

<b>Declaration</b>	
Questions in this exercise are intentionally complex and could be convoluted or confusing. This is by design and to simulate real life situations where customers seldom give crystal clear requirements and ask unambiguous questions.	
I have read the above statement and agree to these conditions	
I AGREE	Alka Sinha
	<Enter your name above this line to indicate that you are in agreement>

<b>Instructions</b>	
Every screenshot requested in this workbook is compulsory and carries 0.5 marks	
Your AWS account ID must be clearly visible in every screenshot using the AWS console; missing id or using someone else's id is not permitted. Such cases will be considered as plagiarism and severe penalty will be imposed.	
All screenshots must be in the order mentioned under "Expected Screenshots" for every step	
DO NOT WAIT UNTIL THE LAST MINUTE. The program office will not extend the project submission deadline under any circumstances.	
The file should be renamed in the format BATCH_FIRSTNAME_LASTNAME_PROJECT1. For example: PGPCCMAY18_VIJAY_DWIVEDI_PROJECT1.pdf	

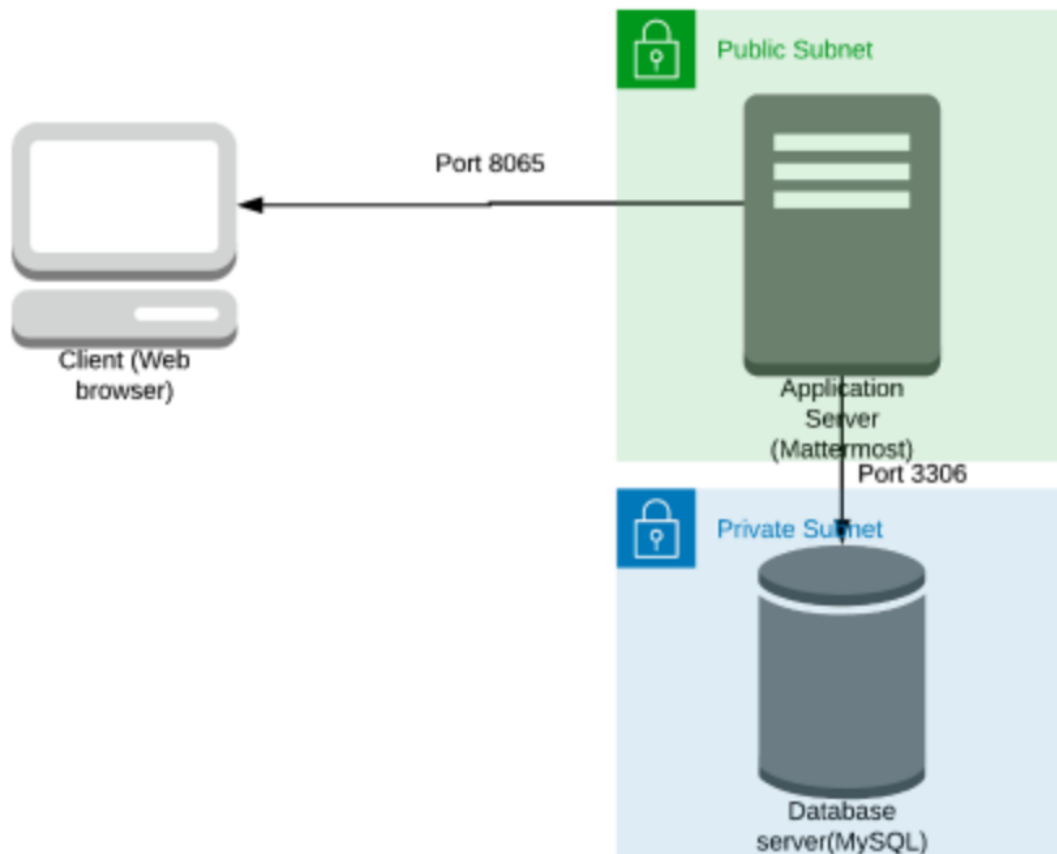
<b>Resource Clean Up</b>	
Cloud is always pay per use model and all resources/services that we consume are chargeable. Cleaning up when you've completed your lab or project is always necessary. This is true whether you're doing a lab or implementing a project at your workplace.	
After completing the lab, make sure to delete each resource created in reverse chronological order.	

## Scenario

Team communication and instant messaging solutions are an integral part of any business environment today. As of 2020, the total number of users of Slack and Microsoft Teams exceeded 20 million.

Some organizations might have compliance policies in place which do not allow them to use services managed by third parties. They will prefer solutions that can be managed and hosted on servers controlled by them. The same will extend to communication solutions as well.

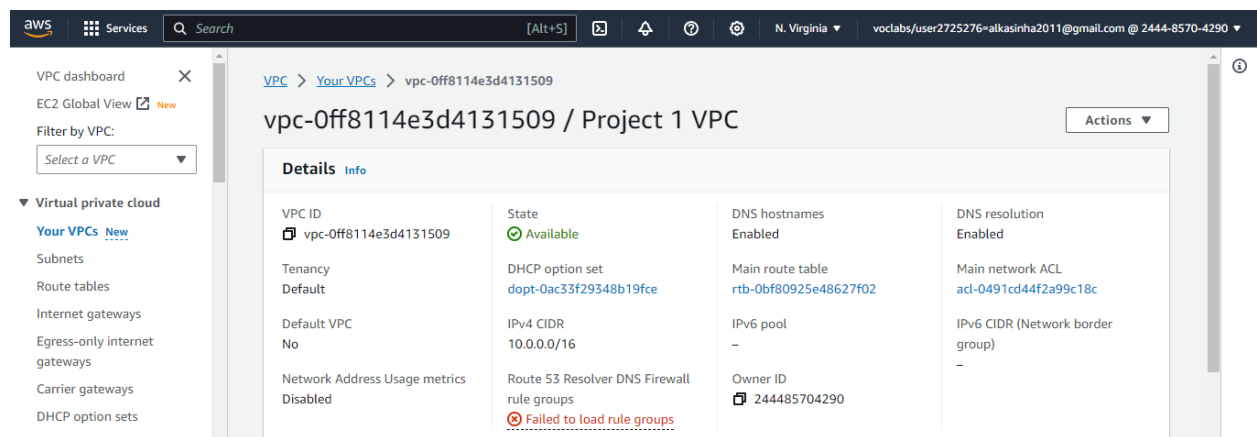
## Architecture diagram



Architecture Implementation	
1	Implement 2 different subnets (one public and the other private) in a custom VPC
2	Install and configure MySQL on an Amazon Linux 2 instance on the private subnet using the instructions provided. (Hint: Use a bastion host and a NAT gateway)
3	Install and configure Mattermost on an Amazon Linux 2 instance on the public subnet using the provided instructions.
4	Configure the security groups to allow the ports as shown in the architecture.
5	Test the installation by accessing the IP of the public instance in a browser via the port 8065.

## Step 1: VPC and Subnet Creation

Step number	a
Step name	Creation of VPC
Instructions	<ol style="list-style-type: none"><li>1) Navigate to VPC using the Services button at the top of the screen</li><li>2) Select "Your VPCs" on the left side of the screen</li><li>3) Click on "Create VPC"</li><li>4) Enter the following fields : Name: Project 1 VPC IPv4 CIDR Block : 10.0.0.0/16 The rest of the options can be ignored</li><li>5) Select "Create VPC"</li><li>6) Select the VPC and click on Actions-&gt;Edit DNS hostnames</li><li>7) Enable DNS hostnames and click on Save</li></ol>
Expected screenshots	1) Created VPC with properties visible



Step number	b
Step name	Creation of public subnet
Instructions	<ol style="list-style-type: none"><li>1) Navigate to VPC-&gt;Subnets</li><li>2) Click on "Create Subnet"</li><li>3) Enter the following fields Name tag : Public Subnet VPC : Select the Project 1 VPC IPv4 CIDR block : 10.0.1.0/24 The other options can be ignored</li><li>4) Click on Create</li><li>5) Once the subnet has been created, select the subnet and click on Actions-&gt;Modify Auto-assign IP settings</li><li>6) Enable the option "Auto assign IPv4" and select Save</li></ol>

Expected  
screenshots

1) Subnet Creation screen

The screenshot displays the AWS Management Console interface for a specific subnet. The breadcrumb navigation at the top indicates the path: **VPC** > **Subnets** > **subnet-016942eba9ea52338**. The main title of the page is **subnet-016942eba9ea52338 / Public Subnet**, with an **Actions** dropdown menu to its right. On the left-hand side, there is a navigation pane under the heading **Virtual private cloud**. It includes links for **Your VPCs** (with a 'New' badge), **Subnets** (the current selection), **Route tables**, **Internet gateways**, **Egress-only internet gateways**, **Carrier gateways**, **DHCP option sets**, **Elastic IPs**, **Managed prefix lists**, **Endpoints**, **Endpoint services**, and **NAT gateways**. The main content area is titled **Details** and presents a grid of 16 key-value pairs describing the subnet's configuration. These details are organized into four columns: Subnet ID, Subnet ARN, State, and IPv4 CIDR. The values include the subnet's ID, its ARN, its 'Available' state, its availability zone (us-east-1f), its CIDR (10.0.1.0/24), and various other network-related settings like route tables, ACLs, and DNS records.

Details			
Subnet ID	Subnet ARN	State	IPv4 CIDR
subnet-016942eba9ea52338	arn:aws:ec2:us-east-1:244485704290:subnet/subnet-016942eba9ea52338	Available	10.0.1.0/24
Available IPv4 addresses	IPv6 CIDR	Availability Zone	Availability Zone ID
250	-	us-east-1f	use1-az5
Network border group	VPC	Route table	Network ACL
us-east-1	vpc-0ff8114e3d4131509   Project 1 VPC	rtb-012d428dbbb4d147f   Public Route Table	acl-0491cd44f2a99c18c
Default subnet	Auto-assign public IPv4 address	Auto-assign IPv6 address	Auto-assign customer-owned IPv4 address
No	Yes	No	No
Customer-owned IPv4 pool	Outpost ID	IPv4 CIDR reservations	IPv6 CIDR reservations
-	-	-	-
IPv6-only		Resource name DNS A record	Resource name DNS AAAA record
No		Disabled	Disabled

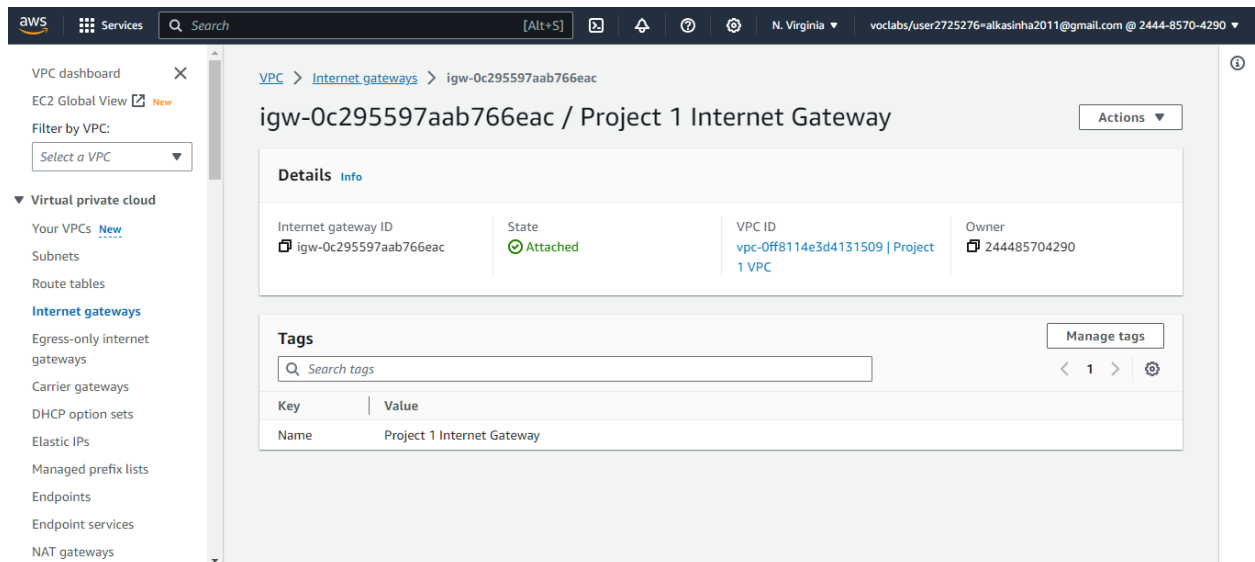
Step number	c
Step name	Creation of private subnet
Instructions	1) Navigate to VPC->Subnets 2) Click on "Create Subnet" 3) Enter the following fields Name tag : Private Subnet VPC : Select the Project 1 VPC IPv4 CIDR block : 10.0.2.0/24 The other options can be ignored 4) Click on Create
Expected screenshots	1) Subnet Creation screen

The screenshot displays the AWS Management Console interface. The top navigation bar shows the AWS logo, 'Services', a search bar, and the user's profile. The left sidebar contains a 'Virtual private cloud' section with links to 'Your VPCs', 'Subnets', 'Route tables', 'Internet gateways', 'Egress-only internet gateways', 'Carrier gateways', 'DHCP option sets', 'Elastic IPs', 'Managed prefix lists', 'Endpoints', 'Endpoint services', and 'NAT gateways'. The main content area is titled 'subnet-0f862d01a3ed37d69 / Private Subnet'. Below the title, there is a 'Details' section with a grid of key-value pairs for the subnet's configuration.

Details			
Subnet ID	Subnet ARN	State	IPv4 CIDR
subnet-0f862d01a3ed37d69	arn:aws:ec2:us-east-1:244485704290:subnet/subnet-0f862d01a3ed37d69	Available	10.0.2.0/24
Available IPv4 addresses	IPv6 CIDR	Availability Zone	Availability Zone ID
251	-	us-east-1f	use1-az5
Network border group	VPC	Route table	Network ACL
us-east-1	vpc-0ff8114e3d4131509   Project 1 VPC	rtb-0bf80925e48627f02	acl-0491cd44f2a99c18c
Default subnet	Auto-assign public IPv4 address	Auto-assign IPv6 address	Auto-assign customer-owned IPv4 address
No	No	No	No
Customer-owned IPv4 pool	Outpost ID	IPv4 CIDR reservations	IPv6 CIDR reservations
-	-	-	-
IPv6-only	Resource name DNS A record	Resource name DNS AAAA record	
No	Disabled	Disabled	

## Step 2 : Internet Gateway and VPC

Step number	a
Step name	Creation and Configuration of Internet Gateway
Instructions	<ol style="list-style-type: none"><li>1) Navigate to VPCs-&gt;Internet Gateway</li><li>2) Click on "Create Internet Gateway"</li><li>3) Enter the name tag "Project 1 Internet Gateway" and click on "Create Internet Gateway"</li><li>4) After the gateway is created, select it and click on Actions-&gt;Attach to VPC</li><li>5) Select the Project 1 VPC and click on "Attach Internet Gateway"</li></ol>
Expected screenshots	<ol style="list-style-type: none"><li>1) Creation of Internet Gateway</li></ol>

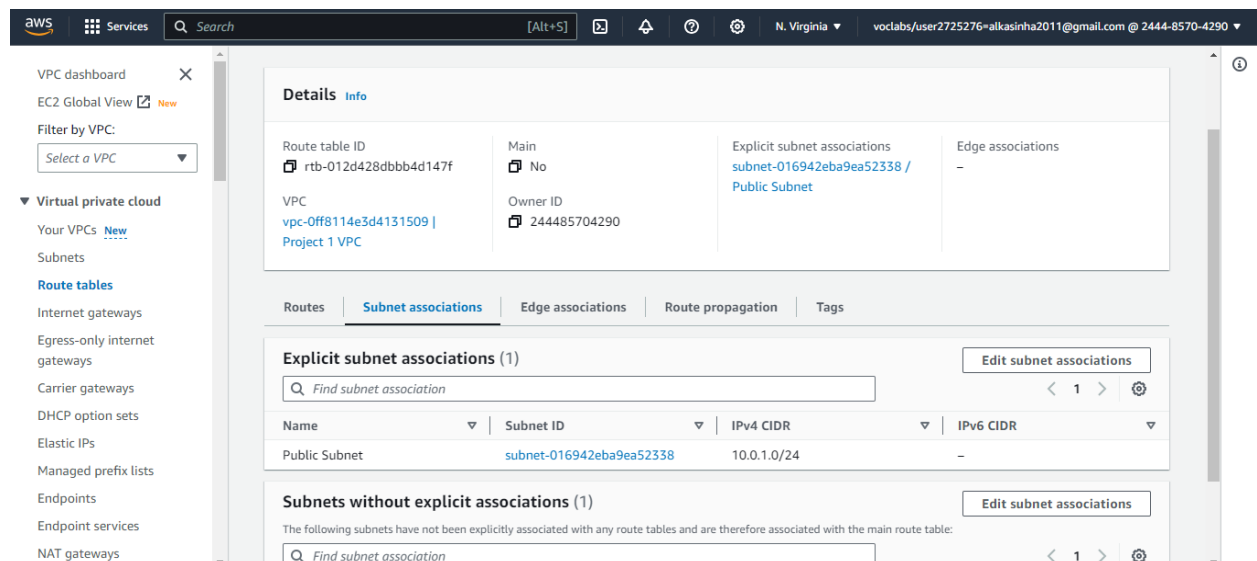
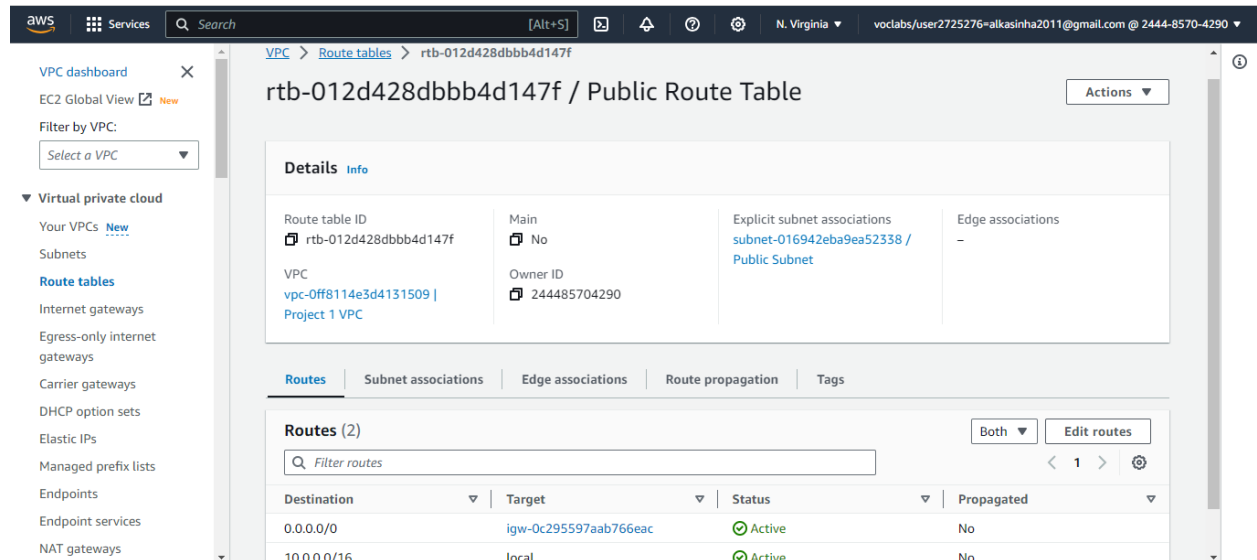


Step number	b
Step name	Creation of public route table
Instructions	<ol style="list-style-type: none"><li>1) Navigate to VPC -&gt; Route Tables and click on Create Route table</li><li>2) Enter the name tag "Public Route Table", select the Project 1 VPC from the dropdown and click on Create</li><li>3) Once the route table is created, select it and select the Routes tab below the list of route tables</li><li>4) Click in Edit Routes and add the following route (Don't edit the existing one)<ul style="list-style-type: none"><li>- Destination : 0.0.0.0/0</li><li>- Target : Select Internet Gateway and the select the Project 1 Internet Gateway</li></ul></li></ol> <p>Click on Save Routes</p>

- 5) Select the Subnet Associations tab and click on Edit Subnet Associations
- 6) Select the Public Subnet from the list and click on Save

Expected  
screenshots

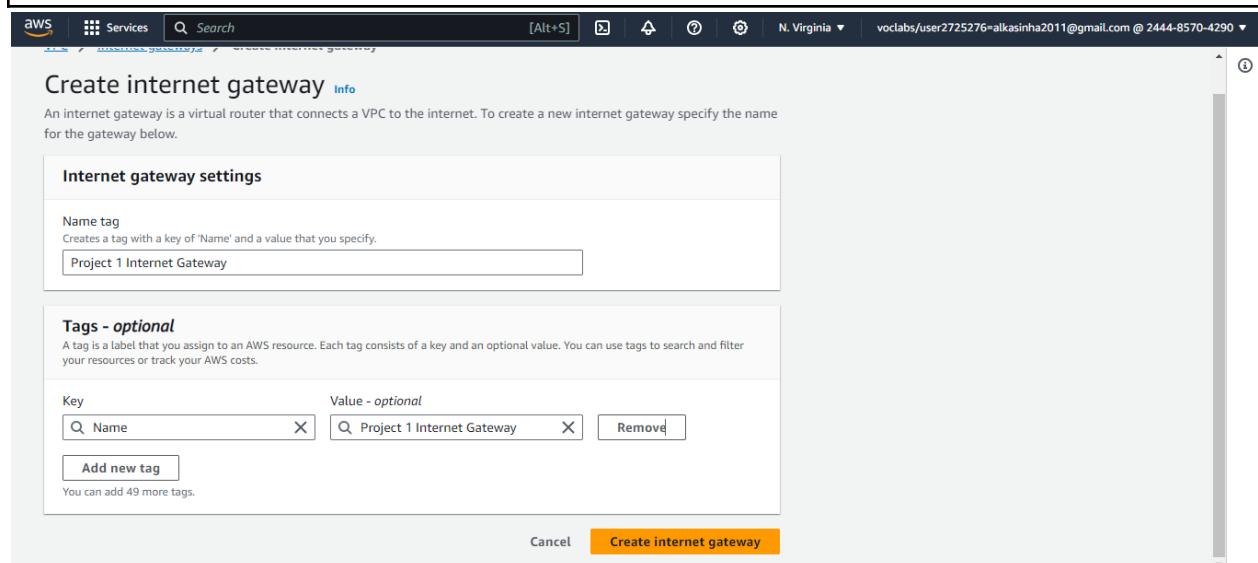
- 1) Route list of the route table
- 2) Subnet Associations of the route table



Step number c

Step name Creation of NAT gateway

Instructions	<ol style="list-style-type: none"> <li>1) Navigate to VPC using the Services button at the top of the screen</li> <li>2) Select NAT Gateway at the left side of the screen</li> <li>3) Click on Create NAT Gateway <ul style="list-style-type: none"> <li>- Deploy it in the public subnet</li> <li>- Connectivity type : Public</li> <li>- Allocate an elastic IP by clicking on "Allocate Elastic IP"</li> </ul> </li> <li>4) Click on "Create NAT Gateway" to create the gateway</li> </ol>
Expected screenshots	<ol style="list-style-type: none"> <li>1) NAT gateway creation details</li> <li>2) Gateway after creation</li> </ol>



**Create internet gateway** [Info](#)

An internet gateway is a virtual router that connects a VPC to the internet. To create a new internet gateway specify the name for the gateway below.

**Internet gateway settings**

**Name tag**  
Creates a tag with a key of 'Name' and a value that you specify.

Project 1 Internet Gateway

**Tags - optional**  
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

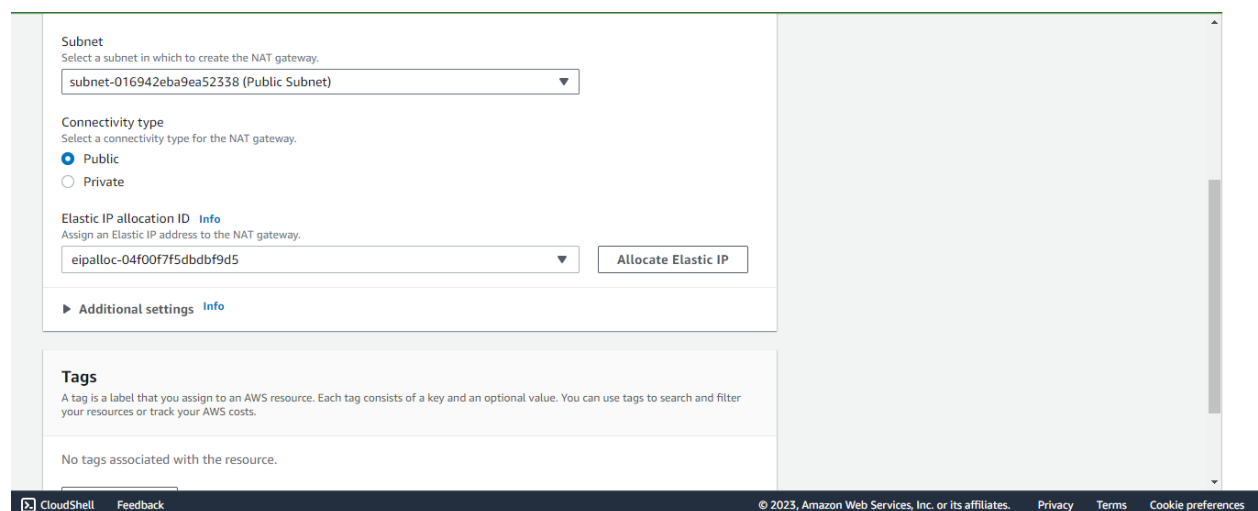
Key Value - optional

Q Name X Q Project 1 Internet Gateway X Remove

Add new tag

You can add 49 more tags.

Cancel Create internet gateway



**Subnet**  
Select a subnet in which to create the NAT gateway.

subnet-016942eba9ea52338 (Public Subnet)

**Connectivity type**  
Select a connectivity type for the NAT gateway.

☒ Public  
☐ Private

**Elastic IP allocation ID** [Info](#)  
Assign an Elastic IP address to the NAT gateway.

eipalloc-04f00f7f5dbdbf9d5 Allocate Elastic IP

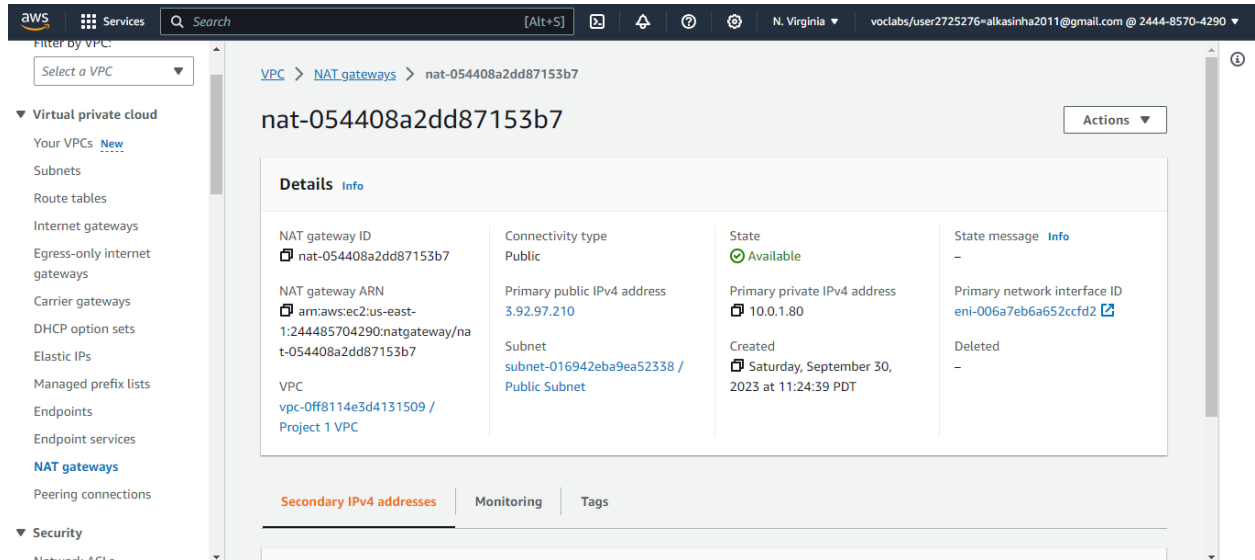
► **Additional settings** [Info](#)

**Tags**  
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources or track your AWS costs.

No tags associated with the resource.

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Step number

Step name Creation of private route tables

Instructions

- 1) Navigate to VPC -> Route Tables and click on Create Route table
- 2) Enter the name tag "Private Route Table", select the Project 1 VPC from the dropdown and click on Create
- 3) Once the route table is created, select it and select the Routes tab below the list of route tables
- 4) Click in Edit Routes and add the following route (Don't edit the existing one)
  - Destination : 0.0.0.0/0
  - Target: Select NAT Gateway and select the NAT Gateway created in the previous step
 Click on Save Routes
- 5) Select the Subnet Associations tab and click on Edit Subnet Associations
- 6) Select the private Subnet from the list and click on Save

Expected screenshots

- 1) Route list of the route table
- 2) Subnet association of the route table

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Filter by VPC:

Select a VPC

Virtual private cloud

Your VPCs [New](#)

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

Peering connections

Security

Network ACLs

VPC > Route tables > rtb-011a1b652d75b74b2

rtb-011a1b652d75b74b2 / Private Route Table

Actions

Details Info

Route table ID

rtb-011a1b652d75b74b2

Main

No

Explicit subnet associations

-

Edge associations

-

VPC

vpc-0ff8114e3d4131509 | [Project 1 VPC](#)

Owner ID

244485704290

Routes

Subnet associations

Edge associations

Route propagation

Tags

Routes (1)

Both Edit routes

Filter routes

< 1 >

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No

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VPC dashboard

EC2 Global View [New](#)

Filter by VPC:

Select a VPC

Virtual private cloud

Your VPCs [New](#)

Subnets

Route tables

Internet gateways

Egress-only internet gateways

Carrier gateways

DHCP option sets

Elastic IPs

Managed prefix lists

Endpoints

Endpoint services

NAT gateways

VPC > Route tables > rtb-011a1b652d75b74b2

rtb-011a1b652d75b74b2 / Private Route Table

Actions

Details Info

Route table ID

rtb-011a1b652d75b74b2

Main

No

Explicit subnet associations

subnet-0f862d01a3ed37d69 / [Private Subnet](#)

Edge associations

-

VPC

vpc-0ff8114e3d4131509 | [Project 1 VPC](#)

Owner ID

244485704290

Routes

Subnet associations

Edge associations

Route propagation

Tags

Explicit subnet associations (1)

Edit subnet associations

Find subnet association

< 1 >

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR
Private Subnet	subnet-0f862d01a3ed37d69	10.0.2.0/24	-

### Step 3 : Creation of database and application servers

Step number	a
Step name	Creation of application server
Instructions	<ol style="list-style-type: none"><li>1) Navigate to EC2 using the Services button at the top of the screen</li><li>2) Select Instances at the left side of the screen</li><li>3) Click on Launch Instance<ul style="list-style-type: none"><li>- Select the AMI Amazon 2 Linux</li><li>- Select the instance type t2.micro</li><li>- Select Network as "Project 1 VPC" and subnet as "Public Subnet"</li><li>- For the security group, open the ports 80,443, 22 and 8065 for source set to "Anywhere"</li></ul></li><li>4) Launch the instance after creating a new pem file and downloading it</li></ol>
Expected screenshots	<ol style="list-style-type: none"><li>1) AMI used</li><li>2) Instance configuration screen</li><li>3) Security group rules</li><li>4) Instance after creation</li></ol>

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**Quick Start**

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Linux

**Amazon Machine Image (AMI)**

Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type Free tier eligible

ami-0bb4c991fa89d4b9b (64-bit (x86)) / ami-0a445ece583184891 (64-bit (Arm))

Virtualization: hvm ENA enabled: true Root device type: ebs

**Description**

Amazon Linux 2 Kernel 5.10 AMI 2.0.20230926.0 x86\_64 HVM gp2

**Architecture** 64-bit (x86)

**AMI ID** ami-0bb4c991fa89d4b9b Verified provider

**Summary**

Number of instances Info 1

**Software Image (AMI)** Amazon Linux 2 Kernel 5.10 AMI...read more

ami-0bb4c991fa89d4b9b

**Virtual server type (instance type)** t2.micro

**Firewall (security group)** New security group

**Storage (volumes)** 1 volume(s) - 8 GiB

Cancel Launch Instance Review commands

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EC2 Dashboard

EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

EC2 > Instances > i-0c32d96916bb53720

Instance summary for i-0c32d96916bb53720 (ApplicationServer) Info

Connect Instance state Actions

Updated less than a minute ago

Instance ID

i-0c32d96916bb53720 (ApplicationServer)

Public IPv4 address

44.210.83.99 [open address](#)

Private IPv4 addresses

10.0.1.151

IPv6 address

-

Instance state

Running

Public IPv4 DNS

ec2-44-210-83-99.compute-1.amazonaws.com [open address](#)

Hostname type

IP name: ip-10-0-1-151.ec2.internal

Private IP DNS name (IPv4 only)

ip-10-0-1-151.ec2.internal

Instance type

t2.micro

Answer private resource DNS name

-

VPC ID

vpc-0ff8114e3d4131509 (Project 1 VPC)

Elastic IP addresses

-

Auto-assigned IP address

44.210.83.99 [Public IP]

Subnet ID

subnet-016942eba9ea52338 (Public)

AWS Compute Optimizer finding

Opt-in to AWS Compute Optimizer for recommendations. [Learn more](#)

Auto Scaling Group name

-

IAM Role

-

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EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Details Security Networking Storage Status checks Monitoring Tags

Security details

IAM Role

-

Owner ID

244485704290

Launch time

Thu Oct 05 2023 13:59:33 GMT-0700 (Pacific Daylight Time)

Security groups

sg-096ea226befd96259 (OpenPort)

Inbound rules

Filter rules

Name	Security group rule ID	Port range	Protocol	Source
-	sgr-080613451e4ff1680	80	TCP	0.0.0.0/0
-	sgr-0ce94232ded51c369	22	TCP	0.0.0.0/0
-	sgr-0f47d43d31027a2ba	8065	TCP	0.0.0.0/0
-	sgr-0a2e81320025d01c1	443	TCP	0.0.0.0/0

Outbound rules

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EC2 Dashboard

EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Instances (1) Info

Connect Instance state Actions Launch instances

Find Instance by attribute or tag (case-sensitive)

Instance state = running Clear filters

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
	ApplicationServer	i-0c32d96916bb53720	Running	t2.micro	2/2 checks passed	No alarms	us-east-1f

Step number b

Step name Creation of database server

Instructions

- 1) Navigate to EC2 using the Services button at the top of the screen
- 2) Select Instances at the left side of the screen
- 3) Click on Launch Instance
  - Select the AMI Amazon 2 Linux
  - Select the instance type t2.micro
  - Select Network as "Project 1 VPC" and subnet as "Private Subnet"
  - For the security group, open the ports 80, 443,22 and 3306 for source set to "Anywhere"
- 4) Launch the instance by selecting the same pem file created in the previous step

Expected screenshots

- 1) AMI used
- 2) Instance configuration screen
- 3) Security group rules
- 4) Instance after creation

The screenshot displays the AWS Management Console interface for launching an Amazon Machine Image (AMI). The top navigation bar includes the AWS logo, 'Services' menu, a search bar, and user account information. The main content area is titled 'Amazon Machine Image (AMI)' and features a 'Quick Start' tab. Below this, there are tiles for various operating systems: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, and SUSE Linux. The 'Amazon Linux 2 AMI (HVM) - Kernel 5.10, SSD Volume Type' is highlighted. To the right, a 'Summary' panel shows configuration options: 'Number of instances' is set to 1, 'Software Image (AMI)' is 'Amazon Linux 2 Kernel 5.10 AMI...', 'Virtual server type (instance type)' is 't2.micro', 'Firewall (security group)' is 'New security group', and 'Storage (volumes)' is '1 volume(s) - 8 GiB'. At the bottom right of the summary panel, there are buttons for 'Cancel', 'Launch instance', and 'Review commands'. The footer of the console shows 'CloudShell', 'Feedback', and copyright information for Amazon Web Services, Inc. or its affiliates.

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Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

EC2 > Instances > i-05a456d48fc29eafb

Instance summary for i-05a456d48fc29eafb (databaseserver) Info

Updated less than a minute ago

Connect

Instance state

Actions

Instance ID

i-05a456d48fc29eafb (databaseserver)

Public IPv4 address

-

Private IPv4 addresses

10.0.2.180

Instance state

Running

Public IPv4 DNS

-

IPv6 address

-

Private IP DNS name (IPv4 only)

ip-10-0-2-180.ec2.internal

Private IP DNS name (IPv4 only)

ip-10-0-2-180.ec2.internal

Hostname type

IP name: ip-10-0-2-180.ec2.internal

Instance type

t2.micro

Answer private resource DNS name

-

VPC ID

vpc-0ff8114e3d4131509 (Project 1 VPC)

Elastic IP addresses

-

Auto-assigned IP address

-

Subnet ID

subnet-0f862d01a3ed37d69 (Private Subnet)

AWS Compute Optimizer finding

Opt-in to AWS Compute Optimizer for recommendations.

Learn more

IAM Role

-

Auto Scaling Group name

-

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EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Reserved Instances

Dedicated Hosts

Capacity Reservations

Images

AMIs

AMI Catalog

Details

Security

Networking

Storage

Status checks

Monitoring

Tags

▼ Security details

IAM Role

-

Owner ID

244485704290

Launch time

Thu Oct 05 2023 21:17:05 GMT-0700 (Pacific Daylight Time)

Security groups

sg-0879da9e0d8978119 (launch-wizard-4)

▼ Inbound rules

Filter rules

< 1 >

Name	Security group rule ID	Port range	Protocol	Source
-	sgr-0fe16c7b14a146794	3306	TCP	0.0.0.0/0
-	sgr-0df72d9da0d57438a	443	TCP	0.0.0.0/0
-	sgr-047e4c5ab13533654	80	TCP	0.0.0.0/0
-	sgr-0753224657bda97e0	22	TCP	0.0.0.0/0

▼ Outbound rules

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EC2 Global View

Events

Instances

Instances

Instance Types

Launch Templates

Spot Requests

Savings Plans

Instances (2) Info

Connect

Instance state

Actions

Launch instances

Find Instance by attribute or tag (case-sensitive)

Instance state = running

Clear filters

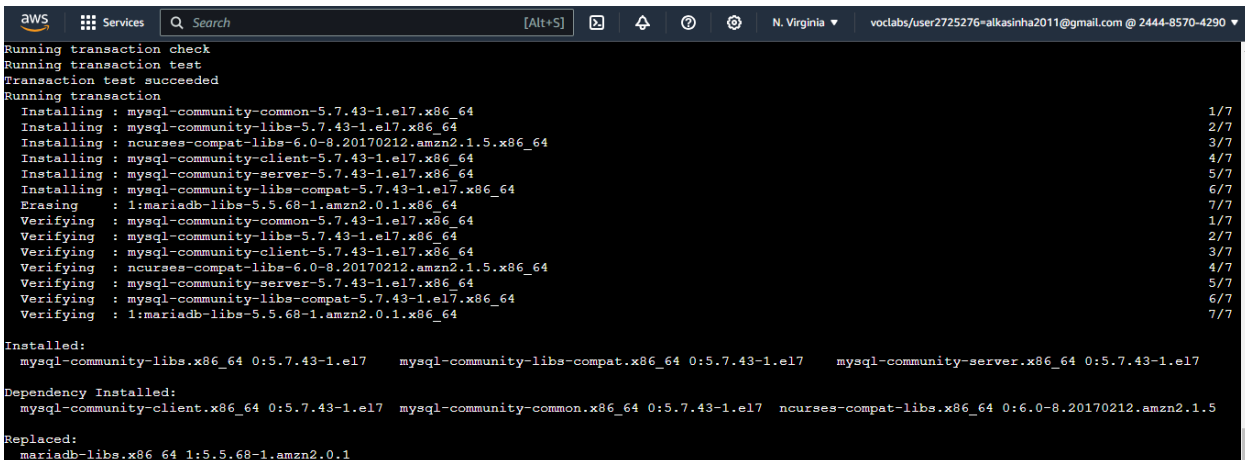
< 1 >

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability
<input type="checkbox"/>	databaseserver	i-05a456d48fc29eafb	Running	t2.micro	2/2 checks passed	No alarms	us-east-1f
<input type="checkbox"/>	ApplicationServer	i-0c32d96916bb53720	Running	t2.micro	2/2 checks passed	No alarms	us-east-1f

## Step 4: Application and Database Installation and Testing

Step number	a
Step name	Installation and configuration of MySQL
Instructions	<p>1) Navigate to the EC2 service console using the search box at the top</p> <p>2) Select the database server created in the previous step</p> <p>3) Click on the Connect button on the top right</p> <p>4) In the tab "EC2 instance connect" , ensure that the value in the username field is <b>ec2-user</b> and click on Connect.</p> <p>5) Enter the following commands one by one in the terminal which opens up to install and configure MySQL on the database server</p> <pre>sudo yum update wget http://dev.mysql.com/get/mysql57-community-release-el7-9.noarch.rpm sudo yum localinstall mysql57-community-release-el7-9.noarch.rpm -y sudo yum install mysql-community-server -y --nogpgcheck sudo systemctl start mysqld.service</pre> <p>Run the below command to retrieve a temporary password for MySQL</p> <pre>sudo grep 'temporary password' /var/log/mysqld.log   rev   cut -d" " -f1   rev   tr -d "."</pre> <p>Login to MySQL with the below command and enter the above password when prompted</p> <pre>mysql -u root -p</pre> <p>Enter the below command after you login to MySQL</p> <pre>ALTER USER 'root'@'localhost' IDENTIFIED BY 'Password42!';</pre> <p>Type 'exit' into the MySQL prompt and press Enter to exit out of the MySQL environment. Enter the below commands to complete the setup. Ignore any warning messages you receive.</p> <pre>wget https://d60pu47qoi4ee.cloudfront.net/install_mysql_linux.sh chmod 777 install_mysql_linux.sh sudo ./install_mysql_linux.sh</pre> <p>6) Type <i>exit</i> to exit the database server and go back to the application server</p>
nbmji90	<p>1) Installation of MySQL</p> <p>2) Retrieving the temporary password</p> <p>3) Executing the provided script</p>

# Installation of MySQL



```

aws  Services  Search  [Alt+S]  [Icons]  N. Virginia  voclabs/user2725276=alkasinha2011@gmail.com @ 2444-8570-4290
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : mysql-community-common-5.7.43-1.el7.x86_64                                1/7
  Installing : mysql-community-libs-5.7.43-1.el7.x86_64                                2/7
  Installing : ncurses-compat-libs-6.0-8.20170212.amzn2.1.5.x86_64                      3/7
  Installing : mysql-community-client-5.7.43-1.el7.x86_64                             4/7
  Installing : mysql-community-server-5.7.43-1.el7.x86_64                             5/7
  Installing : mysql-community-libs-compat-5.7.43-1.el7.x86_64                         6/7
  Erasing    : 1:mariadb-libs-5.5.68-1.amzn2.0.1.x86_64                               7/7
  Verifying  : mysql-community-common-5.7.43-1.el7.x86_64                             1/7
  Verifying  : mysql-community-libs-5.7.43-1.el7.x86_64                             2/7
  Verifying  : mysql-community-client-5.7.43-1.el7.x86_64                             3/7
  Verifying  : ncurses-compat-libs-6.0-8.20170212.amzn2.1.5.x86_64                   4/7
  Verifying  : mysql-community-server-5.7.43-1.el7.x86_64                             5/7
  Verifying  : mysql-community-libs-compat-5.7.43-1.el7.x86_64                       6/7
  Verifying  : 1:mariadb-libs-5.5.68-1.amzn2.0.1.x86_64                             7/7

Installed:
  mysql-community-libs.x86_64 0:5.7.43-1.el7      mysql-community-libs-compat.x86_64 0:5.7.43-1.el7      mysql-community-server.x86_64 0:5.7.43-1.el7

Dependency Installed:
  mysql-community-client.x86_64 0:5.7.43-1.el7  mysql-community-common.x86_64 0:5.7.43-1.el7  ncurses-compat-libs.x86_64 0:6.0-8.20170212.amzn2.1.5

Replaced:
  mariadb-libs.x86_64 1:5.5.68-1.amzn2.0.1

Complete!
[ec2-user@ip-10-0-2-180 ~]$ sudo systemctl start mysqld.service
[ec2-user@ip-10-0-2-180 ~]$

```

## Retrieving the temporary password

```
mattermost/prepackaged_plugins/mattermost-plugin-gitlab-v1.0.1.tar.gz  
mattermost/prepackaged_plugins/mattermost-plugin-custom-attributes-v1.0.2.tar.gz  
mattermost/prepackaged_plugins/mattermost-plugin-zoom-v1.1.2.tar.gz  
Extracted Mattermost  
mv: cannot move 'mattermost' to '/opt/mattermost': File exists  
mkdir: cannot create directory '/opt/mattermost/data': File exists  
useradd: user 'mattermost' already exists  
Created user  
[ec2-user@ip-10-0-1-151 ~]$ ssh -i newkey.pem ec2-user@10.0.2.180  
Last login: Sun Oct 8 00:27:03 2023 from ip-10-0-1-151.ec2.internal  
  
      ##  
    .###.  
   /---\ \_____\n          #####/\n  /     \|####|\n/~-----#~| |\n/~--V----#\n/~-----/\n\nA newer version of Amazon Linux is available!  
  
Amazon Linux 2023, GA and supported until 2028-03-15.  
https://aws.amazon.com/linux/amazon-linux-2023/  
  
[ec2-user@ip-10-0-2-180 ~]$ sudo grep 'temporary password' /var/log/mysql.log | rev | cut -d " " -f1 | rev | tr -d ". "  
x3n!vrt?Oaps  
[ec2-user@ip-10-0-2-180 ~]$ █
```

## Executing provided script

```
ec2-user@ip-10-0-2-180 ~]$ wget https://d6opu47qoi4ee.cloudfront.net/install_mysql_linux.sh
--2023-10-08 00:39:55-- https://d6opu47qoi4ee.cloudfront.net/install_mysql_linux.sh
Resolving d6opu47qoi4ee.cloudfront.net (d6opu47qoi4ee.cloudfront.net)... 3.162.115.128, 3.162.115.161, 3.162.115.180, ...
Connecting to d6opu47qoi4ee.cloudfront.net (d6opu47qoi4ee.cloudfront.net)|3.162.115.128|:443... connected.
HTTP request sent, awaiting response... 200 OK
Length: 189 [text/x-sh]
Saving to: 'install_mysql_linux.sh'

00%[=====>] 189      --.-K/s   in 0s

2023-10-08 00:39:55 (25.8 MB/s) - 'install_mysql_linux.sh' saved [189/189]

ec2-user@ip-10-0-2-180 ~]$ chmod 777 install_mysql_linux.sh
ec2-user@ip-10-0-2-180 ~]$ sudo ./install_mysql_linux.sh
mysql: [Warning] Using a password on the command line interface can be insecure.
ec2-user@ip-10-0-2-180 ~]$
```

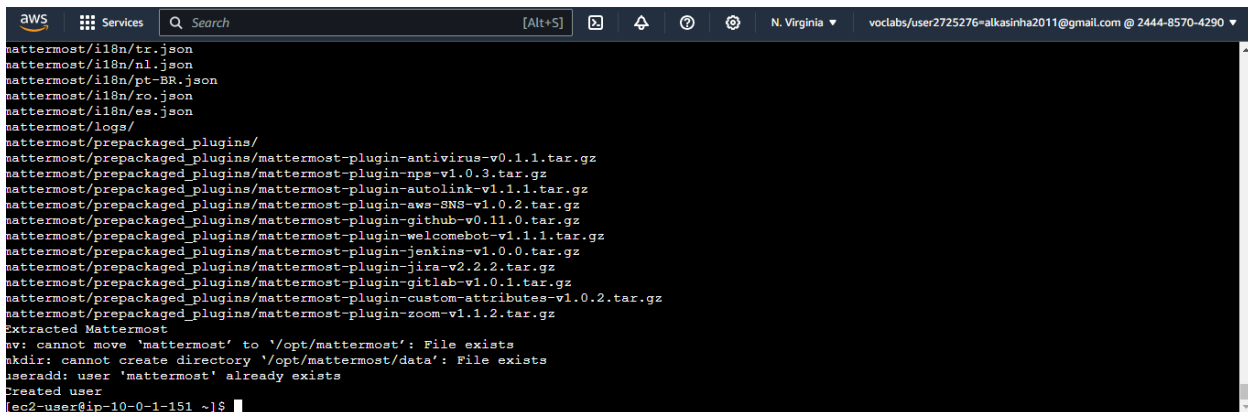
Step number	b
Step name	Installation and configuration of Mattermost

Step name	Installation and configuration of Mattermost
-----------	----------------------------------------------



Instructions	<p>1) Select the Application server in the EC2 console and connect to it using the same method as the database server in the previous step.</p> <p>2) Enter the following commands in the terminal which opens up to install and configure Mattermost</p> <pre>wget https://d6opu47qoi4ee.cloudfront.net/install_mattermost_linux.sh sudo yum install dos2unix -y sudo dos2unix install_mattermost_linux.sh chmod 700 install_mattermost_linux.sh sudo ./install_mattermost_linux.sh &lt;private IP of MySQL server&gt; Example : sudo ./install_mattermost_linux 173.65.34.7 sudo chown -R mattermost:mattermost /opt/mattermost sudo chmod -R g+w /opt/mattermost cd /opt/mattermost sudo -u mattermost ./bin/mattermost</pre> <p>2) Check whether the server has been successfully deployed by navigating to the following URL in your web browser. The web page might take a couple of minutes to load.</p> <p>&lt;public IP of the application server&gt;:8065</p>
Expected screenshots	<p>1) Executing the script</p> <p>2) Starting the Mattermost server</p> <p>3) Accessing the application via web browser</p>

## Executing the script-



```

mattermost/i18n/tr.json
mattermost/i18n/nl.json
mattermost/i18n/pt-BR.json
mattermost/i18n/ro.json
mattermost/i18n/es.json
mattermost/logs/
mattermost/prepackaged_plugins/
mattermost/prepackaged_plugins/mattermost-plugin-antivirus-v0.1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-nps-v1.0.3.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-autolink-v1.1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-aws-SNS-v1.0.2.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-github-v0.11.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-welcomebot-v1.1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-jenkins-v1.0.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-jira-v2.2.2.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-gitlab-v1.0.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-custom-attributes-v1.0.2.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-zoom-v1.1.2.tar.gz
Extracted Mattermost
mv: cannot move 'mattermost' to '/opt/mattermost': File exists
mkdir: cannot create directory '/opt/mattermost/data': File exists
useradd: user 'mattermost' already exists
Created user
[ec2-user@ip-10-0-1-151 ~]$

```

## Starting the Mattermost server

```
aws Services Search [Alt+S] N. Virginia voclabs/user2725276-alkasinha2011@gmail.com @ 2444-8570-4290
{"level":"error","ts":1696726703.0874994,"caller":"app/server_app_adapters.go:125","msg":"SiteURL must be set. Some features will operate incorrectly if the SiteURL is not set. See documentation for details: http://about.mattermost.com/default-site-url"}
{"level":"info","ts":1696726703.0899563,"caller":"app/license.go:39","msg":"License key from https://mattermost.com required to unlock enterprise features."}
{"level":"info","ts":1696726703.0909493,"caller":"app/migrations.go:26","msg":"Migrating roles to database."}
{"level":"info","ts":1696726703.146801,"caller":"sqlstore/post_store.go:1351","msg":"Post.Message has size restrictions","max_characters":16383,"max_bytes":65535}
{"level":"info","ts":1696726703.150917,"caller":"app/migrations.go:102","msg":"Migrating emojis config to database."}
{"level":"info","ts":1696726703.4366984,"caller":"mlog/log.go:166","msg":"Starting up plugins"}
{"level":"info","ts":1696726703.4369564,"caller":"app/plugin.go:213","msg":"Syncing plugins from the file store"}
{"level":"info","ts":1696726706.1603441,"caller":"mlog/sugar.go:19","msg":"Ensuring Surveybot exists","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1696726706.1794422,"caller":"mlog/sugar.go:19","msg":"Surveybot created","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1696726706.1876755,"caller":"mlog/sugar.go:19","msg":"Upgrade detected. Checking if a survey should be scheduled.","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1696726706.3643026,"caller":"mlog/sugar.go:19","msg":"Scheduling next survey for Oct 29, 2023","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1696726706.7486272,"caller":"app/server.go:217","msg":"Current version is 5.19.0 (5.19.0/Thu Jan 16 18:30:33 UTC 2020/90cf883f84000d6fdb025308ad14d56e6ed53f05/1268390c0cde16f750b0b6fe62534b82586d595f)"}
{"level":"info","ts":1696726706.7487974,"caller":"app/server.go:218","msg":"Enterprise Enabled: true"}
{"level":"info","ts":1696726706.748893,"caller":"app/server.go:221","msg":"Printing current working","directory":"/opt/mattermost"}
{"level":"info","ts":1696726706.748966,"caller":"app/server.go:222","msg":"Loaded config","source":"file:///opt/mattermost/config/config.json"}
{"level":"error","ts":1696726706.766241,"caller":"mlog/log.go:174","msg":"RPC call OnConfigurationChange to plugin failed.","plugin_id":"com.mattermost.nps","error":"connection is shut down"}
{"level":"error","ts":1696726706.823909,"caller":"mlog/log.go:174","msg":"RPC call OnConfigurationChange to plugin failed.","plugin_id":"com.mattermost.nps","error":"connection is shut down"}
{"level":"info","ts":1696726706.8309357,"caller":"jobs/workers.go:68","msg":"Starting workers"}
{"level":"info","ts":1696726706.839523,"caller":"app/web_hub.go:75","msg":"Starting websocket hubs","number_of_hubs":2}
{"level":"info","ts":1696726706.8426971,"caller":"jobs/schedulers.go:74","msg":"Starting schedulers."}
{"level":"info","ts":1696726706.851287,"caller":"app/server.go:440","msg":"Starting Server..."}
{"level":"info","ts":1696726706.851585,"caller":"app/server.go:506","msg":"Server is listening on [::]:8065"}
```

## Accessing application via web browser

← → ↺ ⚠ Not secure | 3.228.21.216:8065/signup\_email

🔖 ☆ ⚙ 🌐 Update

< Back

Mattermost

All team communication in one place,  
searchable and accessible anywhere

Let's create your account

Already have an account? [Click here to sign in.](#)

What's your email address?

Valid email required for sign-up

Choose your username

You can use lowercase letters, numbers, periods, dashes, and underscores.

Choose your password

### Step 5: Answer the following questions

Q1 What is the default setting for DNS hostnames when a new VPC is created?

- a) Enabled
- b) Disabled
- c) Can be set during VPC creation
- d) Depends on the region used

Enter your answer here

B

Q2 What is the term used for the machine when we use it to log into the database server?

- a) Bastion Host
- b) NAT Gateway
- c) Tunnel Interface
- d) SSH Gateway

Enter your answer here

A

Q3 The database server security group in this exercise has to keep port 3306 open. Which protocol uses this port to communicate?

- a) HTTPS
- b) RDP
- c) TCP
- d) SCP

Enter your answer here

C

Q4 Which port is being used by Mattermost to communicate with the client application

- a) 8080
- b) 80
- c) 443
- d) 8065

Enter your answer here

D

Q5 Which of the following is a reason why we cannot set the CIDR block for the public subnet to 10.0.2.0/16, assuming the values for the other CIDR blocks are the same as mentioned in the instructions?

- a) CIDR block overlaps with existing block
- b) CIDR block is not a valid CIDR

- c) CIDR block does not fall within the VPC
- d) There is no reason, this is a perfectly valid CIDR

Enter your answer here

A

Q6 Assume that you have been asked to create 3 EC2 instances - application server, the database server and NAT instance. Each of these instances have their own security groups with a set of ports to be kept open. One of those ports is entirely unnecessary for the given architecture to function. Which of the ports given in the option below could it be?

- a) Port 22 on the NAT instances
- b) Port 3306 on the database server
- c) Port 443 on the NAT instance
- d) Port 22 on the application server

Enter your answer here

D

Q7 How are we going to increase the security of the Mattermost server to ensure the users are from a specific organization and the traffic is originating from a known IP address?

Create security group which acts as a virtual firewall for Mattermost server to control incoming and outgoing traffic. Proper inbound rules control the incoming traffic to Mattermost server.

---

Q8 How do we achieve elasticity for the Mattermost server?

Configure Mattermost to use elasticsearch server. Set enable elasticsearch indexing to true in elasticsearch of system console. Set the Elasticsearch server connection details. Edit the config.json file. Enable elasticsearch by setting enable elasticsearch for search queries to true and setting enable elasticsearch for autocomplete to true.

---

Max points

15

Grade distribution	
MCQs	6 (1 point each)
Subjective questions	10 (5 points each)
Implementation screenshots	24 points (1 point each)

Total	40 points
-------	-----------

# Appendix

*This section contains optional details on how to SSH into an EC2 instance using the terminal and can be ignored by learners who are not from a technical background*

## Connecting to an EC2 instance using SSH

- 1) A terminal environment will be required to perform connect to an instance using SSH. Linux and macOS users can use the built-in terminal installed on their operating systems. Windows Users are advised to install a third-party terminal environment such as Gitbash <https://git-scm.com/download/win>
- 2) After opening the terminal environment, you will need to navigate to the folder containing the keypair file for the instance using the `cd` command. For example, if the keypair file is stored in the Downloads folder, you can use the below command

```
cd Downloads
```

- 3) Run the following command in the terminal to ensure that the keypair file is in read-only mode

```
chmod 400 <keypair file name>
```

- 4) Run the following command to SSH into the EC2 instance

```
ssh -i <keypair file name> ec2-user@<IP address of the instance>
```