

Implementing a Team Communication Solution using Mattermost and AWS (VPC| IGW | NAT instance | EC2 | Bastion host)

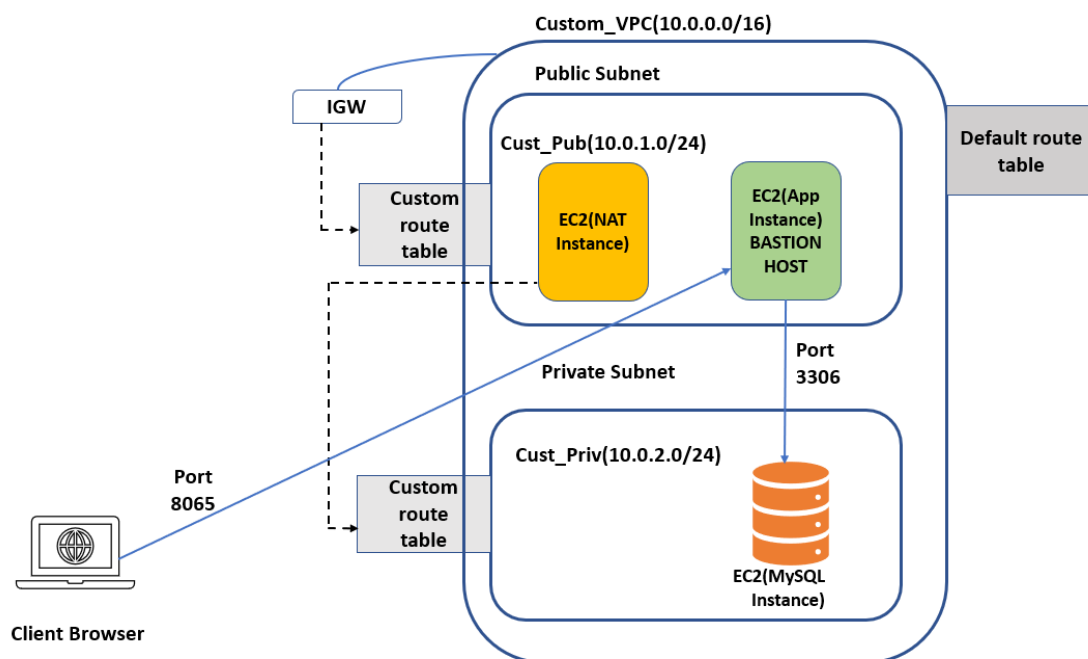
SCENARIO

Team communication and instant messaging solutions are an integral part of any business environment today. As of 2020, the total number of users of Slack and Microsoft Teams exceeded 20 million. Some organizations might have compliance policies in place which do not allow them to use services managed by third parties. We will design a communication solution that can be managed and hosted on servers controlled by the organization.

SOLUTION

Mattermost is an open-source, self-hostable online chat service. It is designed as an in-house chat platform for organizations and companies, and is mostly marketing itself as an open-source alternative to Slack. It uses a 3-tier architecture that can be hosted using an IaaS provider or on-premise servers. The purpose of this project is to deploy the trial version of the application on the public cloud i.e. AWS.

ARCHITECTURE



IMPLEMENTATION

- Implement 2 different subnets (one public and the other private) in a custom VPC
- Install and configure MySQL on an Ubuntu 18.04 instance on the private subnet
- Install and configure Mattermost Application on an Ubuntu 18.04 instance on the public subnet (This will be used as a bastion host to connect to the MySQL private instance)
- Provision a NAT instance on the public subnet
- Configure the security groups to allow the ports as shown in the architecture.

Client(web browser) – port 8065 → Mattermost instance
Mattermost instance – port 3306 –>MySQL instance

- Test the installation by accessing the IP of the public instance(Mattermost) in a browser against the port 8065.

STEPS

REGION : North Virginia

- Create a custom VPC (10.0.0.0/16) and enable DNS hostname option for the created VPC

Create VPC

A VPC is an isolated portion of the AWS cloud populated by AWS objects, such as Amazon EC2 instances. You must specify an IPv4 address range for your VPC. Specify the IPv4 address range as a Classless Inter-Domain Routing (CIDR) block, for example, 10.0.0.0/16. You cannot specify an IPv4 CIDR block larger than /16. You can optionally associate an IPv6 CIDR block with the VPC.

Name tag: custom-vpc

IPv4 CIDR block*: 10.0.0.0/16

IPv6 CIDR block: ☒ No IPv6 CIDR Block
☐ Amazon provided IPv6 CIDR block
☐ IPv6 CIDR owned by me

Tenancy: Default

* Required

Cancel Create

Edit DNS hostnames

VPC ID: vpc-0d13716bcdda35f88

DNS hostnames: ☒ enable

* Required

Cancel Save

- Create 2 subnets in the Custom VPC

a) Public subnet (cust-pub : 10.0.1.0/24 : us-east-1a AZ)

Create subnet

Specify your subnet's IP address block in CIDR format, for example, 10.0.0.0/24. IPv4 block sizes must be between a /16 netmask and /28 netmask, and can be the same size as your VPC. An IPv6 CIDR block must be a /64 CIDR block.

Name tag: cust-pub

VPC*: vpc-0d13716bcdda35f88

Availability Zone: us-east-1a

VPC CIDRs	CIDR	Status	Status Reason
	10.0.0.0/16	associated	

IPv4 CIDR block*: 10.0.1.0/24

* Required

Cancel Create

Enable auto assign public IPv4 address for cust-pub subnet only as we need a public IP to connect to the Bastion Host

Subnets > Modify auto-assign IP settings

Modify auto-assign IP settings

Enable the auto-assign IP address setting to automatically request a public IPv4 or IPv6 address for an instance launched in this subnet. You can override the auto-assign IP settings for an instance at launch time.

Subnet ID: subnet-06914b8394042f53

Auto-assign IPv4 ☒ Enable auto-assign public IPv4 address ⓘ

Auto-assign Co-IP ☐ Enable auto-assign customer-owned IPv4 address ⓘ

* Required Cancel Save

b) Private subnet (cust-priv : 10.0.2.0/16 : us-east-1b AZ)

Subnets > Create subnet

Create subnet

Specify your subnet's IP address block in CIDR format, for example, 10.0.0.0/24. IPv4 block sizes must be between a /16 netmask and /28 netmask, and can be the same size as your VPC. An IPv6 CIDR block must be a /64 CIDR block.

Name tag: cust-priv ⓘ

VPC: vpc-0d13716bcdda35f8 ⓘ

Availability Zone: us-east-1b ⓘ

VPC CIDRs	CIDR	Status	Status Reason
	10.0.0.0/16	associated	

IPv4 CIDR block: 10.0.2.0/24 ⓘ

* Required Cancel Create

- Create Internet Gateway and attach it to the custom VPC

VPC > Internet gateways > Create internet gateway

Create internet gateway ⓘ

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

Internet gateway settings

Name tag: Create a tag with a key of 'Name' and a value that you specify.

IGW ⓘ

Tags - optional

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

Key: Name X Value - optional: IGW X Remove

Add new tag

You can add 49 more tags.

Cancel Create internet gateway

- Create a custom Route Table and associate it with the public subnet only so that it becomes internet facing and the private subnet is inaccessible to the internet

Route Tables > Create route table

Create route table

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Name tag: cust-RT1 ⓘ

VPC: vpc-0d13716bcdda35f8 ⓘ

Key	Value
This resource currently has no tags	

Add Tag 50 remaining (Up to 50 tags maximum)

* Required Cancel Create

Add a route to reach internet via the IGW

Route Tables > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	active	No
0.0.0.0/0	igw-0e3589e90623cae2f	active	No

Add route

* Required

Cancel Save routes

Associate the public subnet with the custom route table created

Create route table Actions

search: cust-RT1 Add filter

Name	Route Table ID	Explicit subnet association	Edge associations	Main	VPC ID	Owner
cust-RT1	rtb-051f62b2f3ae2d809	subnet-06b914b8394042f33	-	No	vpc-0d13716bcd3a35f88	701156759425

Route Table: rtb-051f62b2f3ae2d809

Summary Routes Subnet Associations Edge Associations Route Propagation Tags

Edit subnet associations

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-06b914b8394042f33 cust-pub	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-0d475d5b4e09456ff cust-priv	10.0.2.0/24	-

- Navigate to EC2 and Create a NAT instance in the public subnet

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

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.

Search by Systems Manager parameter

Quick Start (0) My AMIs (0) AWS Marketplace (25) Community AMIs (507)

Operating system: Amazon Linux, CentOS, Debian, Fedora, Gentoo, openSUSE, Other Linux, Red Hat, SUSE Linux, Ubuntu, Windows

Architecture: 32-bit (x86), 64-bit (x86_64)

AMI ID	AMI Name	Root device type	Virtualization type	ENA Enabled	Select
amazon-ami-vpc-nat-hvm-2018.03.0.20181116-x86_64-ebs - ami-00a9d4a05375b2763	Amazon Linux AMI 2018.03.0.20181116 x86_64 VPC HVM ebs	Root device type: ebs	Virtualization type: hvm	ENA Enabled: Yes	Select
amazon-ami-vpc-nat-hvm-2017.09.1.20180108-x86_64-ebs - ami-01823d7b	Amazon Linux AMI 2017.09.1.20180108 x86_64 VPC NAT HVM EBS	Root device type: ebs	Virtualization type: hvm	ENA Enabled: Yes	Select
amazon-ami-vpc-nat-2018.03.0.20200716.0-x86_64-ebs - ami-01ef319f93c5aaed	Amazon Linux AMI 2018.03.0.20200716.0 x86_64 VPC HVM ebs	Root device type: ebs	Virtualization type: hvm	ENA Enabled: Yes	Select
amazon-ami-vpc-nat-2018.03.0.20200514.0-x86_64-ebs - ami-02623b65d521fbd30	Amazon Linux AMI 2018.03.0.20200514.0 x86_64 VPC HVM ebs	Root device type: ebs	Virtualization type: hvm	ENA Enabled: Yes	Select
amazon-ami-vpc-nat-2018.03.0.20190828-x86_64-ebs - ami-02cb555e324696ced	Amazon Linux AMI 2018.03.0.20190828 x86_64 VPC HVM ebs	Root device type: ebs	Virtualization type: hvm	ENA Enabled: Yes	Select

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2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Add Tags

6. Configure Security Group

7. Review

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1. Choose AMI

2. Choose Instance Type

3. Configure Instance

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7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

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2. Choose Instance Type

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1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Add Tags

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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: [Launch into Auto Scaling Group](#)

Purchasing option: ☐ Request Spot instances

Network: [Create new VPC](#)

Subnet: [Create new subnet](#)

Auto-assign Public IP: [Create new IAM role](#)

Placement group: ☐ Add instance to placement group

Capacity Reservation:

IAM role: [Create new IAM role](#)

Shutdown behavior:

Stop - Hibernate behavior: ☐ Enable hibernation as an additional stop behavior

Enable termination protection: ☐ Protect against accidental termination

Monitoring: ☐ Enable CloudWatch detailed monitoring

Tenancy: [Additional charges will apply for dedicated tenancy.](#)

Elastic Inference: ☐ Add an Elastic Inference accelerator

Cancel Previous Review and Launch Next: Add Storage

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2. Choose Instance Type

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1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

5. Add Tags

6. Configure Security Group

7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/xvda	snap-0514af7e161ef69838	<input type="text" value="8"/>	Magnetic (standard)	N/A	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

General Purpose (SSD) volumes provide the ability to burst to 3000 IOPS per volume, independent of volume size, to meet the performance needs of most applications and also deliver a consistent baseline of 3 IOPS/GiB. [Set my root volume to General Purpose \(SSD\).](#)

Free tier eligible customers can get up to 30 GiB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Cancel Previous Review and Launch Next: Add Tags

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1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

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

Security group name:

Description:

Type	Protocol	Port Range	Source	Description
HTTPS	TCP	443	Custom 10.0.2.0/24	e.g. SSH for Admin Desktop

Add Rule

Warning

You will not be able to connect to this instance as the AMI requires port(s) 22 to be open in order to have access. Your current security group doesn't have port(s) 22 open.

Cancel Previous **Review and Launch**

aws Services Resource Groups

EC2 > Security Groups > sg-095dd9367a842b46b - https-allow > Edit inbound rules

Edit inbound rules

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules

Type	Protocol	Port range	Source	Description - optional	
HTTPS	TCP	443	Custom 10.0.2.0/24		Delete
HTTP	TCP	80	Custom 10.0.2.0/24		Delete

Add rule

NOTE: Any edits made on existing rules will result in the edited rule being deleted and a new rule created with the new details. This will cause traffic that depends on that rule to be dropped for a very brief period of time until the new rule can be created.

Cancel Preview changes **Save rules**

NOTE : Disable Source/Destination check in the NAT instance by selecting the instance and navigating to Actions->Networking->Change Source/Dest. Check

Why is this done ? All EC2 instances by default do source and destination checks i.e. the instance must either be a source or destination for any traffic it sends or receives. NAT instance acts as a GW and should be able to send or receive traffic i.e. NAT instance is not a source/destination.

- Create the custom route table and associate it with the private subnet

aws Services Resource Groups

Route Tables > Create route table

Create route table

A route table specifies how packets are forwarded between the subnets within your VPC, the internet, and your VPN connection.

Name tag:

VPC:

Key (128 characters maximum) Value (256 characters maximum)

This resource currently has no tags

Add Tag 50 remaining (Up to 50 tags maximum)

* Required Cancel **Create**

Add a route to reach internet via NAT instance

Route Tables > Edit routes

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	active	No
0.0.0.0/0	i-0e1cd81d3150d7m		No

Add route

* Required

Cancel Save routes

Associate the private subnet with the custom route table created

Create route table Actions

Filter by tags and attributes or search by keyword

Name	Route Table ID	Explicit subnet association	Edge associations	Main	VPC ID	Owner
cust-RT1	rtb-051962b2f3ae2d909	subnet-0b914b639404253	-	No	vpc-0d13716bcd3a35f88	701156759425
cust-RT2	rtb-0bd19a038cf9d0b8	subnet-0d475d5b4e09456f	-	No	vpc-0d13716bcd3a35f88	701156759425
	rtb-0d0e2a14bd9d9549c	-	-	Yes	vpc-0d13716bcd3a35f88	701156759425
	rtb-96511ce5	-	-	Yes	vpc-bcc234c1	701156759425

Route Table: rtb-0bd19a038cf9d0b8

Summary Routes Subnet Associations Edge Associations Route Propagation Tags

Edit subnet associations

Subnet ID	IPv4 CIDR	IPv6 CIDR
subnet-0d475d5b4e09456f	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
None found		

All your subnets are associated with a route table.

- Create the application server in public subnet

1. Choose AMI 2. Choose Instance Type 3. Configure Instance 4. Add Storage 5. Add Tags 6. Configure Security Group 7. Review

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

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

Quick Start

My AMIs

AWS Marketplace

Community AMIs

Free tier only (1)

Amazon Linux	Amazon Linux 2 AMI (HVM), SSD Volume Type - ami-02354e95b39ca8dec (64-bit x86) / ami-0c5b07e510b75b11 (64-bit Arm)	Select
Amazon Linux	Amazon Linux 2018.03.0 (HVM), SSD Volume Type - ami-09d8b52222b93b0	Select
Red Hat	Red Hat Enterprise Linux 8 (HVM), SSD Volume Type - ami-098f16afa9edf40be (64-bit x86) / ami-029ba835dd43c34f (64-bit Arm)	Select
SUSE Linux	SUSE Linux Enterprise Server 15 SP2 (HVM), SSD Volume Type - ami-0a782e324655d1cc0 (64-bit x86) / ami-06ec4eaf39ca724d4 (64-bit Arm)	Select
Ubuntu	Ubuntu Server 18.04 LTS (HVM), SSD Volume Type - ami-0bcc094591f354be2 (64-bit x86) / ami-0bc556e0c71e1b467 (64-bit Arm)	Select

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1. Choose AMI

2. Choose Instance Type

3. Configure Instance

4. Add Storage

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6. Configure Security Group

7. Review

Step 2: Choose an Instance Type

Amazon EC2 provides a wide selection of instance types optimized to fit different use cases. Instances are virtual servers that can run applications. They have varying combinations of CPU, memory, storage, and networking capacity, and give you the flexibility to choose the appropriate mix of resources for your applications. [Learn more](#) about instance types and how they can meet your computing needs.

Filter by: All instance types Current generation Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gbit	Yes
<input type="checkbox"/>	General purpose	t3a.micro	2	1	EBS only	Yes	Up to 5 Gbit	Yes
<input type="checkbox"/>	General purpose	t3a.small	2	2	EBS only	Yes	Up to 5 Gbit	Yes
<input type="checkbox"/>	General purpose	t3a.medium	2	4	EBS only	Yes	Up to 5 Gbit	Yes

Cancel Previous Review and Launch Next: Configure Instance Details

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1. Choose AMI

2. Choose Instance Type

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6. Configure Security Group

7. Review

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 [Launch into Auto Scaling Group](#)

Purchasing option ☐ Request Spot instances

Network [Create new VPC](#)

Subnet [Create new subnet](#)

Auto-assign Public IP ☐ Use subnet setting (Enable)

Placement group ☐ Add instance to placement group

Capacity Reservation

IAM role [Create new IAM role](#)

Shutdown behavior

Stop - Hibernate behavior ☐ Enable hibernation as an additional stop behavior

Enable termination protection ☐ Protect against accidental termination

Monitoring ☐ Enable CloudWatch detailed monitoring

Tenancy [Additional charges will apply for dedicated tenancy.](#)

Elastic Inference ☐ Add an Elastic Inference accelerator

Cancel Previous Review and Launch Next: Add Storage

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1. Choose AMI

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7. Review

Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/sda1	snap-091c9b89d2062ce92	<input type="text" value="8"/>	Magnetic (standard)	N/A	N/A	<input checked="" type="checkbox"/>	Not Encrypted

[Add New Volume](#)

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

Cancel Previous Review and Launch Next: Add Tags

Step 5: Add Tags

A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. A copy of a tag can be applied to volumes, instances or both. Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key (128 characters maximum)	Value (256 characters maximum)	Instances (1)	Volumes (1)
Name	maternmost-app	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

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:
 Description:

Type (1)	Protocol (1)	Port Range (1)	Source (1)	Description (1)
SSH	TCP	22	Custom 0.0.0.0/0	e.g. SSH for Admin Desktop
Custom TCP	TCP	8065	Custom 0.0.0.0/0	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.

[Cancel](#) [Previous](#) [Review and Launch](#)

- Create DB server in the private subnet

Step 1: Choose an Amazon Machine Image (AMI)

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[Search by Systems Manager parameter](#)

[Cancel and Exit](#)

< 1 to 40 of 40 AMIs >

Quick Start	AMI Name	AMI ID	Architecture	Root device type	Virtualization type	ENI Enabled	Select
My AMIs	Amazon Linux 2 AMI (HVM), SSD Volume Type	ami-02354e95b39ca8dec	64-bit x86	efs	hvm	Yes	Select
AWS Marketplace	Amazon Linux 2018.03.0 (HVM), SSD Volume Type	ami-09d8b522272b93bf0	64-bit x86	efs	hvm	Yes	Select
Community AMIs	Red Hat Enterprise Linux 8 (HVM), SSD Volume Type	ami-098f18afa0ed40be	64-bit x86	efs	hvm	Yes	Select
Free tier only	SUSE Linux Enterprise Server 15 SP2 (HVM), SSD Volume Type	ami-0a782e324655d1cc0	64-bit x86	efs	hvm	Yes	Select
	Ubuntu Server 18.04 LTS (HVM), SSD Volume Type	ami-0bc094591b34be2	64-bit x86	efs	hvm	Yes	Select

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1. Choose AMI

2. Choose Instance Type

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Filter by: All instance types

Current generation

Show/Hide Columns

Currently selected: t2.micro (Variable ECUs, 1 vCPUs, 2.5 GHz, Intel Xeon Family, 1 GiB memory, EBS only)

	Family	Type	vCPUs	Memory (GiB)	Instance Storage (GiB)	EBS-Optimized Available	Network Performance	IPv6 Support
<input type="checkbox"/>	General purpose	t2.nano	1	0.5	EBS only	-	Low to Moderate	Yes
<input checked="" type="checkbox"/>	General purpose	t2.micro	1	1	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.small	1	2	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.medium	2	4	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.large	2	8	EBS only	-	Low to Moderate	Yes
<input type="checkbox"/>	General purpose	t2.xlarge	4	16	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t2.2xlarge	8	32	EBS only	-	Moderate	Yes
<input type="checkbox"/>	General purpose	t3a.nano	2	0.5	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.micro	2	1	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.small	2	2	EBS only	Yes	Up to 5 Gigabit	Yes
<input type="checkbox"/>	General purpose	t3a.medium	2	4	EBS only	Yes	Up to 5 Gigabit	Yes

Cancel

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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

1

Launch into Auto Scaling Group

Purchasing option

☐ Request Spot instances

Network

vpc-0d13716bc0da3586 | custom-vpc

Create new VPC

Subnet

subnet-0d475d5b4e09456f | cust-priv | us-east-1b

Create new subnet

Auto-assign Public IP

Use subnet setting (Disable)

Placement group

☐ Add instance to placement group

Capacity Reservation

None

IAM role

None

Create new IAM role

Shutdown behavior

Stop

Stop - Hibernate behavior

☐ Enable hibernation as an additional stop behavior

Enable termination protection

☐ Protect against accidental termination

Monitoring

☐ Enable CloudWatch detailed monitoring

Additional charges apply.

Tenancy

Shared - Run a shared hardware instance

Additional charges will apply for dedicated tenancy.

Elastic Inference

☐ Add an Elastic Inference accelerator

Additional charges apply.

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Step 4: Add Storage

Your instance will be launched with the following storage device settings. You can attach additional EBS volumes and instance store volumes to your instance, or edit the settings of the root volume. You can also attach additional EBS volumes after launching an instance, but not instance store volumes. [Learn more](#) about storage options in Amazon EC2.

Volume Type	Device	Snapshot	Size (GiB)	Volume Type	IOPS	Throughput (MB/s)	Delete on Termination	Encryption
Root	/dev/sda1	snap-091c9689d2082ce92	8	Magnetic (standard)	N/A	N/A	<input checked="" type="checkbox"/>	Not Encrypted

Add New Volume

Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage. [Learn more](#) about free usage tier eligibility and usage restrictions.

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Next: Add Tags

Step 5: Add Tags
A tag consists of a case-sensitive key-value pair. For example, you could define a tag with key = Name and value = Webserver. A copy of a tag can be applied to volumes, instances or both. Tags will be applied to all instances and volumes. [Learn more](#) about tagging your Amazon EC2 resources.

Key	Value	Instances	Volumes
Name	mysql-db	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

[Add another tag](#) (Up to 50 tags maximum)

[Cancel](#) [Previous](#) [Review and Launch](#) [Next: Configure Security Group](#)

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:
Description:

Type	Protocol	Port Range	Source	Description
SSH	TCP	22	Custom 10.0.1.0/24	e.g. SSH for Admin Desktop
MYSQL/Auric	TCP	3306	Custom 10.0.1.0/24	e.g. SSH for Admin Desktop

[Add Rule](#)

[Cancel](#) [Previous](#) [Review and Launch](#)

- Copy the pem file for the Database Server to the Application Server to use it as a Bastion Host

The command is as follows `scp -i <pem file of the application server> <path to pem file of the DB server> ubuntu@<public IP address of the application server>:/home/ubuntu`

NOTE : For the purposes of this demonstration, we have used the same pem file for the application and database server.

```
PS C:\Users\Anusha> Copy-Item 'D:\PGP CC GL\project solution\trial.pem'
PS C:\Users\Anusha> attrib.exe -a .\trial.pem
PS C:\Users\Anusha> attrib.exe +r .\trial.pem
PS C:\Users\Anusha> scp -i .\trial.pem trial.pem ubuntu@52.206.252.226:/home/ubuntu
The authenticity of host '52.206.252.226 (52.206.252.226)' can't be established.
ECDSA key fingerprint is SHA256:vxpk84iuxTrDiEVDQvyxvSYayuzdqFemVaDJ3eK110.
Are you sure you want to continue connecting (yes/no)?
Please type 'yes' or 'no':
Warning: Permanently added '52.206.252.226' (ECDSA) to the list of known hosts.
trial.pem
PS C:\Users\Anusha> |
```

- Log into the application server and use it as a Bastion Host to log into the database server

`ssh -i .\trial.pem ubuntu@52.206.252.226`

```
cd /home/ubuntu/  
chmod 400 trial.pem  
ssh -i trial.pem ubuntu@10.0.2.19
```

NOTE : we are using the private IP of the database server to log into it since it does not have a public IP/DNS address.

- Install and configure DB server as below
 1. Download the script
cd /opt
sudo wget https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/install_mysql.sh

```
ubuntu@ip-10-0-2-90:/opt$ cat install_mysql.sh  
#!/bin/bash  
apt update -y  
apt install mysql-server -y  
echo "Installed MySQL"  
echo "Configuring MySQL now"  
  
mysql -u root <<-EOF  
UPDATE mysql.user SET authentication_string=PASSWORD('password') WHERE User='root';  
DELETE FROM mysql.user WHERE User='root' AND Host NOT IN ('localhost', '127.0.0.1', '::1');  
DELETE FROM mysql.user WHERE User='';  
DELETE FROM mysql.db WHERE Db='test' OR Db='test_%';  
FLUSH PRIVILEGES;  
CREATE USER 'mmuser'@ '%' IDENTIFIED BY 'mostest';  
CREATE DATABASE mattermost_test;  
GRANT ALL PRIVILEGES ON mattermost_test.* TO 'mmuser'@ '%';  
EOF  
  
echo "MySQL Configuration complete"  
sed "s/bind-address/#bind-address/" /etc/mysql/mysql.conf.d/mysqld.cnf > mysqld.cnf  
mv mysqld.cnf /etc/mysql/mysql.conf.d/mysqld.cnf  
  
/etc/init.d/mysql restart  
ubuntu@ip-10-0-2-90:/opt$ |
```

2. Run the script
sudo chmod 700 install_mysql.sh
sudo ./install_mysql.sh
 3. Log out of the database server to go back into the application server
- Install the Mattermost application and configure the app server
 1. Download the script using the following command
cd /opt
sudo wget https://storage.googleapis.com/skl-training/aws-codelabs/mattermost/mattermost_install.sh

```

ubuntu@ip-10-0-1-6:/opt$ cat mattermost_install.sh
#!/bin/bash
wget https://releases.mattermost.com/5.19.0/mattermost-5.19.0-linux-amd64.tar.gz
echo "Downloaded Mattermost"
tar -xvzf mattermost*.gz
echo "Extracted Mattermost"
mv mattermost /opt
mkdir /opt/mattermost/data
useradd --system --user-group mattermost
echo "Created user"
sed "s/localhost:3306/$1:3306/" /opt/mattermost/config/config.json > config.json
mv config.json /opt/mattermost/config/config.json
ubuntu@ip-10-0-1-6:/opt$ |

```

2. Run the script :


```

sudo chmod 700 mattermost_install.sh
sudo ./mattermost_install.sh <private_IP_of_mysql_server>
sudo chown -R mattermost:mattermost /opt/mattermost
sudo chmod -R g+w /opt/mattermost

```
3. Run the Mattermost server:


```

cd /opt/mattermost
sudo -u mattermost ./bin/mattermost

```

```

ubuntu@ip-10-0-1-6:/opt/mattermost$ sudo -u mattermost ./bin/mattermost
{"level":"info","ts":1597574023.4211257,"caller":"utils/i18n.go:83","msg":"Loaded system translations","for locale":"en","from locale":"/opt/mattermost/i18n/en.json"}
{"level":"info","ts":1597574023.4214776,"caller":"app/server_app_adapters.go:58","msg":"Server is initializing..."}
{"level":"info","ts":1597574023.4351275,"caller":"sqlstore/supplier.go:212","msg":"Pinging SQL","database":"master"}
{"level":"info","ts":1597574025.1830187,"caller":"sqlstore/upgrade.go:110","msg":"The database schema version has been set","version":"5.19.0"}
{"level":"error","ts":1597574040.5204957,"caller":"app/server_app_adapters.go:125","msg":"SiteURL must be set. Some features will operate incorrectly if the SiteURL is not set. See documentation for details: http://about.mattermost.com/default-site-url"}
{"level":"info","ts":1597574040.5236347,"caller":"app/license.go:39","msg":"License key from https://mattermost.com required to unlock enterprise features."}
{"level":"info","ts":1597574040.5250566,"caller":"app/migrations.go:26","msg":"Migrating roles to database."}
{"level":"info","ts":1597574040.6167572,"caller":"sqlstore/post_store.go:1351","msg":"Post.Message has size restrictions","max_characters":16383,"max_bytes":65535}
{"level":"info","ts":1597574040.6229656,"caller":"app/migrations.go:102","msg":"Migrating emojis config to database."}
{"level":"info","ts":1597574041.852038,"caller":"mlog/log.go:166","msg":"Starting up plugins"}
{"level":"info","ts":1597574041.853627,"caller":"app/plugin.go:213","msg":"Syncing plugins from the file store"}
{"level":"info","ts":1597574046.0091548,"caller":"mlog/sugar.go:19","msg":"Ensuring Surveybot exists","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574046.3265889,"caller":"mlog/sugar.go:19","msg":"Surveybot created","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574046.3382123,"caller":"mlog/sugar.go:19","msg":"Upgrade detected. Checking if a survey should be scheduled.","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574046.553418,"caller":"mlog/sugar.go:19","msg":"Scheduling next survey for Sep 6, 2020","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574046.9550476,"caller":"app/server.go:217","msg":"Current version is 5.19.0 (5.19.0/Thu Jan 16 18:30:33 UTC 2020/90cf883f8400d6fdb025308ad14d56e6d53f05/1268390c0cd16f750b0b6fe62534b82586d595f)"}
{"level":"info","ts":1597574046.9552195,"caller":"app/server.go:218","msg":"Enterprise Enabled: true"}
{"level":"info","ts":1597574046.9553165,"caller":"app/server.go:221","msg":"Printing current working","directory":"/opt/mattermost"}
{"level":"info","ts":1597574046.9554331,"caller":"app/server.go:222","msg":"Loaded config","source":"file:///opt/mattermost/config/config.json"}
{"level":"info","ts":1597574047.0518095,"caller":"jobs/workers.go:68","msg":"Starting workers"}
{"level":"info","ts":1597574047.0590677,"caller":"app/web_hub.go:75","msg":"Starting websocket hubs","number_of_hubs":2}
{"level":"info","ts":1597574047.0659535,"caller":"jobs/schedulers.go:74","msg":"Starting schedulers."}
{"level":"info","ts":1597574047.0959568,"caller":"app/server.go:440","msg":"Starting Server..."}
{"level":"info","ts":1597574047.098118,"caller":"app/server.go:506","msg":"Server is listening on [::]:8065"}
{"level":"error","ts":1597574076.9645798,"caller":"plugin/health_check.go:90","msg":"Health check failed for plugin","id":"com.mattermost.nps","error":"Plugin in RPC connection is not responding"}
{"level":"warn","ts":1597574076.9646597,"caller":"plugin/hclog_adapter.go:51","msg":"error closing client during Kill","plugin_id":"com.mattermost.nps","wrapped_err":"errconnection is shut down"}
{"level":"warn","ts":1597574076.9646985,"caller":"plugin/hclog_adapter.go:53","msg":"plugin failed to exit gracefully","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574076.9846988,"caller":"mlog/sugar.go:19","msg":"Ensuring Surveybot exists","plugin_id":"com.mattermost.nps"}
{"level":"info","ts":1597574121.5685608,"caller":"migrations/worker.go:109","msg":"Worker: Job is complete","worker":"Migrations","job_id":"ngnapmihbfkfeeu3m7xaeth9o"}

```

- Test the success of the implementation by visiting the public IP of the application server in your browser with the port 8065

Mattermost

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Valid email required for sign-up

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

Choose your password

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