

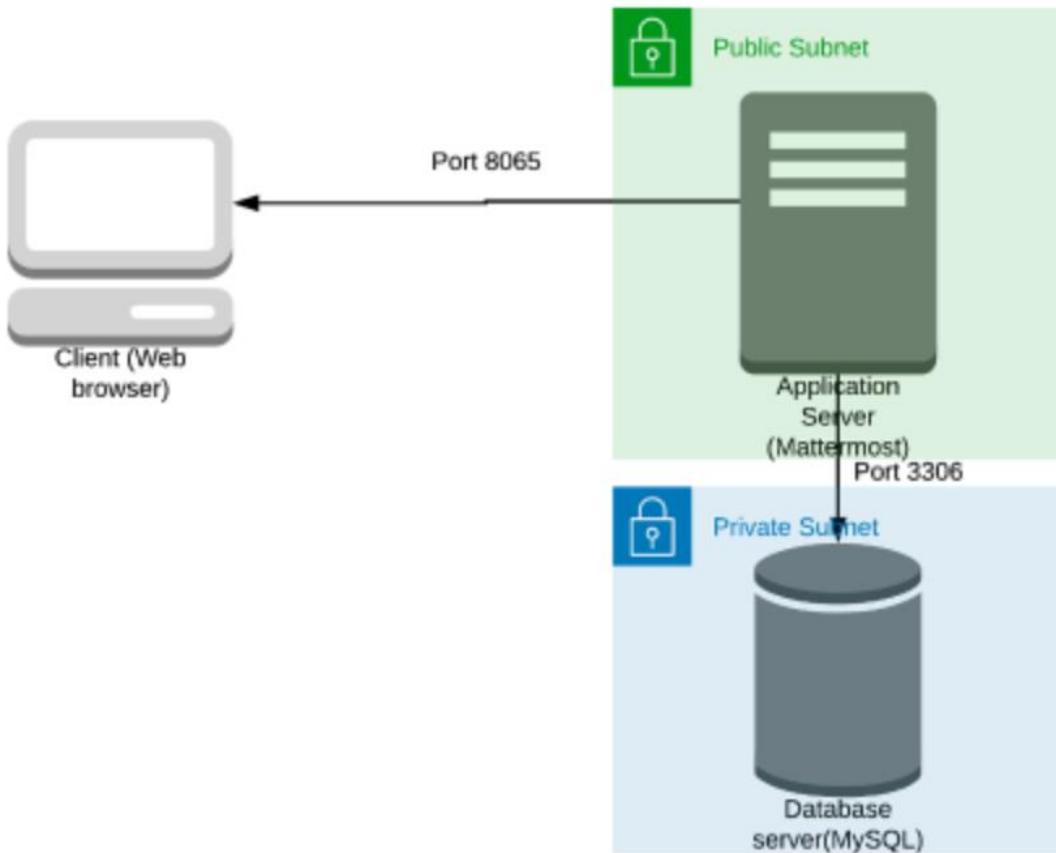
<b>Declaration</b>	
Questions in this exercise are intentionally complex and could be convoluted or confusing. This is by design and to simulate real life situations where customers seldom give crystal clear requirements and ask unambiguous questions.	

I have read the above statement and agree to these conditions	
I AGREE	RAHUL JAIN
	<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.

**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 Ubuntu 18.04 instance on the private subnet using the instructions provided. (Hint: Use a bastion host and a NAT instance)
3	Install and configure Mattermost on an Ubuntu 18.04 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	<ol style="list-style-type: none"><li>1) Created VPC with properties visible</li></ol>

**<Insert Screenshot a(1) here>**

The screenshot shows the AWS VPC Management Console. At the top, there's a navigation bar with tabs like 'AWS Account' and 'Your VPCs | VPC Management C...'. Below the navigation bar is a search bar and a user profile. The main area displays a table titled 'Your VPCs (1/2) Info' with columns: Name, VPC ID, State, IPv4 CIDR, I..., I..., DHCP op..., Main route..., Main netw..., Ten..., Def..., Owner ID. There are two entries: 'Project 1 VPC' (selected) with VPC ID 'vpc-0a6291778cbe1252b' and 'Available' status, and another entry with VPC ID 'vpc-330f6d4e' and 'Available' status. Below the table is a 'Details' section with various configuration parameters.

Name	VPC ID	State	IPv4 CIDR	I...	I...	DHCP op...	Main route...	Main netw...	Ten...	Def...	Owner ID
<input checked="" type="checkbox"/> Project 1 VPC	vpc-0a6291778cbe1252b	Available	10.0.0.0/16	-	-	dopt-976a4...	rtb-0e478aaa...	acl-0443c9cb...	Default	No	616028383755
	vpc-330f6d4e	Available	172.31.0....	-	-	dopt-976a4...	rtb-ff5b5381	acl-b5ac58c9	Default	Yes	616028383755

#### Details

VPC ID vpc-0a6291778cbe1252b	State <span style="color: green;">Available</span>	DNS hostnames Enabled	DNS resolution Enabled
Tenancy Default	DHCP options set dopt-976a44ed	Main route table rtb-0e478aaa94121bbc2	Main network ACL acl-0443c9cb9599813c4
Default VPC No	IPv4 CIDR 10.0.0.0/16	IPv6 pool -	IPv6 CIDR (Network border group) -
Route 53 Resolver DNS Firewall rule groups <span style="color: red;">Failed to load rule groups</span>	Owner ID 616028383755		

Step number	b
Step name	Creation of public subnet
Instructions	<p>1) Navigate to VPC-&gt;Subnets</p> <p>2) Click on "Create Subnet"</p> <p>3) Enter the following fields</p> <p>Name tag : Public Subnet</p> <p>VPC : Select the Project 1 VPC</p> <p>IPv4 CIDR block : 10.0.1.0/24</p> <p>The other options can be ignored</p> <p>4) Click on Create</p> <p>5) Once the subnet has been created, select the subnet and click on Actions-&gt;Modify Auto-assign IP settings</p> <p>6) Enable the option "Auto assign IPv4" and select Save</p>
Expected screenshots	1) Subnet Creation screen

<Insert Screenshot b(1) here>

**Subnets (1/7) Info**

Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR	Available IPv4...	Availability...	Availability
subnet-703a3b3d	subnet-703a3b3d	Available	vpc-330f8d4e	172.31.16.0/20	-	4091	us-east-1c	use1-az4
subnet-b96716df	subnet-b96716df	Available	vpc-330f8d4e	172.31.0.0/20	-	4091	us-east-1a	use1-az1
Public Su...	subnet-0492480...	Available	vpc-0a6291778cbe1252b	10.0.1.0/24	-	251	us-east-1a	use1-az1

**Details**

Subnet ID	State	VPC	IPv4 CIDR
subnet-04924808ed4a7bf82	Available	vpc-0a6291778cbe1252b   Project 1 VPC	10.0.1.0/24
Available IPv4 addresses	IPv6 CIDR	Availability Zone	Availability Zone ID
251	-	us-east-1a	use1-az1
Network border group	Route table	Network ACL	Default subnet
us-east-1	rtb-0e478aaa94121bbc2	acl-0443c9cb9599813c4	No
Auto-assign public IPv4 address	Auto-assign IPv6 address	Auto-assign customer-owned IPv4 address	Customer-owned IPv4 pool
Yes	No	No	-

Step number	c
Step name	Creation of private 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 : Private Subnet VPC : Select the Project 1 VPC IPv4 CIDR block : 10.0.2.0/24 The other options can be ignored</li> <li>4) Click on Create</li> </ol>
Expected screenshots	1) Subnet Creation screen

<Insert Screenshot c(1) here>

**Subnets (1/8) Info**

Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR	Available IPv4...	Availability...	Availability
subnet-703a3b3d	subnet-703a3b3d	Available	vpc-330f8d4e	172.31.16.0/20	-	4091	us-east-1c	use1-az4
Private Subnet	subnet-0e27dbd...	Available	vpc-0a6291778cbe1252b	10.0.2.0/24	-	251	us-east-1a	use1-az1

**subnet-0e27dbd2b0f07bbfb / Private Subnet**

**Details** | Flow logs | Route table | **Network ACL** | Sharing | Tags

**Details**

Subnet ID subnet-0e27dbd2b0f07bbfb	State Available	VPC vpc-0a6291778cbe1252b   Project 1 VPC	IPv4 CIDR 10.0.2.0/24
Available IPv4 addresses 251	IPv6 CIDR -	Availability Zone us-east-1a	Availability Zone ID use1-az1
Network border group us-east-1	Route table rtb-0e478aa94121bbc2	Network ACL acl-0443c9cb599813c4	Default subnet No
Auto-assign public IPv4 address No	Auto-assign IPv6 address No	Auto-assign customer-owned IPv4 address No	Customer-owned IPv4 pool -

## 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>

<Insert Screenshot a(1) here >

The screenshot shows the AWS VPC Internet Gateways management interface. On the left, a sidebar lists various VPC-related services like New VPC Experience, VPC Dashboard, and Internet Gateways. The main pane displays a table of Internet Gateways with columns for Name, Internet gateway ID, State, VPC ID, and Owner. Two entries are shown: 'Project 1 Internet Gateway' (igw-039d88de44aa36a30) which is attached to a VPC, and another unnamed gateway (igw-8e9767f4) which is also attached.

Step number	b
Step name	Creation of public route table
Instructions	<p>1) Navigate to VPC -&gt; Route Tables and click on Create Route table</p> <p>2) Enter the name tag "Public Route Table", select the Project 1 VPC from the dropdown and click on Create</p> <p>3) Once the route table is created, select it and select the Routes tab below the list of route tables</p> <p>4) Click in Edit Routes and add the following route (Don't edit the existing one)</p> <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> <p>Click on Save Routes</p> <p>5) Select the Subnet Associations tab and click on Edit Subnet Associations</p> <p>6) Select the Public Subnet from the list and click on Save</p>

Expected screenshots

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

<Insert Screenshot b(1) here>

Route Table: rb-00c49793ac1e52710

Destination	Target	Status	Propagated
10.0.0.0/16	local	active	No
0.0.0.0/0	igw-039d58de4aa36a30	active	No

<Insert Screenshot b(2) here>

Route Table: rb-00c49793ac1e52710

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-04924000ed4a7bf...	10.0.1.0/24	-

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table.

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0e27fbfd3b0f7bf...	10.0.2.0/24	-

Step number	c
Step name	Creation of NAT instance
Instructions	<p>1) Navigate to EC2 using the Services button at the top of the screen</p> <p>2) Select Instances at the left side of the screen</p> <p>3) Click on Launch Instance</p> <ul style="list-style-type: none"> <li>- Select the Community AMI for NAT instance</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 22,80 and 443 for source set to "Anywhere"</li> </ul> <p>4) Launch the instance</p> <p>5) Once the instance is launched, select the instance and click on Actions-&gt;Networking -&gt; Change Source/Dest. Check and disable Source/Destination Check</p>
Expected screenshots	<p>1) Configure Instance Details</p> <p>2) Security Group Rules</p> <p>3) Instance after creation</p>

### <Insert Screenshot c(1) here>

The screenshot shows the AWS Launch Instance Wizard Step 7: Review Instance Launch. It displays the following information:

- AMI Details:** amzn-ami-vpc-nat-hvm-2018.03.02.20181116.x86\_64.ebs - ami-00d4ae0537502763
- Instance Type:** t2.micro
- Security Groups:** nat-ec2-sg
- Networking:** Security group rules for SSH, HTTP, HTTPS, and HTTPS.
- Callout Box Content:**

**⚠ Improve your instances' security. Your security group, nat-ec2-sg, is open to the world!**  
 Your instances may be accessible from any IP address. We recommend that you update your security group rules to allow access from known IP addresses only.  
 You can also open additional ports in your security group to facilitate access to the application or service you're running, e.g., HTTP (80) for web servers. Edit security groups

### <Insert Screenshot c(2) here>

Disabled source / destination checking for i-0eb334a8d4a68a62

Instances (1/2) Info

Name	Instance ID	Instance state	Insta...	Status c...	Alarm...	Availa...	Public IPv...	Publ...	Elast...	IPv6 ...	Mo...	Securi...
Creatio...	i-026406cfa2...	Terminated	t2.micro	-	1 a+	us-east-1a	-	54.85.8...	-	-	disabled	-
Creatio...	i-0eb334a8...	Running	t2.micro	2/2 check	1/+	us-east-1a	ec2-3-218-2...	3.218.2...	-	-	disabled	nat-ec...

Security groups  
sg-05aa83dbf2ffe9e18 (nat-ec2-sg)

Inbound rules

Port r...	Protocol	Source	Security groups
80	TCP	0.0.0.0/0	nat-ec2-sg
80	TCP	::/0	nat-ec2-sg
22	TCP	0.0.0.0/0	nat-ec2-sg
22	TCP	::/0	nat-ec2-sg
443	TCP	0.0.0.0/0	nat-ec2-sg

<Insert Screenshot c(3) here>

Disabled source / destination checking for i-0eb334a8d4a68a62

Instances (1/2) Info

Details Security Networking Storage Status checks Monitoring Tags

Instance summary

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0eb334a8d4a68a62 (Creation of NAT instance)	3.218.244.167   open address	10.0.1.134
Instance state	Public IPv4 DNS	Private IPv4 DNS
Running	ec2-3-218-244-167.compute-1.amazonaws.com   open address	ip-10-0-1-134.ec2.internal
Instance type	Elastic IP addresses	VPC ID
t2.micro	-	vpc-0a6291778be1252b (Project 1 VPC)
AWS Compute Optimizer finding	IAM Role	Subnet ID
User: arn:aws:sts::616028383755:assumed-role/vocstartsoft/user1403308=rahulpiain81@gmail.com is not authorized to perform: compute.optimizerGetEnrollmentStatus on	-	subnet-04924808ed4a7bf82 (Public Subnet)

Step d  
number

Step name Creation of private route tables

- Instruction
- 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 Instances and select the NAT instance created in the previous stepClick 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 screenshot
- 1) Route list of the route table
  - 2) Subnet association of the route table

<Insert Screenshot for d(1) here >

The screenshot shows the AWS VPC Route Tables management interface. On the left, there's a navigation sidebar with various VPC-related options like VPC Dashboard, Route Tables, Security Groups, and Network ACLs. The main area is titled 'Route Tables | VPC Management' and shows a list of existing route tables. A modal window is open for creating a new route table, with the 'Create route table' button visible. The table lists route entries, including a new entry being added.

Name	Route Table ID	Explicit subnet association	Edge associations	Main	VPC ID	Owner
Private Rout...	rb-02eecd0d9fc2e26a20	subret-0e27ab20f7bbfb	-	No	vpc-0a629177cbef1252b   Project 1 VPC	616023303755
Public Rout...	rb-0049793aade52710	subret-0492400d6d47fb2	-	No	vpc-0a629177cbef1252b   Project 1 VPC	616023303755
	rb-0e473aaad4121bbc2	-	-	Yes	vpc-0a629177cbef1252b   Project 1 VPC	616023303755
	rb-f5953b1	-	-	Yes	vpc-330ff64e	616023303755

<Insert Screenshot for d(2) here>

AWS Account    Route Tables | VPC Management

console.aws.amazon.com/vpc/home?region=us-east-1#RouteTables:sort=routeTableId

New VPC Experience

VPC Dashboard

Selected a VPC

Route Tables

Internet Gateways

Egress Only Internet Gateways

Carrier Gateways

DHCP Options Sets

Elastic IPs

Managed Prefix Lists

Endpoints

Endpoint Services

NAT Gateways

Peering Connections

SECURITY

Network ACLs

Security Groups

REACHABILITY

Reachability Analyzer

DNS FIREWALL

Rule Groups

Domain Lists

AWS NETWORK FIREWALL

Firewalls

Firewall policies

Network Firewall rule groups

VIRTUAL PRIVATE NETWORK (VPN)

Customer Gateways

Virtual Private Gateways

Site-to-Site VPN Connections

Client VPN Endpoints

Feedback English (US) ▾

Route Tables | VPC Management

Create route table Actions ▾

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1 to 4 of 4

Name	Route Table ID	Explicit subnet association	Edge associations	Main	VPC ID	Owner
Private Rout...	rb-02eecd09fc2e26a26	subnet-0e27dbd2b0f7bbfb	-	No	vpc-0a62917776cbe1252b   Project 1 VPC	61602383755
Public Rout...	rb-00e49793a5ce5e52710	subnet-0492400ed4a7bf82	-	No	vpc-0a62917776cbe1252b   Project 1 VPC	61602383755
	rb-0e478aa94121bcb2	-	-	Yes	vpc-0a62917776cbe1252b   Project 1 VPC	61602383755
	rb-ff5b53b1	-	-	Yes	vpc-330fb64e	61602383755

Route Table: rb-02eecd09fc2e26a26

Summary Routes Subnet Associations Edge Associations Route Propagation Tags

Edit subnet associations

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0e27dbd2b0f7bbfb...	10.0.2.0/24	-

The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table.

Subnet ID	IPv4 CIDR	IPv6 CIDR

All your subnets are associated with a route table.

None found

Feedback English (US) ▾

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week#4

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## Step 3 : Creation of database and application servers

Step number a

Step name Creation of application 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 Ubuntu 18.04 LTS
  - Select the instance type t2.micro
  - Select Network as "Project 1 VPC" and subnet as "Public Subnet"
  - For the security group, open the ports 22 and 8065 for source set to "Anywhere"
  - 4) Launch the instance after creating a new pem file and downloading it
- Expected screenshots
- 1) AMI used
  - 2) Instance configuration screen
  - 3) Security group rules
  - 4) Instance after creation

<Insert screenshot a(1) here>

<Insert screenshot a(2) here>

**Step 7: Review Instance Launch**

Please review your instance launch details. You can go back to edit changes for each section. Click Launch to assign a key pair to your instance and complete the launch process.

**AMIs Details**

Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0747bdcabd34c712a

**Instance Type**

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
t2.micro	-	1	1	EBS only	-	Low to Moderate

**Security Groups**

Security group name: app-server-sg  
Description: launch-wizard-2 created 2021-05-15T22:55:14.460+05:30

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0/0	
SSH	TCP	22	::/0	
Custom TCP Rule	TCP	8065	0.0.0.0/0	
Custom TCP Rule	TCP	8065	::/0	

**Instance Details**

**Edit instance type**

**Edit security groups**

**Edit instance details**

**Edit storage**

**Edit tags**

**<Insert screenshot a(3) here>**

**New EC2 Experience**

Welcome to the new instances experience! We're redesigning the EC2 console to make it easier to use. To switch between the old console and the new console, use the New EC2 Experience toggle above the navigation panel. We'll release updates continuously based on customer feedback.

**Instances (1/3) Info**

Name	Instance ID	Instance state	Insta...	Status c...	Alarm...	Availa...	Public IP...	Publ...	Elast...	IPv6 ...	Mo...	Securi...
Creatio...	i-026406cfa2...	Terminated	t2.micro	-	0 1+	us-east-1a	-	-	-	-	disabled	-
Creatio...	i-0e8b334a8...	Running	t2.micro	2/2 check	0 1 a+	us-east-1a	ec2-3-218-2...	3.218.2...	-	-	disabled	nat-ec
ann-se...	i-0f5fc6c7h1...	Running	t2.micro	-	Nn +	us-east-1a	ec2-3-218-1...	3.218.1...	-	-	disabled	ann-se

**Security groups**

sg-080c38c53f24d4f0 (app-server-sg)

**Inbound rules**

Port r...	Protocol	Source	Security groups
22	TCP	0.0.0.0/0	app-server-sg
22	TCP	::/0	app-server-sg
8065	TCP	0.0.0.0/0	app-server-sg
8065	TCP	::/0	app-server-sg

**Outbound rules**

**<Insert screenshot a(4) here>**

The screenshot shows the AWS EC2 Management Console. On the left, the navigation pane is open, showing various services like EC2 Dashboard, Events, Tags, Limits, and Instances. Under Instances, 'Instances' is selected. The main content area displays a table of instances. One instance is highlighted: 'ann-se... i-0f5fc6c7b1ffcaa50 (app-server)'. This instance is currently running. Below the table, there's a detailed view of this specific instance.

**Instances (1/3) Info**

Name	Instance ID	Instance state	Insta...	Status c...	Alarm...	Availa...	Public IPv...	Publ...	Elast...	IPv6 ...	Mo...	Securi...
Creatio...	i-026406cfa2...	Terminated	t2.micro	-	1 2+	us-east-1a	-	-	-	-	disabled	-
Creatio...	i-0e8b534ab8...	Running	t2.micro	2/2 check:	1 2+	us-east-1a	ec2-3-218-2...	3.218.2...	-	-	disabled	nat-ec...
ann-se...	i-0f5fc6c7b1...	Running	t2.micro	-	Nh ...	us-east-1a	ec2-3-218-1...	3.218.1...	-	-	disabled	ann-se...

**Instance: i-0f5fc6c7b1ffcaa50 (app-server)**

**Details** | Security | Networking | Storage | Status checks | Monitoring | Tags

**Instance summary**

Instance ID i-0f5fc6c7b1ffcaa50 (app-server)	Public IPv4 address 3.218.150.62   <a href="#">open address</a>	Private IPv4 addresses 10.0.1.169
Instance state Running	Public IPv4 DNS ec2-3-218-150-62.compute-1.amazonaws.com   <a href="#">open address</a>	Private IPv4 DNS ip-10-0-1-169.ec2.internal
Instance type t2.micro	Elastic IP addresses -	VPC ID <a href="#">vpc-0a6291778cbe1252b (Project 1 VPC)</a>
AWS Compute Optimizer finding	IAM Role	Subnet ID

Step number b

Step name Creation of database 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</li> <li>- Select the AMI Ubuntu 18.04 LTS</li> <li>- Select the instance type t2.micro</li> <li>- Select Network as "Project 1 VPC" and subnet as "Private Subnet"</li> <li>- For the security group, open the ports 22 and 3306 for source set to "Anywhere"</li> <li>4) Launch the instance by selecting the same pem file created in the previous step</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>

### <Insert screenshot b(1) here>

Step 1: 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.

AMI Name	Description	Root device type	Virtualization type	ENAv-Enabled	Select	64-bit (x86)	64-bit (Arm)
Ubuntu Server 20.04 LTS (HVM), SSD Volume Type - ami-09d67e42b25ce0d7 (64-bit x86) / ami-00d1ab6335f217cf (64-bit Arm)	Ubuntu Server 20.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ).	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0747bcaeb34c712a (64-bit x86) / ami-08353a25e00bea3e (64-bit Arm)	Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ).	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Deep Learning AMI (Ubuntu 18.04) Version 43.0 - ami-04cd519d9578053	MINNv1.0 & 1.7.0, TensorFlow-2.4.1, 2.1.3 & 1.15.5, PyTorch-1.4.0 & 1.8.1, Neuron, & others, NVIDIA CUDA, cuONN, NCCL, Intel MKL-DNN, Docker, NVIDIA-Docker & EFA support. For a fully managed experience, check: <a href="https://aws.amazon.com/sagemaker">https://aws.amazon.com/sagemaker</a>	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Deep Learning AMI (Ubuntu 16.04) Version 43.0 - ami-0774e48892bd5f116	MINNv1.0 & 1.7.0, TensorFlow-2.4.1, 2.1.3 & 1.15.5, PyTorch-1.4.0 & 1.8.1, EI, Neuron, & others, NVIDIA CUDA, cuONN, NCCL, Intel MKL-DNN, Docker, NVIDIA-Docker & EFA. For a fully managed experience, check: <a href="https://aws.amazon.com/sagemaker">https://aws.amazon.com/sagemaker</a>	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Deep Learning Base AMI (Ubuntu 18.04) Version 37.0 - ami-0899dbc0ddc28fb07	Built with NVIDIA CUDA, cuONN, NCCL, GPU Drivers, Intel MKL-DNN, Docker, NVIDIA-Docker and EFA support. For a fully managed experience, check: <a href="https://aws.amazon.com/sagemaker">https://aws.amazon.com/sagemaker</a>	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Deep Learning Base AMI (Ubuntu 16.04) Version 37.0 - ami-053b098e110359b0	Built with NVIDIA CUDA, cuONN, NCCL, GPU Drivers, Intel MKL-DNN, Docker, NVIDIA-Docker and EFA support. For a fully managed experience, check: <a href="https://aws.amazon.com/sagemaker">https://aws.amazon.com/sagemaker</a>	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Ubuntu Server 16.04 LTS (HVM) with SQL Server 2017 Standard - ami-093474a6953bc42	Microsoft SQL Server 2017 Standard edition on Ubuntu Server 16.04 LTS. The AMI also comes pre-installed with .NET Core 5.0 and PowerShell 7.1.	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)
Ubuntu Server 16.04 LTS (HVM), SSD Volume Type - ami-0ee02acd5fa5299be (64-bit x86) / ami-0e011417bd70948da (64-bit Arm)	Ubuntu Server 16.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical ( <a href="http://www.ubuntu.com/cloud/services">http://www.ubuntu.com/cloud/services</a> ).	Root device type: ebs	Virtualization type: hvm	ENAv-Enabled: Yes	Select	64-bit (x86)	64-bit (Arm)

### <Insert screenshot b(2) here>



**AWS Account** Launch instance wizard | EC2 Management Console

Step 7: Review Instance Launch

Please review your instance launch details. You can go back to edit changes for each section. Click Launch to assign a key pair to your instance and complete the launch process.

**AMIs Details**

Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0747bdcabd34c712a

**Instance Type**

Instance Type	ECUs	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance
t2.micro	-	1	1	EBS only	-	Low to Moderate

**Security Groups**

Security group name: db-ec2-sg  
Description: launch-wizard-2 created 2021-05-15T23:17:57.050+05:30

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	0.0.0.0	
SSH	TCP	22	::/0	
MySQL/Aurora	TCP	3306	0.0.0.0/0	
MySQL/Aurora	TCP	3306	::/0	

**Instance Details**

**Edit instance type**

**Edit security groups**

**Edit instance details**

**Edit storage**

**Edit tags**

**Feedback English (US) ▾** Launch instance wizard | EC2 Management Console

**Instances (1/4) Info**

**Launch instances**

**Instances**

Name	Instance ID	Instance state	Insta...	Status c...	Alarm...	Availab...	Public IPV...	Publ...	Elast...	IPv6 ...	M
Creation of NAT instance	i-0e8b334a8...	Running	t2.micro	2/2 check	1 +	us-east-1a	ec2-3-218-2...	3.218.2...	-	-	di
app-server	i-0f5fc6c7b1...	Running	t2.micro	2/2 check	1 +	us-east-1a	ec2-3-218-1...	3.218.1...	-	-	di
db-server	i-059818840...	Running	t2.micro	Initializing	No ... +	us-east-1a	-	-	-	-	di

**Security details**

IAM Role: -  
Owner ID: 616028383755  
Launch time: Set May 15 2021 23:19:07 GMT+0530 (India Standard Time)

**Inbound rules**

Port r...	Protocol	Source	Security groups
22	TCP	0.0.0.0/0	db-ec2-sg
22	TCP	::/0	db-ec2-sg
3306	TCP	0.0.0.0/0	db-ec2-sg
3306	TCP	::/0	db-ec2-sg

**Outbound rules**

<Insert screenshot b(4) here>

Instances (1/4) **Info**

Name	Instance ID	Instance state	Insta...	Status c...	Alarm...	Availa...	Public IPV...	Publ...	Elast...	IPv6 ...	M
Creation of NAT instance	i-0e8b334a8...	Running	t2.micro	2/2 check	1 a+	us-east-1a	ec2-3-218-2...	3.218.2...	-	-	di
app-server	i-0f5fc6c7b1...	Running	t2.micro	2/2 check	1 a+	us-east-1a	ec2-3-218-1...	3.218.1...	-	-	di
<b>db-server</b>	<b>i-059818840...</b>	<b>Running</b>	<b>t2.micro</b>	<b>Initializ...</b>	<b>No ... +</b>	<b>us-east-1a</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>di</b>

Instance: i-059818840fbadedbc (db-server)

Details | Security | Networking | Storage | Status checks | Monitoring | Tags

Instance summary

Instance ID i-059818840fbadedbc (db-server)	Public IPv4 address -	Private IPv4 addresses 10.0.2.105
Instance state Running	Public IPv4 DNS -	Private IPv4 DNS ip-10-0-2-105.ec2.internal
Instance type t2.micro	Elastic IP addresses -	VPC ID vpc-0a6291778be1252b (Project 1 VPC)
AWS Compute Optimizer finding User: arn:aws:sss:616028383755:assumed-role/vocstartsoft/user1403308-rahulain1@gmail.com is not authorized to perform: compute-optimizer:GetEnrollmentStatus on resource: * with an explicit deny.	IAM Role -	Subnet ID subnet-0e27dbd2b0f07bbfb (Private Subnet)

## Step 4: Application and Database Installation and Testing

Step number	a
Step name	Installation and configuration of MySQL
Instructions	<p>1) Copy the database pem file into the application server using the below command</p> <pre>scp -i &lt;application server pem file&gt; &lt;database server pem file&gt; ubuntu@&lt;application server public IP&gt;:/home/ubuntu</pre> <p>2) Log into the application server using SSH/Putty</p> <p>3) From the application server, log into the database server using the pem file copied in step 1 and the private IP address of the database server with the following command</p> <pre>ssh -i &lt;database server pem file&gt; ubuntu@&lt;private IP of database server&gt;</pre> <p>4) Enter the following commands to install and configure MySQL on the database server</p> <pre>wget https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/install_mysql.sh chmod 700 install_mysql.sh sudo ./install_mysql.sh</pre> <p>5) Type exit to exit the database server and go back to the application server</p>
Expected screenshots	<p>1) Downloading of the provided script</p> <p>2) Executing the script</p>

<Insert screenshot a(1) here>

```
ubuntu@ip-10-0-2-109:~$ 
Memory Usage: 204      IP address for eth0: 10.0.2.105
Swap usage: 0K

0 packages can be updated.
0 of these updates are security updates.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-2-109:~$ wget https://storage.googleapis.com/skl-training/aws-cod
elabs/mattermost/install_mysql.sh
--2021-05-15 17:58:23 --2021-05-15 17:58:23-- https://storage.googleapis.com/skl-training/aws-codelab
/mattermost/install_mysql.sh
Resolving storage.googleapis.com (storage.googleapis.com)... 142.250.73.208, 142
.250.73.209, 142.250.73.209...
Connecting to storage.googleapis.com (storage.googleapis.com)|142.250.73.208|:44
3... connected.
HTTP request sent, awaiting response... 200 OK
Length: 759 [application/x-shellscrip
t]
Saving to: 'install_mysql.sh'

install_mysql.sh 100%[=====] 759 --.KB/s in 0s

2021-05-15 17:58:23 (17.3 MB/s) - 'install_mysql.sh' saved [759/759]

ubuntu@ip-10-0-2-109:~$ chmod 700 install_mysql.sh
ubuntu@ip-10-0-2-109:~$ ./install_mysql.sh
Httl: http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease [0
.7 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
[74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [98.7 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/universe amd64 Packa
ges [570 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/universe Translation
-en [494 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/multiverse amd64 Pac
kages [191 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/multiverse Translati
on-en [108 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/main amd64 P
ackages [2069 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/main Transl
ation-en [413 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/restricted
amd64 Packages [344 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/restricted
Translation-en [46.8 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe am
d64 Packages [1735 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe Tr
anslation-en [369 kB]
ubuntu@ip-10-0-2-109:~$ week4 *new1 - Notepad+ EC2 Management Co... PGPCCap21_RAHUL_1h4l.png - Paint ubuntu@ip-10-0-2-1...
```

<Insert screenshot a(2) here>

```
ubuntu@ip-10-0-2-109:~$ 
The exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-10-0-2-109:~$ wget https://storage.googleapis.com/skl-training/aws-cod
elabs/mattermost/install_mysql.sh
--2021-05-15 17:58:23 --2021-05-15 17:58:23-- https://storage.googleapis.com/skl-training/aws-codelab
/mattermost/install_mysql.sh
Resolving storage.googleapis.com (storage.googleapis.com)... 142.250.73.208, 142
.250.73.209, 142.250.73.209...
Connecting to storage.googleapis.com (storage.googleapis.com)|142.250.73.208|:44
3... connected.
HTTP request sent, awaiting response... 200 OK
Length: 759 [application/x-shellscrip
t]
Saving to: 'install_mysql.sh'

install_mysql.sh 100%[=====] 759 --.KB/s in 0s

2021-05-15 17:58:23 (17.3 MB/s) - 'install_mysql.sh' saved [759/759]

ubuntu@ip-10-0-2-109:~$ chmod 700 install_mysql.sh
ubuntu@ip-10-0-2-109:~$ ./install_mysql.sh
Httl: http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic InRelease
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates InRelease [0
.7 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports InRelease
[74.6 kB]
Get:4 http://security.ubuntu.com/ubuntu bionic-security InRelease [98.7 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/universe amd64 Packa
ges [570 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/universe Translation
-en [494 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/multiverse amd64 Pac
kages [191 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic/multiverse Translati
on-en [108 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/main amd64 P
ackages [2069 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/main Transl
ation-en [413 kB]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/restricted
amd64 Packages [344 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/restricted
Translation-en [46.8 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe am
d64 Packages [1735 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/universe Tr
anslation-en [369 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/multiverse
amd64 Packages [25.0 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-updates/multiverse
Translation-en [646 kB]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports/main amd6
4 Packages [10.0 kB]
Get:18 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports/main Tran
slation-en [4744 kB]
Get:19 http://us-east-1.ec2.archive.ubuntu.com/ubuntu bionic-backports/unive...
```

```
ubuntu@ip-10-0-2-109:~$ sudo apt update
[...]
ubuntu@ip-10-0-2-109:~$ sudo apt upgrade
[...]
ubuntu@ip-10-0-2-109:~$
```

```
ubuntu@ip-10-0-2-109:~$ cd /var/lib/tls/certs
ubuntu@ip-10-0-2-109:/var/lib/tls/certs$ ls
[...]
ubuntu@ip-10-0-2-109:/var/lib/tls/certs$ rm *
ubuntu@ip-10-0-2-109:/var/lib/tls/certs$
```

Step number	b
Step name	Installation and configuration of Mattermost
Instructions	<p>1) Enter the following commands after logging into the application server via SSH to install and configure Mattermost</p> <pre>wget <a href="https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/mattermost_install.sh">https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/mattermost_install.sh</a> chmod 700 mattermost_install.sh sudo ./mattermost_install.sh &lt;private IP of MySQL server&gt; Example : sudo ./mattermost_install.sh 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  &lt;public IP of the application server&gt;:8065</p>
Expected screenshots	<ul style="list-style-type: none"> <li>1) Executing the script</li> <li>2) Starting the Mattermost server</li> <li>3) Accessing the application via web browser</li> </ul>

**<Insert screenshot b(1) here>**

**Execution of script from start was not captured as too many logs were coming.**

```

ls /opt/mattermost/client/files/*
ls /opt/mattermost/client/files/4f95fb0d7466be5e509239c1209756f/
ls /opt/mattermost/client/files/5640d95706cead1efc97480fb35df/
ls /opt/mattermost/client/files/b06d71f201feeb0b24160592ae93f699.tif/
ls /opt/mattermost/client/files/73e012e42a5f736c5e00e71a5f359e64.tif/
ls /opt/mattermost/client/files/84a22e2cc01c09de9e6ee77e7eb297e.wolf2/
ls /opt/mattermost/client/files/332c288f57d634a026f589c1e9.tif/
ls /opt/mattermost/client/files/59746fa7fb5b51e45aa7f4e756f02f2.png/
ls /opt/mattermost/client/files/3ea0cfffd7eefad737fbdb8903065d.wolf2/
ls /opt/mattermost/client/files/f60d833ee04dff7f70e02773e5d7eobe.avg/
ls /opt/mattermost/client/files/98e593e59e341fd82b8a99d1c6b5890.png/
ls /opt/mattermost/client/files/7a139b233e55247227d1a8423e597842.png/
ls /opt/mattermost/client/files/_ad2b150218d3d0edbc0d61e6d61e3.css/
ls /opt/mattermost/client/files/bfc14925e764edbd15264e6c949b3c042.css/
ls /opt/mattermost/client/files/9ac0ca355fce9e83dd016a02f7d780fe.css/
ls /opt/mattermost/client/files/9d8087ecf8e822cf8fb95fd3d4605.png/
ls /opt/mattermost/client/files/9d8087ecf8e822cf8fb95fd3d4605.gif/
ls /opt/mattermost/client/files/31917e8871b04460701bd979d91dco7.tif/
ls /opt/mattermost/client/files/0c0a924fd7080aa79ef929d0ed98ab.png/
ls /opt/mattermost/client/files/0d33939895a18802143383379d661469.png/
ls /opt/mattermost/client/files/6893babb880ea1a7c019bfbaa112bb4.worf2/
ls /opt/mattermost/client/files/abdb192647bca0ff2f73132c6c500c.png/
ls /opt/mattermost/client/files/154d93e52458e123e166d353f93c083.avg/
ls /opt/mattermost/client/files/c5055dc4d8d9d72e99ff7043f738e.png/
ls /opt/mattermost/client/files/bd0f37b8773823415d1b7b4b7d4.gif/
ls /opt/mattermost/client/files/d1a644903493678639e08950d447294.tif/
ls /opt/mattermost/client/files/18202440a95481e4129289a9e98ff9a.png/
ls /opt/mattermost/client/files/e22495fb8b7b5484466142257e30f802.png/
ls /opt/mattermost/client/files/0820244077880604285046fe129f6.png/
ls /opt/mattermost/client/files/3713078922854a0e131d44eacbb-1.jpg/
ls /opt/mattermost/client/files/b19731e472fbcd4d0d85927e99550c.worf2/
ls /opt/mattermost/client/files/b311cae9d2f299a10fb914b5a095305.worf2/
ls /opt/mattermost/client/files/b311cae9d2f299a10fb914b5a095305.wolf2/
ls /opt/mattermost/client/files/7bcb7ff2d2315d0ef525336e6b72b315.png/
ls /opt/mattermost/client/files/ab990303f10b1l1cabed1dbcc7786.png/
ls /opt/mattermost/client/files/722ffaa3231780a1aae2046ff079a.png/
ls /opt/mattermost/client/files/3a6211f523d832267d15f430717292c00c.png/
ls /opt/mattermost/client/files/546d0a849595eb55643a0209a3b033287f.avg/
ls /opt/mattermost/client/files/d194fc0b23c1e24b7f132950eb4e4f68.jpg/
ls /opt/mattermost/client/files/13649521334074ce39890902081d9eb.png/
ls /opt/mattermost/client/files/0535024657985a34911849e42d8935001.png/
ls /opt/mattermost/client/files/2e2357d5894d432053d0a045d5d00.avg/
ls /opt/mattermost/client/files/f1d3bce72fbcb1a5d5d2d2ade9e89d1.png/
ls /opt/mattermost/client/files/18949c0e01539c09745d1e22a2c0.png/
ls /opt/mattermost/client/files/37301a9cd4a0955010efc0c998f.ttf/
ls /opt/mattermost/client/files/bd95a6afccfed74da236f21a209ff.gif/
ls /opt/mattermost/client/files/3202b9a6272b9ewebc19935868d22039d.png/
ls /opt/mattermost/client/files/001444201039ef93506700f739b49d.worf2/
ls /opt/mattermost/client/files/01a444201039ef93506700f739b49d.wolf2/
ls /opt/mattermost/client/files/04922d280eef4f40f982dbaa3d74fb59.ttf/
ls /opt/mattermost/client/files/e37d72524644730df176140a89545cb.ttf/
ls /opt/mattermost/client/files/27232750e0348b4035e93515011.ttf

```

```

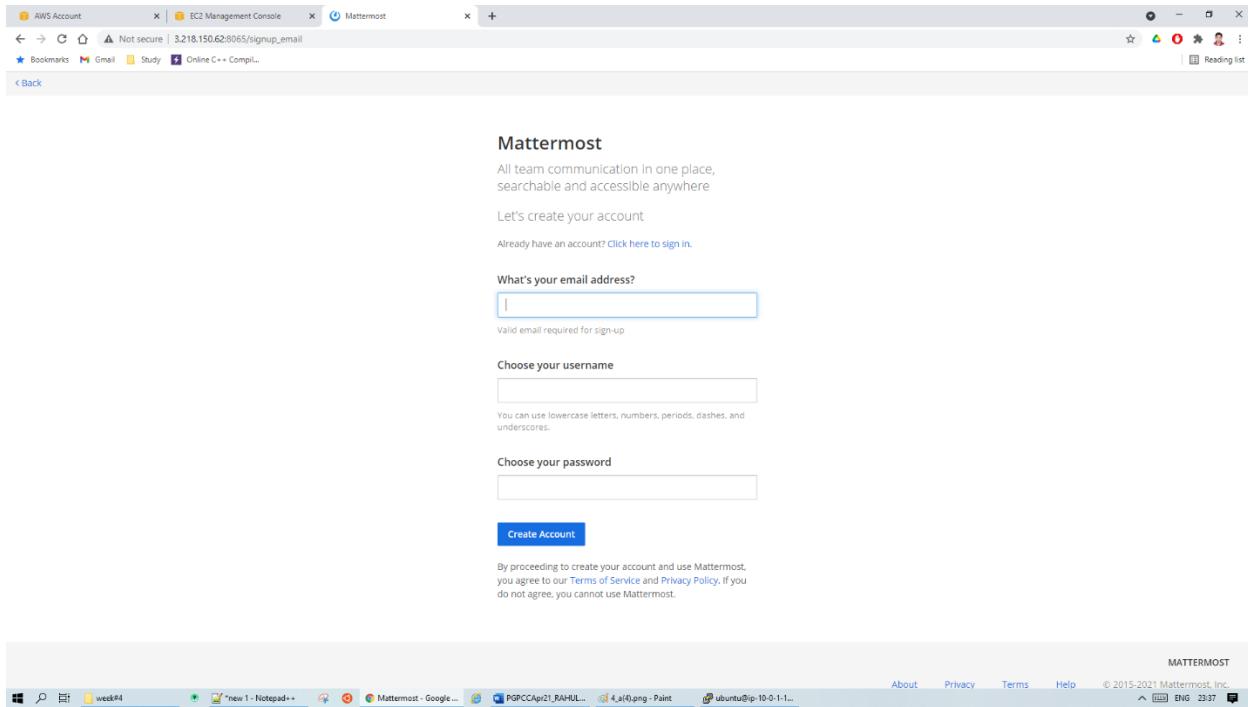
ubuntu@ip-10-0-1-169:~$ cd /opt/mattermost
mattermost/templates/email/_base_body.html
mattermost/templates/globalrelay_compliance_export.html
mattermost/templates/reset_body.html
mattermost/templates/invite_body.html
mattermost/templates/post_batched_post_full.html
mattermost/templates/globalrelay_compliance_export_participant_row.html
mattermost/templates/enterprise_change_export_message.html
mattermost/templates/signin_change_body.html
mattermost/templates/verify_body.html
mattermost/templates/mfa_change_body.html
mattermost/templates/unsupported_browser.html
mattermost/templates/post_body_full.html
mattermost/templates/post_batched_post_generic.html
mattermost/config/README.md
mattermost/config/config.json
mattermost/LICENSE-EDITION-LICENSE.txt
mattermost/fonts/ttf
mattermost/fonts/
mattermost/fonts/OTF.txt
mattermost/fonts/mono-bold.otf
mattermost/fonts/lisp
mattermost/libn/ko.json
mattermost/libn/zh-CN.json
mattermost/libn/zh-TW.json
mattermost/libn/en.json
mattermost/libn/de.json
mattermost/libn/fr.json
mattermost/libn/nl.json
mattermost/libn/pt-BR.json
mattermost/libn/it.json
mattermost/libn/ja.json
mattermost/libn/es.json
mattermost/logs/
mattermost/prepackaged_plugins/
mattermost/prepackaged_plugins/mattermost-plugin-antivirus-v0.1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-mps-v1.0.3.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-autolink-v1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-aws-SNS-v1.0.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-github-v1.0.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-welcomebot-v1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-jenkins-v1.0.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-github-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
Created user
ubuntu@ip-10-0-1-169:~#
ubuntu@ip-10-0-1-169:~$ sudo chown -R mattermost:mattermost /opt/mattermost
ubuntu@ip-10-0-1-169:~$ chmod 755 /opt/mattermost
ubuntu@ip-10-0-1-169:~$ cd /opt/mattermost
ubuntu@ip-10-0-1-169:~/opt/mattermost$ sudo ./mattermost ./bin/mattermost
{
  "level": "info",
  "ts": "1621101923.2086103",
  "caller": "utils/linux.go:83",
  "msg": "Loaded system translations", "for_locale": "en", "from_locale": "/opt/mattermost/libn/en.json"
},
{
  "level": "info",
  "ts": "1621101923.2086103",
  "caller": "utils/linux.go:83",
  "msg": "Server is initializing.."
},
{
  "level": "info",
  "ts": "1621101923.2166643",
  "caller": "sqlstore/sql.go:12",
  "msg": "Pinging SQL", "database": "master"
},
{
  "level": "info",
  "ts": "1621101923.2166643",
  "caller": "sqlstore/sql.go:12",
  "msg": "Binging SQL", "database": "master"
}
ubuntu@ip-10-0-1-169:~$
```

<Insert screenshot b(2) here>

```

ubuntu@ip-10-0-1-169:~$ cd /opt/mattermost
mattermost/libn/ja.json
mattermost/libn/zh-TW.json
mattermost/libn/it.json
mattermost/libn/nl.json
mattermost/libn/pt-BR.json
mattermost/libn/ro.json
mattermost/libn/es.json
mattermost/logs/
mattermost/prepackaged_plugins/
mattermost/prepackaged_plugins/mattermost-plugin-antivirus-v0.1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-mps-v1.0.3.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-autolink-v1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-aws-SNS-v1.0.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-github-v1.0.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-welcomebot-v1.1.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-jenkins-v1.0.0.tar.gz
mattermost/prepackaged_plugins/mattermost-plugin-github-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
Created user
ubuntu@ip-10-0-1-169:~#
ubuntu@ip-10-0-1-169:~$ sudo chown -R mattermost:mattermost /opt/mattermost
ubuntu@ip-10-0-1-169:~$ chmod 755 /opt/mattermost
ubuntu@ip-10-0-1-169:~/opt/mattermost$ sudo ./mattermost ./bin/mattermost
{
  "level": "info",
  "ts": "1621101923.2086103",
  "caller": "utils/linux.go:83",
  "msg": "Loaded system translations", "for_locale": "en", "from_locale": "/opt/mattermost/libn/en.json"
},
{
  "level": "info",
  "ts": "1621101923.2086103",
  "caller": "app/server/app_adapters.go:58",
  "msg": "Server is initializing.."
},
{
  "level": "info",
  "ts": "1621101923.2166643",
  "caller": "sqlstore/sql.go:12",
  "msg": "Pinging SQL", "database": "master"
},
{
  "level": "info",
  "ts": "1621101924.5843527",
  "caller": "sqlstore/upgrade.go:110",
  "msg": "The database schema version has been set", "version": "5.19.0"
},
{
  "level": "error",
  "ts": "1621101928.1111078",
  "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: https://mattermost.com/docs/configuring-siteurl.html"
},
{
  "level": "info",
  "ts": "1621101928.1141396",
  "caller": "app/license.go:39",
  "msg": "License key from https://mattermost.com required to unlock enterprise features."
},
{
  "level": "info",
  "ts": "1621101928.1156316",
  "caller": "app/migrations.go:26",
  "msg": "Migrating roles to database."
},
{
  "level": "info",
  "ts": "1621101928.21371",
  "caller": "sqlstore/post_store.go:1351",
  "msg": "Post.Message has size restrictions", "max_characters": 16383, "max_bytes": 65535
},
{
  "level": "info",
  "ts": "1621101928.2207663",
  "caller": "app/migrations.go:102",
  "msg": "Migrating emojis config to database."
},
{
  "level": "info",
  "ts": "1621101928.7344396",
  "caller": "mlog/log.go:166",
  "msg": "Starting up plugins"
},
{
  "level": "info",
  "ts": "1621101928.734747",
  "caller": "app/plugin.go:213",
  "msg": "Syncing plugins from the file store"
},
{
  "level": "info",
  "ts": "1621101928.1141396",
  "caller": "mlog/sugar.go:193",
  "msg": "Ensuring Surveybot exists", "plugin_id": "com.mattermost.nps"
},
{
  "level": "info",
  "ts": "1621101933.0171976",
  "caller": "mlog/sugar.go:19",
  "msg": "Surveybot created", "plugin_id": "com.mattermost.nps"
},
{
  "level": "info",
  "ts": "1621101933.0289405",
  "caller": "mlog/sugar.go:19",
  "msg": "Upgrade detected. Checking if a survey should be scheduled.", "plugin_id": "com.mattermost.nps"
},
{
  "level": "info",
  "ts": "1621101933.2444563",
  "caller": "mlog/sugar.go:19",
  "msg": "Scheduling next survey for Jun 5, 2021", "plugin_id": "com.mattermost.nps"
},
{
  "level": "info",
  "ts": "1621101933.8745958",
  "caller": "app/server.go:217",
  "msg": "Current version is 5.19.0 (5.19.0) Thu Jan 16 18:30:33 UTC 2020/90cf883f84000d6fdb025308ad14d56e6ed5f05/1268390c0cde16f750b0b6fe62534b"
},
{
  "level": "info",
  "ts": "1621101933.8746156",
  "caller": "app/server.go:218",
  "msg": "Enterprise Enabled: true"
},
{
  "level": "info",
  "ts": "1621101933.874642",
  "caller": "app/server.go:221",
  "msg": "Printing current working", "directory": "/opt/mattermost"
},
{
  "level": "error",
  "ts": "1621101933.874642",
  "caller": "app/server.go:222",
  "msg": "Loaded config", "source": "file:///opt/mattermost/config/config.json"
},
{
  "level": "error",
  "ts": "1621101933.874642",
  "caller": "app/logger.go:10007",
  "msg": "Calling mlog.Log.go:10007", "plugin_id": "com.mattermost.nps", "error": "connection is shut down"
},
{
  "level": "error",
  "ts": "1621101933.874642",
  "caller": "app/logger.go:10010",
  "msg": "Calling mlog.Log.go:10010", "plugin_id": "com.mattermost.nps", "error": "connection is shut down"
},
{
  "level": "info",
  "ts": "1621101933.9545354",
  "caller": "jobs/webhook.go:689",
  "msg": "Starting webhooks"
},
{
  "level": "info",
  "ts": "1621101933.9720657",
  "caller": "jobs/webhook_hub.go:75",
  "msg": "Starting webhook hub", "number_of_hubs": 2
},
{
  "level": "info",
  "ts": "1621101933.9766705",
  "caller": "jobs/schedulers.go:74",
  "msg": "Starting schedulers."
},
{
  "level": "info",
  "ts": "1621101933.9981456",
  "caller": "app/server.go:440",
  "msg": "Starting Server.."
},
{
  "level": "info",
  "ts": "1621101934.0002828",
  "caller": "app/server.go:506",
  "msg": "Server is listening on [::]:8065"
},
{
  "level": "error",
  "ts": "1621101934.0002828",
  "caller": "plugin/health_check.go:90",
  "msg": "Health check failed for plugin", "id": "com.mattermost.nps", "error": "Plugin RPC connection is not responding"
},
{
  "level": "warn",
  "ts": "1621101963.8762457",
  "caller": "plugin/hlog_adapter.go:51",
  "msg": "Error closing client during Kill!", "plugin_id": "com.mattermost.nps", "wrapped_extras": "errconnection is shut down"
},
{
  "level": "warn",
  "ts": "1621101963.8780463",
  "caller": "plugin/hlog_adapter.go:53",
  "msg": "Plugin failed to exit gracefully", "plugin_id": "com.mattermost.nps"
},
{
  "level": "info",
  "ts": "1621101963.8960931",
  "caller": "mlog/sugar.go:19",
  "msg": "Ensuring Surveybot exists", "plugin_id": "com.mattermost.nps"
}
{
  "level": "info",
  "ts": "1621102005.3545995",
  "caller": "migrations/worker.go:109",
  "msg": "Worker: Job is complete", "worker": "Migrations", "job_id": "mfnn6yajja7dfjjsq19ifjjig9e"
}
```

<Insert screenshot b(3) here>



## Step 5: Answer the following questions

### Answer the following questions

### Marks

Q1 What is the default setting for DNS hostnames when a new VPC is created? 1

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

Enter your answer here

b) Disabled

Q2 What is the term used for the application server when we use it to log into the database server 1

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

d) SSH Gateway

Enter your answer here

a) Bastion Host

Q3 The database server security group in this exercise has to keep port 3306 open. 1  
Which protocol uses this port to communicate?

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

Enter your answer here

c) TCP

Q4 Which port is being used by Mattermost to communicate with the client application 1

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

Enter your answer here

d) 8065

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? 1

- 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) CIDR block  
overlaps with  
existing block

Q6 In this exercise, you have been asked to create 3 EC2 instances - the application server, the database server and the 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 is it? 1

- 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

a) Port 22 on the  
NAT instances

Q7 Describe the steps you would take to increase security of the servers you have deployed so that they are not reachable from external sources 4

- Use security groups.
- Augment Security Groups with NACLs.
- Implement Firewalls
- Internet gateways as the single point of access between your VPC network's resources and the public internet.
- Service auditing is a way of knowing what services are running on a given system, which ports they are using for communication, and what protocols are accepted. This information can help you configure which services should be publicly accessible, firewall settings, and monitoring and alerting.
- Disable Directory Indexes.
- Using a VPN is, effectively, a way to map out a private network that only your servers can see.
- Establishing a certificate authority (CA) and managing certificates for your servers allows each entity within your infrastructure to validate the other members' identities and encrypt their traffic.
- Isolating execution environments refers to any method in which individual components are run within their own dedicated space.

Q8 Describe the steps required to deploy the given application in an autoscaling environment

5

step#1

Create 1 EC2 instance using the 7 step workflow (use t2.micro instance type only)

a) Use the usual Amazon Linux AMI in AZ1

step#2

Create a LB with TG

a) Associate the EC2 instance to it

b) Ensure all AZ are selected when creating the TG

c) Once the instance turns "healthy" hit the LB to ensure the page is being served

step#3

Create a autoscaling group

a) Use the bootstrap script for the autoscale launch config, tag = "autoscale"

b) Min instance = 1, max = 2

c) Setup the cloud watch alarm (add 1 instance if cpu>80, remove when <30)

step#4

Manually terminate the manuualy created EC2 instance, wait for 2-3 mins and auto scaling kicks into picture and creates a new EC2 instance.

**Max  
marks**

15

<b>Grades distribution</b>	
MCQs	6 (1 mark each)
Subjective questions	9 marks (4+5)
Implementation screenshots	10 marks (0.5 marks each)
Total	25 marks