

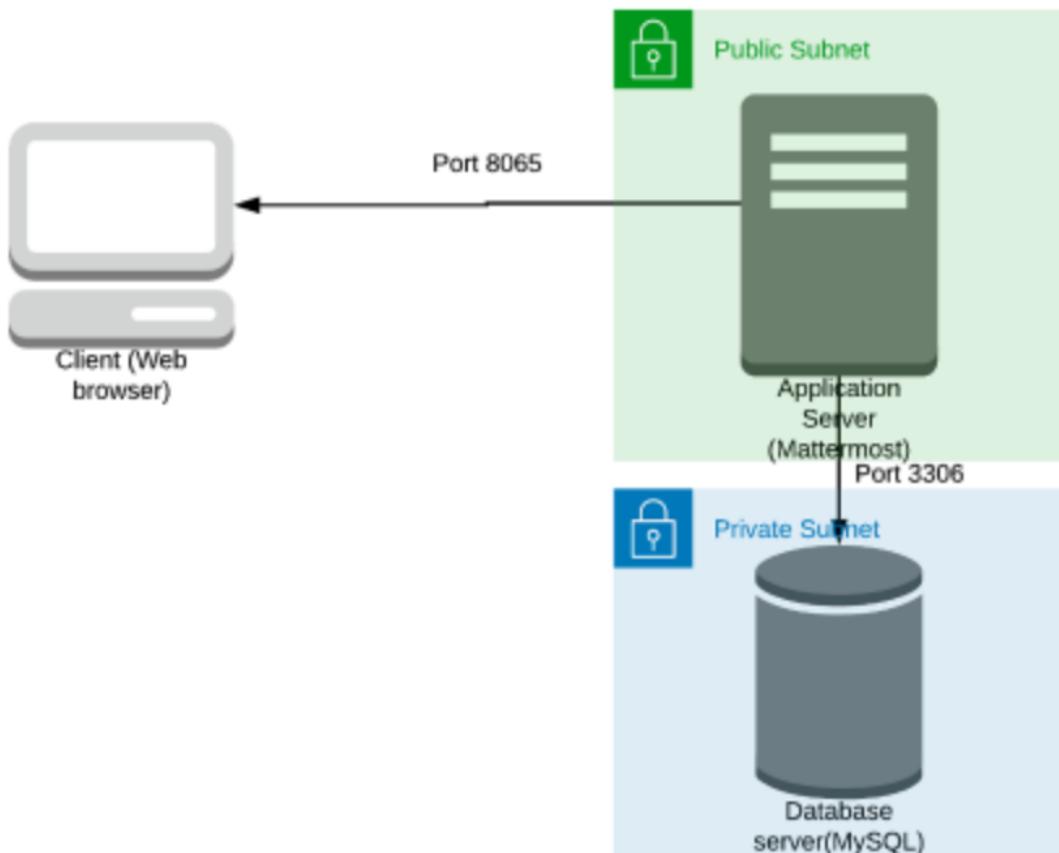
<b>Declaration</b>	
Questions in this exercise are intentionally complex and could be convoluted or confusing. This is by design and to simulate real life situations where customers seldom give crystal clear requirements and ask unambiguous questions.	

I have read the above statement and agree to these conditions	
I AGREE	Edgardo Banuelas
	<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>

The screenshot shows the AWS VPC Dashboard. At the top, there is a green success message: "DNS hostnames successfully updated." Below this, the "Your VPCs (1/2)" section displays a table of two VPCs. The first VPC, "Project 1 VPC", has a VPC ID of "vpc-07b075a9a44f2ab97", is in an "Available" state, and its IPv4 CIDR is "10.0.0.0/16". The second VPC listed is "vpc-4842e835", also in an "Available" state with an IPv4 CIDR of "172.31.0.0/16". The table includes columns for VPC ID, State, DNS hostnames, and various network settings like DHCP options sets and route tables.

Step number	b
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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

AWS Services ▾ Search for services, features, marketplace [Option+S] vocstartsoft/user1315769=eddiebanuelas@gmail.com @ 0034-4536-... N. Virginia ▾ Support ▾

## Create subnet Info

**VPC**

VPC ID  
Create subnets in this VPC.  
vpc-07b075a9a44f2ab97 (Project 1 VPC)

Associated VPC CIDRs  
IPv4 CIDRs  
10.0.0.0/16

**Subnet settings**  
Specify the CIDR blocks and Availability Zone for the subnet.

**Subnet 1 of 1**

Subnet name  
Create a tag with a key of 'Name' and a value that you specify.  
my-subnet-01

Feedback English (US) ▾ © 2008 - 2021, Amazon Web Services, Inc. or its affiliates. All rights reserved. Privacy Policy Terms of Use Cookie preferences

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 shows the 'Create Subnet' wizard on the AWS Management Console. The first step, 'Subnet 1 of 1', is displayed. The 'Subnet name' field contains 'Private Subnet'. The 'Availability Zone' dropdown is set to 'No preference'. The 'IPv4 CIDR block' field shows '10.0.2.0/24'. Under 'Tags - optional', there is a single tag named 'Name' with the value 'Private Subnet'. The top navigation bar includes the AWS logo, services dropdown, search bar, user information, and support links.

## Step 2 : Internet Gateway and VPC

Step number	a
Step name	Creation and Configuration of Internet Gateway
Instructions	1) Navigate to VPCs->Internet Gateway 2) Click on "Create Internet Gateway" 3) Enter the name tag "Project 1 Internet Gateway" and click on "Create Internet Gateway" 4) After the gateway is created, select it and click on Actions->Attach to VPC 5) Select the Project 1 VPC and click on "Attach Internet Gateway"
Expected screenshots	1) Creation of Internet Gateway

The screenshot shows the AWS VPC Internet Gateways page. A green banner at the top states: "The following internet gateway was created: igw-0bce5af760780c4a3. You can now attach to a VPC to enable the VPC to communicate with the internet." Below the banner, the breadcrumb navigation shows: VPC > Internet gateways > igw-0bce5af760780c4a3. The main title is "igw-0bce5af760780c4a3 / Project 1 Internet Gateway". The "Details" tab is selected, showing the following information:

Internet gateway ID	State	VPC ID	Owner
igw-0bce5af760780c4a3	Detached	-	003445361146

Below the details, there is a "Tags" section with a search bar and a table:

Key	Value
Name	Project 1 Internet Gateway

At the bottom of the page, there are links for Feedback, English (US), and various AWS terms like Privacy Policy, Terms of Use, and Cookie preferences.

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

This screenshot shows the AWS VPC Route Table list page. The left sidebar is collapsed, and the main content area displays a table of routes. A single row is selected, showing a route from 10.0.0.0/16 to a local target. The table includes columns for Destination, Target, Status, and Propagated.

Destination	Target	Status	Propagated
10.0.0.0/16	local	active	No
0.0.0.0/0	igw-0bce5af760780c4a3	active	No

This screenshot shows the same AWS VPC Route Table list page as the previous one. The right sidebar is collapsed, and the main content area displays a table of subnet associations. A single row is selected, showing a subnet association for a specific subnet ID. The table includes columns for Subnet ID, IPv4 CIDR, and IPv6 CIDR.

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0d6dabb5e6028cd0c...	10.0.1.0/24	-

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>

**Step 3: Configure Instance Details**

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	<input type="text" value="1"/>	Launch into Auto Scaling Group
Purchasing option	<input type="checkbox"/> Request Spot instances	
Network	vpc-b075a9a44f2ab97   Project 1 VPC	<input type="button" value="Create new VPC"/>
Subnet	subnet-0d6dabb5e6028cd0c   us-east-1f	<input type="button" value="Create new subnet"/> 251 IP Addresses available
Auto-assign Public IP	Use subnet setting (Enable)	
Placement group	<input type="checkbox"/> Add instance to placement group	
Capacity Reservation	Open	
Domain join directory	No directory	<input type="button" value="Create new directory"/>
IAM role	None	

**Buttons:** Cancel, Previous, Review and Launch, Next: Add Storage

**Step 6: Configure Security Group**

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

**Assign a security group:**  Create a new security group  Select an existing security group

Security group name:	launch-wizard-3			
Description:	launch-wizard-3 created 2021-03-28T07:50:58.643-05:00			
Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Anywhere	0.0.0.0/0, ::/0 e.g. SSH for Admin Desktop
Custom TCP Rule	TCP	80	Anywhere	0.0.0.0/0, ::/0 e.g. SSH for Admin Desktop
Custom TCP Rule	TCP	443	Anywhere	0.0.0.0/0, ::/0 e.g. SSH for Admin Desktop

**Buttons:** Add Rule, Warning, Cancel, Previous, Review and Launch

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with options like EC2 Dashboard, Events, Tags, Limits, Instances (with sub-options like Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations), and Images (AMIs). The main area is titled 'Instances (1) Info' and shows a table with one row. The table columns are Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Avail. The single instance listed is 'i-0f78c3e1698e8a18c', which is 'Running' on an 't2.micro' instance type. Below the table, it says 'Select an instance above' and shows three small square selection icons. At the bottom of the page, there are links for Feedback, English (US), Privacy Policy, Terms of Use, and Cookies.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
-	i-0f78c3e1698e8a18c	Running	t2.micro	-	No alarms + us-

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

The screenshot shows the AWS VPC Route Tables page. On the left, there's a sidebar with navigation links like 'New VPC Experience', 'VPC Dashboard', 'Filter by VPC', 'Your VPCs', 'Subnets', and 'Route Tables'. Under 'Route Tables', several options are listed: Internet Gateways, Egress Only Internet Gateways, Carrier Gateways, DHCP Options Sets, Elastic IPs, Managed Prefix Lists, Endpoints, Endpoint Services, NAT Gateways, and Peering Connections. The 'Route Tables' link is highlighted.

The main content area has a search bar at the top with the placeholder 'Search for services, features, marketplace [Option+S]'. Below the search bar is a 'Create route table' button and an 'Actions' dropdown menu. A table lists the route table details:

Name	Route Table ID	Explicit subnet association	Edge associations	Main	VPC ID
Private Rou...	rtb-04d39df62261f5dae	-	-	No	vpc-07b075a9a44

Below the table is a section titled 'View All routes' with a dropdown menu. It shows two routes:

Destination	Target	Status	Propagated
10.0.0.0/16	local	active	No
0.0.0.0/0	eni-093c70a15a98d0b8e	active	No

At the bottom of the page, there are links for 'Feedback', 'English (US)', 'Privacy Policy', 'Terms of Use', and 'Cookie preferences'.

The screenshot shows the AWS VPC Route Tables page. On the left, there's a sidebar with options like 'New VPC Experience', 'VPC Dashboard', 'Route Tables' (which is selected), and 'Subnets'. The main area displays a table of route tables. One row is selected, showing details for a 'Private Rou...' route table with ID 'rtb-04d39df62261f5dae'. It has one explicit subnet association to 'subnet-0d6dabb5e6028cd0c' with CIDR '10.0.1.0/24'. Below the table, tabs for 'Summary', 'Routes', 'Subnet Associations' (which is active), 'Edge Associations', 'Route Propagation', and 'Tags' are visible. A message at the bottom states: 'The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:'. A note at the bottom right says 'None found'.

### 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</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 "Public Subnet"</li> <li>- For the security group, open the ports 22 and 8065 for source set to "Anywhere"</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>

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.

Quick Start (8)

My AMIs (0)

AWS Marketplace (634)

Community AMIs (36827)

Free tier only (i)

**Ubuntu Server 20.04 LTS (HVM), SSD Volume Type - ami-0b75998a97c952252 (64-bit Arm)**

Free tier eligible

Ubuntu Server 20.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Root device type: ebs Virtualization type: hvm ENA Enabled: Yes

**Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-013f17f36f8b1fefb (64-bit x86) / ami-02ed82f3a38303e6f (64-bit Arm)**

Free tier eligible

Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Select

64-bit (x86)  64-bit (Arm)

**Select**

64-bit (x86)  64-bit (Arm)

**Step 3: Configure Instance Details**

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	<input type="text" value="1"/>	Launch into Auto Scaling Group
Purchasing option	<input type="checkbox"/> Request Spot instances	
Network	vpc-07b075a9a44f2ab97   Project 1 VPC	<input type="button" value="Create new VPC"/>
Subnet	subnet-0d6dabb5e6028cd0c   us-east-1f	<input type="button" value="Create new subnet"/> 250 IP Addresses available
Auto-assign Public IP	<input type="button" value="Use subnet setting (Enable)"/>	
Placement group	<input type="checkbox"/> Add instance to placement group	
Capacity Reservation	<input type="button" value="Open"/>	
Domain join directory	No directory	<input type="button" value="Create new directory"/>
IAM role	<input type="button" value="None"/> <input type="button" value="Create new IAM role"/>	

**Buttons:** Cancel, Previous, **Review and Launch**, Next: Add Storage

**Step 6: Configure Security Group**

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

<b>Assign a security group:</b>	<input checked="" type="radio"/> Create a new security group			
	<input type="radio"/> Select an existing security group			
Security group name:	launch-wizard-4			
Description:	launch-wizard-4 created 2021-03-28T08:07:11.160-05:00			
Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Anywhere	e.g. SSH for Admin Desktop
Custom TCP Rule	TCP	8065	Anywhere	e.g. SSH for Admin Desktop

**Add Rule**

**Warning**  
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

**Buttons:** Cancel, Previous, **Review and Launch**

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with options like EC2 Dashboard, Events, Tags, Limits, Instances (with sub-options like Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations), and Images (AMIs). The main area is titled 'Instances (1) Info' and shows a table with one row. The table columns are Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Avail. The single instance listed is 'i-0f78c3e1698e8a18c', which is 'Running' on an 't2.micro' instance type. Below the table, it says 'Select an instance above' and shows three small square selection icons. At the bottom of the page, there are links for Feedback, English (US), Copyright notice (© 2008–2021 Amazon Web Services, Inc. or its affiliates. All rights reserved.), Privacy Policy, Terms of Use, and Cookies information.

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 Ubuntu 18.04 LTS
  - Select the instance type t2.micro
  - Select Network as "Project 1 VPC" and subnet as "Private Subnet"
  - For the security group, open the ports 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 shows the AWS EC2 Launch Instance wizard. The top navigation bar includes the AWS logo, Services dropdown, search bar, user information, and N. Virginia region. Below the navigation is a progress bar with steps 1 through 7. Step 1 is highlighted.

**Step 1: Choose an Amazon Machine Image (AMI)**

Community, or the AWS Marketplace; or you can select one of your own AMIs.

Search bar: Ubuntu

Quick Start (8) filters: My AMIs (0), AWS Marketplace (634), Community AMIs (36827). A checkbox for Free tier only is also present.

Results list:

- Ubuntu Server 20.04 LTS (HVM), SSD Volume Type** - ami-042e8287309f5df03 (64-bit x86) / ami-0b75998a97c952252 (64-bit Arm)
  - Free tier eligible
  - Description: Ubuntu Server 20.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
  - Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes
  - Select button
  - 64-bit (x86) radio button selected
  - 64-bit (Arm) radio button
- Ubuntu Server 18.04 LTS (HVM), SSD Volume Type** - ami-013f17f36f8b1fefb (64-bit x86) / ami-02ed82f3a38303e6f (64-bit Arm)
  - Free tier eligible
  - Description: Ubuntu Server 18.04 LTS (HVM), EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).
  - Root device type: ebs, Virtualization type: hvm, ENA Enabled: Yes
  - Select button
  - 64-bit (x86) radio button selected
  - 64-bit (Arm) radio button

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**Step 3: Configure Instance Details**

Configure the instance to suit your requirements. You can launch multiple instances from the same AMI, request Spot instances to take advantage of the lower pricing, assign an access management role to the instance, and more.

Number of instances	<input type="text" value="1"/>	Launch into Auto Scaling Group
Purchasing option	<input type="checkbox"/> Request Spot instances	
Network	vpc-07b075a9a44f2ab97   Project 1 VPC	<input type="button" value="Create new VPC"/>
Subnet	subnet-0d6dabb5e6028cd0c   us-east-1f	<input type="button" value="Create new subnet"/> 249 IP Addresses available
Auto-assign Public IP	Use subnet setting (Enable)	
Placement group	<input type="checkbox"/> Add instance to placement group	
Capacity Reservation	Open	
Domain join directory	No directory	<input type="button" value="Create new directory"/>
IAM role	None	

**Buttons:** Cancel, Previous, **Review and Launch**, Next: Add Storage

**Step 6: Configure Security Group**

A security group is a set of firewall rules that control the traffic for your instance. On this page, you can add rules to allow specific traffic to reach your instance. For example, if you want to set up a web server and allow Internet traffic to reach your instance, add rules that allow unrestricted access to the HTTP and HTTPS ports. You can create a new security group or select from an existing one below. [Learn more](#) about Amazon EC2 security groups.

**Assign a security group:**  Create a new security group  
 Select an existing security group

Security group name:	launch-wizard-6			
Description:	launch-wizard-6 created 2021-03-28T08:39:08.484-05:00			
Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Anywhere	0.0.0.0/0, ::/0
Custom TCP Rule	TCP	3306	Anywhere	0.0.0.0/0, ::/0

**Add Rule**

**Warning**  
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.

**Buttons:** Cancel, Previous, **Review and Launch**

The screenshot shows the AWS EC2 Instances page. On the left, there's a sidebar with 'New EC2 Experience' selected. The main area displays 'Instances (4) Info' with a table. The table has columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, and Avail. The first instance is 'Running' (t2.micro), the second and third are 'Terminating' (t2.micro), and the fourth is 'Running' (t2.micro). Below the table, it says 'Select an instance above'.

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Avail
-	i-0f78c3e1698e8a18c	Running	t2.micro	2/2 checks ...	1 alarm...	us-
autoscale	i-0ec0b06456515e49c	Terminating	t2.micro	-	1 alarm...	us-
autoscale	i-03947528d5466f03d	Terminating	t2.micro	-	1 alarm...	us-
-	i-012396bb7ab625a9d	Running	t2.micro	-	No alarms	us-

## 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  <code>scp -i &lt;application server pem file&gt; &lt;database server pem file&gt; ubuntu@&lt;application server public IP&gt;:/home/ubuntu</code></p> <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  <code>ssh -i &lt;database server pem file&gt; ubuntu@&lt;private IP of database server&gt;</code></p> <p>4) Enter the following commands to install and configure MySQL on the database server  <code>wget https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/install_mysql.sh  chmod 700 install_mysql.sh  sudo ./install_mysql.sh</code></p> <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>

**Great Learning**

Learning Material - AWS: An Introduction

Week 1 - Learning Material - Compute, Organization & IAM (~ 3.5 Hours)

Assessments - Week 1

Week 2 - Learning Material - Auto Scaling, AMI, AWS CLI & Storage (~ 5 Hours)

Frequently Asked Questions

Assessments - Week 2

Week 3 - Learning Material - VPC, Route53, WAF (~ 4 Hours)

Assessments - Week 3

ubuntu@ip-10-0-2-94:~ -- ssh -i Downloads/project1private.pem ubu...  
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-10-0-2-94:~ \$ wget https://storage.googleapis.com/skl-training/aws-codeabs/mattermost/install\_mysql.sh  
--2021-03-28 14:08:50-- https://storage.googleapis.com/skl-training/aws-codeabs/mattermost/install\_mysql.sh  
Resolving storage.googleapis.com (storage.googleapis.com)... 172.217.9.208, 172.217.18.88, ...  
Connecting to storage.googleapis.com (storage.googleapis.com)|172.217.9.208|:443  
... connected.  
HTTP request sent, awaiting response... 200 OK  
Length: 759 [application/x-shellscrip...  
Saving to: 'install\_mysql.sh'  
  
install\_mysql.sh 100%[=====] 759 --.KB/s in 0s  
2021-03-28 14:08:51 (12.9 MB/s) - 'install\_mysql.sh' saved [759/759]  
  
ubuntu@ip-10-0-2-94:~ \$ [REDACTED]  
[REDACTED]  
wget https://storage.googleapis.com/skl-training/aws-codeabs/mattermost/install\_mysql.sh  
chmod 700 install\_mysql.sh  
sudo ./install\_mysql.sh  
5) Type exit to exit the database server and go back to the application server  
Expected screenshots 1) Downloading of the provided script  
2) Executing the script  
  
<Insert screenshot a(1) here>  
<Insert screenshot a(2) here>

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**Great Learning**

Learning Material - AWS: An Introduction

Week 1 - Learning Material - Compute, Organization & IAM (~ 3.5 Hours)

Assessments - Week 1

Week 2 - Learning Material - Auto Scaling, AMI, AWS CLI & Storage (~ 5 Hours)

Frequently Asked Questions

Assessments - Week 2

Week 3 - Learning Material - VPC, Route53, WAF (~ 4 Hours)

Assessments - Week 3

ubuntu@ip-10-0-2-94:~ -- ssh -i Downloads/project1private.pem ubu...  
Setting up libhtml-tagset-perl (3.20-3)...  
Setting up libevent-core-2.1-6:amd64 (2.1.8-stable-4build1) ...  
Setting up libencore-locale-perl (1.05-1)...  
Setting up libtime-date-perl (2.3000-2)...  
Setting up libio-html-perl (1.001-1)...  
Setting up liblwp-mediawords-perl (6.02-1)...  
Setting up liblwp-ua-perl (0.3.11b-5ubuntu0.1)...  
Setting up liburi-perl (1.73-1)...  
Setting up libhtml-parser-perl (3.72-3build1)...  
Setting up libcgi-pm-perl (4.38-1)...  
Setting up mysql-client-core-5.7 (5.7.33-0ubuntu0.18.04.1)...  
Setting up libfcgi-perl (0.78-2build1)...  
Setting up libhttp-date-perl (6.02-1)...  
Setting up libhtml-template-perl (2.97-1)...  
Setting up mysql-server-core-5.7 (5.7.33-0ubuntu0.18.04.1)...  
Setting up libcgi-fast-perl (1:2.13-1)...  
Setting up libhttp-message-perl (6.14-1)...  
Setting up mysql-client-5.7 (5.7.33-0ubuntu0.18.04.1)...  
Setting up mysql-server-5.7 (5.7.33-0ubuntu0.18.04.1)...  
update-alternatives: using /etc/mysql/mysql.cnf to provide /etc/mysql/my.cnf (my.cnf) in auto mode  
Renaming removed key\_buffer and myisam-recover options (if present)  
Progress: 96% [#####][REDACTED]  
[REDACTED]  
wget https://storage.googleapis.com/skl-training/aws-codeabs/mattermost/install\_mysql.sh  
chmod 700 install\_mysql.sh  
sudo ./install\_mysql.sh  
5) Type exit to exit the database server and go back to the application server  
Expected screenshots 1) Downloading of the provided script  
2) Executing the script  
  
<Insert screenshot a(1) here>  
<Insert screenshot a(2) here>

PAGE 10 OF 14 97%

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>

AWS Services Search for services, features, marketpla [Option+S] vocstartsoft/user1315769=eddiebanuelas@gmail.com @ 0034-4536... N. Virginia Support

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Feedback English (US)

```
user — ubuntu@ip-10-0-1-142: ~ ssh -i Downloads/project1private.pem ubu...
mattermost/i18n/ja.json
mattermost/i18n/zh-TW.json
mattermost/i18n/it.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-v0.3.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
Created user
ubuntu@ip-10-0-1-142:~$
```

AWS Compute Optimizer finding

User:
 arn:aws:sts::003445361146:assumed-role/vocstartsoft/user1315769=eddiebanuelas@gmail.com is not authorized to perform: compute-optimizer:GetEnrollmentStatus on resource: \* with an explicit deny

Retry

Instance state ▾

Private IPv4 address 10.0.2.94

Private IPv4 DNS ip-10-0-2-94.ec2.internal

VPC ID vpc-07b075a9a44f2ab97 (Project 1 VPC) [ ]

Subnet ID subnet-0342dd10ecf2e13fe (Private Subnet) [ ]

Feedback English (US)

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  - Reserved Instances New
  - Dedicated Hosts
  - Scheduled Instances
  - Capacity Reservations
- Images
  - AMIs

Feedback English (US)

```
user — ubuntu@ip-10-0-1-142: /opt/mattermost — ssh -i Downloads/project1p...
308ad14d56eed53f065/1268390c0cd16f750bb6fe62534b82586d595f")
{"level":"info","ts":1616940751.239395,"caller":"app/server.go:218","msg":"Enterprise Enabled: true"}
{"level":"info","ts":1616940751.239493,"caller":"app/server.go:221","msg":"Printing current working", "directory":"/opt/mattermost"}
{"level":"info","ts":1616940751.2396054,"caller":"app/server.go:222","msg":"Loaded config","source":file:///opt/mattermost/config/config.json"}
{"level":"error","ts":1616940751.2685685,"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":1616940751.3222704,"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":1616940751.328737,"caller":"jobs/workers.go:68","msg":"Starting workers"}
{"level":"info","ts":1616940751.3372493,"caller":"app/web_hub.go:75","msg":"Starting websocket hubs", "number_of_hubs":2}
{"level":"info","ts":1616940751.3583724,"caller":"jobs/schedulers.go:74","msg":"Starting Scheduler..."}
{"level":"info","ts":1616940751.3620188,"caller":"app/server.go:440","msg":"Starting Server..."}
{"level":"info","ts":1616940751.364197,"caller":"app/server.go:506","msg":"Server is listening on [:]:8065"}
```

AWS Compute Optimizer finding

User:
 arn:aws:sts::003445361146:assumed-role/vocstartsoft/user1315769=eddiebanuelas@gmail.com is not authorized to perform: compute-optimizer:GetEnrollmentStatus on resource: \* with an explicit deny

Retry

Instance state ▾

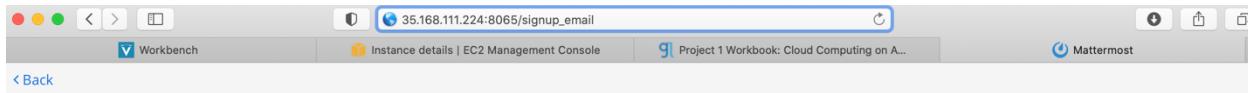
Private IPv4 address 10.0.2.94

Private IPv4 DNS ip-10-0-2-94.ec2.internal

VPC ID vpc-07b075a9a44f2ab97 (Project 1 VPC) [ ]

Subnet ID subnet-0342dd10ecf2e13fe (Private Subnet) [ ]

Feedback English (US)



## 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.

## 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
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

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

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

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

c

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

c

- 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

We could close port 22 traffic to anywhere and only allow it to our own IP address. Port 3360 would also need to remove anywhere access and only allow the user to access the application server.

- Q8      Describe the steps required to deploy the given application in an autoscaling environment                  5

First an auto scaling group would need to be created. Use a script application server as user data and configure a launch configuration. After that then we would create an ASG and finally we would need to attach the ASG to the load balancer that is most likely in existence.

**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