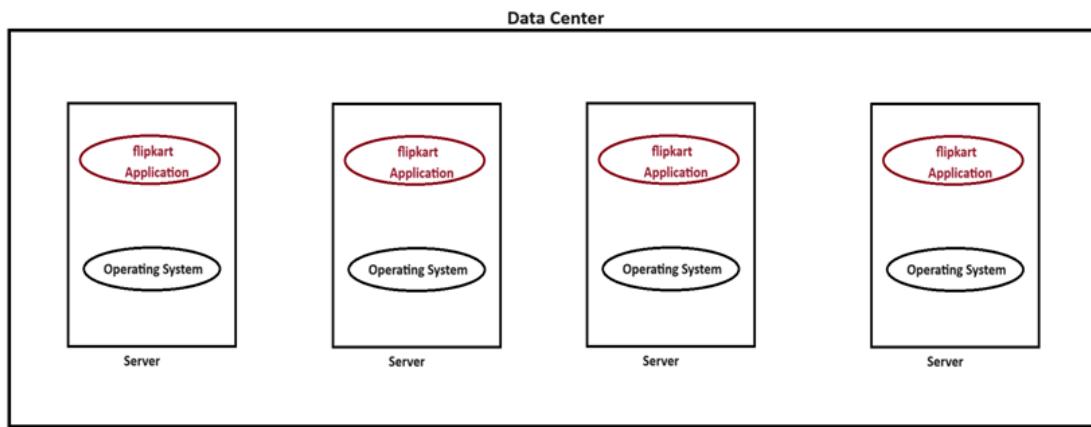
### **Q) What is the difference between PC and server?**

PC	Server
<b>A personal computer is designed for particular user.</b>	<b>A server is designed to operate multiple users.</b>
<b>It contains less storage from gigabyte to terabytes.</b>	<b>It contains high storage from terabytes to petabytes</b>
<b>It contains simple structure.</b>	<b>It contains complex structure.</b>
<b>Low network capability.</b>	<b>High network capability.</b>
<b>It contains single processor.</b>	<b>It contains multiple processors.</b>

### **Q) Will company use one server or multiple servers?**

- Depends upon the scale of the company they will use the servers.
- In short, companies revenue is completely rely on performance and availability of these machines(servers). So company need to ensure that servers are operating all the time.
- 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.

- Required private and secure place
- Server maintenance team (database admin, network admin, monitoring team and etc).
- 24/7 we need to maintain temperature 16 to 19 degree celsius.
- 24/7 Dual power supply (government and private power supplier)
- 24/7 Dual Network (ISP)
- Need to follow geographical orders/standards to protect customer data which contains physical security and network security.
- 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**

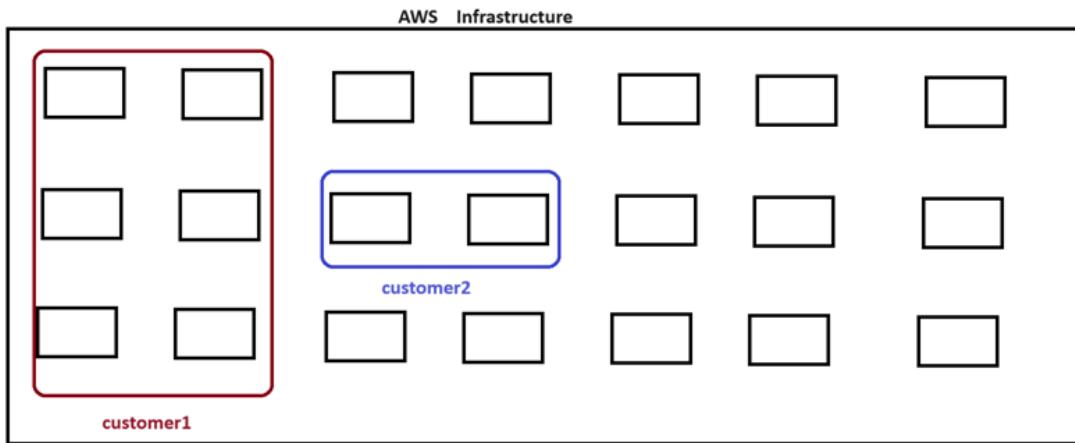
**Azure**

**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.

### **Q)Why to choose AWS?**

- AWS is been for industry more then a decade.Hence majority of the customers on Amazon cloud and learning AWS is ensure that you will get secure job.

### Types of Cloud Business/Service Models

We have three types of cloud business/service models.

**IaS (Infrastructure as a Service)**

**PaS (Platform as a Service)**

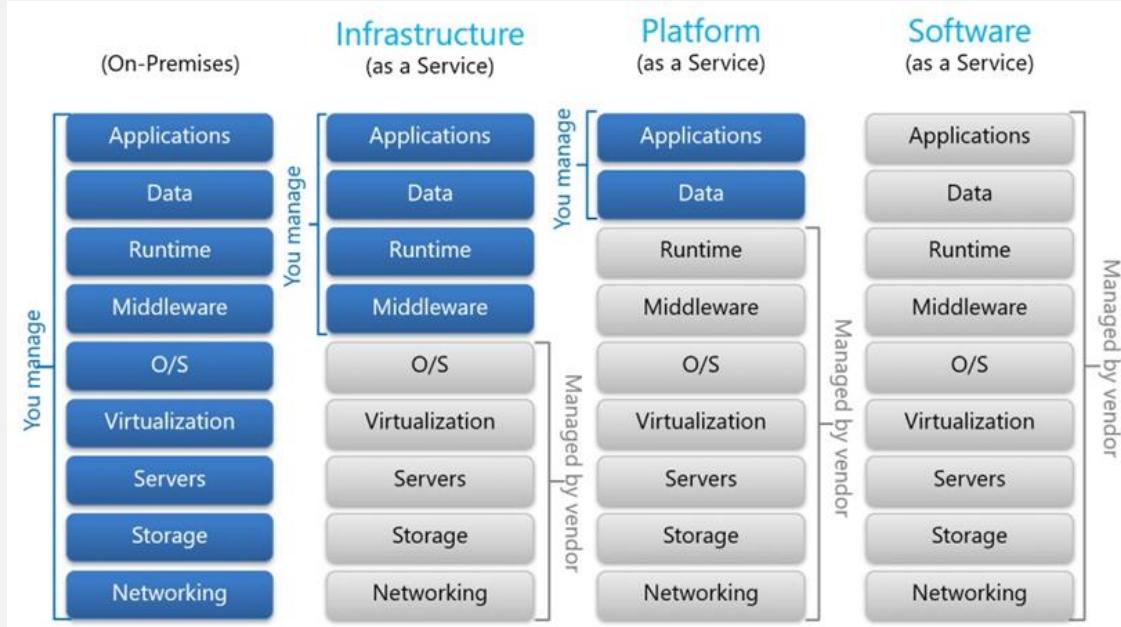
**SaS (Software as a Service)**

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

They come 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.

- Debit/Credit card
- Email Id
- Maintain minimum 2 rupees in account

#### Note:

- 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 than 2 to 3 hours.

## Diagram: aws2.2

A screenshot of a Google search results page. The search query is "aws free tier account". The top result is a link to Amazon's "Free Cloud Computing Services - AWS Free Tier" page. Below it is a link to "AWS Free Tier FAQs". A "People also ask" section is visible, with two expandable questions: "How do I use AWS free tier after 1 year?" and "What is the validity of AWS free tier account?". The URL "https://aws.amazon.com/free/" is highlighted in the search results.

## Diagram: aws2.3

A screenshot of the AWS Free Tier landing page. The page features a large orange header with the AWS logo and navigation links like "Contact Us", "Support", "English", "My Account", "Sign In", and "Complete Sign Up". Below the header, there's a main navigation bar with links for "AWS Free Tier", "Overview", "Free Tier Categories", "How to Create an Account", "Featured Offers for Business", "FAQs", and "Terms and Conditions". The main content area has a dark background with the title "AWS Free Tier" in large white text. Below the title, a sub-headline reads "Gain free, hands-on experience with the AWS platform, products, and services". A blue button labeled "Learn more about AWS Free Tier" is present. At the bottom, an orange button says "Create a Free Account". The URL "https://portal.aws.amazon.com/gp/aws/developer/registration/index.html?refid=em\_127222" is shown at the bottom left.

## Diagram: aws2.4

**aws**

### Sign up for AWS

**Explore Free Tier products with a new AWS account.**

To learn more, visit [aws.amazon.com/free](http://aws.amazon.com/free).



**Root user email address**  
Used for account recovery and some administrative functions

**AWS account name**  
Choose a name for your account. You can change this name in your account settings after you sign up.

**Verify email address**

OR

**Sign in to an existing AWS account**

## Diagram: aws2.5

**aws**

### Sign up for AWS

**Explore Free Tier products with a new AWS account.**

To learn more, visit [aws.amazon.com/free](http://aws.amazon.com/free).



**Confirm you are you**

Making sure you are secure -- it's what we do.

We sent an email with a verification code to [ulhasan7867@gmail.com](mailto:ulhasan7867@gmail.com). ([not you?](#))

Enter it below to confirm your email.

**Verification code**

**Verify**

**Resend code**

## Diagram: aws2.6

Explore Free Tier products with a new AWS account.

To learn more, visit [aws.amazon.com/free](http://aws.amazon.com/free).



### Sign up for AWS

#### Create your password

It's you! Your email address has been successfully verified. X

Your password provides you with sign in access to AWS, so it's important we get it right.

Root user password  
\*\*\*\*\*

Confirm root user password  
\*\*\*\*\*

**Continue (step 1 of 5)**

OR

[Sign in to an existing AWS account](#)

## Diagram: aws2.7



### Sign up for AWS

#### Contact Information

How do you plan to use AWS?

Business - for your work, school, or organization

Personal - for your own projects

Who should we contact about this account?

Full Name  
NIYAZ UL HASAN

Phone Number  
 +91 9030477947

Country or Region  
India

Address

## Diagram: aws2.8

Start your service activation today

Country or Region  
India

Address  
Hyderabad

1-4-735/78

City  
Hyderabad

State, Province, or Region  
Telangana

Postal Code  
500020

Customers with an Indian contact address are served by Amazon Web Services India Private Limited, the local seller for AWS services in India.

I have read and agree to the terms of the [AWS Customer Agreement](#).

**Continue (step 2 of 5)**

## Diagram: aws2.9

aws

### Sign up for AWS

**Secure verification**

We will not charge you for usage below AWS Free Tier limits. We may temporarily hold up to \$1 USD (or an equivalent amount in local currency) as a pending transaction for 3-5 days to verify your identity.

**Billing Information**

Credit or Debit card number

VISA, MasterCard, AMEX

AWS accepts all major credit and debit cards. To learn more about payment options, review our [FAQ](#).

Expiration date  
June 2026

Cardholder's name  
NIYAZ UL HASAN

CVV  
\*\*\*

## Diagram: aws2.10



Cardholder's name  
NIYAZ UL HASAN

CVV  
\*\*\*

Billing address  
 Use my contact address  
Hyderabad  
Hyderabad Telangana 500020  
IN  
 Use a new address

Do you have a PAN?  
Permanent Account Number (PAN) is a ten-digit alphanumeric number issued by the Indian Income Tax Department. This 10-digit number is printed on the front of your PAN card.

Yes  
 No

You can go on the Tax Settings Page on Billing and Cost Management Console to update your PAN information.

**Verify and Continue (step 3 of 5)**

You might be redirected to your bank's website to authorize the verification charge.

## Diagram: aws2.11



**Merchant Details**

Merchant Name	AMAZON
Date	Jun 13, 2023
Card Number	4280 XXXX XXXX 9022
Amount	₹2.00

**Authenticate Transaction**

OTP

Your OTP was successfully sent to your registered mobile number XXXXXX7947.  
Not your contact details? [Refresh Here](#)

Enter OTP  
\*\*\*\*\*

Resend OTP

**Cancel** **Submit**

## Diagram: aws2.12

aws

### Sign up for AWS

#### Confirm your identity

Before you can use your AWS account, you must verify your phone number. When you continue, the AWS automated system will contact you with a verification code.

How should we send you the verification code?

Text message (SMS)  
 Voice call

Country or region code  
India (+91)

Mobile phone number  
9030477947

Security check  
 

## Diagram: aws2.13

Text message (SMS)  
 Voice call

Country or region code  
India (+91)

Mobile phone number  
9030477947

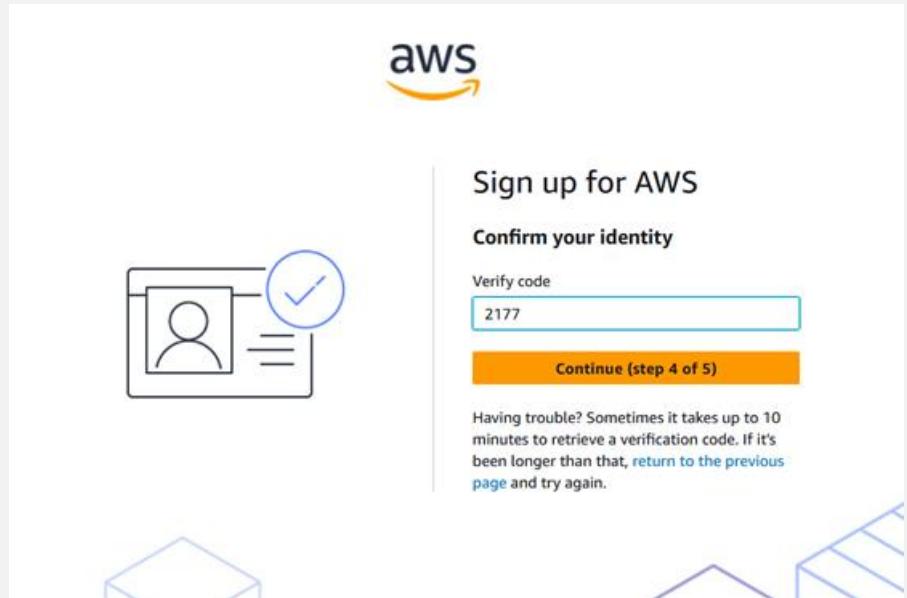
Security check  
   


Type the characters as shown above  
nCXX4t

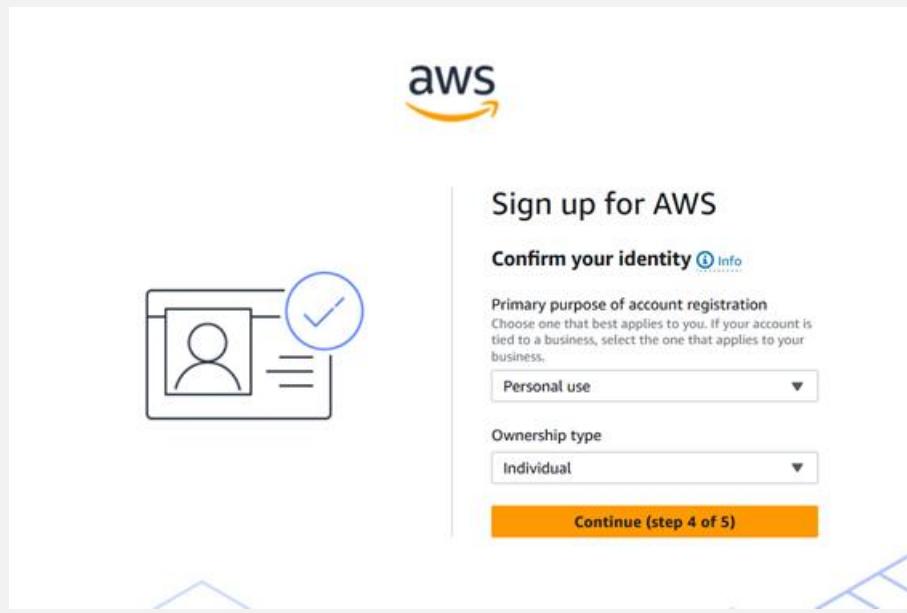
**Send SMS (step 4 of 5)**



## Diagram: aws2.14



## Diagram: aws2.15



## Diagram: aws2.16

Select a support plan

Choose a support plan for your business or personal account. [Compare plans and pricing examples](#) . You can change your plan anytime in the AWS Management Console.

<input checked="" type="radio"/> <b>Basic support - Free</b> <ul style="list-style-type: none"><li>Recommended for new users just getting started with AWS</li><li>24x7 self-service access to AWS resources</li><li>For account and billing issues only</li><li>Access to Personal Health Dashboard &amp; Trusted Advisor</li></ul> 	<input type="radio"/> <b>Developer support - From \$29/month</b> <ul style="list-style-type: none"><li>Recommended for developers experimenting with AWS</li><li>Email access to AWS Support during business hours</li><li>12 (business)-hour response times</li></ul> 	<input type="radio"/> <b>Business support - From \$100/month</b> <ul style="list-style-type: none"><li>Recommended for running production workloads on AWS</li><li>24x7 tech support via email, phone, and chat</li><li>1-hour response times</li><li>Full set of Trusted Advisor best-practice recommendations</li></ul> 
--	--	---

Need Enterprise level support?  
 From \$15,000 a month you will receive 15-minute response times and concierge-style experience with an assigned Technical Account Manager. [Learn more](#) 

[Complete sign up](#)

## Diagram: aws2.17





### Congratulations

Thank you for signing up for AWS.

We are activating your account, which should only take a few minutes. You will receive an email when this is complete.

[Go to the AWS Management Console](#)

[Sign up for another account or contact sales.](#)

Join confirmation/

## Diagram: aws2.18

The screenshot shows the AWS homepage with a purple header bar. Below it, a section titled "Personalize Your Experience" asks users to fill in blanks for role and interests. The "My role is:" dropdown is set to "Academic / Researcher". The "I am interested in:" dropdown is set to "Enterprise Applications". There is a checkbox for receiving news via email, post, or telephone, which is checked. A link to the AWS Privacy Notice is provided below the checkbox. A yellow "Submit" button is at the bottom right.

## Diagram: aws2.19

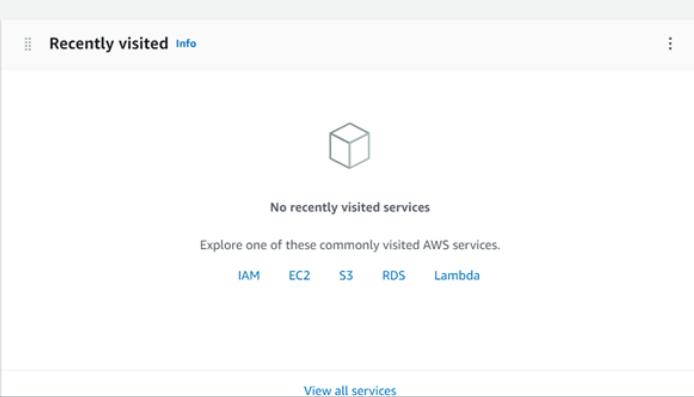
The screenshot shows the AWS sign-in process. On the left, there's a "Sign in" form with two radio button options: "Root user" (selected) and "IAM user". The "Root user" option includes a link to learn more about account owners. Below this is a "Root user email address" input field containing "ulhasan7867@gmail.com" and a blue "Next" button. At the bottom, a small legal text about cookie usage is visible. On the right, a large banner for "AWS Training and Certification" is displayed, featuring the text "Propel your career. Get AWS certified" and a "LEARN MORE" button. The banner has a dark background with white and orange graphics, including a gear icon.

## Diagram: aws2.20



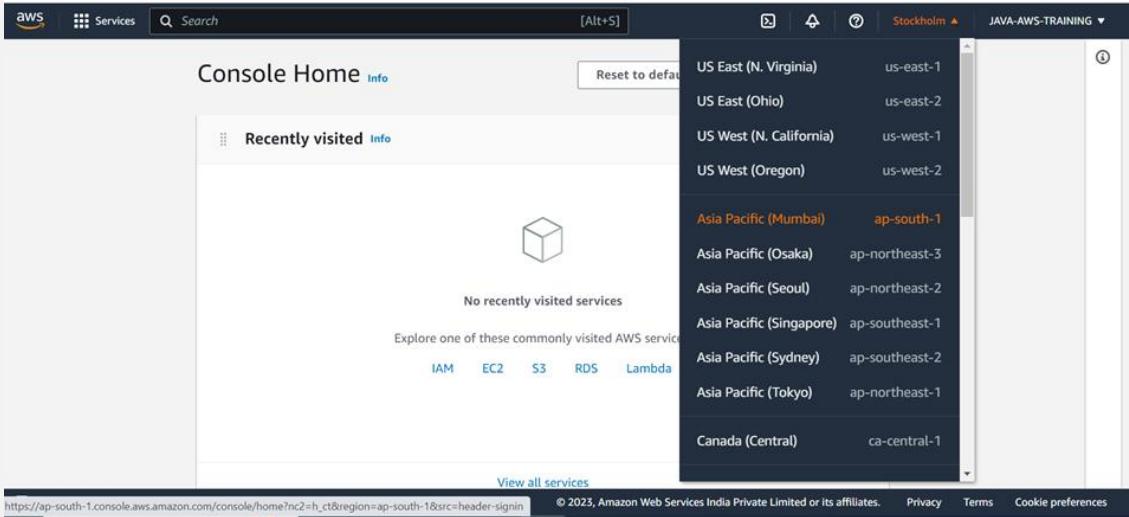
The screenshot shows the AWS Training and Certification landing page. At the top left is the AWS logo. Below it is a sign-in form for a root user, with fields for email (ulhasan7867@gmail.com) and password, and buttons for 'Sign in' and 'Forgot password?'. To the right of the sign-in form is a large banner for 'AWS Training and Certification' with the tagline 'Propel your career. Get AWS certified'. The banner features a graphic of a certificate with a seal and stars.

## Diagram: aws2.21



The screenshot shows the AWS Console Home page. The top navigation bar includes the AWS logo, a 'Services' dropdown, a search bar, and account information for 'Stockholm' and 'JAVA-AWS-TRAINING'. Below the navigation is a 'Console Home' section with a 'Recently visited' link. A central feature is a large cube icon with the text 'No recently visited services'. Below this, there's a link to 'View all services'. At the bottom of the page are links for 'CloudShell', 'Feedback', 'Language', '© 2023, Amazon Web Services India Private Limited or its affiliates.', 'Privacy', 'Terms', and 'Cookie preferences'. A red number '17' is overlaid at the bottom center of the page.

## Diagram: 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:

- 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?**

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
- GENUX (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

- You can have linux laptop.
- You can have a VM on your computers on top of Oracle Box.
- Katakoda Sandbox (Test Environment)
- Create a server on AWS cloud and start learning linux.

## Linux Server in AWS

Linux provide two ways authentication.

**1) Username and password : Recommended**

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

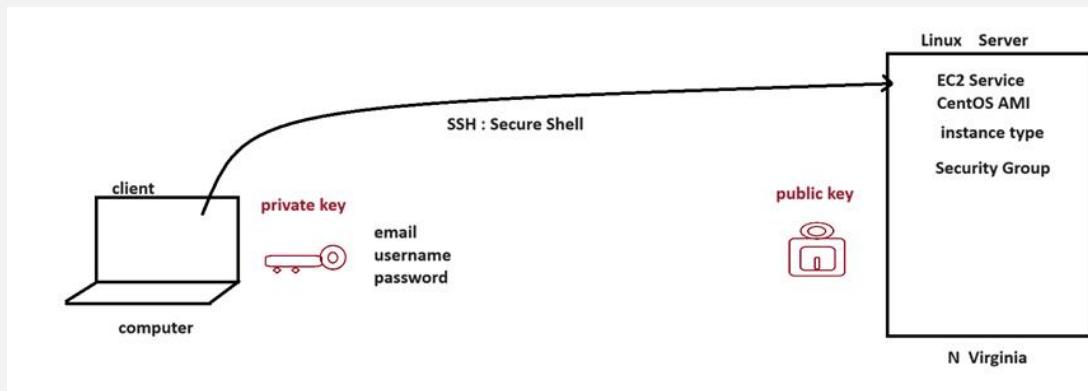
Assume if your manager say to upgrade, install, uninstall or to do some task in a server then how we will connect to the server.

## Key based Authentication or SSH key pair

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

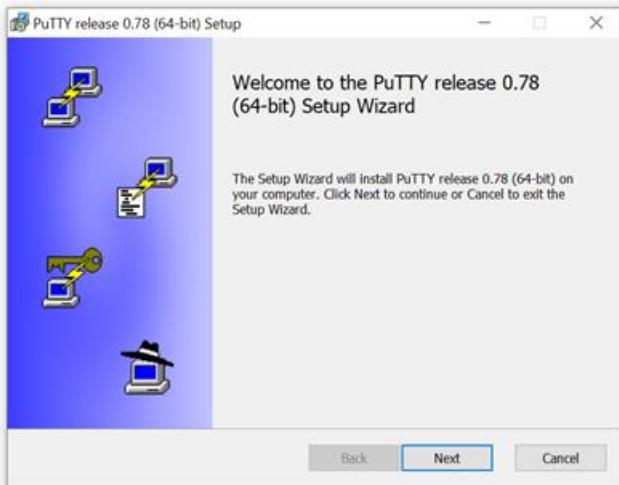
### step1:

Download and Install Putty software for windows OS.

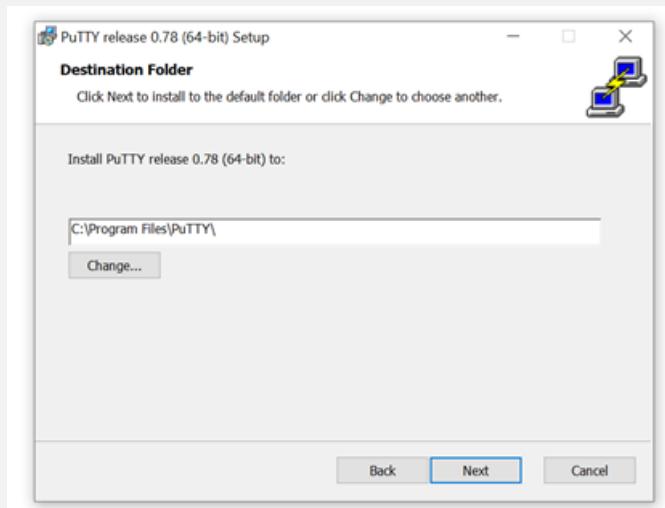
**ex:**

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

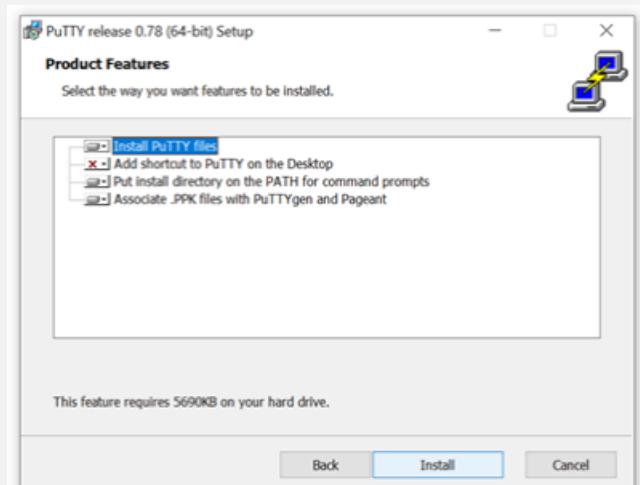
## Diagram: aws3.2



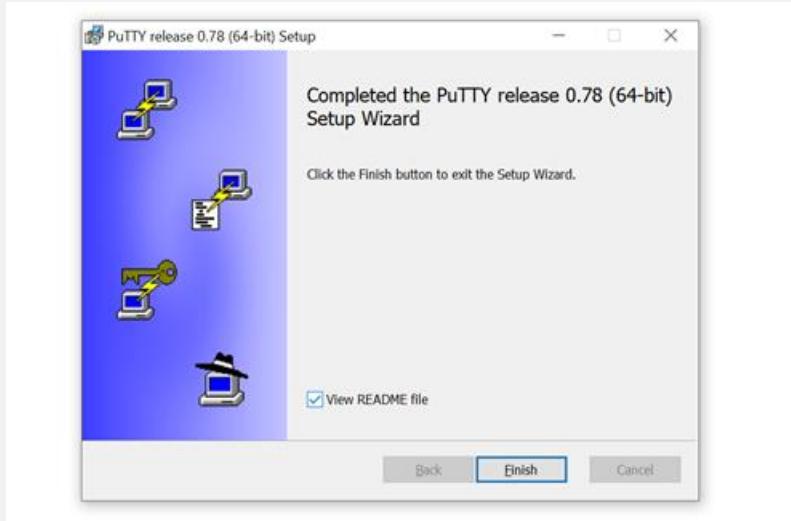
### Diagram: aws3.3



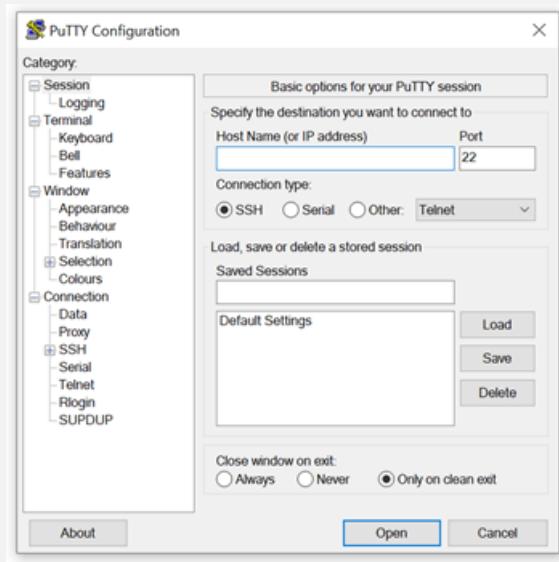
### Diagram: aws3.4



## Diagram: aws3.5



## Diagram: 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:

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

The screenshot shows the AWS Services search interface. The search bar at the top contains the query 'EC2'. Below the search bar, a list of services is displayed under the heading 'Services (12)'. The 'EC2' service is highlighted with a blue border. Other listed services include Features (53), Resources (New), Blogs (1,980), Documentation (32,246), Knowledge Articles (30), Tutorials (21), Events (30), and Marketplace (2,398). To the right of the search results, there is a sidebar titled 'Services' which lists EC2, EC2 Image Builder, and Amazon Inspector. At the bottom of the page, there are links for CloudShell, Feedback, Language, and cookie preferences.

## Diagrams: aws3.8

The screenshot shows the AWS EC2 Resources page. On the left, a sidebar menu includes EC2 Dashboard, Events, Limits, Instances (with sub-options like Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, and Dedicated Hosts), and a feedback link. The main content area displays a table of resources with counts: Instances (running) 0, Auto Scaling Groups 0, Dedicated Hosts 0, Elastic IPs 0, Instances 0, Key pairs 0, Load balancers 0, Placement groups 0, Security groups 1, Snapshots 0, and Volumes 0. A callout bubble points to the 'Instances (running)' row. To the right, an 'Account attributes' sidebar lists supported platforms (VPC), default VPC (vpc-05cfe746cc08117dc), settings, EBS encryption, zones, EC2 Serial Console, default credit specification, and console experiments. A vertical toolbar on the far right contains various icons for managing resources.

## Diagrams: aws3.9

The screenshot shows the AWS EC2 Instances page. The left sidebar is identical to the previous screenshot. The main area shows a table with one entry: 'No matching instances found'. Above the table, there is a search bar with the placeholder 'Find instance by attribute or tag (case-sensitive)' and a filter button 'Instance state = running'. To the right of the table, there is a 'Actions' dropdown menu with a 'Launch instances' option, which is circled in red. A vertical toolbar on the right side provides additional management tools.

## Diagrams: aws3.10

**Launch an instance**

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

**Name and tags**

Name: Linux-Server-Dev

**Application and OS Images (Amazon Machine Image)**

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

**Summary**

Number of instances: 1

Software Image (AMI): Amazon Linux 2023 AMI 2023.0.2...  
ami-022e1a32d3f742bd8

Virtual server type (instance type): t2.micro

**Launch instance**

## Diagrams: aws3.11

**Application and OS Images (Amazon Machine Image)**

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below.

**Quick Start**

Amazon Linux, macOS, Ubuntu, Windows, Red Hat, **ubuntu**, Microsoft, Red Hat

**Browse more AMIs**

Including AMIs from AWS, Marketplace and the Community

**Summary**

Number of instances: 1

Software Image (AMI): Amazon Linux 2023 AMI 2023.0.2...  
ami-022e1a32d3f742bd8

Virtual server type (instance type): t2.micro

**Launch instance**

## Diagrams: aws3.12

**Search for an AMI by entering a search term e.g. "Windows"**

**Quickstart AMIs (47)** Commonly used AMIs

**My AMIs (0)** Created by me

**AWS Marketplace AMIs (8262)** AWS & trusted third-party AMIs

**Community AMIs (500)** Published by anyone

**Amazon Linux**

ami-022e1a32d3f742bd8 (64-bit (x86)) / ami-0b54418bdd76353ce (64-bit (Arm))  
Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.  
Platform: amazon Root device type: ebs Virtualization: hvm ENA enabled: Yes  
**Select**  
 64-bit (x86)  
 64-bit (Arm)

**Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type**

ami-090e0fc566929d98b (64-bit (x86)) / ami-0dd13bd6eb6a9effe (64-bit (Arm))  
Amazon Linux 2 comes with five years support. It provides Linux kernel 5.10 tuned for optimal performance on Amazon EC2, extended 219 GCC  
**Select**

## Diagrams: aws3.13

The screenshot shows the AWS Lambda console interface. At the top, there's a search bar with the query "centos 7". Below the search bar, there are four categories: "Quickstart AMIs (47)", "My AMIs (0)", "AWS Marketplace AMIs (8262)", and "Community AMIs (500)". The "Community AMIs" tab is selected. A large list of AMI results is displayed, with the first item being "us-east-1 image for x86\_64 CentOS\_7 ami-08679b538849297f1". To the right of this item is a yellow "Select" button, which is circled in red. At the bottom of the page, there's a "Show all" link.

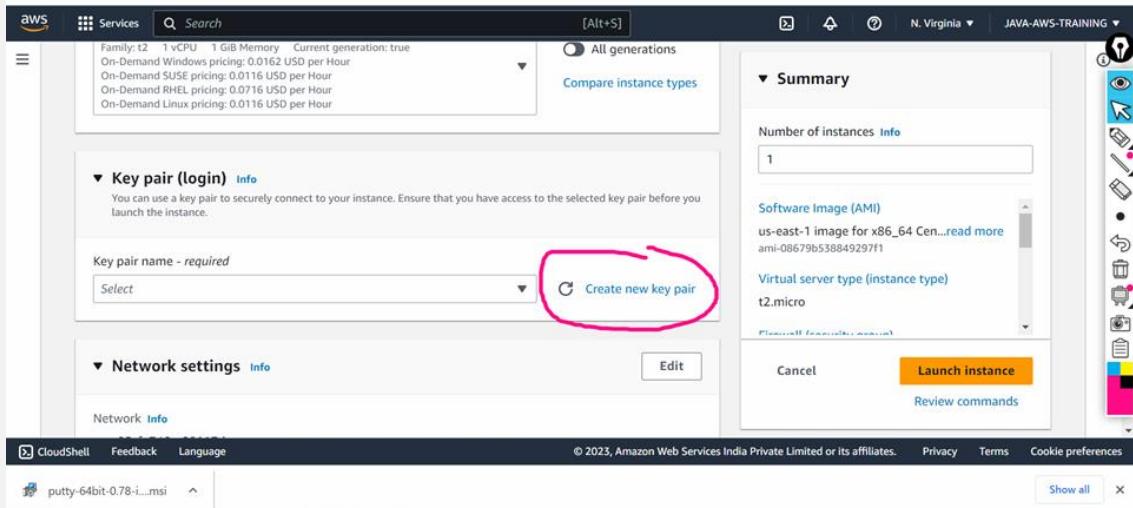
## Diagrams: aws3.14

This screenshot is similar to the one above, showing the AWS Lambda console with the search term "centos 7" in the search bar. The "Community AMIs (500)" tab is selected. The same "us-east-1 image for x86\_64 CentOS\_7" item is shown, but the yellow "Select" button is now highlighted with a pink circle.

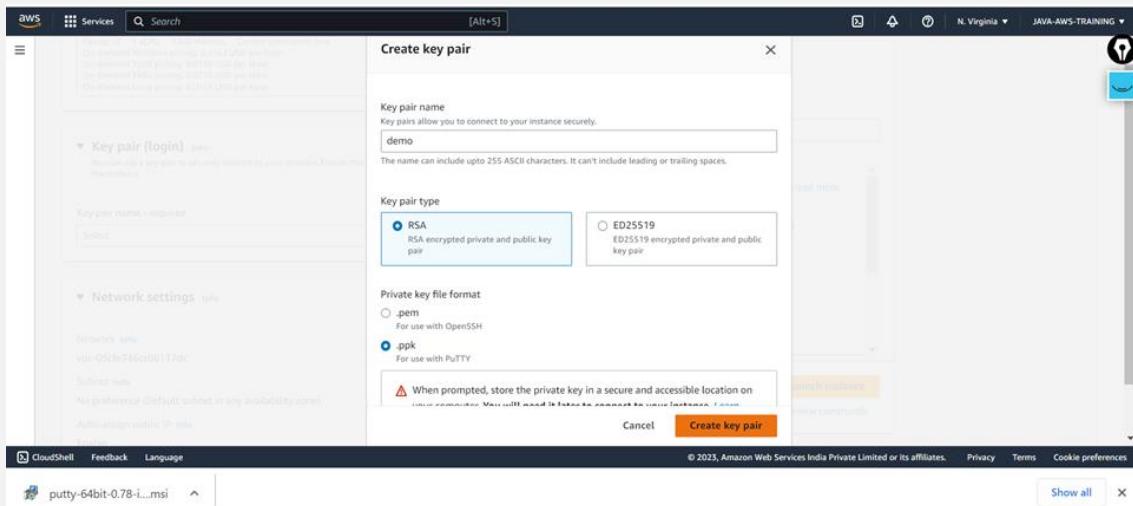
## Diagrams: aws3.15

This screenshot shows the AWS Lambda console during the instance creation process, specifically step 2: "Configure instance details". On the left, there's a sidebar with sections for "Instance type" and "Key pair (login)". The "Instance type" section is expanded, showing the "t2.micro" option selected. The "Key pair (login)" section is also expanded, with a note about using a key pair for secure connection. On the right, there's a summary panel with fields for "Number of instances" (set to 1), "Software image (AMI)" (set to "us-east-1 image for x86\_64 CentOS\_7"), and "Virtual server type (instance type)" (set to "t2.micro"). At the bottom right is a yellow "Launch instance" button, which is circled in red. Other buttons like "Cancel" and "Review commands" are also visible.

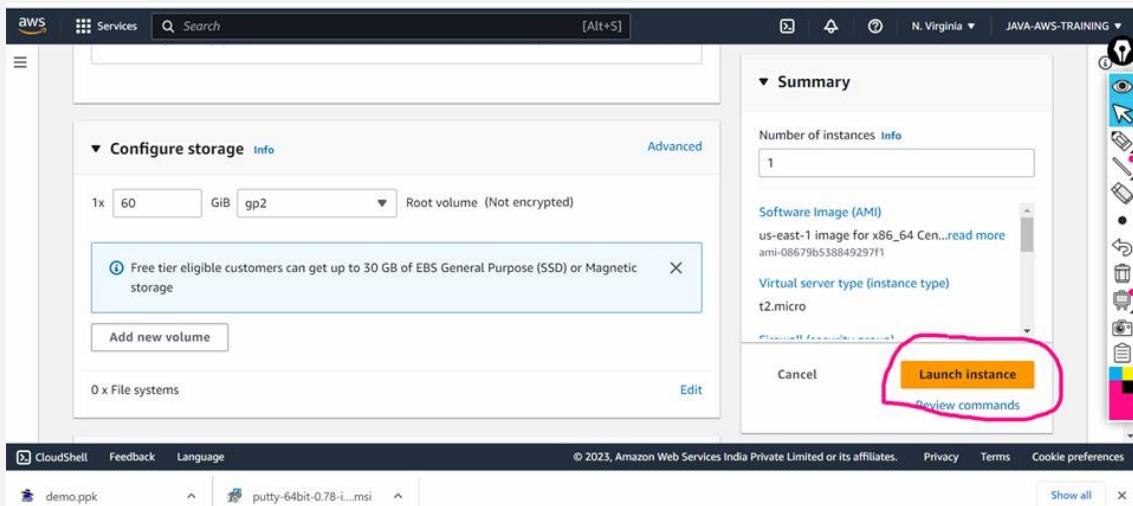
## Diagrams: aws3.16



## Diagrams: aws3.17



## Diagrams: aws3.18



## Diagrams: aws3.19

The screenshot shows the AWS EC2 Instances page with the 'Launch an instance' wizard. A progress bar at the top indicates 'Creating security group rules' at 23%. Below the progress bar, there's a link to 'Details'. The bottom of the screen shows the AWS navigation bar with CloudShell, Feedback, Language, and other links.

## Diagrams: aws3.20

The screenshot shows the AWS EC2 Instances page after a successful launch. A green success message states 'Successfully initiated launch of instance (i-0ff94285af9d6b8db)'. The 'Launch log' link is visible below the message. The 'Next Steps' section includes links for Create billing and free tier usage alerts, Connect to your instance, Connect an RDS database, and Create EBS snapshot policy. The bottom of the screen shows the AWS navigation bar.

## Diagrams: aws3.21

The screenshot shows the AWS EC2 Instances page listing one instance. The instance details are: Instance ID = i-0ff94285af9d6b8db, Name = Linux-Server-..., Instance state = Running, Instance type = t2.micro, Status check = Initializing, Alarm status = No alarms. The 'Running' status is highlighted with a pink circle. The left sidebar shows the 'Instances' section with sub-links like Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, and Scheduled Instances. The bottom of the screen shows the AWS navigation bar.

## Diagrams: aws3.22

The screenshot shows the AWS EC2 Instances page. A single instance, "Linux-Server-...", is listed with the following details:

- Instance ID: i-0ff94285af9d6b8db
- Instance state: Running
- Instance type: t2.micro
- Status check: Initializing
- Alarm status: No alarms

A red circle highlights the checkbox in the header row, which is checked.

## Diagrams: aws3.23

The screenshot shows the AWS EC2 Instances page with the "Status checks" tab selected. Two specific items are highlighted with red circles:

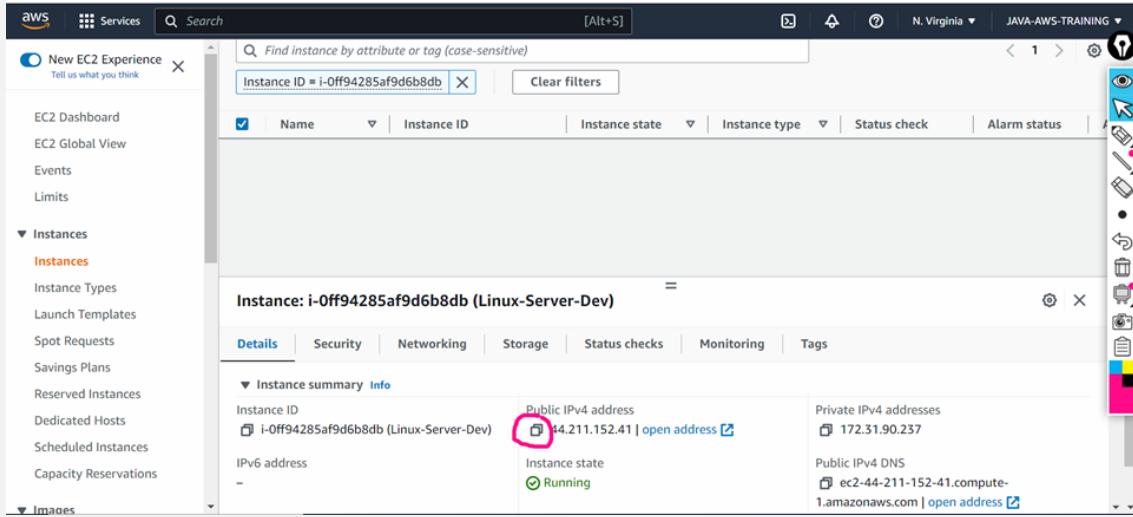
- System status checks: System reachability check passed
- Instance status checks: Instance reachability check passed

A red circle also highlights the "Status checks" tab itself.

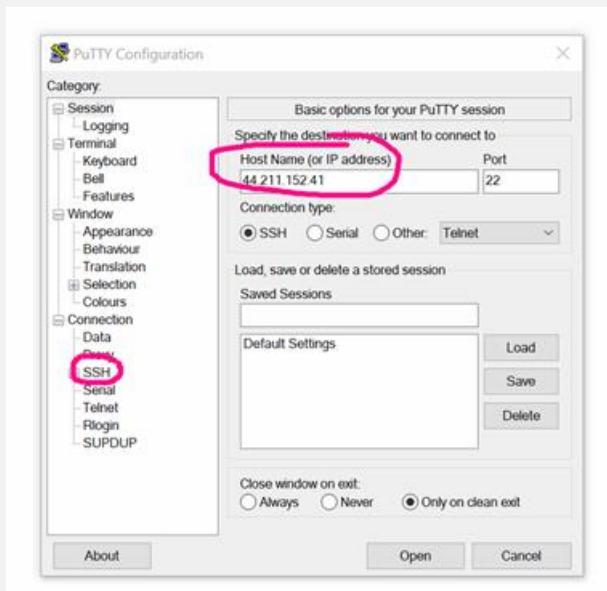
## Diagrams: aws3.24

The screenshot shows the AWS EC2 Instances page with the "Details" tab selected. A red circle highlights the checkbox in the header row, which is checked.

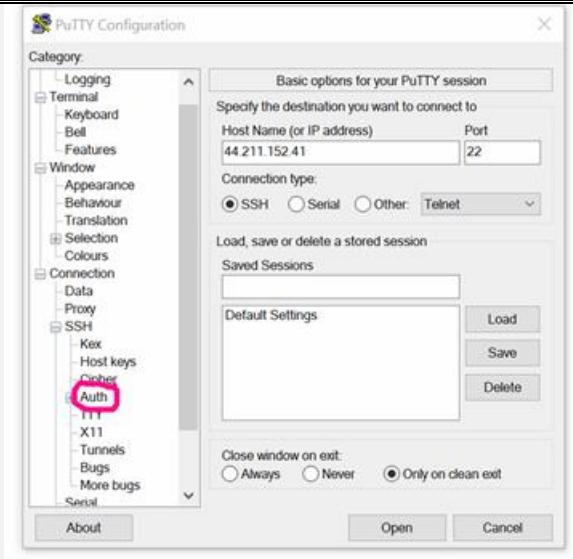
## Diagrams: aws3.25



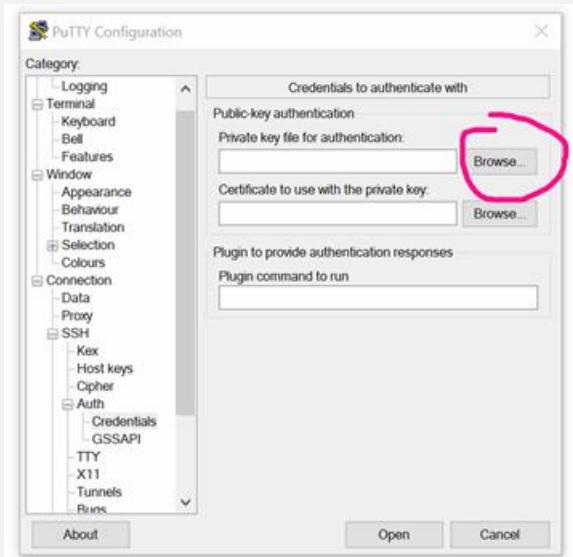
## Diagrams: aws3.26



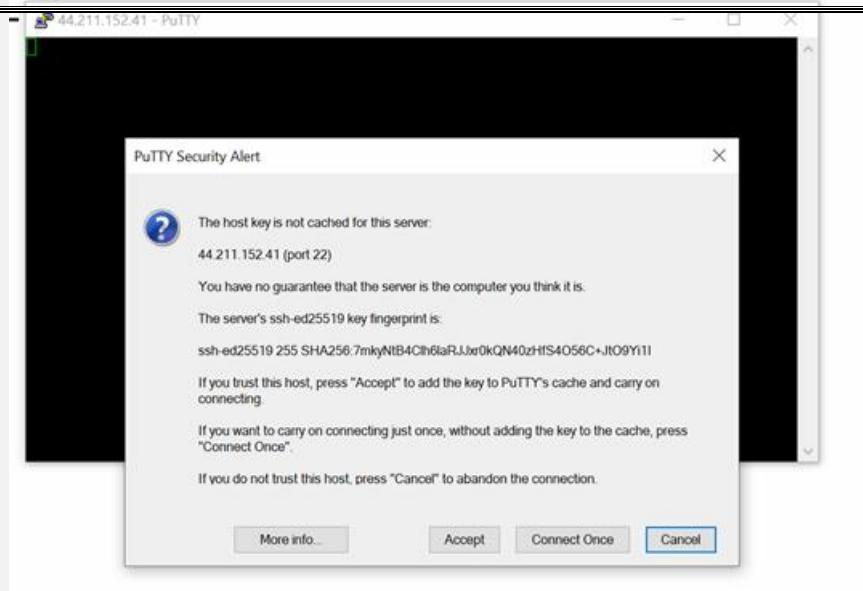
## Diagrams: aws3.27



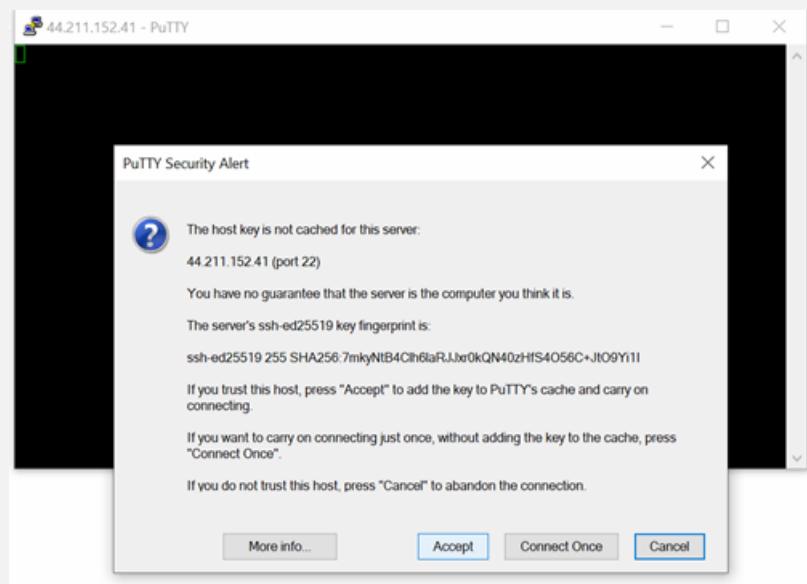
## Diagrams: aws3.28



## Diagrams: aws3.29



## Diagrams: aws3.30



## Diagrams: aws3.31

The screenshot shows the AWS EC2 Instances page. On the left sidebar, under the 'Instances' section, 'Instances' is selected. In the main content area, the 'Instances (1/1) Info' section is displayed. An instance named 'Linux-Server-...' with Instance ID i-Off94285af9d6b8db is listed, showing it is 'Running'. The 'Status checks' tab is active, displaying two successful status checks: 'System reachability check passed' and 'Instance reachability check passed'. A tooltip for the 'Report instance status' button is visible at the bottom of the status checks section.

## Diagrams: aws3.32

The screenshot shows the AWS EC2 Instances page with a termination dialog box overlaid. The dialog box is titled 'Terminate instance?' and contains a warning message: 'On an EBS-backed instance, the default action is for the root EBS volume to be deleted when the instance is terminated. Storage on any local drives will be lost.' Below this, it asks 'Are you sure you want to terminate these instances?' and lists the instance ID 'i-Off94285af9d6b8db (Linux-Server-Dev)'. It also states 'To confirm that you want to terminate the instances, choose the terminate button below. Terminating the instance cannot be undone.' At the bottom right of the dialog is a large orange 'Terminate' button.

## 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:

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:

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

Open the putty and type the IPv4 address.

## Types of instances in AWS

We have three types of instances.

- On-demand instance
- Reserved instance

- spot instance

## **1) On-demand Instance:**

- In this case we are not ensure when we are going to create server and terminate server.
- On adopt basis , we are creating servers and terminating servers.
- Here billing is very high (> high)

## **2) Reserved Instance :**

- 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 (Technical Account Manager).

**ex:**

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

## **3) Spot Instance :**

Here we will get 95% to 98% discount.

spot instance is gold in company.

# **AWS Tenancy**

## **1) Shared instances :**

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

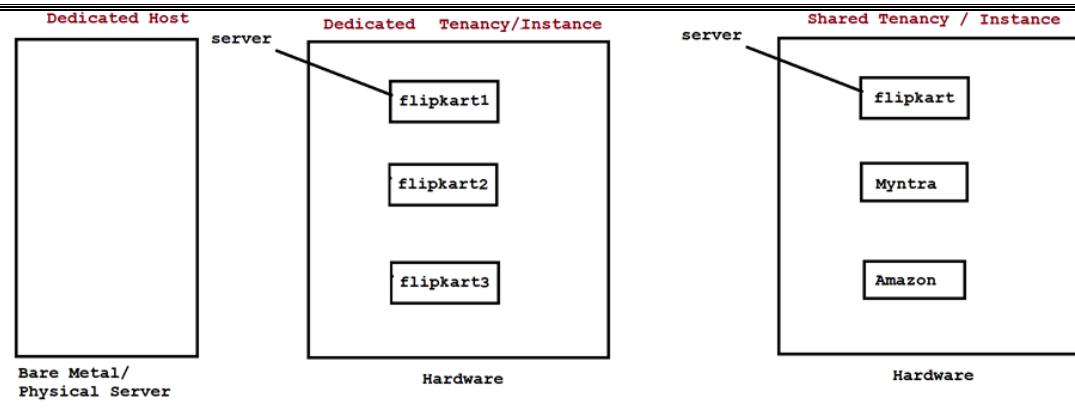
## **Dedicated instances :**

- In dedicated instance , banks and insurance companies don't want other servers should run in the hardware where they are running.
- It is costly to the company.

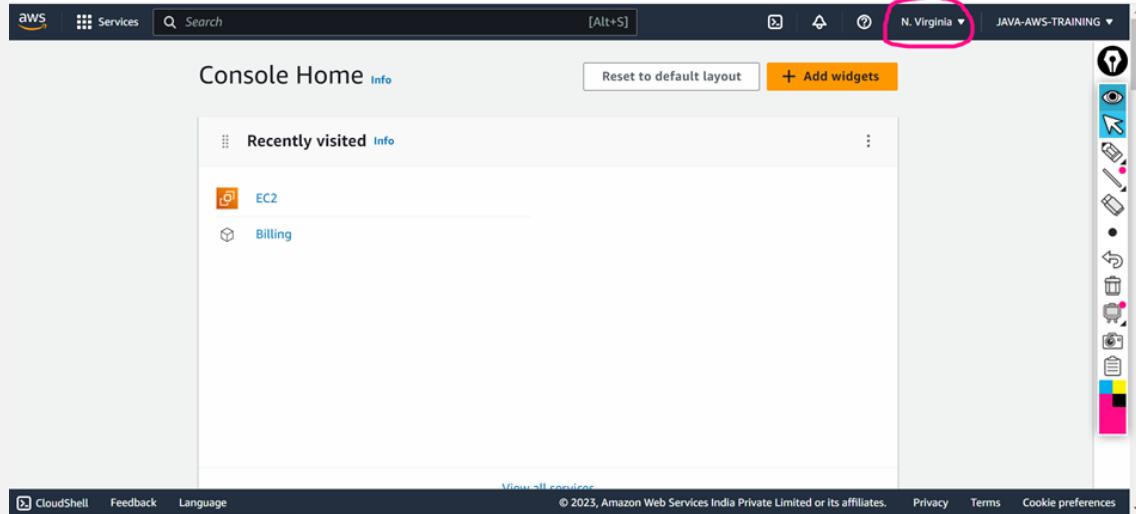
## **Dedicated Hosts :**

- 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.

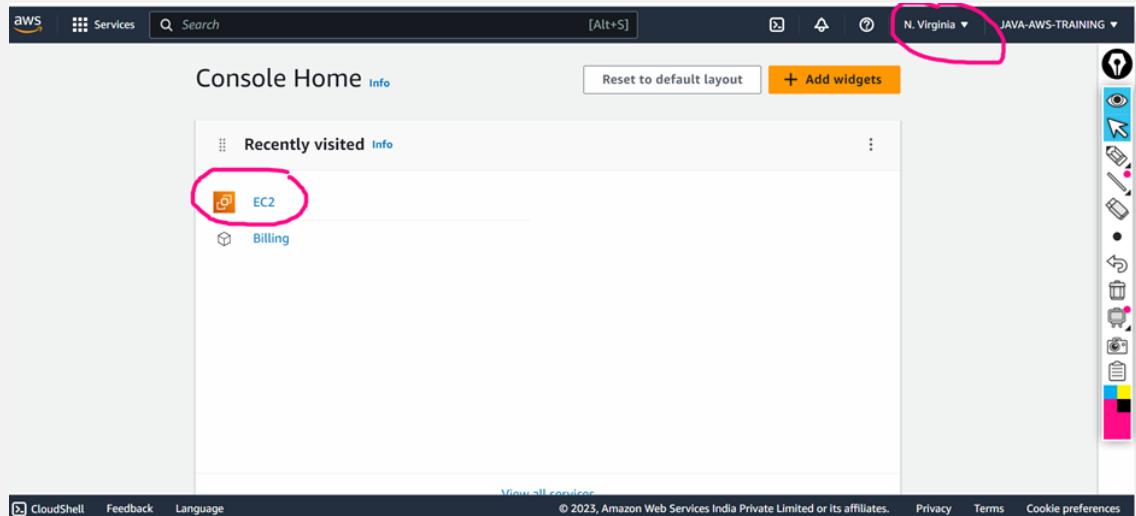
## **Diagram: aws4.1**



**Diagram: aws4.2**



**Diagram: aws4.3**



**Diagram: aws4.4**

The screenshot shows the AWS EC2 Dashboard. On the left, there's a sidebar with options like EC2 Dashboard, Instances, and Capacity Reservations. The main area displays a grid of resources: Instances (running) 0, Auto Scaling Groups 0, Dedicated Hosts 0, Elastic IPs 0, Instances 0, Key pairs 1, Load balancers 0, Placement groups 0, Security groups 4, Snapshots 0, and Volumes 0. A callout box highlights the 'Instances (running)' row. On the right, the 'Account attributes' section is visible, showing supported platforms (VPC), default VPC (vpc-05cf746cc08117dc), settings, EBS encryption, zones, EC2 Serial Console, Default credit specification, and Console experiments. A vertical toolbar on the far right contains various icons for managing resources.

## Diagram: aws4.5

The screenshot shows the AWS EC2 Instances page. The left sidebar includes Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, and Capacity Reservations. The main area has a search bar and filters for instance state (running) and instance type. A large button labeled 'Launch Instances' is highlighted with a red circle. A callout box points to this button with the text: 'Easily size, configure, and deploy Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server. Learn more'. The bottom right corner features a vertical toolbar with various icons.

## Diagram: aws4.6

The screenshot shows the 'Launch an instance' wizard. Step 1: Set instance details. It asks for a name (My-Linux-Spot-Server) and allows adding tags. Step 2: Application and OS Images (Amazon Machine Image). It provides a search bar to find AMIs. A callout box points to the search bar with the text: 'Search our full catalog including 1000s of application and OS images'. The bottom right corner features a vertical toolbar with various icons.

## Diagram: aws4.7

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Search our full catalog including 1000s of application and OS images

**Quick Start**

Amazon Machine Image (AMI)

Amazon Linux 2023 AMI      Free tier eligible

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## Diagram: aws4.8

Search for an AMI by entering a search term e.g. "Windows"

Quickstart AMIs (47)   My AMIs (0)   AWS Marketplace AMIs (0)   **Community AMIs (500)**

Clear all filters

Free tier only   OS category   All Linux/Unix   All Windows   Architecture   64-bit (Arm)   32-bit (x86)   64-bit (x86)   64-bit (Mac)   64-bit (Mac-Arm)

**Amazon Linux 2023 AMI**  
ami-06b09bfacae1453cb (64-bit (x86), uefi-preferred) / ami-03e7d35abf8845efc (64-bit (Arm), uefi)  
Amazon Linux 2023 is a modern, general purpose Linux-based OS that comes with 5 years of long term support. It is optimized for AWS and designed to provide a secure, stable and high-performance execution environment to develop and run your cloud applications.  
Platform: amazon Root device type: ebs Virtualization: hvm ENA enabled: Yes  
**Select**  
64-bit (x86), uefi-preferred   64-bit (Arm), uefi

**Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type**  
ami-04823729c75214919 (64-bit (x86)) / ami-000a54989336780b5  
Amazon Linux 2 comes with five years support. It provides Linux kernel 5.10 tuned for optimal performance on Amazon EC2, systemd 219, GCC 7.3, Glibc 2.26, Binutils 2.29.1, and the latest software packages  
**Select**  
64-bit (x86)

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## Diagram: aws4.9

Choose an Amazon Machine Image (AMI)

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. You can select an AMI provided by AWS, our user community, or the AWS Marketplace; or you can select one of your own AMIs.

Q: Centos7-Linux-Learning-AMI

Quickstart AMIs (47)   My AMIs (0)   AWS Marketplace AMIs (8290)   **Community AMIs (500)**

Refine results   Clear all filters   Operating system

All products (500 filtered, 500 unfiltered)

**Community AMIs**  
Community AMIs contain all AMIs that are public, therefore anyone can publish an AMI and it will show in this catalog. This catalog can also contain paid products. When using community AMIs it is best practice to ensure you know and trust the publisher before launching an AMI.

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## Diagram: aws4.10

Screenshot of the AWS Marketplace AMIs search results for "Centos7-Linux-Learning-AMI". The search bar at the top contains the query. Below it, there are four tabs: "Quickstart AMIs (0)", "My AMIs (0)", "AWS Marketplace AMIs (10)", and "Community AMIs (1)". The "AWS Marketplace AMIs" tab is selected, showing a single result: "Centos7-Linux-Learning-AMI" (ami-01337809c40300dde). The result card includes details: Platform: Cent OS, Architecture: x86\_64, Owner: 834725375088, Publish date: 2023-02-21, Root device type: ebs, Virtualization: hvm, ENA enabled: Yes. A large orange "Select" button is highlighted with a red circle. To the left, a sidebar shows categories like "Operating system" and "Linux/Unix". At the bottom, a note says "The following results for 'Centos7-Linux-Learning-AMI' were found in other categories" followed by a link to "10 results in AWS Marketplace AMIs".

## Diagram: aws4.11

Screenshot of the AWS Launch Wizard configuration page. The "Instance type" section is highlighted with a red circle, showing the selection of "t2.micro". To the right, the "Free tier eligible" status is also highlighted with a red circle. Other options shown include "All generations" and "Compare instance types". Below this, the "Key pair (login)" section is visible, containing a note about using a key pair for secure connection and a "Key pair name - required" input field.

## Diagram: aws4.12

Screenshot of the AWS Launch Wizard configuration page, focusing on the "Key pair (login)" section. The "Key pair name" input field is highlighted with a red circle. It contains the placeholder text "Proceed without a key pair (Not recommended)". Below this, there are buttons for "Default value" and "Create new key pair". The "Network settings" section is partially visible at the bottom.

## Diagram: aws4.13

The screenshot shows the AWS CloudFormation console. In the 'Configure storage' section, there is a pink circle highlighting the 'Advanced details' section. The 'Advanced' tab is selected. Other visible sections include 'Root volume (Not encrypted)', 'Add new volume', 'File systems', and 'Summary'.

## Diagram: aws4.14

The screenshot shows the 'Advanced details' section of the AWS CloudFormation console. A pink circle highlights the 'Request Spot Instances' checkbox, which is checked. Another pink circle highlights the 'Customize' button. Other sections include 'Purchasing option', 'Domain join directory', 'IAM instance profile', 'Hostname type', and 'DNS Hostname'.

## Diagram: aws4.15

The screenshot shows the 'Advanced details' section of the AWS CloudFormation console. A pink circle highlights the 'Request type' dropdown menu, which is set to 'Persistent'. Other sections include 'Purchasing option', 'Maximum price', 'Request type', 'Valid to', and 'Interruption behavior'.

## Diagram: aws4.16

The screenshot shows the AWS CloudShell interface. On the left, there are several configuration dropdowns:

- Request type**: Info  
Persistent
- Valid to**: Info  
No request expiry date (selected)  
The default value is no expiry date
- Set your request expiry date**
- Interruption behavior**: Info  
Stop (selected)
- Domain join directory**: Info  
Select
- Create new directory**
- IAM instance profile**: Info  
Select
- Create new IAM profile**
- Hostname type**: Info  
IP name

On the right, there is a vertical toolbar with various icons for file operations like copy, paste, and search.

## Diagram: aws4.17

The screenshot shows the AWS EC2 instance creation wizard at the 'Summary' step. The summary information includes:

- Number of instances**: Info  
1
- Software Image (AMI)**: Centos7-Linux-Learning-AMI  
ami-01337809c40300dd
- Virtual server type (instance type)**: t2.micro
- Firewall (security group)**: None (select security group)
- Cancel**

In the bottom right corner of the summary section, there is a red circle around the **Launch instance** button. Below it are two other buttons: **Review commands** and **Review and launch**. The **Review and launch** button is also circled in red.

## Diagram: aws4.18

The screenshot shows the AWS EC2 instance launch progress bar. The progress bar indicates that the process is currently creating security group rules, which is 23% complete. The progress bar has a blue bar and a grey background.

EC2 > Instances > Launch an instance

Launching instance

Please wait while we launch your instance.  
Do not close your browser while this is loading.

Creating security group rules  
23%

Details

## Diagram: aws4.19

The screenshot shows the AWS EC2 Instances launch log page. At the top, there is a success message: "Successfully initiated launch of instance (i-0c083e6bd696509aa)". Below this, there is a "Next Steps" section with several options: "Create billing and free tier usage alerts", "Connect to your instance", "Connect an RDS database", and "Create EBS snapshot policy". A vertical toolbar on the right side contains various icons for managing instances.

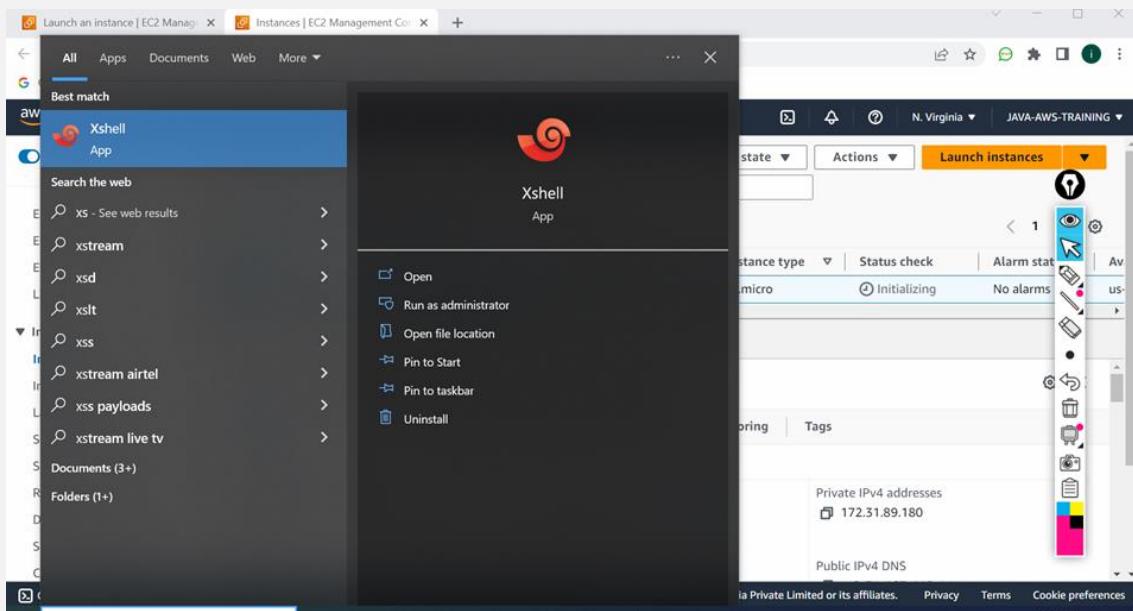
## Diagram: aws4.20

The screenshot shows the AWS EC2 Instances details page for an instance named "My-Linux-Spot...". The instance is listed in the table with the following details: Instance ID: i-0c083e6bd696509aa, Name: My-Linux-Spot..., Instance state: Running, Instance type: t2.micro, Status check: Initializing, and Alarm status: No alarms. The "Details" tab is selected, showing the instance summary. The Public IPv4 address is listed as 54.167.110.14. A red circle highlights the instance ID in the table header.

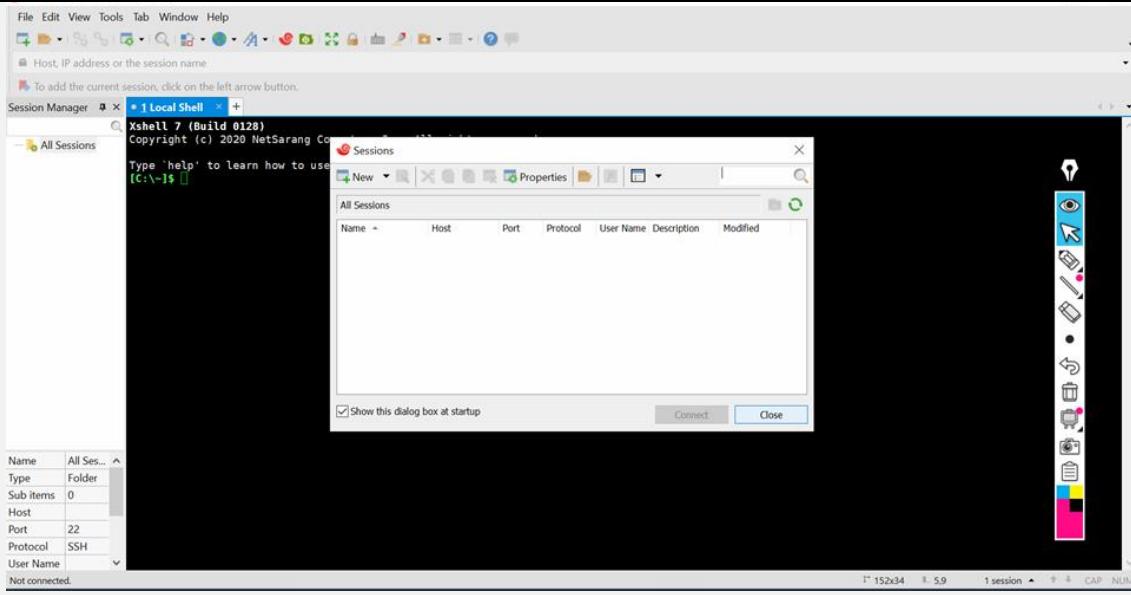
## Diagram: aws4.21

The screenshot shows the AWS EC2 Instances details page for the same instance. The Public IPv4 address (54.167.110.14) is highlighted with a red circle. The rest of the interface is identical to the previous screenshot.

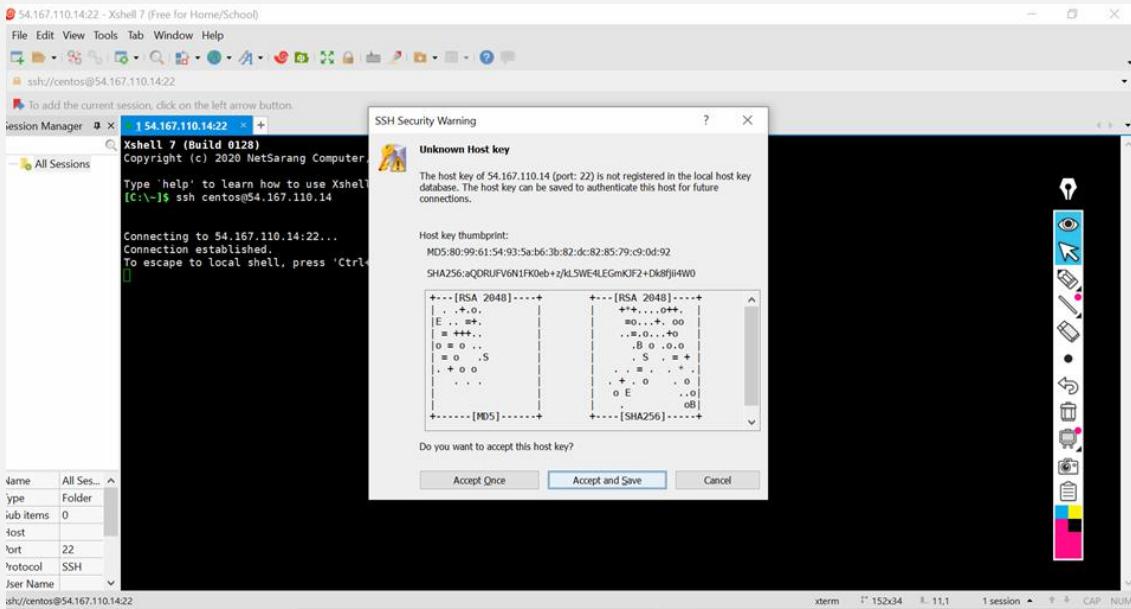
## Diagram: aws4.22



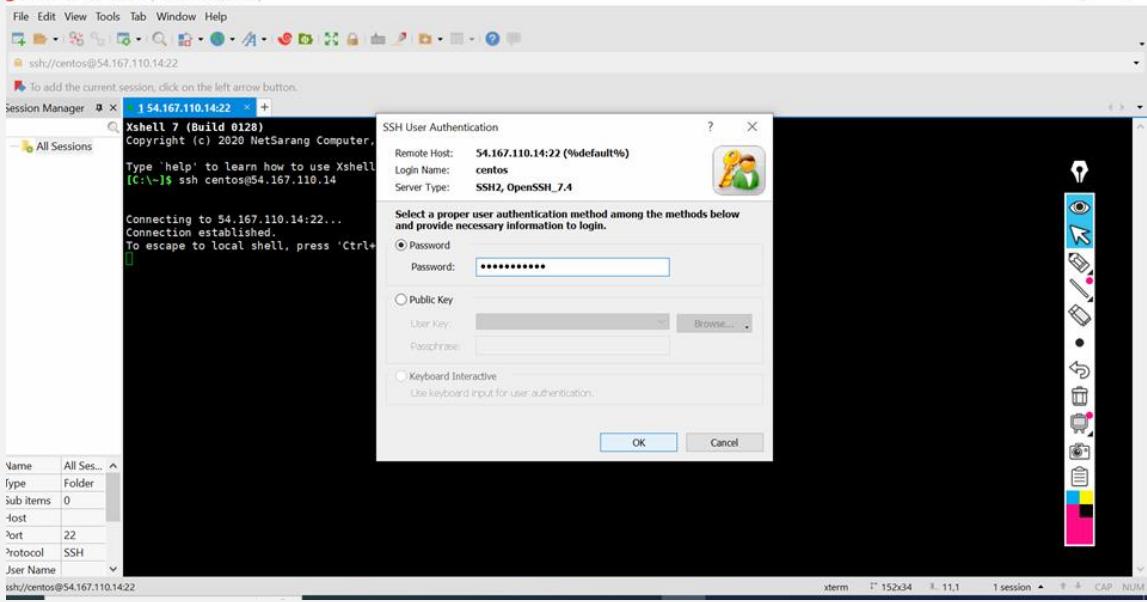
## Diagram: aws4.23



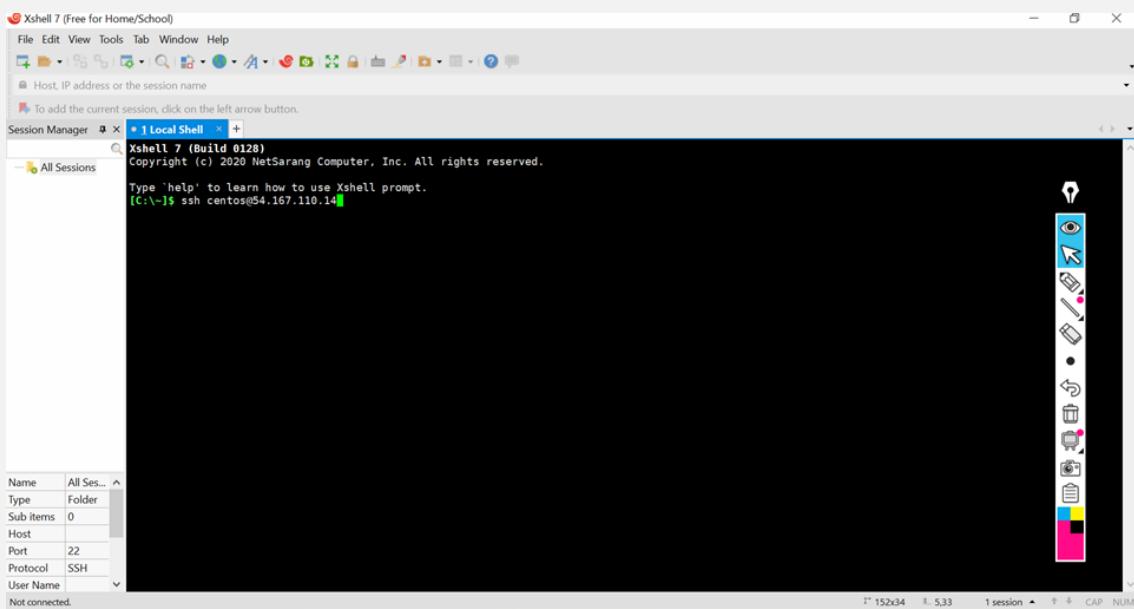
## Diagram: aws4.24



## Diagram: aws4.25



## Diagram: aws4.26



## Diagram: aws4.27

```

Session Manager > x 154.167.110.14:22 + 
Xshell 7 (Build 0128)
Copyright (c) 2020 NetSarang Computer, Inc. All rights reserved.

Type 'help' to learn how to use Xshell prompt.

[centos@ip-172-31-89-180 ~] $ 

Connecting to 54.167.110.14:22...
Connection established.
To escape to local shell, press 'Ctrl+Alt+]'.

WARNING! The remote SSH server rejected X11 forwarding request.
Last login: Tue Feb 21 23:26:26 2023 from c-24-99-7-64.hsd1.ga.comcast.net
Welcome To Cloud DevOps Training !!

1) If you want to be a successful DevOps Engineer, Linux is the first thing to start with.
2) This machine is designed only to learn linux only.
3) Usage on Enterprise is not recommended.
4) If you need any help with Linux, please reach Manoj or the team.

[centos@ip-172-31-89-180 ~] $ 

```

Name All Ses...  
Type Folder  
Sub items 0  
Host  
Port 22  
Protocol SSH  
User Name  
ssh/centos@54.167.110.14:22

SSH2 xterm 152x34 20.32 1 session CAP NUM

## Diagram: aws4.28

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
My-Linux-Spot...	i-0c083e6bd696509aa	Running	t2.micro	Initializing	No alarms

## Diagram: aws4.29

We recommend Savings Plans over Reserved Instances. Savings Plans are the easiest and most flexible way to save money on your AWS compute costs and offer lower prices (up to 72% off) just like Reserved Instances. To learn more and get started with Savings Plans click here.

**EC2 > Reserved Instances**

**Reserved Instances (0) Info**

Filter by attributes or search by keyword

0 Reserved Instances selected

Select a Reserved Instance above

## Diagram: aws4.30

The screenshot shows the AWS EC2 Spot Requests page. At the top, a banner reads "Running other controlled experiments to improve resiliency and performance" and "Visit Fault Injection Simulator to run chaos experiments". Below the banner, the page title is "EC2 > Spot requests". A toolbar at the top right includes "Spot Blueprints", "Savings summary", "Pricing history", and "Spot placement". On the left, a sidebar menu lists "Instances", "Spot Requests", and other EC2 options. The main content area displays "Spot Requests (1)". A table shows one row: Request ID "sir-zxxemh6h", Instance Type "t2.micro", State "active", Capacity "1", Status "fulfilled", and Persistence "persistent". A vertical toolbar on the right provides various actions like "Edit", "Delete", and "Clone". The URL in the address bar is <https://us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#SpotInstances>.

## Diagram: aws4.31

This screenshot is similar to the previous one, but the "Actions" dropdown menu is open, circled in red. The "Cancel request" option is also highlighted with a red circle. The rest of the interface and data are identical to the first screenshot.

## Diagram: aws4.32

In this screenshot, the "Cancel request" option from the "Actions" dropdown has been selected, as indicated by the red circle. The "Spot Requests" table now shows the status as "canceling". The rest of the interface remains the same.

## Diagram: aws4.33

The screenshot shows the AWS EC2 Spot Requests page. A modal window titled "Cancel Spot request" is open, prompting the user to confirm the cancellation of a spot request. The modal contains a list of requests, one of which is selected: "sir-zxxemh6h". There is a checkbox labeled "Terminate instances" which is checked. At the bottom right of the modal is a large orange "Confirm" button, which is circled in red.

## AWS Launch Template

- 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 launch 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

The screenshot shows the AWS Console Home page. In the "Recently visited" section, the "EC2" link is highlighted with a red circle. Below this section is a "View all services" link. On the right side of the page is a vertical toolbar with various icons for different AWS services.

## Diagram: aws5.2

The screenshot shows the AWS EC2 Dashboard. On the left sidebar, under the 'Instances' section, 'Launch Templates' is highlighted with a red circle. The main content area displays a summary of EC2 resources in the US East (N. Virginia) Region. A callout box at the bottom left of the dashboard area points to the 'Launch Templates' section with the text: 'Easily size, configure, and deploy Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server. [Learn more](#)'.

## Diagram: aws5.3

The screenshot shows the 'EC2 launch templates' landing page. The main heading is 'EC2 launch templates: Streamline, simplify and standardize instance launches'. Below it, a sub-section titled 'Benefits and features' includes 'Streamline provisioning' and 'Simplify permissions'. A large orange button labeled 'Create launch template' is highlighted with a red circle. The left sidebar has 'Launch Templates' selected.

## Diagram: aws5.4

The screenshot shows the 'Create launch template' wizard. The first step, 'Launch template name and description', is displayed. The 'Launch template name - required' field contains 'payment-app-dev' and is highlighted with a red circle. Below it, the 'Template version description' field contains 'This template is created to launch a spot server for aws students' and is also highlighted with a red circle. At the bottom of this step, there is a note about Auto Scaling guidance and a checkbox for providing guidance for EC2 Auto Scaling. The right side of the screen shows the 'Summary' section with tabs for 'Software Image (AMI)', 'Virtual server type (instance type)', 'Firewall (security group)', and 'Storage (volumes)'. A large orange 'Create launch template' button is located at the bottom right of the wizard.

## Diagram: aws5.5

The screenshot shows the AWS Management Console search interface for AMIs. At the top, there's a search bar and a 'Quick Start' section with various OS icons. A red circle highlights the 'Browse more AMIs' button, which says 'Including AMIs from AWS, Marketplace and the Community'. Below this is the 'Instance type' dropdown, followed by a 'Create launch template' button.

## Diagram: aws5.6

The screenshot shows the 'Choose an Amazon Machine Image (AMI)' page. A red circle highlights the 'Community AMIs (500)' tab, which is described as 'Published by anyone'. Other tabs include 'Quickstart AMIs (47)', 'My AMIs (0)', and 'AWS Marketplace AMIs (8305)'. The main search bar contains 'centos7-linux-learning'.

## Diagram: aws5.7

The screenshot shows the detailed view of the 'centos7-linux-learning' AMI. A red circle highlights the 'Select' button. The page displays the AMI details: 'Centos7-Linux-Learning-AMI', 'ami-01337809c40300dde', 'Centos7-Linux-Learning-AMI ; This image works with username and password', 'Platform: Cent OS', 'Architecture: x86\_64', 'Owner: 834725375088', and 'Publish date: 2023-02-21 Root device type: ebs Virtualization: hvm ENA enabled: Yes'.

## Diagram: aws5.8

The screenshot shows the 'Instance type' section of the AWS Launch Wizard. A red circle highlights the 't2.micro' instance type selection. Another red circle highlights the 'Free tier eligible' status indicator. The summary panel on the right lists the selected software image (Centos7-Linux-Learning-AMI), virtual server type (t2.micro), and storage (1 volume(s) - 5 GiB). A 'Create launch template' button is visible.

## Diagram: aws5.9

The screenshot shows the 'Key pair (login)' and 'Network settings' sections. A red circle highlights the 'Don't include in launch template' option for the key pair name. The summary panel on the right remains the same as in Diagram 5.8.

## Diagram: aws5.10

The screenshot shows the 'Firewall (security groups)' and 'Inbound Security Group Rules' sections. A red circle highlights the 'Create security group' button. The summary panel on the right remains the same as in Diagram 5.8.

## Diagram: aws5.1.1

The screenshot shows the AWS VPC - required info page for a security group. It displays an inbound rule allowing SSH traffic (TCP port 22) from anywhere. A warning message states: "Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only." Below this, there are buttons for "Add security group rule" and "Advanced network configuration". On the right, the "Summary" section shows the software image (Centos7-Linux-Learning-AMI), virtual server type (t2.micro), firewall (New security group), and storage (1 volume(s) - 5 GiB). A "Create launch template" button is at the bottom right.

## Diagram: aws5.1.2

The screenshot shows the AWS Launch Template creation page. It includes a note about free tier storage, a "Resource tags" section, and a "Advanced details" section. The "Advanced details" section is circled in red and contains options for purchasing instances, including a checked checkbox for "Request Spot Instances". Other settings include IAM instance profile, hostname type, DNS options, and instance auto-recovery. The "Summary" section on the right shows the software image (Centos7-Linux-Learning-AMI), virtual server type (t2.micro), firewall (New security group), and storage (1 volume(s) - 5 GiB). A "Create launch template" button is at the bottom right.

## Diagram: aws5.1.3

This screenshot is similar to Diagram 5.1.2 but with the "Advanced details" section expanded. The "Request Spot Instances" checkbox is highlighted with a red circle. The "Summary" section on the right remains the same, showing the software image, virtual server type, firewall, and storage details. A "Create launch template" button is at the bottom right.

## Diagram: aws5.1 4

Purchasing option [Info](#)  
 Request Spot Instances  
Request Spot Instances at the Spot price, capped at the On-Demand price

IAM instance profile [Info](#)  
Don't include in launch template [Create new IAM profile](#)

Hostname type [Info](#)  
Don't include in launch template

DNS Hostname [Info](#)  
 Enable resource-based IPv4 (A record) DNS requests  
 Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery [Info](#)  
Don't include in launch template

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## Diagram: aws5.1 5

Request Spot Instances  
Maximum price [Info](#)  
 Don't include in launch template (recommended)  
Request Spot Instances at the Spot price, capped at the On-Demand price  
 Set your maximum price (per instance/hour)

Request type [Info](#)  
 Persistent

Valid to [Info](#)  
 Don't include in launch template  
 Set your request expiry date

Interruption behavior [Info](#)  
 Stop

IAM instance profile [Info](#)  
Don't include in launch template [Create new IAM profile](#)

Hostname type [Info](#)

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## Diagram: aws5.1 6

Request Spot Instances at the Spot price, capped at the On-Demand price  
 Set your maximum price (per instance/hour)

Request type [Info](#)  
Persistent

Valid to [Info](#)  
 Don't include in launch template  
 Set your request expiry date

Interruption behavior [Info](#)  
Stop

IAM instance profile [Info](#)  
Don't include in launch template [Create new IAM profile](#)

Hostname type [Info](#)  
Don't include in launch template

DNS Hostname [Info](#)  
 Enable resource-based IPv4 (A record) DNS requests

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## Diagram: aws5.1 7

The screenshot shows the AWS EC2 Launch Templates page. At the top, there is a success message: "Successfully created payment-app-dev (lt-01ce55348f98b02f7)". Below this, there is a "Next steps" section with links to "Launch an instance", "Create an Auto Scaling group from your template", and "Launch instance from this template". The bottom of the page includes standard AWS navigation links like CloudShell, Feedback, Language, and a copyright notice for 2023.

## Diagram: aws5.1 8

This screenshot is identical to Diagram 7, showing the AWS EC2 Launch Templates page with a success message and a "Next steps" section. The only difference is that the "EC2" link in the breadcrumb navigation bar has been circled in red.

## Diagram: aws5.1 9

This screenshot shows the AWS EC2 Dashboard. On the left sidebar, under the "Instances" section, the "Launch Templates" link has been circled in red. The main content area displays EC2 resources and account attributes. A callout box at the bottom left of the dashboard provides information about easily sizing, configuring, and deploying Microsoft SQL Server Always On availability groups on AWS using the AWS Launch Wizard for SQL Server.

## Diagram: aws5.20

The screenshot shows the AWS EC2 Launch Templates page. In the top right corner, there is a context menu with several options: 'Actions', 'Create launch template', 'Launch instance from template', 'Modify template (Create new version)', 'Delete template', 'Delete template version', 'Set default version', 'Manage tags', 'Create Spot Fleet', 'Create Auto Scaling group', and 'View details'. The 'Create launch template' button is highlighted with a red circle. On the left sidebar, under the 'Launch Templates' section, there is a link 'Launch template ID lt-01ce55348f98b02f7 payment-app-dev'. The main area displays 'Launch template details' for the template 'payment-app-dev'. The details include: Launch template ID (lt-01ce55348f98b02f7), Launch template name (payment-app-dev), Default version (1), and Owner (arn:aws:iam::519577338767 :root). The bottom of the screen shows the AWS footer with links for CloudShell, Feedback, and Language.

## Diagram: aws5.21

This screenshot shows the first step of the AWS EC2 Launch Instance wizard. It includes sections for 'Key pair (login)', 'Network settings', and 'Firewall (security groups)'. The 'Key pair (login)' section has a required field 'Key pair name - required' with a dropdown menu showing 'Proceed without a key pair (Not recommended)' and 'Default value'. A red circle highlights this dropdown. The 'Network settings' section contains a 'Subnet Info' dropdown set to 'Template or default value' and a 'Create new subnet' button. The 'Firewall (security groups)' section is collapsed. On the right side, there is a 'Summary' panel showing 'Number of instances: 1', 'Software Image (AMI): Centos7-Linux-Learning-AMI', 'Virtual server type (instance type): t2.micro', and a 'Launch instance' button. The bottom of the screen shows the AWS footer with links for CloudShell, Feedback, and Language.

## Diagram: aws5.22

This screenshot shows the same step of the AWS EC2 Launch Instance wizard as diagram 5.21. The 'Key pair (login)', 'Network settings', and 'Firewall (security groups)' sections are visible. The 'Key pair (login)' section has the same 'Key pair name - required' field. The 'Network settings' section has the same 'Subnet Info' dropdown and 'Create new subnet' button. The 'Firewall (security groups)' section is collapsed. On the right side, the 'Summary' panel is identical to diagram 5.21. However, the 'Launch instance' button in the summary panel is highlighted with a red circle. The bottom of the screen shows the AWS footer with links for CloudShell, Feedback, and Language.

## Diagram: aws5.23

The screenshot shows the AWS EC2 console with the path: EC2 > Launch templates > Launch instance from template. A progress bar indicates the task is 33% complete, labeled "Launching instance from template". Below the progress bar, there is a "Details" link. The right side of the screen features a vertical toolbar with various icons. At the bottom, standard AWS navigation links like CloudShell, Feedback, Language, and cookie preferences are visible.

## Diagram: aws5.24

The screenshot shows the AWS EC2 console with the path: EC2 > Launch templates > Launch instance from template. A success message is displayed: "Successfully initiated launch of instance (i-0d4b37fc08b4393a8)". Below this, a "Launch log" section shows two entries: "Initializing requests" and "Launching instance from template", both marked as "Succeeded". Under the "Next steps" section, there is a "Get notified of estimated charges" link and a "Connect to your instance" link. The right side has a vertical toolbar and the bottom includes standard AWS links.

## Diagram: aws5.25

This screenshot is identical to aws5.24, showing the success message and launch log. However, a red circle highlights the instance ID "i-0d4b37fc08b4393a8" in the success message. The "Next steps" section and the rest of the interface are also present.

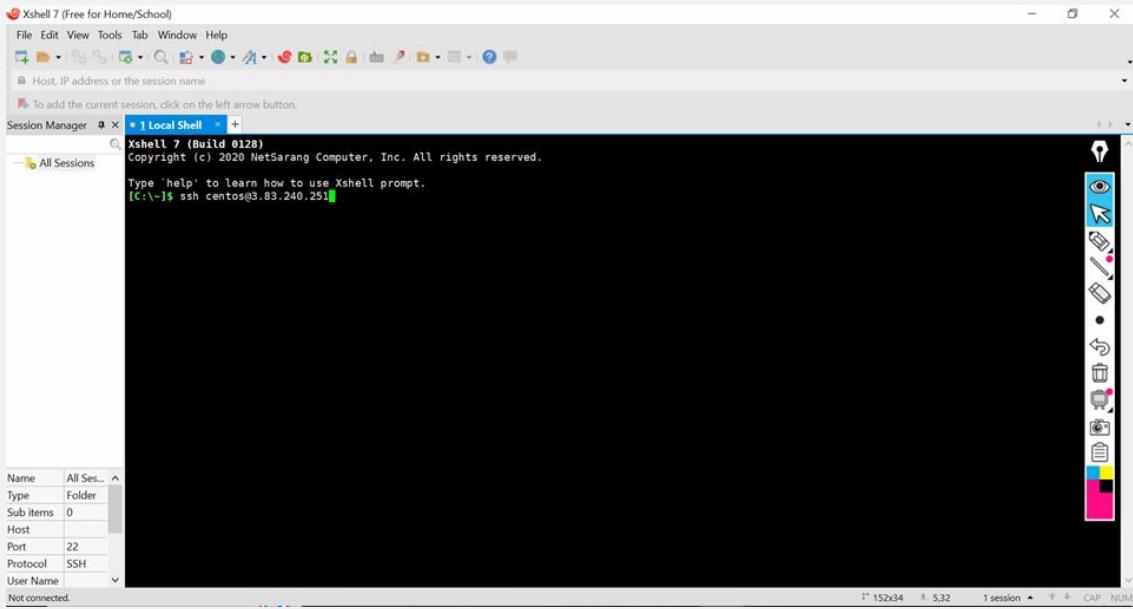
## Diagram: aws5.26

The screenshot shows the AWS EC2 Instances page. A single instance is listed with the ID `i-0d4b37fc08b4393a8`, which is highlighted with a red circle. The instance is in a `Running` state and has a type of `t2.micro`. Below the main list, the details for the selected instance are expanded. The `Public IPv4 address` is shown as `183.240.251`, with a link to open the address, also highlighted with a red circle. Other details shown include the `Private IPv4 addresses` (`172.31.90.5`), `Public IPv4 DNS` (`ec2-3-83-240-251.compute-`), and the `Instance state` (`Running`). The interface includes standard AWS navigation and action buttons.

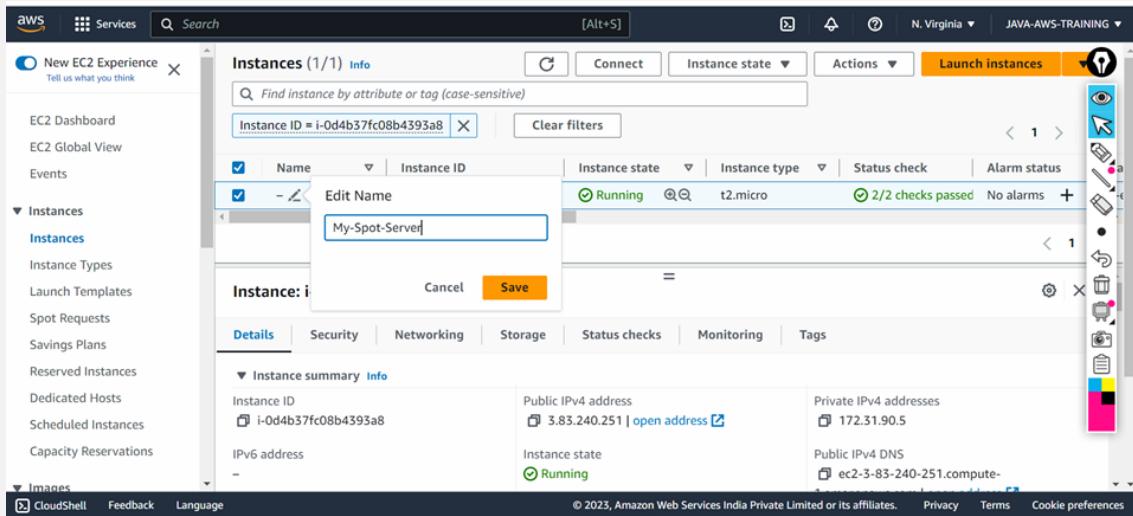
## Diagram: aws5.27

The screenshot shows a Windows Start Menu search results window. The query `xshell` has been entered, and the result `Xshell App` is highlighted with a blue selection bar. To the right of the search results, a separate window is visible, likely a file explorer or task manager, showing the AWS EC2 Instances page with the same instance details as in diagram 5.26. The Xshell app entry in the Start Menu has a context menu open, with the `Open` option highlighted with a red circle. Other options in the menu include `Run as administrator`, `Open file location`, `Pin to Start`, `Pin to taskbar`, and `Uninstall`.

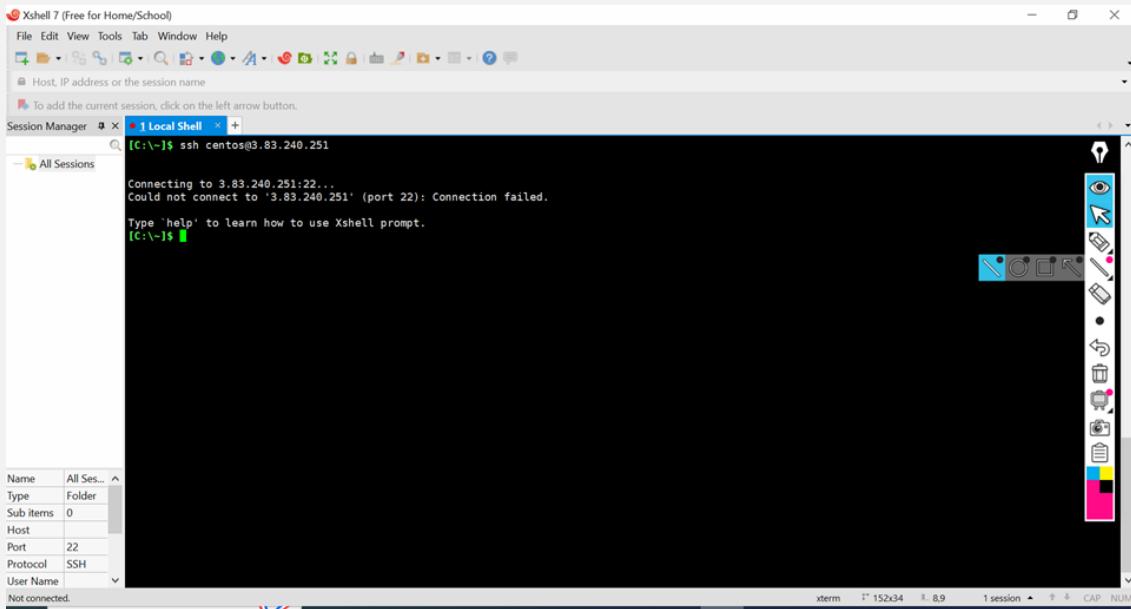
## Diagram: aws5.28



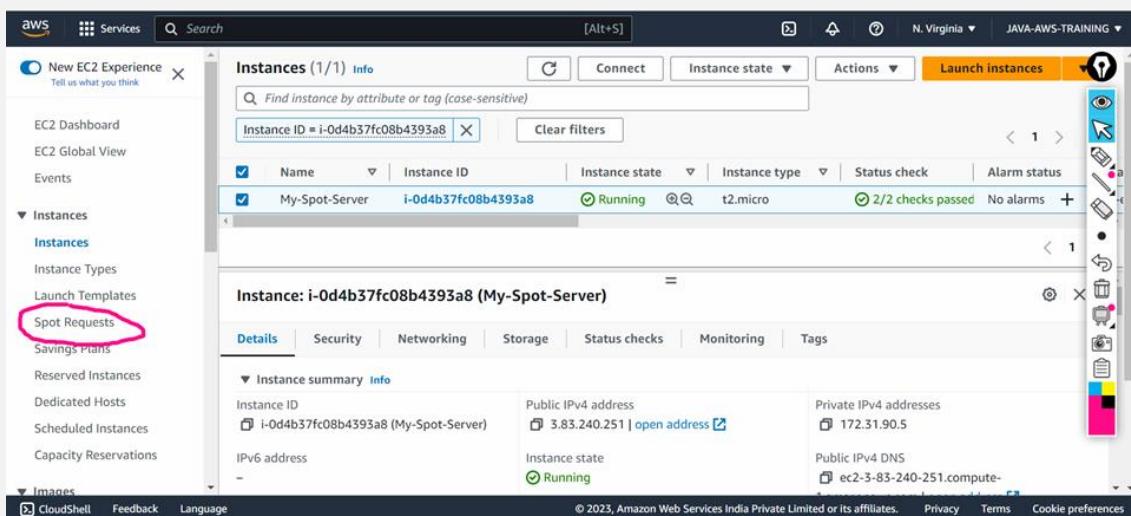
## Diagram: aws5.29



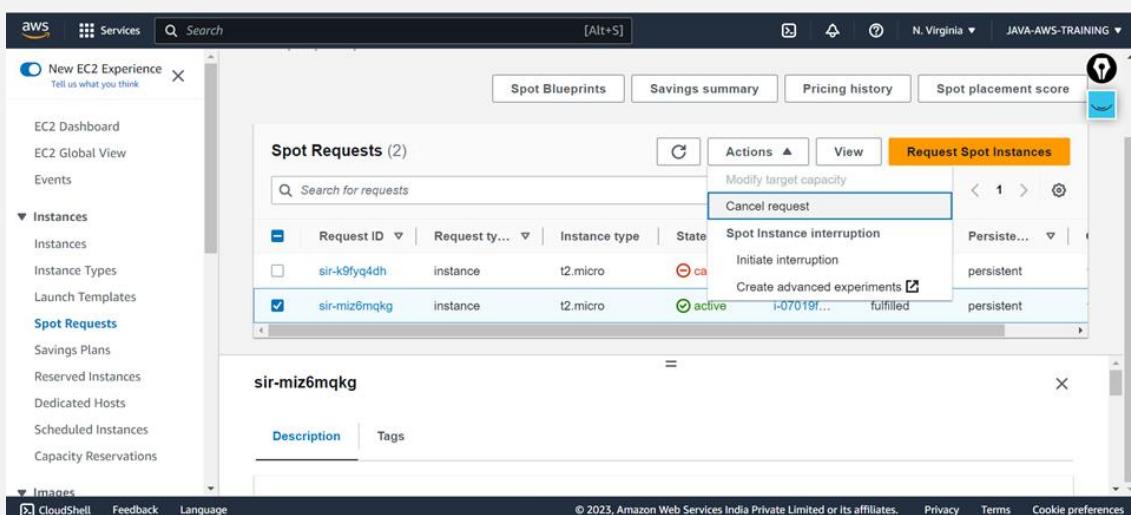
## Diagram: aws5.30



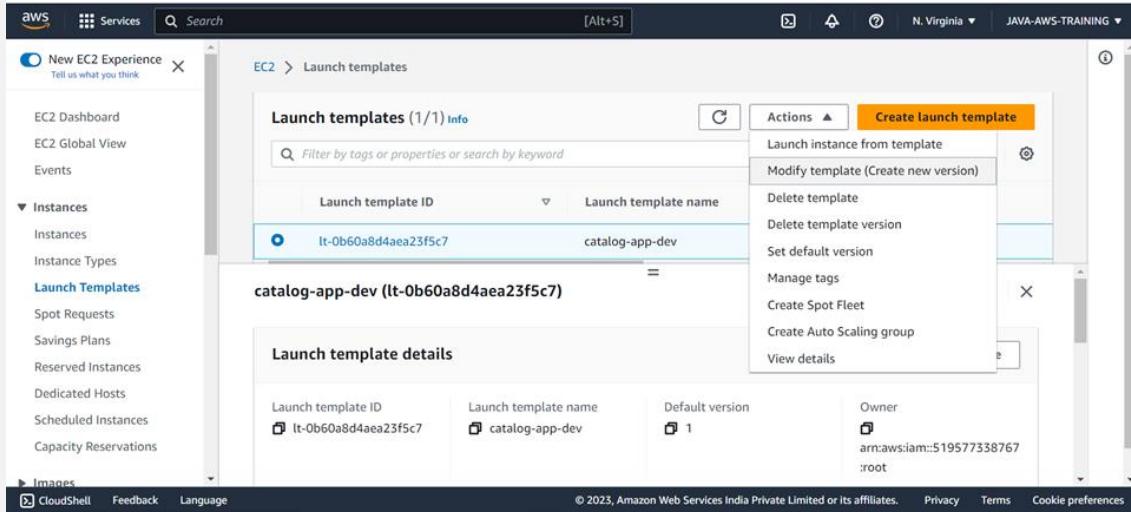
## Diagram: aws5.31



## Diagram: aws5.32



## Diagram: aws5.33



## JDBC Application To interact with AWS MySQL Database

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:  
DB.

**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:

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) throws Exception  
    {  
        Class.forName("com.mysql.jdbc.Driver");
```

```
        Connection con=DriverManager.getConnection("jdbc:mysql://database-1.cxjasnejkd9q.us-  
east-1.rds.amazonaws.com:3306/ihubdb?characterEncoding=utf8","admin","adminadmin");  
        Statement st=con.createStatement();  
        String qry="select * from student";  
        ResultSet rs=st.executeQuery(qry);  
        while(rs.next())
```

```

        }

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

        }

        rs.close();

        st.close();

        con.close();

    }

}

```

**step16:** Run the JDBC Application and see the output.

### **Elastic BeanStalk**

- 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**

LoginApp

|

|---Java Resources

|

|-----src

|

|---com.ihub.www

|

|---LoginSrv.java

|---Web Content

|

```
|-----index.html  
|-----view.jsp  
|-----error.jsp  
|  
|-----WEB-INF  
|  
|-----web.xml  
|  
|-----lib  
|  
|-----servlet-api.jar
```

**Note:**

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

**index.html**

```
<form action="test" method="GET">  
    <center><h3>Login Here</h3></center>  
    <table align="center">  
        <tr>  
            <td>UserName:</td>  
            <td><input type="text" name="t1"/></td>  
        </tr>  
        <tr>  
            <td>Passoword:</td>  
            <td><input type="password" name="t2"/></td>  
        </tr>  
        <tr>  
            <td><input type="reset" value="reset"/></td>  
  
            <td><input type="submit" value="submit"/></td>  
  
        </tr>  
    </table>
```

```
</form>
```

### 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">

  <servlet>
    <servlet-name>LoginSrv</servlet-name>
    <servlet-class>com.ihub.www.LoginSrv</servlet-class>
  </servlet>

  <servlet-mapping>
    <servlet-name>LoginSrv</servlet-name>
    <url-pattern>/test</url-pattern>
  </servlet-mapping>

  <welcome-file-list>
    <welcome-file>index.html</welcome-file>
  </welcome-file-list>

</web-app>
```

**LoginSrv.java**

```
package com.ihub.www;

import java.io.IOException;
import java.io.PrintWriter;

import javax.servlet.RequestDispatcher;
import javax.servlet.ServletException;

import javax.servlet.http.HttpServlet;
```

```

import javax.servlet.http.HttpServletRequest;
import javax.servlet.http.HttpServletResponse;

public class LoginSrv extends HttpServlet
{
    protected void doGet(HttpServletRequest req, HttpServletResponse res)
        throws ServletException, IOException
    {
        PrintWriter pw = res.getWriter();
        res.setContentType("text/html");

        // reading form data
        String uname = req.getParameter("t1");
        String pass = req.getParameter("t2");

        if (pass.equals("admin"))
        {
            RequestDispatcher rd = req.getRequestDispatcher("view.jsp");
            rd.forward(req, res);
        }
        else
        {
            RequestDispatcher rd = req.getRequestDispatcher("error.jsp");
            rd.forward(req, res);
        }
        pw.close();
    }
}

```

### [view.jsp](#)

```

<center>
    <h3 style="color:green">Login Successfully!!</h3>

```

<br><br>

<a href=".index.html">| Home |</a>

</center>

## error.jsp

<center>

<h3 style="color:red">Login Failed!!</h3>

<br><br>

<a href=".index.html">| Home |</a>

</center>

**step2:**

Convert dynamic web project to war file.

**step3:**

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

## Diagram: aws6.1

The screenshot shows the AWS IAM Roles page. The left sidebar is titled 'Identity and Access Management (IAM)' and includes sections for 'Access management' (User groups, Users, Roles, Policies, Identity providers, Account settings), 'CloudShell', 'Feedback', and 'Language'. The main content area is titled 'Roles (6) Info' and contains a table listing six roles: 'aws-elasticbeanstalk-service-role', 'AWSServiceRoleForEC2Spot', 'AWSServiceRoleForRDS', and 'AWSServiceRoleForSageMaker'. A 'Create role' button is visible at the top right of the table.

## Diagram: aws6.2

The screenshot shows the 'Create role' wizard at Step 1: 'Select trusted entity'. The left sidebar shows steps: 'Step 1 Select trusted entity', 'Step 2 Add permissions', and 'Step 3 Name, review, and create'. The main content area is titled 'Select trusted entity Info' and shows a 'Trusted entity type' section with five options: 'AWS service' (selected), 'AWS account', 'Web identity', 'SAML 2.0 federation', and 'Custom trust policy'. The 'AWS service' option is described as allowing AWS services like EC2, Lambda, or others to perform actions in this account.

## Diagram: aws6.3

The screenshot shows the 'Add permissions' step in the AWS IAM console. The search bar at the top contains the query "s3". Below it, a table lists several AWS managed policies:

Policy name	Type	Description
AmazonS3FullAccess	AWS managed	Provides full access to all buckets via the ...
AmazonS3ReadonlyAccess	AWS managed	Provides read only access to all buckets v...
AmazonDMSRedshiftFullAccess	AWS managed	Provides access to manage S3 settings fo...

## Diagram: aws6.4

The screenshot shows the 'Name, review, and create' step in the AWS IAM console. The 'Role details' section includes:

- Role name:** ec2-instance-profile-role
- Description:** Allows EC2 Instances to call AWS services on your behalf.

step4:

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

## Amazon S3

- Amazon S3 (Simple Storage Service) provides object storage, which is built for storing and recovering any amount of information or data from anywhere over the internet.

Steps to deploy spring boot jar file in S3 storage

## Diagram 7.1

Buckets are containers for data stored in S3. [Learn more](#)

### General configuration

AWS Region: US East (N. Virginia) us-east-1

Bucket type: General purpose

Bucket name: myspringbootbucket

Copy settings from existing bucket - optional

Choose bucket

Format: s3://bucket/prefix

## Diagram 7.2

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

### Object Ownership

ACLs disabled (recommended)

All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.

ACLs enabled

Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

### Block Public Access settings for this bucket

Block all public access

Block public access to buckets and objects granted through new access control lists (ACLs)

Block public access to buckets and objects granted through any access control lists (ACLs)

CloudShell Feedback

## Diagram 7.3

The screenshot shows the 'Block public access' step in the AWS S3 Bucket Creation wizard. It lists three options:

- Block public access to buckets and objects granted through *any* access control lists (ACLs)**  
S3 will ignore all ACLs that grant public access to buckets and objects.
- Block public access to buckets and objects granted through *new* public bucket or access point policies**  
S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.
- Block public and cross-account access to buckets and objects through *any* public bucket or access point policies**  
S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

A yellow warning box contains the following text:

**Turning off block all public access might result in this bucket and the objects within becoming public**  
AWS recommends that you turn on block all public access, unless public access is required for specific and verified use cases such as static website hosting.

I acknowledge that the current settings might result in this bucket and the objects within becoming public.

**Bucket Versioning**  
Versioning is a means of keeping multiple variants of an object in the same bucket. You can use versioning to preserve, retrieve, and restore every version of every object stored in your Amazon S3 bucket. With versioning, you can easily recover from both unintended user actions and application failures. [Learn more](#)

Bucket Versioning:  
 Disable  
 Enable

CloudShell Feedback

## Diagram 7.4

The screenshot shows the 'Amazon S3 > Buckets' page. The left sidebar includes links for Buckets, Access Grants, Access Points, Object Lambda Access Points, Multi-Region Access Points, Batch Operations, IAM Access Analyzer for S3, Block Public Access settings for this account, Storage Lens (Dashboards, Storage Lens groups, AWS Organizations settings), Feature spotlight, and AWS Marketplace for S3.

The main area displays the 'Account snapshot' and 'General purpose buckets (2)'. The 'General purpose buckets' table lists two buckets:

Name	AWS Region	Access	Creation date
elasticbeanstalk-us-east-1-519577338767	US East (N. Virginia) us-east-1	Objects can be public	August 18, 2023, 22:49:23 (UTC+05:30)
mysb3bucket	US East (N. Virginia) us-east-1	Objects can be public	January 26, 2024, 21:22:27 (UTC+05:30)

Buttons for 'Create bucket' and other actions like 'Copy ARN', 'Empty', and 'Delete' are visible above the table. A search bar at the top allows finding buckets by name.

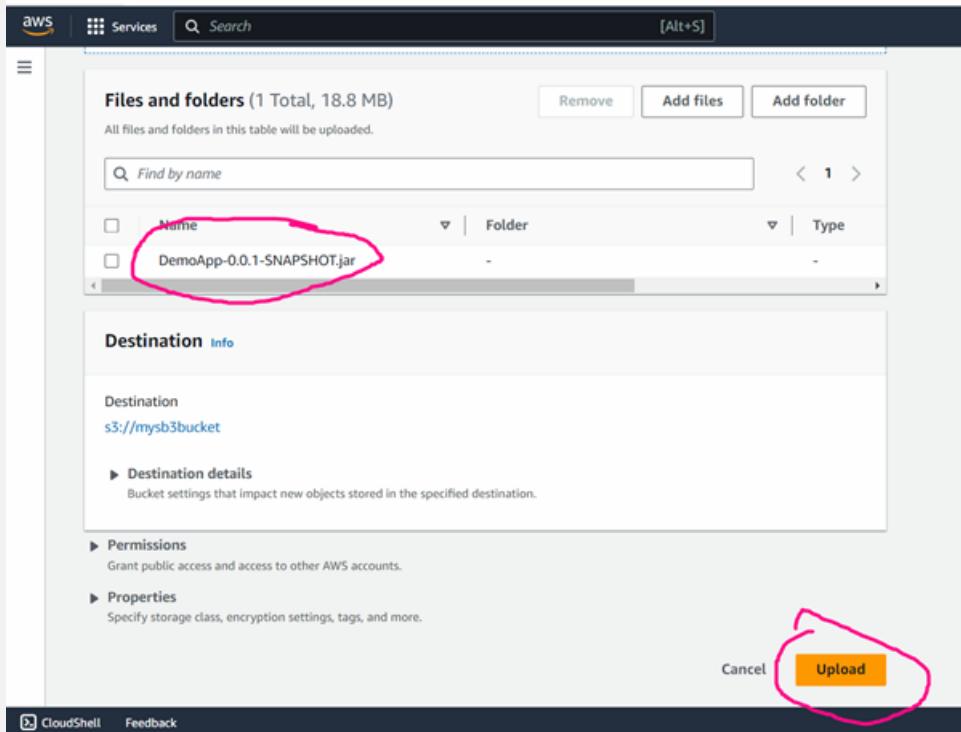
## Diagram 7.5

The screenshot shows the AWS S3 console interface. On the left, there's a sidebar with various navigation options like Buckets, Access Grants, and Storage Lens. The main area shows a bucket named 'mysb3bucket'. At the top, there are tabs for Objects, Properties, Permissions, Metrics, Management, and Access Points. Below the tabs, there's a toolbar with actions like Copy S3 URI, Copy URL, Download, Open, Delete, Actions (with a dropdown), Create folder, and Upload. The 'Upload' button is highlighted with a red circle. A search bar and a message about objects in the bucket are also visible.

## Diagram 7.6

This screenshot shows the 'Upload' page within the 'mysb3bucket' bucket. At the top, there's a message about uploading files and folders. Below it is a large dashed blue box with a red circle around it, containing the text 'Drag and drop files and folders you want to upload here, or choose Add files or Add folder.' To the right of this box is a table titled 'Files and folders (0)' with columns for Name, Folder, and Type. It shows a message: 'All files and folders in this table will be uploaded.' Below the table is a search bar and a message: 'No files or folders' followed by 'You have not chosen any files or folders to upload.' At the bottom, there's a section for 'Destination' with a 'Info' link, and a footer with CloudShell and Feedback links. A small orange box with the number '69' is overlaid at the bottom center of the page.

## Diagram 7.7



## Diagram 7.8

