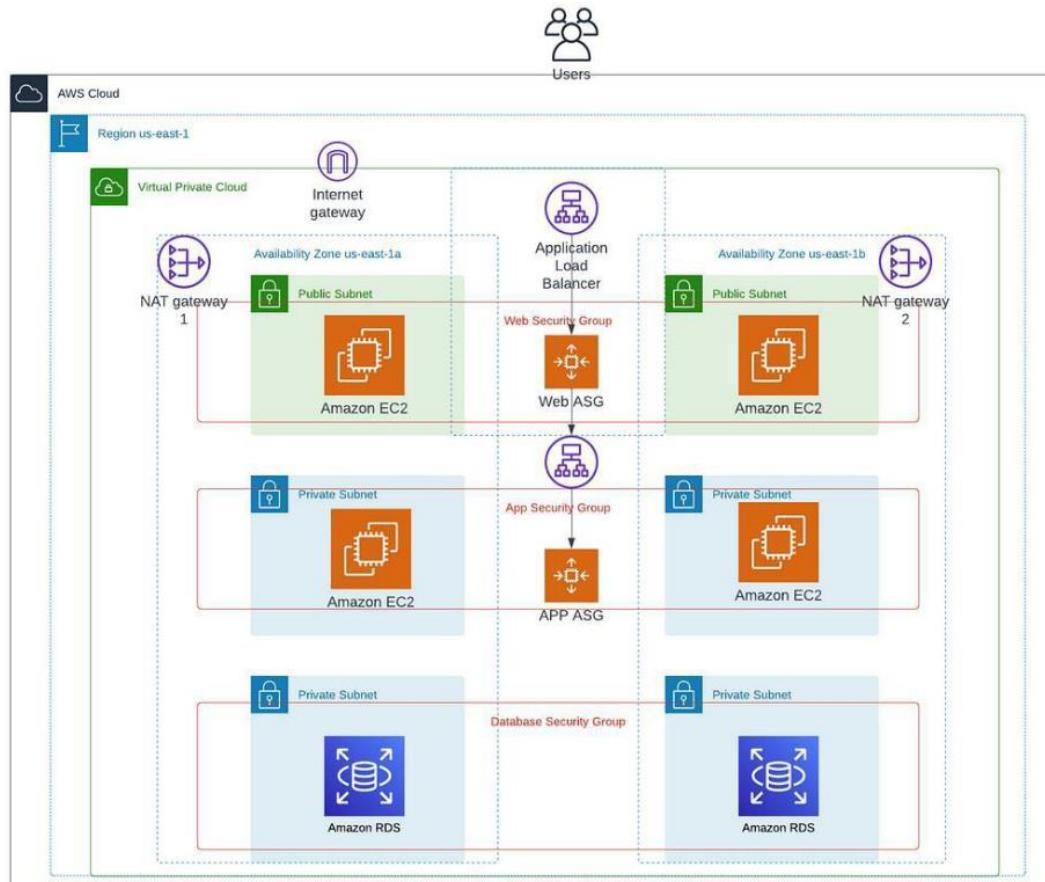


Three tier Project



A three-tier architecture comprises three layers, namely the presentation tier, the application tier, and the data tier. The presentation tier serves as the front-end, hosting the user interface, such as the website that users or clients interact with. The application tier, commonly referred to as the back-end, processes the data. Finally, the data tier is responsible for data storage and management.

Create VPC [Info](#)

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances. Mouse over a resource to highlight the related resources.

VPC settings

Resources to create [Info](#)
Create only the VPC resource or the VPC and other networking resources.

VPC only VPC and more

Name tag auto-generation [Info](#)
Enter a value for the Name tag. This value will be used to auto-generate Name tags for all resources in the VPC.
 Auto-generate
my project

IPv4 CIDR block [Info](#)
Determine the starting IP and the size of your VPC using CIDR notation.
10.0.0.16 65,536 IPs
CIDR block size must be between /16 and /28.

IPv6 CIDR block [Info](#)
 No IPv6 CIDR block
 Amazon-provided IPv6 CIDR block

Tenancy [Info](#)
Default

Number of Availability Zones (AZs) [Info](#)
Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.
1 2 3

Preview

VPC [Show details](#)
Your AWS virtual network
my project-vpc

Subnets (6)
Subnets within this VPC

eu-north-1a
my project-subnet-public1-eu-
my project-subnet-private1-eu-
my project-subnet-private3-eu-

eu-north-1b
my project-subnet-public2-eu-
my project-subnet-private2-eu-
my project-subnet-private4-eu-

Route tables (5)
Route network traffic

my project-rtb-pub
my project-rtb-prv
my project-rtb-prv
my project-rtb-prv
my project-rtb-prv

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Create VPC [Info](#)

Choose the number of AZs in which to provision subnets. We recommend at least two AZs for high availability.

1 2 3 [Customize AZs](#)

Number of public subnets [Info](#)
The number of public subnets to add to your VPC. Use public subnets for web applications that need to be publicly accessible over the internet.
0 2

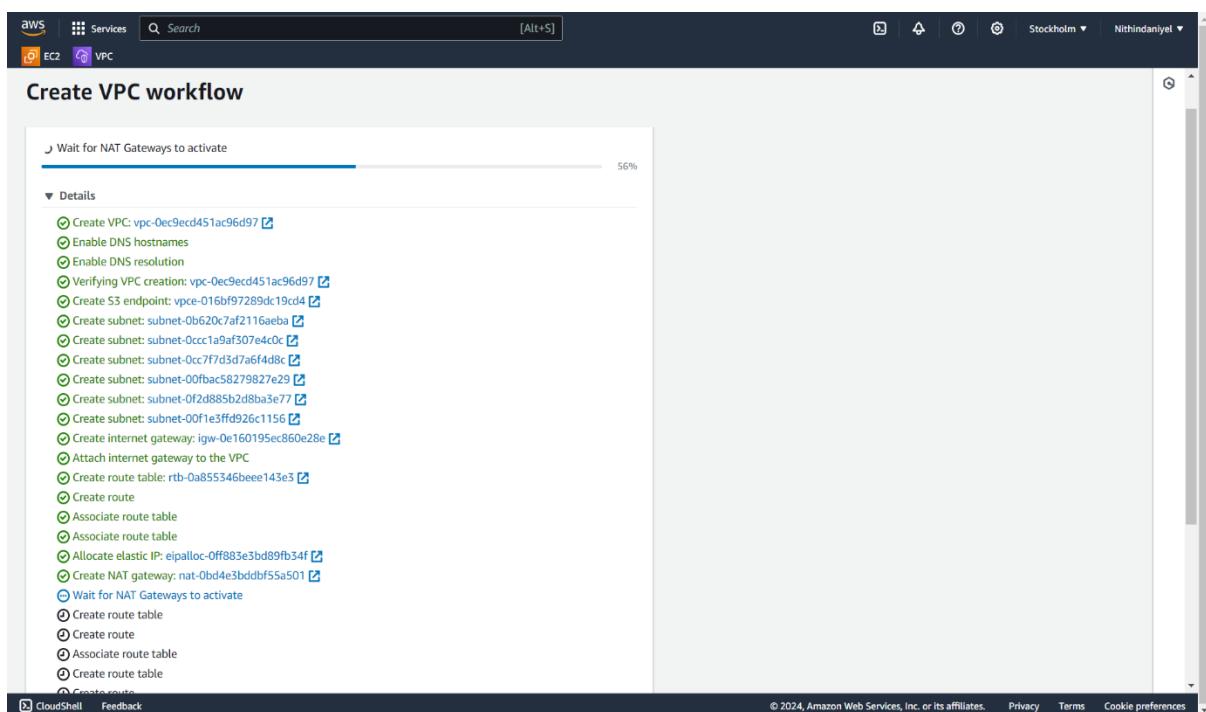
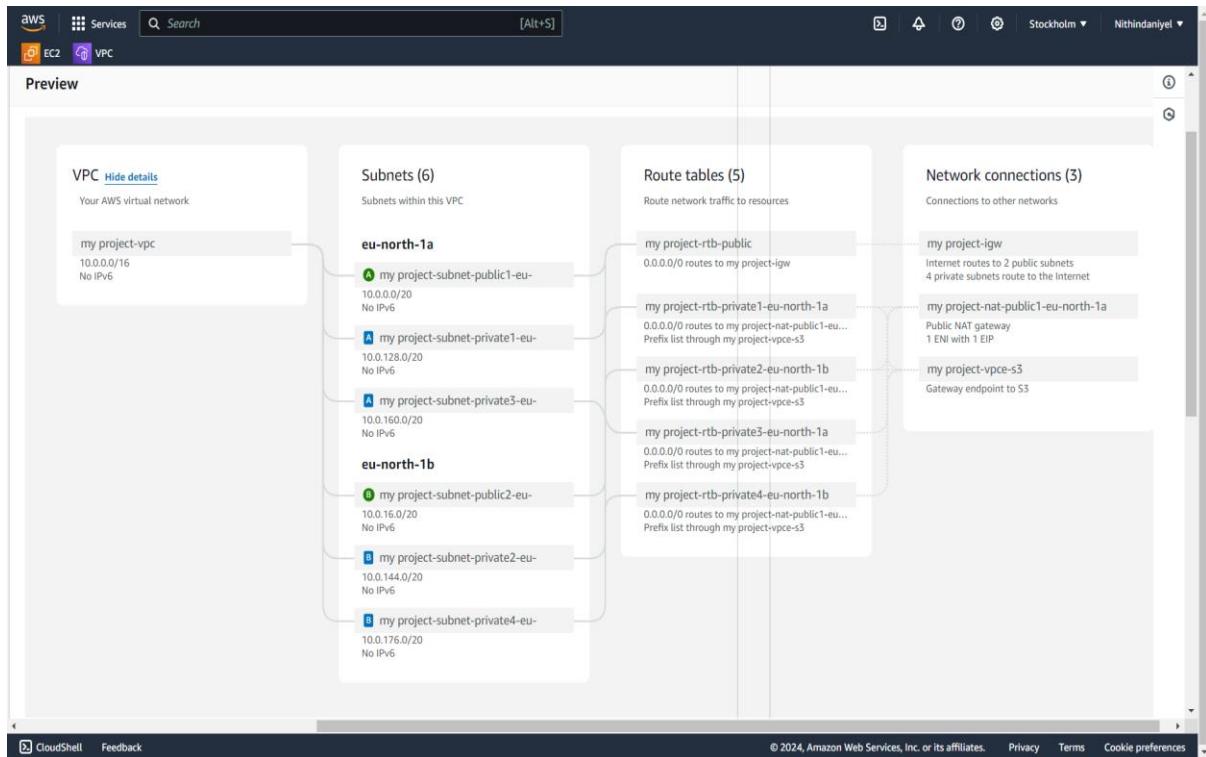
Number of private subnets [Info](#)
The number of private subnets to add to your VPC. Use private subnets to secure backend resources that don't need public access.
0 2 4 [Customize subnets CIDR blocks](#)

NAT gateways (\$) [Info](#)
Choose the number of Availability Zones (AZs) in which to create NAT gateways. Note that there is a charge for each NAT gateway.
None In 1 AZ 1 per AZ

VPC endpoints [Info](#)
Endpoints can help reduce NAT gateway charges and improve security by accessing S3 directly from the VPC. By default, full access policy is used. You can customize this policy at any time.
None S3 Gateway

DNS options [Info](#)
 Enable DNS hostnames
 Enable DNS resolution

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Screenshot of the AWS VPC Console showing the 'Edit subnet settings' page for a private subnet.

Subnet

| | |
|--------------------------|--|
| Subnet ID | Name |
| subnet-0f2d885b2d8ba3e77 | my project-subnet-private3-eu-north-1a |

Auto-assign IP settings Info
Enable AWS to automatically assign a public IPv4 or IPv6 address to a new primary network interface for an instance in this subnet.

Enable auto-assign public IPv4 address Info

Enable auto-assign customer-owned IPv4 address Info
Option disabled because no customer owned pools found.

Resource-based name (RBN) settings Info
Specify the hostname type for EC2 instances in this subnet and optional RBN DNS query settings.

Enable resource name DNS A record on launch Info

Enable resource name DNS AAAA record on launch Info

Hostname type Info

Resource name
 IP name

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Screenshot of the AWS VPC Console showing the 'Edit subnet settings' page for a public subnet.

Subnet

| | |
|--------------------------|---------------------------------------|
| Subnet ID | Name |
| subnet-0b620c7af2116aeba | my project-subnet-public1-eu-north-1a |

Auto-assign IP settings Info
Enable AWS to automatically assign a public IPv4 or IPv6 address to a new primary network interface for an instance in this subnet.

Enable auto-assign public IPv4 address Info

Enable auto-assign customer-owned IPv4 address Info
Option disabled because no customer owned pools found.

Resource-based name (RBN) settings Info
Specify the hostname type for EC2 instances in this subnet and optional RBN DNS query settings.

Enable resource name DNS A record on launch Info

Enable resource name DNS AAAA record on launch Info

Hostname type Info

Resource name
 IP name

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Screenshot of the AWS EC2 Instances Launch an instance page.

Name and tags

Name: My Project

Application and OS Images (Amazon Machine Image)

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

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

Recent AMIs: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux Enterprise Server, AWS Lambda, Mac, ubuntu, Microsoft, Red Hat, SUSE Linux Enterprise Server.

Amazon Machine Image (AMI)

Ubuntu Server 24.04 LTS (HVM), SSD Volume Type

ami-07dc1b18ca66bb07 (64-bit x86) / ami-0d4dcac1e1aefc9e (64-bit Arm)
Virtualization type: ENA enabled: true Root device type: ebs

Description: Ubuntu Server 24.04 LTS (HVM) EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Architecture: 64-bit (x86) AMI ID: ami-07dc1b18ca66bb07 Verified provider

Instance type

Summary

Number of instances: 1

Software Image (AMI): Canonical, Ubuntu, 24.04 LTS, ...
ami-07dc1b18ca66bb07

Virtual server type (instance type): t3.micro

Firewall (security group): New security group

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

Free tier: In your first year includes 750 hours of t3.micro (or t3.micro in the Regions in which t3.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Launch instance Review commands

Screenshot of the AWS EC2 Instances Launch an instance page.

Name and tags

Name: My Project

Application and OS Images (Amazon Machine Image)

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

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

Recent AMIs: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux Enterprise Server, AWS Lambda, Mac, ubuntu, Microsoft, Red Hat, SUSE Linux Enterprise Server.

Amazon Machine Image (AMI)

Ubuntu Server 24.04 LTS (HVM), SSD Volume Type

ami-07dc1b18ca66bb07 (64-bit x86) / ami-0d4dcac1e1aefc9e (64-bit Arm)
Virtualization type: ENA enabled: true Root device type: ebs

Description: Ubuntu Server 24.04 LTS (HVM) EBS General Purpose (SSD) Volume Type. Support available from Canonical (<http://www.ubuntu.com/cloud/services>).

Architecture: 64-bit (x86) AMI ID: ami-07dc1b18ca66bb07 Verified provider

Instance type

Summary

Number of instances: 1

ami-07dc1b18ca66bb07

Virtual server type (instance type): t3.micro

Firewall (security group): New security group

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

Free tier: In your first year includes 750 hours of t3.micro (or t3.micro in the Regions in which t3.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GiB of bandwidth to the internet.

Cancel Launch instance Review commands

aws Services Search [Alt+S] Stockholm Nithindaniyal

VPC

before you launch the instance.

Key pair name - required

Project ▾ Create new key pair

▼ Network settings Info

VPC - required Info

vpc-0ec9ecd451ac96d97 (my project-vpc) 10.0.0.0/16

Subnet Info

subnet-0b620c7af2116aeba my project-subnet-public1-eu-north-1a
VPC: vpc-0ec9ecd451ac96d97 Owner: 975050336998 Availability Zone: eu-north-1a Zone type: Availability Zone IP addresses available: 4090 CIDR: 10.0.0.0/20

Create new subnet

Auto-assign public IP Info

Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups) Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group Select existing security group

Security group name - required

project

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and -_<|=!@#&:;`\$^

Description - required Info

▼ Summary

Number of instances Info

1

ami-0/csc1b18cab6bb00/

Virtual server type (instance type)

t3.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Launch instance Review commands

The screenshot shows the AWS EC2 VPC Security Group creation interface. The security group is named "Launch-wizard-1" and is set to apply to all network interfaces. It has two inbound rules: one for SSH (TCP port 22) from anywhere, and another for HTTP (TCP port 80) from a custom source. A warning message at the bottom advises against allowing all IP addresses and recommends setting security group rules for known IP addresses. On the right, a summary panel shows one instance, the virtual server type as t3.micro, and storage details. A tooltip provides information about the free tier.

Security group name - required

project

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and _-/.@+=:&|\$*

Description - required [Info](#)

Launch-wizard-1 created 2024-08-19T12:12:52.100Z

Inbound Security Group Rules

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0)

Type [Info](#) Protocol [Info](#) Port range [Info](#)

| | | |
|-----|-----|----|
| ssh | TCP | 22 |
|-----|-----|----|

Source type [Info](#) Source [Info](#) Description - optional [Info](#)

| | |
|----------|---|
| Anywhere | <input type="text" value="Add CIDR, prefix list or security"/> e.g. SSH for admin desktop |
|----------|---|

0.0.0.0/0 [X](#)

▼ Security group rule 2 (TCP, 80)

Type [Info](#) Protocol [Info](#) Port range [Info](#)

| | | |
|------|-----|----|
| HTTP | TCP | 80 |
|------|-----|----|

Source type [Info](#) Source [Info](#) Description - optional [Info](#)

| | |
|--------|---|
| Custom | <input type="text" value="Add CIDR, prefix list or security"/> e.g. SSH for admin desktop |
|--------|---|

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. [X](#)

Add security group rule

Number of instances [Info](#)

1

ami-0/csc18cabbbbu/

Virtual server type (instance type)

t3.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os per month, 100 GB of snapshots, and 100 GB of bandwidth to the internet. [X](#)

Cancel [Launch instance](#)

Review commands

CloudShell Feedback

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Launch an instance

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

Name and tags

Name: My Project 1 | Add additional tags

Application and OS Images (Amazon Machine Image)

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

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

Recent AMIs: Amazon Linux, macOS, Ubuntu, Windows, Red Hat, SUSE Linux Enterprise Server

Quick Start AMIs: Amazon Machine Image (AMI), Ubuntu Server 24.04 LTS (HVM), SSD Volume Type

Free tier eligible

Summary

Number of instances: 1

Software Image (AMI): Canonical, Ubuntu, 24.04 LTS, ami-07c8c1b18ca66bb07

Virtual server type (instance type): t3.micro

Firewall (security group): New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of

Cancel | Launch instance | Review commands

Key pair name - required

Project | Create new key pair

Network settings

VPC - required

vpc-0ec9ecd451ac96d97 (my project-vpc) | 10.0.0.0/16

Subnet

subnet-0f0fac58279827e29 my project-subnet-private2-eu-north-1b | VPC: vpc-0ec9ecd451ac96d97 Owner: 975050336998 Availability Zone: eu-north-1b Zone type: Availability Zone IP addresses available: 4091 CIDR: 10.0.144.0/20 | Create new subnet

Auto-assign public IP

Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups)

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

Create security group | Select existing security group

Security group name - required

project

This security group will be added to all network interfaces. The name can't be edited after the security group is created. Max length is 255 characters. Valid characters: a-z, A-Z, 0-9, spaces, and _-./[]{}+=;<;/>

Description - required

launch-wizard-1 created 2024-08-19T12:17:57.584Z

Summary

Number of instances: 1

Software Image (AMI): Canonical, Ubuntu, 24.04 LTS, ami-07c8c1b18ca66bb07

Virtual server type (instance type): t3.micro

Firewall (security group): New security group

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

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million I/Os, 1 GB of snapshots, and 100 GB of

Cancel | Launch instance | Review commands

Screenshot of the AWS EC2 Security Groups configuration page for a new security group named "project".

Inbound Security Group Rules:

- Security group rule 1 (TCP, 22, 0.0.0.0/0)**:
 - Type: ssh
 - Protocol: TCP
 - Port range: 22
 - Source type: Anywhere
 - Description: e.g. SSH for admin desktop
 - Port range: 0.0.0.0/0
- Security group rule 2 (TCP, 80, 0.0.0.0/0)**:
 - Type: HTTP
 - Protocol: TCP
 - Port range: 80
 - Source type: Custom
 - Description: e.g. SSH for admin desktop
 - Port range: 0.0.0.0/0

A yellow warning box at the bottom left states: "⚠️ Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only." X

Summary:

- Number of instances: 1
- Software Image (AMI): Canonical, Ubuntu, 24.04 LTS, ami-07c8c1b18ca66bb07
- Virtual server type (instance type): t3.micro
- Firewall (security group): New security group
- Storage (volumes): 1 volume(s) - 8 GiB

Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, 30 GiB of EBS storage, 2 million IOPS, 1 GB of snapshots, and 100 GB of

Cancel Launch instance Review commands

Screenshot of the AWS EC2 Instances Connect page for the instance i-099d668ff0023f76a.

Connect to instance: [info](#)

Connect to your instance i-099d668ff0023f76a (My Project) using any of these options

EC2 Instance Connect Session Manager SSH client EC2 serial console

Instance ID: [i-099d668ff0023f76a \(My Project\)](#)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is Project.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
`chmod 400 "Project.pem"`
4. Connect to your instance using its Public DNS:
`ec2-13-60-226-68.eu-north-1.compute.amazonaws.com`

Command copied

`ssh -i "Project.pem" ubuntu@ec2-13-60-226-68.eu-north-1.compute.amazonaws.com`

Note: In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

Cancel

```
root@ip-10-0-3-194: /var/www/html
Created symlink /etc/systemd/system/multi-user.target.wants/apache2.service → /usr/lib/systemd/system/apache2.service.
Created symlink /etc/systemd/system/multi-user.target.wants/apache-htcacheload.service → /usr/lib/systemd/system/apache-htcacheload.service.
Processing triggers for ufw (0.36.2-6) ...
Processing triggers for man-db (2.12.0-4build2) ...
Processing triggers for libc-bin (2.39-0ubuntu8.2) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-10-0-3-194:~# cd /var/www/html
root@ip-10-0-3-194:/var/www/html# ls
index.html
root@ip-10-0-3-194:/var/www/html# rm index.html
root@ip-10-0-3-194:/var/www/html# vi index.html
root@ip-10-0-3-194:/var/www/html# systemctl restart apache2
root@ip-10-0-3-194:/var/www/html# ls
index.html
root@ip-10-0-3-194:/var/www/html# cat index.html
My Project
root@ip-10-0-3-194:/var/www/html# vi index.html
root@ip-10-0-3-194:/var/www/html# top
top - 12:44:48 up 27 min,  2 users,  load average: 0.00, 0.02, 0.00
Tasks: 119 total,   1 running, 118 sleeping,   0 stopped,   0 zombie
%Cpu(s):  0.0 us,  0.0 sy,  0.0 ni,100.0 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :    914.2 total,    255.8 free,    345.1 used,    474.3 buff/cache
```



A screenshot of the AWS CloudShell interface. At the top, there's a navigation bar with tabs for AWS Services, EC2, VPC, and a search bar. Below the navigation bar, the main content area shows the EC2 Instances page, specifically for an instance with ID i-0fa4aaa933a674e45. A 'Connect to instance' button is visible. The central part of the screen is a 'Connect to instance' dialog box. This dialog has tabs for 'EC2 Instance Connect', 'Session Manager', 'SSH client' (which is currently selected), and 'EC2 serial console'. Under the 'SSH client' tab, the 'Instance ID' is listed as i-0fa4aaa933a674e45 (My Project 1). Below this, a numbered list of steps for SSH connection is provided, along with a 'Command copied' message and a copy link. A note at the bottom of the dialog states: 'Note: In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.' At the bottom right of the dialog, there's a 'Cancel' button. The footer of the page includes links for CloudShell, Feedback, and a copyright notice from 2024.

```

root@ip-10-0-20-222:/var/www/html# Reporting Problems
</div>
<div class="content_section_text">
<p>
    Please use the <tt>ubuntu-bug</tt> tool to report bugs in the
    Apache2 package with Ubuntu. However, check <a
    href="https://bugs.launchpad.net/ubuntu/+source/apache2"
    rel="nofollow">existing bug reports</a> before reporting a new bug.
</p>
<p>
    Please report bugs specific to modules (such as PHP and others)
    to their respective packages, not to the web server itself.
</p>
</div>
</div>
<div class="validator">
</div>
</body>
</html>
root@ip-10-0-20-222:/var/www/html# rm index.html
root@ip-10-0-20-222:/var/www/html# vi index.html
root@ip-10-0-20-222:/var/www/html# cat index.html
this is public 2 for 3 tier application
root@ip-10-0-20-222:/var/www/html# top
top - 13:09:20 up 8 min, 1 user, load average: 0.00, 0.06, 0.05
Tasks: 112 total, 1 running, 111 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.0 us, 0.0 sy, 0.0 ni, 100.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 914.2 total, 219.3 free, 352.9 used, 501.8 buff/cache
MiB Swap: 0.0 total, 0.0 free, 0.0 used. 561.3 avail Mem

```

NTR Nagar Road
Closed road

Search ENG IN 18:39 19-08-2024

The screenshot shows the AWS CloudShell interface with the EC2 service selected. It displays two running instances:

| Instance ID | Name | State | Project | Region |
|---------------------|--------------|---------|---------|------------|
| i-034fecb2b72b629ef | my project 2 | Running | project | eu-north-1 |
| i-099d668ff0023f76a | My Project | Running | project | eu-north-1 |

Ports for the selected instances

Ports for routing traffic to the selected instances.

1-65535 (separate multiple ports with commas)

2 selections are now pending below. Include more or register targets when ready.

Review targets

Targets (2)

| Instance ID | Name | Port | State | Security groups | Zone | Private IPv4 address | Subnet ID |
|---------------------|--------------|------|---------|-----------------|-------------|----------------------|----------------|
| i-034fecb2b72b629ef | my project 2 | 80 | Running | project | eu-north-1b | 10.0.20.222 | subnet-0ccc1af |
| i-099d668ff0023f76a | My Project | 80 | Running | project | eu-north-1a | 10.0.3.194 | subnet-0b620c |

2 pending Cancel Previous

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EC2 VPC

Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

Target group name

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Protocol : Port

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation.

HTTP 80 1-65535

IP address type

Only targets with the indicated IP address type can be registered to this target group.

IPv4
Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.

IPv6
Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). [Learn more](#)

VPC

Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

my project-vpc
vpc-0ec9ecd451ac96d97
IPv4 VPC CIDR: 10.0.0.0/16

Protocol version

HTTP1
Send requests to targets using HTTP/1.1. Supported when the request protocol is HTTP/1.1 or HTTP/2.

HTTP2
Send requests to targets using HTTP/2. Supported when the request protocol is HTTP/2 or gRPC, but gRPC-specific features are not available.

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EC2 VPC

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

project lb

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme [Info](#)

Scheme can't be changed after the load balancer is created.

Internet-facing
An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet. [Learn more](#)

Internal
An internal load balancer routes requests from clients to targets using private IP addresses. Compatible with the IPv4 and Dualstack IP address types.

Load balancer IP address type [Info](#)

Select the front-end IP address type to assign to the load balancer. The VPC and subnets mapped to this load balancer must include the selected IP address types. Public IPv4 addresses have an additional cost.

IPv4
Includes only IPv4 addresses.

Dualstack
Includes IPv4 and IPv6 addresses.

Dualstack without public IPv4
Includes a public IPv6 address, and private IPv4 and IPv6 addresses. Compatible with **internet-facing** load balancers only.

Network mapping [Info](#)

The load balancer routes traffic to targets in the selected subnets, and in accordance with your IP address settings.

VPC [Info](#)

The load balancer will exist and scale within the selected VPC. The selected VPC is also where the load balancer targets must be hosted unless routing to Lambda or on-premises targets, or if using VPC peering. To confirm the VPC for your targets, view [target groups](#). For a new VPC, create a [VPC](#).

my project-vpc
vpc-0ec9ecd451ac96d97
IPv4 VPC CIDR: 10.0.0.0/16

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Screenshot of the AWS VPC console showing the configuration of a new VPC.

Mappings Info
Select at least two Availability Zones and one subnet per zone. The load balancer routes traffic to targets in these Availability Zones only. Availability Zones that are not supported by the load balancer or the VPC are not available for selection.

Availability Zones

eu-north-1a (eun1-az1)
Subnet
subnet-0b620c7af2116aebe my project-subnet-public1-eu-north-1a
IPv4 subnet CIDR: 10.0.0.0/16

eu-north-1b (eun1-az2)
Subnet
subnet-0ccc1a9af307e4c0c my project-subnet-public2-eu-north-1b
IPv4 subnet CIDR: 10.0.16.0/20

Security groups Info
A security group is a set of firewall rules that control the traffic to your load balancer. Select an existing security group, or you can [create a new security group](#).

Security groups
Select up to 5 security groups
project sg-0480b388bbd6feafe VPC: vpc-0ec9ecd451ac96d97

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Screenshot of the AWS Load Balancers console showing the configuration of a new Application Load Balancer (ALB).

project-lb Actions Actions for Load balancer

Details

| | | | |
|--|--|--|--|
| Load balancer type Application | Status Provisioning | VPC vpc-0ec9ecd451ac96d97 | Load balancer IP address type IPv4 |
| Scheme Internet-facing | Hosted zone Z23TAZ6LKFNMIO | Availability Zones subnet-0b620c7af2116aebe eu-north-1a (eun1-az1) subnet-0ccc1a9af307e4c0c eu-north-1b (eun1-az2) | Date created August 19, 2024, 18:49 (UTC+05:30) |
| Load balancer ARN arn:aws:elasticloadbalancing:eu-north-1:975050336998:loadbalancer/app/project-lb/b5d88a89ab90871f | DNS name <small>Info</small> project-lb-803675968.eu-north-1.elb.amazonaws.com (A Record) | | |

Listeners and rules (1) Info Manage rules Add listener

A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the default action and any additional rules.

| Protocol:Port | Default action | Rules | ARN | Security policy | Default SSL/TLS certificate |
|---------------|----------------|-------|-----|-----------------|-----------------------------|
| | | | | | |

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this is public 2 for 3 tier application

To exit full screen, press **F11**

My Project fo 3 tier application

The screenshot shows the AWS EC2 Instances page with three instances listed:

| Name | Instance ID | Instance state | Instance type | Status check |
|-------------------|----------------------------|----------------|-----------------|--------------------------|
| My Project 1 | i-0fa4aaa933a674e45 | Terminated | t3.micro | - |
| my project 2 | i-034fecb2b72b629ef | Running | t3.micro | 2/2 checks passed |
| My Project | i-099d668ff0023f76a | Running | t3.micro | 2/2 checks passed |

A context menu is open for the selected instance 'My Project' (i-099d668ff0023f76a), showing options like 'Create image', 'Image and templates', and 'Monitor and troubleshoot'.

The instance details page for 'i-099d668ff0023f76a (My Project)' is displayed, showing the following information:

| Details | Status and alarms | Monitoring | Security | Networking | Storage | Tags |
|----------------------------------|-----------------------------|---|----------|------------|---------|------|
| Instance summary | | | | | | |
| Instance ID | Public IPv4 address | Private IPv4 addresses | | | | |
| i-099d668ff0023f76a (My Project) | 13.60.226.68 open address | 10.0.3.194 | | | | |
| IPv6 address | Instance state | Public IPv4 DNS | | | | |
| - | Running | ec2-13-60-226-68.eu-north-1.compute.amazonaws.com Launch address | | | | |

At the bottom, there are links for CloudShell, Feedback, and a footer with copyright information and links for Privacy, Terms, and Cookie preferences.

The screenshot shows the 'Create launch template' wizard on the AWS EC2 service. The current step is 'Network settings'. It includes fields for 'Key pair name' (set to 'Don't include in launch template'), 'Subnet' (set to 'Don't include in launch template'), and 'Firewall (security group)' (set to 'project'). A tooltip for the 'Free tier' is visible, stating: 'Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, and 20 GiB of Amazon EBS IOPS per month'. The 'Create launch template' button is at the bottom right.

The screenshot shows the 'Create launch template' wizard on the AWS EC2 service. The current step is 'Create launch template'. It includes fields for 'Launch template name - required' (set to 'project-tmt'), 'Template version description' (set to 'nothing'), and 'Auto Scaling guidance' (checkbox checked). A tooltip for the 'Free tier' is visible, stating: 'Free tier: In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is unavailable) instance usage on free tier AMIs per month, 750 hours of public IPv4 address usage per month, and 20 GiB of Amazon EBS IOPS per month'. The 'Create launch template' button is at the bottom right.

Screenshot of the AWS EC2 Auto Scaling group creation wizard, Step 5.

Auto Scaling group name: project-as

Launch template: project-tmt

Version: Default (1)

Description: (Optional)

Next Step: Step 6 - optional: Add tags

Screenshot of the AWS EC2 Auto Scaling group creation wizard, Step 5.

Auto Scaling group name: project-as

Launch template: project-tmt

Version: Default (1)

Description: (Optional)

Next Step: Step 6 - optional: Add tags

Screenshot of the AWS CloudShell interface showing the creation of an Auto Scaling group. The user is on Step 6 - optional, specifically configuring the Network settings.

Network Info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

vpc-0ec9ecd451ac96d97 (my project-vpc)

[Create a VPC](#)

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

eu-north-1a | subnet-0620c7af2116aeaba (my project-subnet-public1-eu-north-1a)
10.0.0.0/20

eu-north-1b | subnet-0ccc1a9af307e4c0c (my project-subnet-public2-eu-north-1b)
10.0.16.0/20

[Create a subnet](#)

Cancel Skip to review Previous Next

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Screenshot of the AWS CloudShell interface showing the continuation of the Auto Scaling group creation process. The user is now on Step 3 - optional, specifically configuring load balancing options.

Load balancing info

Use the options below to attach your Auto Scaling group to an existing load balancer, or to a new load balancer that you define.

No load balancer
Traffic to your Auto Scaling group will not be fronted by a load balancer.

Attach to an existing load balancer
Choose from your existing load balancers.

Attach to a new load balancer
Quickly create a basic load balancer to attach to your Auto Scaling group.

Attach to an existing load balancer

Select the load balancers that you want to attach to your Auto Scaling group.

Choose from your load balancer target groups
This option allows you to attach Application, Network, or Gateway Load Balancers.

Choose from Classic Load Balancers

Existing load balancer target groups

Only instance target groups that belong to the same VPC as your Auto Scaling group are available for selection.

Select target groups

project | HTTP
Application Load Balancer: project-lb

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Screenshot of the AWS CloudShell interface showing the AWS Management Console. The browser tab is titled "eu-north-1.console.aws.amazon.com/ec2/home?region=eu-north-1#AutoScalingGroups:". The AWS navigation bar shows "EC2" and "VPC". The main content area displays the "Auto Scaling groups (1) Info" page with one entry:

| Name | Launch template/configuration | Instances | Status | Desired capacity | Min | Max | Availability zone |
|------------|-------------------------------|-----------|--------|------------------|-----|-----|-------------------|
| project-as | project-tmt Version Default | 1 | - | 1 | 1 | 1 | eu-north... |

The status bar at the bottom indicates "CloudShell Feedback" and shows the date and time as "19-08-2024 19:05".

Screenshot of the AWS CloudShell interface showing the AWS Management Console. The browser tab is titled "eu-north-1.console.aws.amazon.com/ec2/home?region=eu-north-1#Instances:instanceState=running". The AWS navigation bar shows "EC2" and "VPC". The main content area displays the "Instances (1/4) Info" page with four running instances:

| Name | Instance ID | Instance state | Instance type | Status check | Alarm status | Availability Zone | Public IPv4 DNS |
|--------------|---------------------|----------------|---------------|-------------------|---------------|-------------------|-----------------|
| my project 2 | i-034fecb2b72b629ef | Running | t3.micro | 2/2 checks passed | View alarms + | eu-north-1b | ec2-13-53-168 |
| My Project | i-01a11569e86747872 | Running | t3.micro | 2/2 checks passed | View alarms + | eu-north-1b | ec2-16-171-42 |
| My Project | i-099d668ff0023f76a | Running | t3.micro | 2/2 checks passed | View alarms + | eu-north-1a | ec2-13-60-226 |
| My Project | i-073a169633ebf9da9 | Running | t3.micro | 2/2 checks passed | View alarms + | eu-north-1a | ec2-51-20-116 |

The status bar at the bottom indicates "CloudShell Feedback" and shows the date and time as "19-08-2024 19:11".

SubnetDetails | VPC Console Create Auto Scaling group | EC2 EC2 | eu-north-1

eu-north-1.console.aws.amazon.com/ec2/home?region=eu-north-1#CreateAutoScalingGroup:

Gmail YouTube Have I Been Pwned... Timeline GitHub - GitSquare... Verzeo EduTech acs | VPC Console Python Syntax

AWS Services Search [Alt+S]

EC2 VPC

Auto Scaling group updated successfully

Network Info

For most applications, you can use multiple Availability Zones and let EC2 Auto Scaling balance your instances across the zones. The default VPC and default subnets are suitable for getting started quickly.

VPC

Choose the VPC that defines the virtual network for your Auto Scaling group.

vpc-0ec9ecd451ac96d97 (my project-vpc) 10.0.0.0/16

Create a VPC

Availability Zones and subnets

Define which Availability Zones and subnets your Auto Scaling group can use in the chosen VPC.

Select Availability Zones and subnets

eu-north-1a | subnet-0cc7f7d3d7a6f4d8c (my project-subnet-private1-eu-north-1a) 10.0.128.0/20

eu-north-1b | subnet-00fbac58279827e29 (my project-subnet-private2-eu-north-1b) 10.0.144.0/20

Create a subnet

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SubnetDetails | VPC Console Create Auto Scaling group | EC2 EC2 | eu-north-1

eu-north-1.console.aws.amazon.com/ec2/home?region=eu-north-1#CreateAutoScalingGroup:

Gmail YouTube Have I Been Pwned... Timeline GitHub - GitSquare... Verzeo EduTech acs | VPC Console Python Syntax

AWS Services Search [Alt+S]

EC2 VPC

Auto Scaling group updated successfully

Step 6 - optional

Add tags

Step 7

Review

Attach to a new load balancer

Define a new load balancer to create for attachment to this Auto Scaling group.

Load balancer type

Choose from the load balancer types offered below. Type selection cannot be changed after the load balancer is created. If you need a different type of load balancer than those offered here, visit the Load Balancing console.

Application Load Balancer HTTP, HTTPS

Network Load Balancer TCP, UDP, TLS

Load balancer name

Name cannot be changed after the load balancer is created.

project-AMS-1

Load balancer scheme

Scheme cannot be changed after the load balancer is created.

Internal

Internet-facing

Network mapping

Your new load balancer will be created using the same VPC and Availability Zone selections as your Auto Scaling group. You can select different subnets and add subnets from additional Availability Zones.

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Connectivity [Info](#)

Compute resource
Choose whether to set up a connection to a compute resource for this database. Setting up a connection will automatically change connectivity settings so that the compute resource can connect to this database.

Don't connect to an EC2 compute resource
Don't set up a connection to a compute resource for this database. You can manually set up a connection to a compute resource later.

Connect to an EC2 compute resource
Set up a connection to an EC2 compute resource for this database.

Virtual private cloud (VPC) [Info](#)
Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.

PROJECT-vpc (vpc-02c8d8ad3a0eb390e)
6 Subnets, 2 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

⚠️ The VPC subnets must be in 3 Availability Zones (AZs) for the Multi-AZ DB cluster. The current subnets are in 2 AZs (us-east-1b, us-east-1a). Add a subnet in a different AZ than the current subnets. [Add new subnet](#)

ℹ️ After a database is created, you can't change its VPC.

DB subnet group [Info](#)
Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB cluster can use in the VPC that you selected.

my-project
6 Subnets, 2 Availability Zones

⚠️ The DB subnets must be in 3 Availability Zones (AZs) for the Multi-AZ DB cluster. The current subnets are in 2 AZs (us-east-1b, us-east-1a). Add a subnet in a different AZ than the current subnets. [Edit new subnet](#)

⌚ Successfully created database database-3tier [View connection details](#)

You can use settings from database-3tier to simplify configuration of suggested database add-ons while we finish creating your DB for you.

Notifications 0 0 0 2 0 0 0 0 ▾

RDS > Databases > database-3tier

database-3tier [C](#) [Modify](#) [Actions ▾](#)

Related

Filter by databases

| DB identifier | Status | Role | Engine | Region & AZ | Size | Recommendations |
|---------------------------|-----------|---------------------|-----------------|-------------|--------------|-----------------|
| database-3tier | Available | Multi-AZ DB cluster | MySQL Community | us-east-1 | 3 instances | |
| database-3tier-instance-1 | Available | Writer instance | MySQL Community | us-east-1a | db.m5d.large | |
| database-3tier-instance-2 | Available | Reader instance | MySQL Community | us-east-1b | db.m5d.large | |
| database-3tier-instance-3 | Available | Reader instance | MySQL Community | us-east-1c | db.m5d.large | |

[Connectivity & security](#) [Monitoring](#) [Logs & events](#) [Configuration](#) [Maintenance & backups](#) [Tags](#) [Recommendations](#)

Set up EC2 connection Info

Select EC2 instance

Database

database-3tier

EC2 instance

Choose the EC2 instance to connect to this database. Only EC2 instances in the same VPC as the database are shown. If no EC2 instances in the same VPC are available, you can create a new EC2 instance.

i-09bdb991de60cc1b1
project-3tier-public1 us-east-1a



Create EC2 instance

Cancel

Continue

VPC > Your VPCs > vpc-094f0bf96a7e0bf87 > Edit VPC settings

Edit VPC settings Info

VPC details

VPC ID

vpc-094f0bf96a7e0bf87

Name

project-3tier

DHCP settings

DHCP option set Info

dopt-01d606309be84088f

DNS settings

Enable DNS resolution Info

Enable DNS hostnames Info

Network Address Usage metrics settings

Enable Network Address Usage metrics Info

Cancel

Save

EC2 > Instances > i-09bdb991de60cc1b1 > Connect to Instance

Connect to instance Info

Connect to your instance i-09bdb991de60cc1b1 (project-3tier-public1) using any of these options

EC2 Instance Connect | Session Manager | **SSH client** | EC2 serial console

Instance ID

i-09bdb991de60cc1b1 (project-3tier-public1)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is project-3tier.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
 chmod 400 "project-3tier.pem"

4. Connect to your instance using its Public DNS:
 ec2-98-80-8-145.compute-1.amazonaws.com

Command copied

ssh -i "project-3tier.pem" ubuntu@ec2-98-80-8-145.compute-1.amazonaws.com

Note: In most cases, the guessed username is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI username.

- Once created the RDS connect to the private instance through public instance.



```
ubuntu@ip-10-0-7-30:~$ sudo -i
root@ip-10-0-7-30:~# vi project-3tier.pem
root@ip-10-0-7-30:~# chmod 777 project-3tier.pem
root@ip-10-0-7-30:~# ssh -i "project-3tier.pem" root@10.0.9.36
The authenticity of host '10.0.9.36 (10.0.9.36)' can't be established.
ED25519 key fingerprint is SHA256:Z0AlhjCybm6+dCtfRuf8zeGdYITJow43lwLk/2sKL
This key is not known by any other names.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '10.0.9.36' (ED25519) to the list of known hosts.
@@@@@@@WARNING: UNPROTECTED PRIVATE KEY FILE! @@@
Permissions 0777 for 'project-3tier.pem' are too open.
It is required that your private key files are NOT accessible by others.
This private key will be ignored.
Load key "project-3tier.pem": bad permissions
root@10.0.9.36: Permission denied (publickey).
root@ip-10-0-7-30:~#
```

```
root@ip-10-0-7-30:~# mysql -h database-3tier.cluster-c9emcoqj2lvz.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 62
Server version: 8.0.35 Source distribution

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> |

ERROR 1146 (42S02): Table 'serverproject.starterpersons' doesn't exist
mysql> INSERT INTO Persons (ID, LastName, FirstName, Age) VALUES ('7', 'aws', 'devops', '10')
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Persons (ID, LastName, FirstName, Age) VALUES ('8', 'aws', 'k8s', '8')
Query OK, 1 row affected (0.00 sec)

mysql> select * from Persons;
+----+-----+-----+----+
| ID | LastName | FirstName | Age |
+----+-----+-----+----+
| 7 | aws     | devops    | 10 |
| 8 | aws     | k8s      | 8  |
+----+-----+-----+----+
ERROR 1146 (42S02): Table 'serverproject.starterpersons' doesn't exist
mysql> INSERT INTO Persons (ID, LastName, FirstName, Age) VALUES ('7', 'aws', 'devops', '10');
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Persons (ID, LastName, FirstName, Age) VALUES ('8', 'aws', 'k8s', '8')
Query OK, 1 row affected (0.00 sec)

mysql> select * from Persons;
+----+-----+-----+----+
| ID | LastName | FirstName | Age |
+----+-----+-----+----+
| 7 | aws     | devops    | 10 |
| 8 | aws     | k8s      | 8  |
+----+-----+-----+----+
2 rows in set (0.00 sec)
```