

AWS Three Tier GitHub - iamt... Console Home Dashboard | E IAM | Global RDS | us-east subnets | VPC GitHub - aws- AWS Thre ... + - VPN

catalog.us-east-1.prod.workshops.aws/workshops/85cd2bb2-7f79-4e96-bdee-8078e4697... | 3 | 10 | 26-11-2023

aws workshop studio

AWS Three Tier Web Architecture X

AWS Three Tier Web Architecture > Part 0: Setup

## Part 0: Setup

For this workshop, we will be downloading the code from Github and upload it to S3 so our instances can access it. We will also create an AWS Identity and Access Management EC2 role so we can use AWS Systems Manager Session Manager to connect to our instances securely and without needing to create SSH key pairs.

### Learning Objectives:

- S3 Bucket Creation
- IAM EC2 Instance Role Creation
- Download Code from Github Repository

Previous Next

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27°C Haze 10:12 AM 26-11-2023

```
MINGW64:/c/Users/ASUS/Downloads/3tier
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ pwd
/c/Users/ASUS/Downloads
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ mkdir 3tier
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ cd 3tier/
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
$ git clone https://github.com/aws-samples/aws-three-tier-web-architecture-workshop.git
```

catalog.us-east... AWS workshop studio

AWS Three Tier Web Architecture > ... > Download Code from Github

## Download Code from Github

Download the code from [this repository](https://github.com/aws-samples/aws-three-tier-web-architecture-workshop) into your local environment by running the command below. If you don't have git installed, you can just download the zip. Save it somewhere you can easily access.

```
1 git clone https://github.com/aws-samples/aws-three-tier-web-architecture-workshop
```

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Ln 13, Col 87 | 100% | Windows (CRLF) | UTF-8 | 27°C Haze | ENG | 10:14 AM | 26-11-2023

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```
MINGW64:/c/Users/ASUS/Downloads/3tier/aws-three-tier-web-architecture-workshop
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
```

```
$ pwd
```

```
/c/Users/ASUS/Downloads
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
```

```
$ mkdir 3tier
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
```

```
$ cd 3tier/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
```

```
$ git clone https://github.com/aws-samples/aws-three-tier-web-architecture-wor  
kshop.git
```

```
Cloning into 'aws-three-tier-web-architecture-workshop'...
```

```
remote: Enumerating objects: 133, done.
```

```
remote: Counting objects: 100% (20/20), done.
```

```
remote: Compressing objects: 100% (10/10), done.
```

```
remote: Total 133 (delta 14), reused 10 (delta 10), pack-reused 113
```

```
Receiving objects: 100% (133/133), 230.74 KiB | 699.00 KiB/s, done.
```

```
Resolving deltas: 100% (52/52), done.
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
```

```
$ ls -lrt
```

```
total 4
```

```
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 aws-three-tier-web-architecture-workshop/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
```

```
$ cd aws-three-tier-web-architecture-workshop/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop (main)
```

```
$ ls -rlt
```

```
total 13
```

```
-rw-r--r-- 1 ASUS 197121 313 Nov 26 10:14 CODE_OF_CONDUCT.md
```

```
-rw-r--r-- 1 ASUS 197121 3219 Nov 26 10:14 CONTRIBUTING.md
```

```
-rw-r--r-- 1 ASUS 197121 2045 Nov 26 10:14 README.md
```

```
-rw-r--r-- 1 ASUS 197121 942 Nov 26 10:14 LICENSE
```

```
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 application-code/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop (main)
```

```
$ |
```



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```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier  
$ cd aws-three-tier-web-architecture-workshop/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop  
$ ls -rlt  
total 13  
-rw-r--r-- 1 ASUS 197121 313 Nov 26 10:14 CODE_OF_CONDUCT.md  
-rw-r--r-- 1 ASUS 197121 3219 Nov 26 10:14 CONTRIBUTING.md  
-rw-r--r-- 1 ASUS 197121 2045 Nov 26 10:14 README.md  
-rw-r--r-- 1 ASUS 197121 942 Nov 26 10:14 LICENSE  
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 application-code/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop  
$ cd application-code/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop  
$ ls -lrt  
total 8  
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 app-tier/  
-rw-r--r-- 1 ASUS 197121 2590 Nov 26 10:14 nginx.conf  
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 web-tier/
```

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop  
$
```

AWS Three GitHub - iar Console Home Create Dashboard IAM | Global RDS | us-east-1 subnets | VF GitHub - aw AWS Three +

s3.console.aws.amazon.com/s3/bucket/create?region=us-east-1

aws Services Search [Alt+S]

Amazon S3 > Buckets > Create bucket

## Create bucket Info

Buckets are containers for data stored in S3. [Learn more](#)

### General configuration

Bucket name

3tier-project-bucket

Bucket name must be unique within the global namespace and follow the bucket naming rules. [See rules for bucket naming](#)

AWS Region

US East (N. Virginia) us-east-1

Copy settings from existing bucket - *optional*

Only the bucket settings in the following configuration are copied.

[Choose bucket](#)

### Object Ownership Info

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

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## aws workshop studio

3. When adding permissions, include the following AWS managed policies. You can search for them and select them. These policies will allow our instances to download our code from S3 and use Systems Manager Session Manager to securely connect to our instances without SSH keys through the AWS console.

- **AmazonSSMManagedInstanceCore**
- **AmazonS3ReadOnlyAccess**

The screenshot shows the 'Add permissions' step in the AWS IAM 'Create role' wizard. The search bar at the top contains the text 'AmazonSSMManagedInstanceCore'. A single result is listed: 'AmazonSSMManagedInstanceCore' (AWS managed), which is described as 'The policy for Amazon EC2 Role to enable AWS Systems Manager service core functionality.'

Services Search for services, features, blogs, docs, and more [Option+S] Global Admin-OneClick/awsshivs-isengard @ 1924-6266-9998

IAM > Roles > Create role

Add permissions

Permissions policies (762)

Step 1 Select trusted entity

Step 2 Add permissions

Step 3 Name, review, and create

AmazonSSMManagedInstanceCore

Clear filters

Policy name Type Description

AmazonSSMManagedInstanceCore AWS m... The policy for Amazon EC2 Role to enable AWS Systems Manager service core functionality.

Set permissions boundary - optional

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Step 1

Select trusted entity

Step 2

Add permissions

Step 3

Name, review, and create

## Select trusted entity Info

### Trusted entity type

#### AWS service

Allow AWS services like EC2, Lambda, or others to perform actions in this account.

#### AWS account

Allow entities in other AWS accounts belonging to you or a 3rd party to perform actions in this account.

#### Web identity

Allows users federated by the specified external web identity provider to assume this role to perform actions in this account.

#### SAML 2.0 federation

Allow users federated with SAML 2.0 from a corporate directory to perform actions in this account.

#### Custom trust policy

Create a custom trust policy to enable others to perform actions in this account.

### Use case

Allow an AWS service like EC2, Lambda, or others to perform actions in this account.

#### Service or use case

EC2

Choose a use case for the specified service.

#### Use case

EC2

## Part 1: Networking and Security

In this section we will be building out the VPC networking components as well as security groups that will add a layer of protection around our EC2 instances, Aurora databases, and Elastic Load Balancers.

### Learning Objectives:

- Create an isolated network with the following components:
  - VPC
  - Subnets
  - Route Tables
  - Internet Gateway
  - NAT gateway
  - Security Groups

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aws Services Search [Alt+S] Your VPCs (1/2) Info Actions Create VPC

Search

VPC dashboard EC2 Global View Filter by VPC: Select a VPC Virtual private cloud Your VPCs Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways Peering connections Security Network ACLs Security groups

vpc-03fd1615f6a986005 Available 172.31.0.0/16 dopt-0e0c582a7461c88c7

VPC-3TIER [vpc-02af9ec2fad7ffb7c](#) Available 10.0.0.0/16 dopt-0e0c582a7461c88c7

vpc-02af9ec2fad7ffb7c / VPC-3TIER

Details Resource map New CIDRs Flow logs Tags Integrations

Details

VPC ID <a href="#">vpc-02af9ec2fad7ffb7c</a>	State Available	DNS hostnames Disabled	DNS resolution Enabled
Tenancy Default	DHCP option set <a href="#">dopt-0e0c582a7461c88c7</a>	Main route table -	Main network ACL -
Default VPC No	IPv4 CIDR 10.0.0.0/16	IPv6 pool -	IPv6 CIDR (Network border group) -

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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSubnet: Search [Alt+S] Services N. Virginia Subham Pradhan

VPC > Subnets > Create subnet

## Create subnet Info

**VPC**

**VPC ID**  
Create subnets in this 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 6**

**Subnet name**  
Create a tag with a key of 'Name' and a value that you specify.  
  
The name can be up to 256 characters long.

**Availability Zone Info**  
Choose the zone in which your subnet will reside, or let Amazon choose one for you.

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Internet Gateway

NAT gateway

Security Groups ]

VPC - CIDR range - 10.0.0.0/16

Public-Web-Subnet-AZ-1 - 10.0.0.0/24 - us-east-1a

Public-Web-Subnet-AZ-2 - 10.0.1.0/24 - us-east-1b

Private-App-Subnet-AZ-1 - 10.0.2.0/24 - us-east-1a

Private-App-Subnet-AZ-2 - 10.0.3.0/24 - us-east-1b

Private-DB-Subnet-AZ-1 - 10.0.4.0/24 - us-east-1a

Private-DB-Subnet-AZ-2 - 10.0.5.0/24 - us-east-1b

Create Internet Gateway - Attach igw to VPC

Create NAT gateway - Public Subnet AZ-1



AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east subnets GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#subnets: Search [Alt+S] Actions Create subnet

VPC dashboard EC2 Global View Filter by VPC: Select a VPC Virtual private cloud Your VPCs Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways Peering connections Security Network ACLs Security groups

Subnets (1/6) Info Find resources by attribute or tag

Name	Subnet ID	State	VPC	IPv4 CIDR	IPv6 CIDR
Private-App-Subnet-AZ-2	subnet-0489fc8af0c95e8c2	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.3.0/24	-
Public-Web-Subnet-AZ-2	subnet-0a8d6e5542317c7c7	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.1.0/24	-
Private-App-Subnet-AZ-1	subnet-03a5ca24269152655	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.2.0/24	-
Private-DB-Subnet-AZ-2	subnet-0d654e90080ee67f6	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.5.0/24	-
Private-DB-Subnet-AZ-1	subnet-0ec96361fea19ebfc	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.4.0/24	-
Public-Web-Subnet-AZ-1	subnet-0622093a71429752e	Available	vpc-02af9ec2fad7ffb7c   VPC-3...	10.0.0.0/24	-

subnet-0622093a71429752e / Public-Web-Subnet-AZ-1

Details Flow logs Route table Network ACL CIDR reservations Sharing Tags

Details

Subnet ID subnet-0622093a71429752e	Subnet ARN arn:aws:ec2:us-east-1:782921506756:subnet/subnet-0622093a71429752e	State Available	IPv4 CIDR 10.0.0.0/24
Available IPv4 addresses 251		Availability Zone us-east-1a	Availability Zone ID use1-az2
Network border group us-east-1	IPv6 CIDR -	Route table rtb-0427a2d7cda406e3r	Network ACL arn:aws:acel:us-east-1:087056cae0a4h858

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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#vpcs: Search Actions Create VPC

VPC dashboard EC2 Global View Filter by VPC: Select a VPC Virtual private cloud Your VPCs (1/2) Info

Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR	DHCP option set
-	vpc-03fd1615f6a986005	Available	172.31.0.0/16	-	dopt-0e0c582a7e
<input checked="" type="checkbox"/> VPC-3TIER	vpc-02af9ec2fad7ffb7c	Available	10.0.0.0/16	-	dopt-0e0c582a7e

VPC Show details Your AWS virtual network VPC-3TIER

Subnets (6) Subnets within this VPC

- us-east-1a
  - Private-App-Subnet-AZ-1
  - Private-DB-Subnet-AZ-1
  - Public-Web-Subnet-AZ-1
- us-east-1b
  - Private-App-Subnet-AZ-2
  - Public-Web-Subnet-AZ-2
  - Private-DB-Subnet-AZ-2

Route tables (1) Route network traffic to resources rtb-0427a2d2cda406e3c

Network connections Connections to other networks

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VPC > Internet gateways > Create internet gateway

## Create internet gateway Info

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

### Internet gateway settings

#### Name tag

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

3tier-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

##### Value - optional

Name

3tier-IGW

X Remove

Add new tag

You can add 49 more tags.

Cancel

Create internet gateway





## Internet gateways (1) [Info](#)

Search

<input type="checkbox"/>	Name	Internet gateway ID	State	VP
<input type="checkbox"/>	3tier-IGW	igw-07dbd8aeee63fe504	<input checked="" type="checkbox"/> Attached	vpo



AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 Create GitHub - aw AWS Three + us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateNatGateway...

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > NAT gateways > Create NAT gateway

## Create NAT gateway

A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.

### NAT gateway settings

Name - optional  
Create a tag with a key of 'Name' and a value that you specify.  
  
The name can be up to 256 characters long.

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

Connectivity type  
Select a connectivity type for the NAT gateway.  
 Public  
 Private

Elastic IP allocation ID   
Assign an Elastic IP address to the NAT gateway.

► Additional settings



Type here to search



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aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > NAT gateways > Create NAT gateway

## Create NAT gateway

A highly available, managed Network Address Translation (NAT) service that instances in private subnets can use to connect to services in other VPCs, on-premises networks, or the internet.

**NAT gateway settings**

**Name - optional**  
Create a tag with a key of 'Name' and a value that you specify.  
 The name can be up to 256 characters long.

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

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

**Elastic IP allocation ID**   
Assign an Elastic IP address to the NAT gateway.

Additional settings

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 NatGateways GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#NatGateways: Search [Alt+S] Services N. Virginia Subham Pradhan

VPC dashboard EC2 Global View Filter by VPC: Select a VPC Virtual private cloud Your VPCs Subnets Route tables Internet gateways Egress-only internet gateways Carrier gateways DHCP option sets Elastic IPs Managed prefix lists Endpoints Endpoint services NAT gateways Peering connections Security Network ACLs Security groups CloudShell Feedback

### NAT gateways (2) Info

Filter NAT gateways

Name	NAT gateway ID	Connectivit...	State	State message	Primary public I...	Primary private ...
3tier-NGW-AZ-1	nat-03940cd63bbb8fbf2b	Public	Pending	-	-	10.0.0.66
3tier-NGW-AZ-2	nat-0a0c877718af3860b	Public	Pending	-	-	10.0.1.75

Select a NAT gateway

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Type here to search 27°C Haze 10:32 AM 26-11-2023 ENG

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 CreateF GitHub - aw AWS Three +     

aws Services Search [Alt+S]    N. Virginia Subham Pradhan

VPC > Route tables > Create route table

## Create route table Info

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

### Route table settings

Name - *optional*  
Create a tag with a key of 'Name' and a value that you specify.

Public-RT

VPC  
The VPC to use for this route table.

vpc-02af9ec2fad7ffb7c (VPC-3TIER)

### Tags

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

Key Value - *optional*

Q Name X Q Public-RT X Remove

Add new tag

You can add 49 more tags.

Cancel **Create route table**



Type here to search



AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 EditRoute GitHub - aw AWS Three + V - X

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#EditRoutes:Route... Search [Alt+S] Services N. Virginia Subham Pradhan

VPC > Route tables > rtb-03426ff4280561725 > Edit routes

## Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	Internet Gateway	-	No

Add route Remove

Cancel Preview Save changes

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 EditRouteTable GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#EditRouteTable... Search [Alt+S]

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > Route tables > rtb-03426ff4280561725 > Edit subnet associations

## Edit subnet associations

Change which subnets are associated with this route table.

### Available subnets (2/6)

<input type="checkbox"/>	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input type="checkbox"/>	Private-App-Subnet-AZ-2	<a href="#">subnet-0489fc8af0c95e8c2</a>	10.0.3.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input checked="" type="checkbox"/>	Public-Web-Subnet-AZ-2	<a href="#">subnet-0a8d6e5542317c7c7</a>	10.0.1.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/>	Private-App-Subnet-AZ-1	<a href="#">subnet-03a5ca24269152655</a>	10.0.2.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/>	Private-DB-Subnet-AZ-2	<a href="#">subnet-0d654e90080ee67f6</a>	10.0.5.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/>	Private-DB-Subnet-AZ-1	<a href="#">subnet-0ec96361fea19ebfc</a>	10.0.4.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input checked="" type="checkbox"/>	Public-Web-Subnet-AZ-1	<a href="#">subnet-0622093a71429752e</a>	10.0.0.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>

### Selected subnets

[subnet-0622093a71429752e / Public-Web-Subnet-AZ-1](#) [X](#) [subnet-0a8d6e5542317c7c7 / Public-Web-Subnet-AZ-2](#) [X](#)

[Cancel](#) [Save associations](#)

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 CreateF GitHub - aw AWS Three +         <img alt="Cloud

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 EditRoute GitHub - aw AWS Three + V - X

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#EditRoutes:Route... Search [Alt+S] Services N. Virginia Subham Pradhan

VPC > Route tables > rtb-07f6e41a3d9c73790 > Edit routes

## Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
0.0.0.0/0	NAT Gateway	-	No
	nat-03940d63bbb8fbf2b		<button>Remove</button>
	nat-03940d63bbb8fbf2b (3tier-NGW-AZ-1)		
	nat-0a0c877718af3860b (3tier-NGW-AZ-2)		

Add route Cancel Preview Save changes

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 EditRouteTable GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#EditRouteTable... Search [Alt+S]

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > Route tables > rtb-07f6e41a3d9c73790 > Edit subnet associations

## Edit subnet associations

Change which subnets are associated with this route table.

**Available subnets (1/6)**

Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
Private-App-Subnet-AZ-2	<a href="#">subnet-0489fc8af0c95e8c2</a>	10.0.3.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
Public-Web-Subnet-AZ-2	<a href="#">subnet-0a8d6e5542317c7c7</a>	10.0.1.0/24	-	<a href="#">rtb-03426ff4280561725 / Public-RT</a>
<input checked="" type="checkbox"/> Private-App-Subnet-AZ-1	<a href="#">subnet-03a5ca24269152655</a>	10.0.2.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/> Private-DB-Subnet-AZ-2	<a href="#">subnet-0d654e90080ee67f6</a>	10.0.5.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/> Private-DB-Subnet-AZ-1	<a href="#">subnet-0ec96361fea19ebfc</a>	10.0.4.0/24	-	<a href="#">Main (rtb-0427a2d2cda406e3c)</a>
<input type="checkbox"/> Public-Web-Subnet-AZ-1	<a href="#">subnet-0622093a71429752e</a>	10.0.0.0/24	-	<a href="#">rtb-03426ff4280561725 / Public-RT</a>

**Selected subnets**

subnet-03a5ca24269152655 / Private-App-Subnet-AZ-1 X

Cancel Save associations

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | us-east-1 VPC Co GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSecurityG... Q L A VPN

aws Services Search [Alt+S] N. Virginia Subham Pradhan

## Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

Security group name Info  
InternetFacing-lb-sg  
Name cannot be edited after creation.

Description Info  
External load balancer security groups

VPC Info  
vpc-02af9ec2fad7ffb7c (VPC-3TIER) ▾

### Inbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
HTTP	TCP	80	Anywhere-... ▾ 0.0.0.0/0 X	
HTTP	TCP	80	Anywhere-... ▾ ::/0 X	

Add rule

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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSecurityG... Q | L A VPN

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > Security Groups > Create security group

## Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

Security group name Info  
WebTier-sg  
Name cannot be edited after creation.

Description Info  
WebTier-sg

VPC Info  
vpc-02af9ec2fad7ffb7c (VPC-3TIER)

### Inbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
HTTP	TCP	80	Custom Q sg-09a2ad3fdcd6bc5b X sg-09a2ad3fdcd6bc5b	
HTTP	TCP	80	My IP Q 152.58.149.51/32 X	

Add rule

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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSecurityG... Q | L A VPN

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > Security Groups > Create security group

## Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

Security group name Info  
Internal-lb-sg  
Name cannot be edited after creation.

Description Info  
Internal-lb-sg

VPC Info  
vpc-02af9ec2fad7ffb7c (VPC-3TIER)

### Inbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
HTTP	TCP	80	Custom	Q sg-054a20c0515fe73de X sg-054a20c0515fe73de X

Add rule

### Outbound rules Info

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us-east-1.console.aws.amazon.com/vpcconsole/home?region=us-east-1#CreateSecurityG... Q | L A VPN

aws Services Search [Alt+S] N. Virginia Subham Pradhan

VPC > Security Groups > Create security group

## Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

Security group name Info  
Private-instance-sg  
Name cannot be edited after creation.

Description Info  
Private-instance-sg

VPC Info  
vpc-02af9ec2fad7ffb7c (VPC-3TIER)

### Inbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Source <small>Info</small>	Description - optional <small>Info</small>
HTTP	TCP	80	Custom sg-0704448da1f4846fb sg-0704448da1f4846fb	<input type="text"/> Delete
HTTP	TCP	80	My IP 152.58.149.51/32	<input type="text"/> Delete

Add rule

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## VPC &gt; Security Groups &gt; Create security group

## Create security group Info

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

### Basic details

**Security group name** Info

DB-sg

Name cannot be edited after creation.

**Description** Info

DB-sg

**VPC** Info

vpc-02af9ec2fad7ffb7c (VPC-3TIER)

### Inbound rules Info

**Type** Info**Protocol** Info**Port range** Info**Source** Info**Description - optional** Info

MySQL/Aurora

TCP

3306

Custom

sg-0ecde1e7554abbf3e

X

Delete

sg-0ecde1e7554abbf3e X

**Add rule**

### Outbound rules Info



Type here to search



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10:45 AM  
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Create Security Groups: InternetFacing-lb-sg (External load balancer security groups) - HTTP - Anywhere-IPv4 and HTTP - Anywhere-IPv6  
WebTier-sg - HTTP - InternalFacing-lb-sg and HTTP - MYIP  
Internal-lb-sg (WebServer Can Access Only) - HTTP - WebTier-sg  
Private-instance-sg - HTTP - Internal-lb-sg - port-4000 and HTTP - MYIP - port-4000  
DB-sg - MYSQL/Aurora - Custom - Private-instance-sg - port-3306

AWS Three GitHub - ian Console Home S3 buckets Dashboard Roles | IAM RDS | u VPC Consol GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#create-db-subnet-group: [Alt+S]

aws Services Search

## Amazon RDS

Dashboard Databases Query Editor Performance insights Snapshots Exports in Amazon S3 Automated backups Reserved instances Proxies

### Subnet groups

Parameter groups Option groups Custom engine versions Zero-ETL integrations New

Events Event subscriptions

Recommendations 0

### Create DB subnet group

To create a new subnet group, give it a name and a description, and choose an existing VPC. You will then be able to add subnets related to that VPC.

#### Subnet group details

Name: 3tier-DB-subnet-group  
Description: 3tier-DB-subnet-group  
VPC: VPC-3TIER (vpc-02af9ec2fad7ffb7c)

#### Add subnets

Availability Zones: Choose the Availability Zones that include the subnets you want to add.  
Choose an availability zone

Windows Taskbar: Type here to search (with a profile icon), File, Chat, Task View, Camera, File Explorer, Shield, Google Drive, 27°C Haze, ENG, 10:49 AM, 26-11-2023

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Add subnets

Availability Zones  
Choose the Availability Zones that include the subnets you want to add.

Choose an availability zone ▾

us-east-1a X us-east-1b X

Subnets  
Choose the subnets that you want to add. The list includes the subnets in the selected Availability Zones.

Select subnets ▾

subnet-0ec96361fea19ebfc (10.0.4.0/24) X

subnet-0d654e90080ee67f6 (10.0.5.0/24) X

For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.

Subnets selected (2)

Availability zone	Subnet ID	CIDR block
us-east-1a	subnet-0ec96361fea19ebfc	10.0.4.0/24
us-east-1b	subnet-0d654e90080ee67f6	10.0.5.0/24

Cancel Create

Type here to search 27°C Haze 10:50 AM 26-11-2023 ENG

AWS Three GitHub - iar Console Home S3 buckets Dashboard Roles | IAM RDS | u subnets | VF GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#launch-dbinstance: Search | VPN N. Virginia Subham Pradhan

RDS Services Search [Alt+S] Create database

## Create database

**Choose a database creation method** Info

Standard create You set all of the configuration options, including ones for availability, security, backups, and maintenance.

Easy create Use recommended best-practice configurations. Some configuration options can be changed after the database is created.

**Engine options**

Engine type Info

Aurora (MySQL Compatible) 

Aurora (PostgreSQL Compatible) 

MySQL 

MariaDB 

PostgreSQL 

Oracle 

Microsoft SQL Server 

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aws Services Search [Alt+S] N. Virginia Subham Pradhan

### DB cluster identifier [Info](#)

Enter a name for your DB cluster. The name must be unique across all DB clusters owned by your AWS account in the current AWS Region.

The DB cluster identifier is case-insensitive, but is stored as all lowercase (as in "mydbcluster"). Constraints: 1 to 60 alphanumeric characters or hyphens. First character must be a letter. Can't contain two consecutive hyphens. Can't end with a hyphen.

#### Credentials Settings

Master username [Info](#)

Type a login ID for the master user of your DB instance.

1 to 32 alphanumeric characters. The first character must be a letter.

Manage master credentials in AWS Secrets Manager

Manage master user credentials in Secrets Manager. RDS can generate a password for you and manage it throughout its lifecycle.

**If you manage the master user credentials in Secrets Manager, some RDS features aren't supported.**

[Learn more](#)

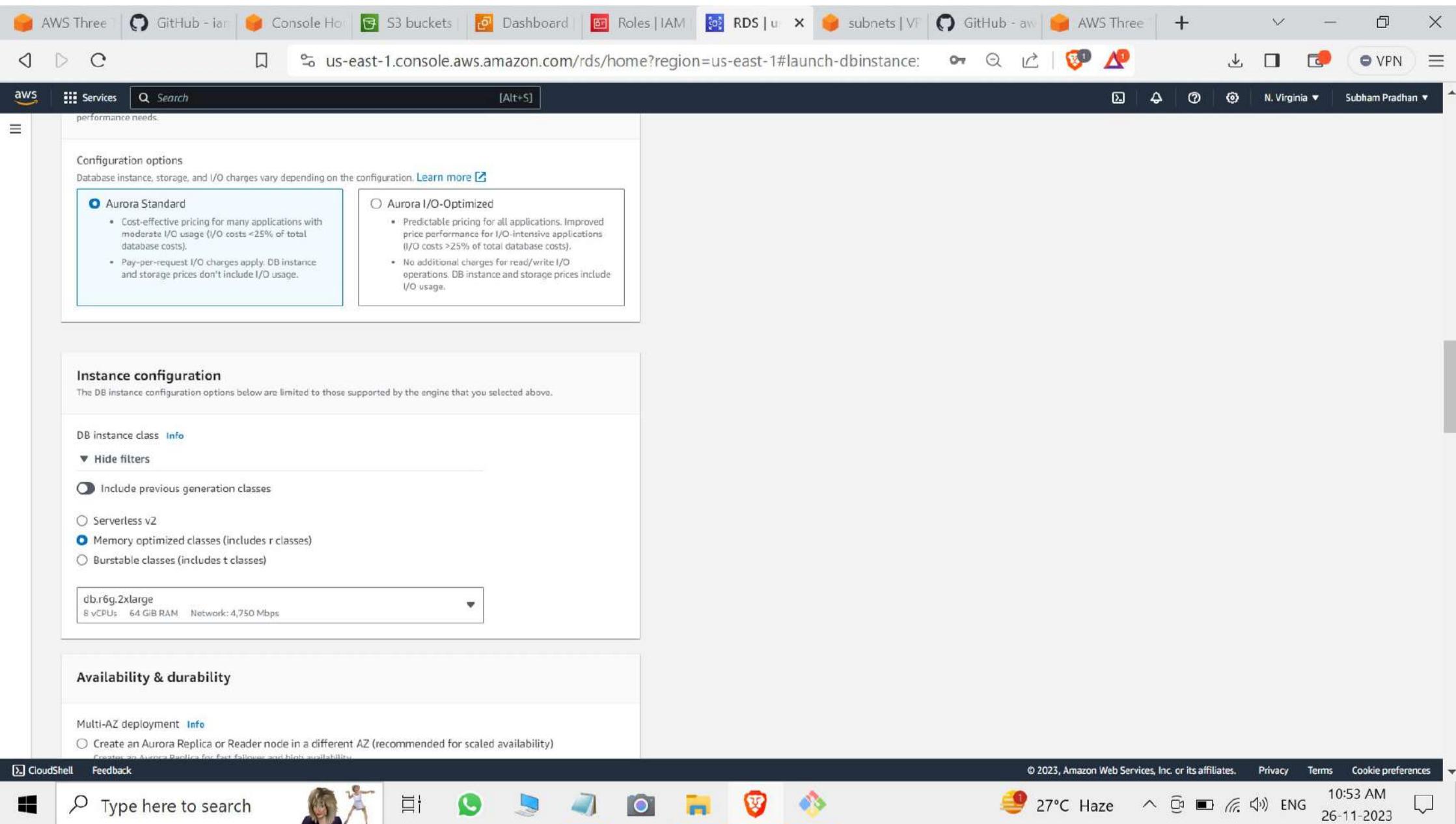
Auto generate a password

Amazon RDS can generate a password for you, or you can specify your own password.

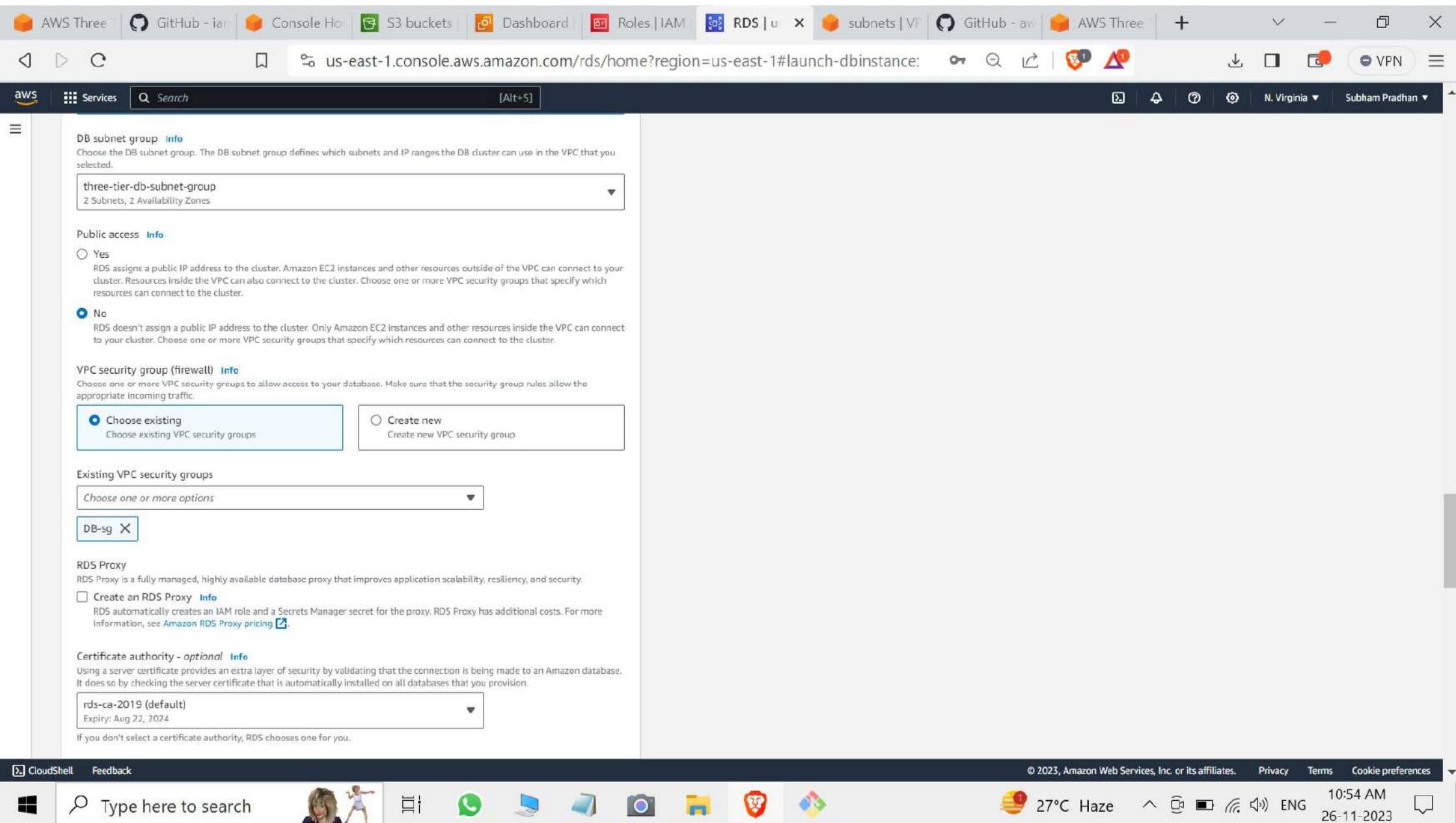
Master password [Info](#)

Constraints: At least 8 printable ASCII characters. Can't contain any of the following: / (slash), ' (single quote), " (double quote) and @ (at sign).

Confirm master password [Info](#)



Availability & durability	
Multi-AZ deployment <a href="#">Info</a>	<input checked="" type="radio"/> Create an Aurora Replica or Reader node in a different AZ (recommended for scaled availability) Creates an Aurora Replica for fast failover and high availability.
<input type="radio"/> Don't create an Aurora Replica	
Connectivity <a href="#">Info</a>	
<b>Compute resource</b>	
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.	
<input checked="" type="radio"/> <b>Don't connect to an EC2 compute resource</b> 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.	<input type="radio"/> <b>Connect to an EC2 compute resource</b> Set up a connection to an EC2 compute resource for this database.
Network type <a href="#">Info</a>	
To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.	
<input checked="" type="radio"/> <b>IPv4</b> Your resources can communicate only over the IPv4 addressing protocol.	<input type="radio"/> <b>Dual-stack mode</b> Your resources can communicate over IPv4, IPv6, or both.
Virtual private cloud (VPC) <a href="#">Info</a>	
Choose the VPC. The VPC defines the virtual networking environment for this DB cluster.	
VPC-3TIER (vpc-02af9ec2fad7ffb7c)	
6 Subnets, 2 Availability Zones	
Only VPCs with a corresponding DB subnet group are listed.	
 After a database is created, you can't change its VPC.	



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us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#databases: Search [Alt+S] View credential details X

aws Services N. Virginia Subham Pradhan

**Amazon RDS**

Creating database database-1  
Your database might take a few minutes to launch.  
You can use settings from database-1 to simplify configuration of [suggested database add-ons](#) while we finish creating your DB for you.

RDS > Databases

Databases (3)

Filter by databases

Group resources C Modify Actions ▾ Restore from S3 Create database

DB identifier	Status	Role	Engine	Region & AZ	Size	Actions	CPU	Current activity	Maintenance	VPC
database-1	Creating	Regional cluster	Aurora MySQL	us-east-1	2 instances	-	-	-	none	-
database-1-instance-1	Creating	Reader instance	Aurora MySQL	us-east-1b	db.r6g.2xlarge	-	-	-	none	vpc-02a
database-1-instance-1-us-east-1a	Creating	Reader instance	Aurora MySQL	us-east-1a	db.r6g.2xlarge	-	-	-	none	vpc-02a

Events

Event subscriptions

Recommendations 0

Certificate update 2

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances: Search [Alt+S] Services N. Virginia Subham Pradhan

EC2 > Instances > Launch an instance

## Launch an instance Info

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 Info**

Name  Add additional tags

**Application and OS Images (Amazon Machine Image) Info**

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

Recents Quick Start

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Li

**Summary**

Number of instances Info

Software Image (AMI)  
Amazon Linux 2 Kernel 5.10 AMI...read more  
ami-0fa1ca9559f1892ec

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
Private-instance-sg

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. 30 GiB of EBS

Cancel **Launch instance** Review commands

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Alt+S]

Key pair name - required  
Proceed without a key pair (Not recommended) Default value Create new key pair

▼ Network settings Info

VPC - required Info  
vpc-02af9ec2fad7ffb7c (VPC-3TIER)  
10.0.0.0/16

Subnet Info  
subnet-0622093a71429752e Public-Web-Subnet-AZ-1  
VPC: vpc-02af9ec2fad7ffb7c Owner: 782921506756 Availability Zone: us-east-1a  
IP addresses available: 250 CIDR: 10.0.0.0/24

Create new subnet

Auto-assign public IP Info  
Disable

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

Common security groups Info  
Select security groups

Private-instance-sg sg-0ecd1e7554abbf3e X  
VPC: vpc-02af9ec2fad7ffb7c

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▼ Summary

Number of instances Info  
1

Software Image (AMI)  
Amazon Linux 2 Kernel 5.10 AMI...read more  
ami-0fa1ca9559f1892ec

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
Private-instance-sg

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. 30 GiB of EBS

Cancel Launch instance Review commands

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Alt+S] N. Virginia Subham Pradhan

0 x File systems Edit

Advanced details Info

Domain join directory Info Select Create new directory

IAM instance profile Info Select Create new IAM profile

3tier-ROLE-IAM arn:aws:iam::782921506756:instance-profile/3tier-ROLE-IAM DNS hostname

Enable IP name IPv4 (A record) DNS requests

Enable resource-based IPv4 (A record) DNS requests

Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery Info Select

Shutdown behavior Info Stop

▼ Summary

Number of instances Info 1

Software Image (AMI) Amazon Linux 2 Kernel 5.10 AMI...read more ami-0fa1ca9559f1892ec

Virtual server type (instance type) t2.micro

Firewall (security group) Private-instance-sg

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. 30 GiB of EBS

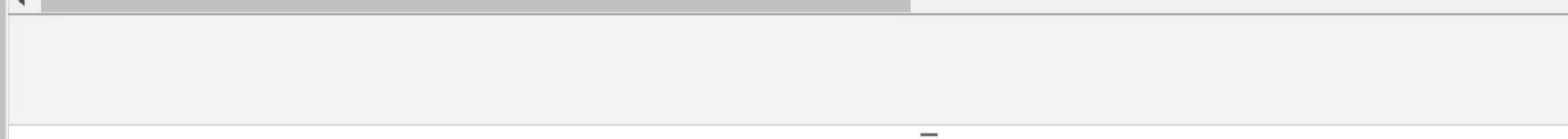
Cancel Launch instance Review commands

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Name		Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
<input checked="" type="checkbox"/>	MyWebServer-1	i-09ce7827c28146dda	<span>Running</span>	t2.micro	<span>2/2 checks pass</span>	No alarms	us-east-1a



## Instance: i-09ce7827c28146dda (MyWebServer-1)

Details    Security    Networking    Storage    Status checks    Monitoring    Tags

▼ Instance summary [Info](#)

Instance ID	Public IPv4 address	Private IPv4 addresses
<a href="#">i-09ce7827c28146dda (MyWebServer-1)</a>	-	<a href="#">10.0.0.206</a>
IPv6 address	Instance state	Public IPv4 DNS
-	<span>Running</span>	-



[EC2 Instance Connect](#)[Session Manager](#)[SSH client](#)[EC2 serial console](#)

### Session Manager usage:

- Connect to your instance without SSH keys, a bastion host, or opening any inbound ports.
- Sessions are secured using an AWS Key Management Service key.
- You can log session commands and details in an Amazon S3 bucket or CloudWatch Logs log group.
- Configure sessions on the Session Manager [Preferences](#) page.

[Cancel](#)[Connect](#)



```
sh-4.2$ ^M
sh: $'\r': command not found
sh-4.2$ sudo -su ec2-user
[ec2-user@ip-10-0-2-223 bin]$
[ec2-user@ip-10-0-2-223 bin]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=3.95 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=1.24 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=1.22 ms
64 bytes from 8.8.8.8: icmp_seq=4 ttl=116 time=1.19 ms
64 bytes from 8.8.8.8: icmp_seq=5 ttl=116 time=1.23 ms
64 bytes from 8.8.8.8: icmp_seq=6 ttl=116 time=1.22 ms
64 bytes from 8.8.8.8: icmp_seq=7 ttl=116 time=1.20 ms
64 bytes from 8.8.8.8: icmp_seq=8 ttl=116 time=1.19 ms
64 bytes from 8.8.8.8: icmp_seq=9 ttl=116 time=1.14 ms
64 bytes from 8.8.8.8: icmp_seq=10 ttl=116 time=1.20 ms
64 bytes from 8.8.8.8: icmp_seq=11 ttl=116 time=1.18 ms
64 bytes from 8.8.8.8: icmp_seq=12 ttl=116 time=1.37 ms
```



AWS Thread GitHub - i Console H S3 buckets Connect to System 3tier-ROLE Database subnets GitHub - o AWS Thread + VPN

Session ID: root-0714b12fb68cf9bc Instance ID: i-0d903cbc434883887 Terminate

```
[ec2-user@ip-10-0-2-223 bin]$ sudo yum install mysql -y
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core
Resolving Dependencies
--> Running transaction check
--> Package mariadb.x86_64 1:5.5.68-1.amzn2.0.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

=====
Package           Arch      Version       Repository      Size
=====
Installing:
mariadb          x86_64   1:5.5.68-1.amzn2.0.1  amzn2-core    8.8 M

Transaction Summary
=====
Install 1 Package

Total download size: 8.8 M
Installed size: 49 M
Downloading packages:
mariadb-5.5.68-1.amzn2.0.1.x86_64.rpm | 8.8 MB 00:00:00
Running transaction check
Running transaction test
Transaction test succeeded
Running transaction
  Installing : 1:mariadb-5.5.68-1.amzn2.0.1.x86_64 1/1
```

Type here to search        

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AWS Thread GitHub - i Console H S3 buckets Connect Systems M 3tier-ROLE RDS subnets GitHub - o AWS Thread +

us-east-1.console.aws.amazon.com/rds/home?region=us-east-1#database:id=database-1-inst... ↗ | 🔍 | 🌐 | 📈 | 🛡️ | VPN

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**Amazon RDS**

Dashboard Databases Query Editor Performance insights Snapshots Exports in Amazon S3 Automated backups Reserved instances Proxies Subnet groups Parameter groups Option groups Custom engine versions Zero-ETL integrations New

**Connectivity & security**

database-1

database-1-instance-1

database-1-instance-1-us-east-1a

Available Regional cluster Aurora MySQL us-east-1

Available Writer instance Aurora MySQL us-east-1b

Available Reader instance Aurora MySQL us-east-1a

Connectivity & security Monitoring Logs & events Configuration Maintenance & backups Tags

**Connectivity & security**

Endpoint & port	Networking	Security
Endpoint <b>database-1-instance-1.c0capommwqmn.us-east-1.rds.amazonaws.com</b>	Availability Zone us-east-1b	VPC security groups <b>DB-sg (sg-Of72c5fdfaebe2e80)</b>
Port 3306	VPC <b>VPC-3TIER (vpc-02af9ec2fad7ffb7c)</b>	Active
	Subnet group	Publicly accessible No

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AWS Thread GitHub - i Console H S3 buckets Connect to System 3tier-ROLE RDS | us-east-1 subnets GitHub - o AWS Thread + VPN

Session ID: root-0714b12fb68cf9bc Instance ID: i-0d903cbc434883887 Terminate

```
[ec2-user@ip-10-0-2-223 bin]$ mysql -h database-1-instance-1.c0capommwqmn.us-east-1.rds.amazonaws.com -u admin -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 305
Server version: 8.0.28 Source distribution

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MySQL [(none)]> CREATE DATABASE webappdb;
Query OK, 1 row affected (0.00 sec)

MySQL [(none)]> SHOW DATABASES;
+-----+
| Database      |
+-----+
| information_schema |
| mysql          |
| performance_schema |
| sys            |
| webappdb       |
+-----+
5 rows in set (0.00 sec)

MySQL [(none)]> USE webappdb;
Database changed
MySQL [webappdb]> CREATE TABLE IF NOT EXISTS transactions(id INT NOT NULL
-> AUTO_INCREMENT, amount DECIMAL(10,2), description
```

Type here to search        

30°C Haze 11:57 AM 26-11-2023



5 rows in set (0.00 sec)

MySQL [(none)]> USE webappdb;

**Database changed**

MySQL [webappdb]> CREATE TABLE IF NOT EXISTS transactions(id INT NOT NULL  
-> AUTO\_INCREMENT, amount DECIMAL(10,2), description  
-> VARCHAR(100), PRIMARY KEY(id));

**Query OK, 0 rows affected (0.03 sec)**

MySQL [webappdb]> SHOW TABLES;

Tables_in_webappdb	
transactions	

1 row in set (0.00 sec)

MySQL [webappdb]> INSERT INTO transactions (amount,description) VALUES ('400','groceries');

**Query OK, 1 row affected (0.01 sec)**

MySQL [webappdb]> SELECT \* FROM transactions;

id   amount   description		
1   400.00   groceries		

1 row in set (0.00 sec)

MySQL [webappdb]>



30°C Haze 11:57 AM  
26-11-2023

AWS Thre GitHub - GitHub Console H S3 buckets Connect Systems M 3tier-ROLE RDS | us-east subnets GitHub AWS Thre +

github.com/aws-samples/aws-three-tier-web-architecture-workshop

aws-samples / aws-three-tier-web-architecture-workshop Public Notifications Fork 133 Star 39

Code Issues 1 Pull requests 2 Actions Projects Security Insights

main 3 branches 0 tags Go to file Code

awsshivs updating dependency typo 20a71db on Jun 1, 2022 16 commits

application-code updating dependency typo last year

CODE\_OF\_CONDUCT.md Initial commit last year

CONTRIBUTING.md Initial commit last year

LICENSE Initial commit last year

README.md adding published workshop link as instructions last year

README.md

## AWS Three Tier Web Architecture Workshop

Description Type here to search

Notifications Fork 133 Star 39

About

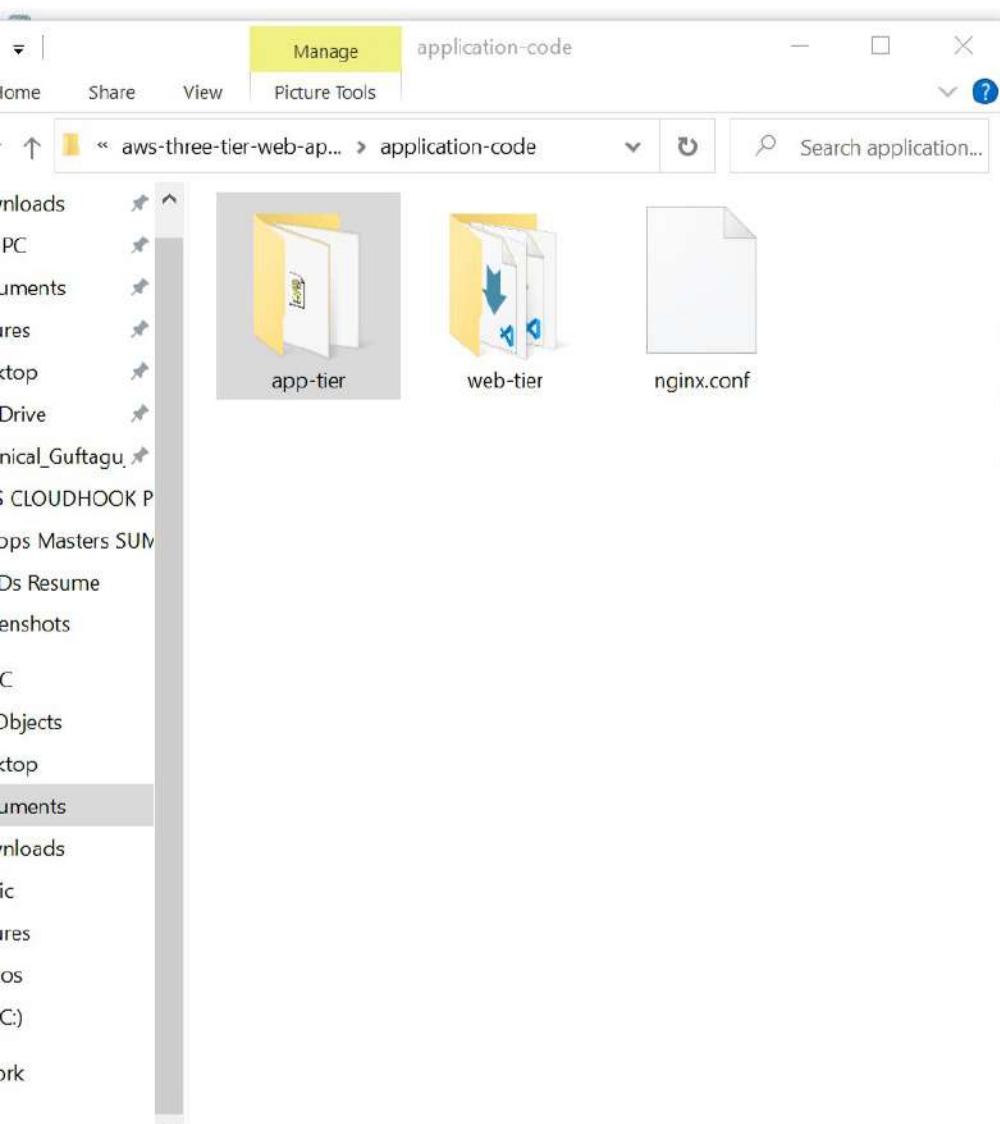
No description, website, or topics provided.

Readme MIT-0 license Code of conduct Security policy Activity 39 stars 7 watching 133 forks Report repository

Releases

No releases published

30°C Haze ENG 11:59 AM 26-11-2023



A screenshot of the AWS S3 console interface. The URL in the address bar is 's3.console.aws.amazon.co...'. The main area has a large dashed box for dragging files and a message: 'Drag and drop files and folders you want to upload here, or choose Add files or Add folder.' Below this is a table titled 'Files and folders (6 Total, 47.4 KB)'. The table lists the following files:

	Name	Folder	Type	Size
<input type="checkbox"/>	DbConfig.js	app-tier/	text/javascript	110.0 B
<input type="checkbox"/>	index.js	app-tier/	text/javascript	3.1 KB
<input type="checkbox"/>	package-lo...	app-tier/	application/zip	41.8 KB
<input type="checkbox"/>	package.json	app-tier/	application/json	655.0 B
<input type="checkbox"/>	README.md	app-tier/	-	12.0 B
<input type="checkbox"/>	Transaction...	app-tier/	text/javascript	1.7 KB

At the bottom of the table, it says 'All files and folders in this table will be uploaded.' There is also a search bar with 'Find by name' and navigation arrows. The footer includes links for 'CloudShell', 'Feedback', 'Privacy', 'Terms', and 'Cookie preferences', along with the copyright notice '© 2023, Amazon Web Services, Inc. or its affiliates.'

Systems Manager | us-east-1    +    us-east-1.console.aws.amazon.com/systems-manager/session-manager/i-0d903cbc434883887?regi...    VPN

Session ID: root-0714b12fb68cf9bc    Instance ID: i-0d903cbc434883887    Terminate

```
[ec2-user@ip-10-0-2-223 bin]$ curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.38.0/install.sh | bash
% Total    % Received % Xferd  Average Speed   Time     Time      Time  Current
          Dload  Upload   Total Spent    Left Speed
100 14926  100 14926    0     0  179k      0 --:--:-- --:--:-- --:--:-- 179k
=> Downloading nvm as script to '/home/ec2-user/.nvm'

=> Appending nvm source string to /home/ec2-user/.bashrc
=> Appending bash_completion source string to /home/ec2-user/.bashrc
=> Close and reopen your terminal to start using nvm or run the following to use it now:

export NVM_DIR="$HOME/.nvm"
[ -s "$NVM_DIR/nvm.sh" ] && \. "$NVM_DIR/nvm.sh" # This loads nvm
[ -s "$NVM_DIR/bash_completion" ] && \. "$NVM_DIR/bash_completion" # This loads nvm bash_completion
[ec2-user@ip-10-0-2-223 bin]$ source ~/.bashrc
[ec2-user@ip-10-0-2-223 bin]$ nvm install 16
Downloading and installing node v16.20.2...
Downloading https://nodejs.org/dist/v16.20.2/node-v16.20.2-linux-x64.tar.xz...
#####
Computing checksum with sha256sum
Checksums matched!
Now using node v16.20.2 (npm v8.19.4)
Creating default alias: default -> 16 (-> v16.20.2)
[ec2-user@ip-10-0-2-223 bin]$ nvm use 16
Now using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-2-223 bin]$ npm install -g pm2
( ) :: idealTree:lib: sill idealTree buildDeps
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
```

Type here to search           

30°C Haze    12:05 PM  
26-11-2023

Systems Manager | us-east-1    +    X

Session ID: root-0714b12fb68cf9bc    Instance ID: i-0d903cbc434883887    Terminate

```
Now using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-2-223 bin]$ npm install -g pm2
( [REDACTED] ) :: idealTree:lib: sill idealTree buildDeps
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.

added 157 packages, and audited 158 packages in 8s

13 packages are looking for funding
  run `npm fund` for details

2 moderate severity vulnerabilities

Some issues need review, and may require choosing
a different dependency.

Run `npm audit` for details.
npm notice
npm notice New major version of npm available! 8.19.4 -> 10.2.4
npm notice Changelog: https://github.com/npm/cli/releases/tag/v10.2.4
npm notice Run npm install -g npm@10.2.4 to update!
npm notice
[ec2-user@ip-10-0-2-223 bin]$
[ec2-user@ip-10-0-2-223 bin]$ cd ~/
[ec2-user@ip-10-0-2-223 ~]$ aws s3 cp s3://BUCKET_NAME/app-tier/ app-tier --recursive
fatal error: An error occurred (AllAccessDisabled) when calling the ListObjectsV2 operation: All access to this object has been disabled
[ec2-user@ip-10-0-2-223 ~]$ aws s3 cp s3://3tier-project-bucket/app-tier/ app-tier --recursive
[ec2-user@ip-10-0-2-223 ~]$
```

Type here to search         

30°C Haze  ENG 12:05 PM  
26-11-2023 

Systems Manager | us-east-1    +    X

Session ID: root-0714b12fb68cf9bc    Instance ID: i-0d903cbc434883887    Terminate

```
2.pid
PM2 2023-11-26T06:36:54: PM2 log: RPC socket file      : /home/ec2-user/.pm2/rpc.sock
PM2 2023-11-26T06:36:54: PM2 log: BUS socket file     : /home/ec2-user/.pm2/pub.sock
PM2 2023-11-26T06:36:54: PM2 log: Application log path : /home/ec2-user/.pm2/logs
PM2 2023-11-26T06:36:54: PM2 log: Worker Interval       : 30000
PM2 2023-11-26T06:36:54: PM2 log: Process dump file    : /home/ec2-user/.pm2/dumps.pm2
PM2 2023-11-26T06:36:54: PM2 log: Concurrent actions   : 2
PM2 2023-11-26T06:36:54: PM2 log: SIGTERM timeout      : 1600
PM2 2023-11-26T06:36:54: PM2 log: =====
=====
^C
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 startup
[PM2] Init System found: systemd
[PM2] To setup the Startup Script, copy/paste the following command:
sudo env PATH=$PATH:/home/ec2-user/.nvm/versions/node/v16.20.2/bin /home/ec2-user/.nvm/versions/node/v16.20.2/lib/node_modules/pm2/bin/pm2 start
up systemd -u ec2-user --hp /home/ec2-user
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 save
[PM2] Saving current process list...
[PM2] [WARN] PM2 is not managing any process, skipping save...
[PM2] [WARN] To force saving use: pm2 save --force
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 save --force
[PM2] Saving current process list...
[PM2] Successfully saved in /home/ec2-user/.pm2/dump.pm2
[ec2-user@ip-10-0-2-223 app-tier]$ 
```

Type here to search           

30°C Haze    12:11 PM  
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AWS Three GitHub - ian Console Home Upload obje Instances 3tier-ROLE RDS | us-east-1 subnets | VF GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:search=:Running;v=3;c...

aws Services Search [Alt+S]

EC2 Dashboard EC2 Global View Events Instances Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store

Instances (1/1) Info C Connect Instance state ▾ Actions ▾ Launch instances ▾

Find Instance by attribute or tag (case-sensitive)

Running X Clear filters

Name	Instance ID	Instance state	Instance type
AppServer-11	i-0d903cbc434883887	Running	t2.micro

Create image Create template from instance Launch more like this

Instance: i-0d903cbc434883887 (AppServer-11)

Details Security Networking Storage Status checks Monitoring Tags

Instance summary Info

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0d903cbc434883887 (AppServer-11)	-	10.0.2.223
IPv6 address	Instance state	Public IPv4 DNS
-	Running	-
Hostname type	Private IP DNS name (IPv4 only)	

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateImage:instanceId=i-0d903c... ↗ | 🌐 APN N. Virginia Subham Pradhan

aws Services Search [Alt+S] EC2 > Instances > i-0d903cbc434883887 > Create image

## Create image Info

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

Instance ID  
 i-0d903cbc434883887 (AppServer-11)

Image name  
AppTierimage

Maximum 127 characters. Can't be modified after creation.

Image description - *optional*  
AppTierimage

Maximum 255 characters

No reboot  
 Enable

Instance volumes

AWS Three GitHub - iar Console Home Upload obje Step 1 3tier-ROLE RDS | us-east-1 subnets | VF GitHub - aw AWS Three +

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:

Services Search [Alt+S]

EC2 > Target groups > Create target group

Step 1 Specify group details

Your load balancer routes requests to the targets in a target group and performs health checks on the targets.

Step 2 Register targets

## Specify group details

### Basic configuration

Settings in this section can't be changed after the target group is created.

#### Choose a target type

Instances

- Supports load balancing to instances within a specific VPC.
- Facilitates the use of [Amazon EC2 Auto Scaling](#) to manage and scale your EC2 capacity.

IP addresses

- Supports load balancing to VPC and on-premises resources.
- Facilitates routing to multiple IP addresses and network interfaces on the same instance.
- Offers flexibility with microservice based architectures, simplifying inter-application communication.
- Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.

Lambda function

- Facilitates routing to a single Lambda function.
- Accessible to Application Load Balancers only.

Application Load Balancer

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:

Services Search [Alt+S]

Protocol : Port

HTTP 4000 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.

VPC-3TIER  
vpc-02af9ec2fad7ffb7c  
IPv4: 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.

gRPC  
Send requests to targets using gRPC. Supported when the request protocol is gRPC.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard: Search [Alt+S] Services N. Virginia Subham Pradhan

EC2 > Load balancers > Create Application Load Balancer

## Create Application Load Balancer Info

The Application Load Balancer distributes incoming HTTP and HTTPS traffic across multiple targets such as Amazon EC2 instances, microservices, and containers, based on request attributes. When the load balancer receives a connection request, it evaluates the listener rules in priority order to determine which rule to apply, and if applicable, it selects a target from the target group for the rule action.

▶ How Elastic Load Balancing works

### Basic configuration

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

**IP address type** Info  
Select the type of IP addresses that your subnets use.  
 IPv4 Recommended for internal load balancers.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard:

Services Search [Alt+S]

VPC Info  
Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

VPC-3TIER  
vpc-02af9ec2fad7ffb7c  
IPv4: 10.0.0.1/16

C

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.

us-east-1a (use1-az2)  
Subnet  
subnet-03a5ca24269152655 Private-App-Subnet-AZ-1

IPv4 address  
Assigned from CIDR 10.0.2.0/24

us-east-1b (use1-az4)  
Subnet  
subnet-0489fc8af0c95e8c2 Private-App-Subnet-AZ-2

IPv4 address  
Assigned from CIDR 10.0.3.0/24

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](#).

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard:

Services Search [Alt+S] N. Virginia Subham Pradhan

Security groups  
Select up to 5 security groups Internal-lb-sg sg-0704448da1f4846fb VPC: vpc-02af9ec2fad7ffb7c

**Listeners and routing** Info  
A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▼ Listener HTTP:80 Remove

Protocol	Port	Default action
HTTP	: 80 1-65535	Forward to AppTierTG Target type: Instance, IPv4 HTTP <small>▼</small> C <a href="#">Create target group</a>

Listener tags - *optional*  
Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

Add listener tag You can add up to 50 more tags.

Add listener

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S] N. Virginia Subham Pradhan

EC2 > Launch templates > Create launch template

## Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

**Launch template name and description**

Launch template name - required

AppTier-LaunchTemplate

Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '#', '@'.

Template version description

AppTier-LaunchTemplate

Max 255 chars

Auto Scaling guidance [Info](#)

Select this if you intend to use this template with EC2 Auto Scaling

Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

► Template tags  
► Source template

**Summary**

Software Image (AMI)

Virtual server type (instance type)

Firewall (security group)

Storage (volumes)

**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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel **Create launch template**

### Launch template contents

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AWS Thread GitHub - Create Target group 3tier-ROLE RDS | us-east-1 subnets GitHub - AWS Thread + VPN

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

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

Recents My AMIs Quick Start

Don't include in launch template  Owned by me  Shared with me

Browse more AMIs Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

AppTierimage  
ami-064635e63f4b41c04  
2023-11-26T07:00:48.000Z Virtualization: hvm ENA enabled: true Root device type: ebs

Description AppTierimage

Architecture x86\_64 AMI ID ami-064635e63f4b41c04

Instance type Info Advanced

Cancel Create launch template

▼ Summary

Software Image (AMI)  
AppTierimage  
ami-064635e63f4b41c04

Virtual server type (instance type)

Firewall (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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

**Instance type** Info

Manually select instance type  
Select an instance type that meets your computing, memory, networking, or storage needs

Specify instance type attributes  
Specify instance attributes that match your compute requirements

Simple

Instance type: t2.micro Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour  
On-Demand RHEL base pricing: 0.0716 USD per Hour  
On-Demand Linux base pricing: 0.0116 USD per Hour

All generations Compare instance types

**Summary**

Software Image (AMI)  
AppTierimage  
ami-064635e63f4b41c04

Virtual server type (instance type)  
t2.micro

Firewall (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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Create launch template

**Key pair (login)** Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name: test-key Create new key pair

**Network settings** Info

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AWS Thread GitHub - Create Target gro 3tier-ROLE RDS | us-e subnets GitHub - AWS Thread + VPN

us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

**Network settings** Info

Subnet Info  
Don't include in launch template ▼ Create new subnet

When you specify a subnet, a network interface is automatically added to your template.

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.

Select existing security group ○ Create security group

Security groups Info  
Select security groups ▼  
Private-instance-sg sg-0ecd1e7554abff3e X  
VPC: vpc-02af9ec2fad7fffb7c

Compare security group rules

Advanced network configuration

**Storage (volumes)** Info

EBS Volumes Hide details

**Summary**

Software Image (AMI)  
AppTierimage  
ami-064635e63f4b41c04

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
Private-instance-sg

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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Create launch template

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S]

Add new tag You can add up to 50 more tags.

**Advanced details** Info

IAM instance profile Info

3tier-ROLE-IAM  
arn:aws:iam::782921506756:instance-profile/3tier-ROLE-IAM

Create new IAM profile +

Specify a custom value... Search

Don't include in launch template

3tier-ROLE-IAM  
arn:aws:iam::782921506756:instance-profile/3tier-ROLE-IAM

AmazonSSMRoleForInstancesQuickSetup  
arn:aws:iam::782921506756:instance-profile/AmazonSSMRoleForInstancesQuickSetup

Instance auto-recovery Info

Don't include in launch template

Shutdown behavior Info

Don't include in launch template

Stop - Hibernate behavior Info

Don't include in launch template

Termination protection Info

**Summary**

Software Image (AMI)  
AppTierimage  
ami-064635e63f4b41c04

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
Private-instance-sg

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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet. X

Cancel Create launch template

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## EC2 &gt; Auto Scaling groups &gt; Create Auto Scaling group

Step 1

## Choose launch template

Step 2

## Choose instance launch options

Step 3 - optional

## Configure advanced options

Step 4 - optional

## Configure group size and scaling

Step 5 - optional

## Add notifications

Step 6 - optional

## Add tags

Step 7

## Review

Choose launch template Info

Specify a launch template that contains settings common to all EC2 instances that are launched by this Auto Scaling group.

## Name

## Auto Scaling group name

Enter a name to identify the group.

AppserverASG

Must be unique to this account in the current Region and no more than 255 characters.

Launch template Info

ⓘ For accounts created after May 31, 2023, the EC2 console only supports creating Auto Scaling groups with launch templates. Creating Auto Scaling groups with launch configurations is not recommended but still available via the CLI and API until December 31, 2023.

## Launch template

Choose a launch template that contains the instance-level settings, such as the Amazon Machine Image (AMI), instance type, key pair, and security groups.

AppTier-LaunchTemplate

[Create a launch template](#)

## Version

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

Services Search [Alt+S]

Step 5 - optional Add notifications

Step 6 - optional Add tags

Step 7 Review

**t2.micro**

**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-02af9ec2fad7ffb7c (VPC-3TIER)  
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

us-east-1a | subnet-03a5ca24269152655 (Private- App-Subnet-AZ-1)  
10.0.2.0/24

us-east-1b | subnet-0489fc8af0c95e8c2 (Private- App-Subnet-AZ-2)  
10.0.3.0/24

Create a subnet

Cancel Skip to review Previous Next

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aws Services Search [Alt+S]

Configure group size and scaling

Step 5 - optional Add notifications

Step 6 - optional Add tags

Step 7 Review

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

AppTierTG | HTTP X Application Load Balancer: App-tier-internal-lb

### VPC Lattice integration options Info

To improve networking capabilities and scalability, integrate your Auto Scaling group with VPC Lattice. VPC Lattice facilitates communications between AWS services and helps you connect and manage your applications across compute services in AWS.

Select VPC Lattice service to attach

No VPC Lattice service VPC Lattice will not manage your Auto Scaling group's incoming requests associated with specified VPC Lattice.

Attach to VPC Lattice service

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup: [Alt+S]

Services Search N. Virginia Subham Pradhan

Configure advanced options

Step 4 - optional  
Configure group size and scaling

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

Desired capacity type  
Choose the unit of measurement for the desired capacity value. vCPUs and Memory(GiB) are only supported for mixed instances groups configured with a set of instance attributes.

Units (number of instances)

Desired capacity  
Specify your group size.  
2

Scaling Info  
You can resize your Auto Scaling group manually or automatically to meet changes in demand.

Scaling limits  
Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity: 2  
Max desired capacity: 2  
Equal or less than desired capacity  
Equal or greater than desired capacity

Automatic scaling - optional  
Choose whether to use a target tracking policy Info  
You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

No scaling policies  
Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.

Target tracking scaling policy  
Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.

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Session ID: root-021350098dc616474

Instance ID: i-0d903cbc434883887

Terminate

```
[ec2-user@ip-10-0-2-223 ~]$ cd app-tier/  
[ec2-user@ip-10-0-2-223 app-tier]$ npm install
```

added 68 packages, and audited 69 packages in 2s

2 packages are looking for funding  
run `npm fund` for details

3 **high** severity vulnerabilities

To address all issues, run:

```
npm audit fix
```

Run `npm audit` for details.

```
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 start index.js  
[PM2] Applying action restartProcessId on app [index](ids: [ 0 ])  
[PM2] [index] (0) ✓  
[PM2] Process successfully started
```

<b>id</b>	<b>name</b>	<b>mode</b>	<b>0</b>	<b>status</b>	<b>cpu</b>	<b>memory</b>
0	index	fork	15	online	0%	14.1mb

```
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 list
```

<b>id</b>	<b>name</b>	<b>mode</b>	<b>0</b>	<b>status</b>	<b>cpu</b>	<b>memory</b>
-----------	-------------	-------------	----------	---------------	------------	---------------





```
LimitCORE=infinity
Environment=PATH=/home/ec2-user/.nvm/versions/node/v16.20.2/bin:/sbin:/bin:/usr/sbin:/usr/bin:/home/ec2-user/.nvm/versions/node/v16.20.2/bin:/bin:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin
Environment=PM2_HOME=/home/ec2-user/.pm2
PIDFile=/home/ec2-user/.pm2/pm2.pid
Restart=on-failure

ExecStart=/home/ec2-user/.nvm/versions/node/v16.20.2/lib/node_modules/pm2/bin/pm2 resurrect
ExecReload=/home/ec2-user/.nvm/versions/node/v16.20.2/lib/node_modules/pm2/bin/pm2 reload all
ExecStop=/home/ec2-user/.nvm/versions/node/v16.20.2/lib/node_modules/pm2/bin/pm2 kill

[Install]
WantedBy=multi-user.target

Target path
/etc/systemd/system/pm2-ec2-user.service
Command list
[ 'systemctl enable pm2-ec2-user' ]
[PM2] Writing init configuration in /etc/systemd/system/pm2-ec2-user.service
[PM2] Making script booting at startup...
[PM2] [-] Executing: systemctl enable pm2-ec2-user...
[PM2] [v] Command successfully executed.
+-----+
[PM2] Freeze a process list on reboot via:
$ pm2 save

[PM2] Remove init script via:
$ pm2 unstartup systemd
[ec2-user@ip-10-0-2-223 app-tier]$ pm2 save
[PM2] Saving current process list...
[PM2] Successfully saved in /home/ec2-user/.pm2/dump.pm2
[ec2-user@ip-10-0-2-223 app-tier]$
```



MINGW64:/c/Users/ASUS/Downloads/3tier/aws-three-tier-web-architecture-workshop/application-code

```
ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ pwd
/c/Users/ASUS/Downloads

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ ls

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads
$ cd 3tier

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
$ ls -lrt
total 4
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 aws-three-tier-web-architecture-workshop
/

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier
$ cd aws-three-tier-web-architecture-workshop/

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-w
orkshop (main)
$ ls -lrt
total 13
-rw-r--r-- 1 ASUS 197121 313 Nov 26 10:14 CODE_OF_CONDUCT.md
-rw-r--r-- 1 ASUS 197121 3219 Nov 26 10:14 CONTRIBUTING.md
-rw-r--r-- 1 ASUS 197121 2045 Nov 26 10:14 README.md
-rw-r--r-- 1 ASUS 197121 942 Nov 26 10:14 LICENSE
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 application-code/

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-w
orkshop (main)
$ cd application-code/

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-w
orkshop/application-code (main)
$ ls -lrt
total 8
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 app-tier/
-rw-r--r-- 1 ASUS 197121 2590 Nov 26 10:14 nginx.conf
drwxr-xr-x 1 ASUS 197121 0 Nov 26 10:14 web-tier/

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-w
orkshop/application-code (main)
$ vi nginx.conf

ASUS@LAPTOP-Q9QDRNKO MINGW64 ~/Downloads/3tier/aws-three-tier-web-architecture-workshop/application-code (main)
```



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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Alt+S] N. Virginia Subham Pradhan

EC2 > Instances > Launch an instance

## Launch an instance Info

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 Info**

Name  Add additional tags

**Application and OS Images (Amazon Machine Image) Info**

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

Recents My AMIs **Quick Start**

Amazon Linux macOS Ubuntu Windows Red Hat SUSE Li

**Summary**

Number of instances Info

Software Image (AMI)  
Amazon Linux 2 Kernel 5.10 AMI...read more  
ami-0fa1ca9559f1892ec

Virtual server type (instance type)  
t2.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. 30 GiB of EBS

Cancel **Launch instance** Review commands

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Alt+S] N. Virginia Subham Pradhan

VPC - required [Info](#)  
vpc-02af9ec2fad7ffb7c (VPC-3TIER)  
10.0.0.0/16

Subnet [Info](#)  
subnet-0622093a71429752e Public-Web-Subnet-AZ-1  
VPC: vpc-02af9ec2fad7ffb7c Owner: 782921506756 Availability Zone: us-east-1a  
IP addresses available: 249 CIDR: 10.0.0.0/24

Create new subnet

Auto-assign public IP [Info](#)  
Enable

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

Common security groups [Info](#)  
Select security groups  
WebTier-sg sg-054a20c0515fe73de X  
VPC: vpc-02af9ec2fad7ffb7c

Compare security group rules

Security groups that you add or remove here will be added to or removed from all your network interfaces.

Advanced network configuration

Configure storage [Info](#) Advanced

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. 30 GiB of EBS

Cancel Launch instance Review commands

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchInstances:

Services Search [Alt+S]

**Advanced details** Info

Domain join directory Info  
Select Create new directory

IAM instance profile Info  
3tier-ROLE-IAM arn:aws:iam::782921506756:instance-profile/3tier-ROLE-IAM  
Select Create new IAM profile

AmazonSSMRoleForInstancesQuickSetup arn:aws:iam::782921506756:instance-profile/AmazonSSMRoleForInstancesQuickSetup

Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery Info  
Select

Shutdown behavior Info  
Stop

Stop - Hibernate behavior Info  
Select

**Summary**

Number of instances Info  
1

Software Image (AMI)  
Amazon Linux 2 Kernel 5.10 AMI...read more  
ami-0fa1ca9559f1892ec

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
WebTier-sg

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. 30 GiB of EBS

Cancel **Launch instance** Review commands

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EC2 > Instances > i-0e2239540c88a807e > Connect to instance

## Connect to instance Info

Connect to your instance i-0e2239540c88a807e (Demo-Web-server) using any of these options

EC2 Instance Connect

Session Manager

SSH client

EC2 serial console

### Session Manager usage:

- Connect to your instance without SSH keys, a bastion host, or opening any inbound ports.
- Sessions are secured using an AWS Key Management Service key.
- You can log session commands and details in an Amazon S3 bucket or CloudWatch Logs log group.
- Configure sessions on the Session Manager [Preferences](#) page.

Cancel

Connect



Type here to search





Session ID: root-0d2f03c8b394d4362

Instance ID: i-0e2239540c88a807e

Terminate

```
sh-4.2$ sudo -su ec2-user
[ec2-user@ip-10-0-0-112 bin]$ ping 8.8.8.8
PING 8.8.8.8 (8.8.8.8) 56(84) bytes of data.
64 bytes from 8.8.8.8: icmp_seq=1 ttl=116 time=1.06 ms
64 bytes from 8.8.8.8: icmp_seq=2 ttl=116 time=1.14 ms
64 bytes from 8.8.8.8: icmp_seq=3 ttl=116 time=1.17 ms
^C
--- 8.8.8.8 ping statistics ---
3 packets transmitted, 3 received, 0% packet loss, time 2002ms
rtt min/avg/max/mdev = 1.069/1.130/1.176/0.044 ms
[ec2-user@ip-10-0-0-112 bin]$ █
```



AWS Th GitHub Console 3tier-pi Instance Sys Systems Target 3tier-R RDS | subnets GitHub AWS Th +

us-east-1.console.aws.amazon.com/systems-manager/session-manager/i-0e2239540c88a807e...

VPN

Session ID: root-0d2f03c8b394d4362

Instance ID: i-0e2239540c88a807e

Terminate

```
[ec2-user@ip-10-0-0-112 bin]$ curl -o- https://raw.githubusercontent.com/nvm-sh/nvm/v0.38.0/install.sh | bash
% Total    % Received % Xferd  Average Speed   Time     Time      Time  Current
                                         Dload  Upload   Total   Spent    Left  Speed
100 14926  100 14926    0     0  169k      0 --:--:-- --:--:-- --:--:--  171k
=> Downloading nvm as script to '/home/ec2-user/.nvm'

=> Appending nvm source string to /home/ec2-user/.bashrc
=> Appending bash_completion source string to /home/ec2-user/.bashrc
=> Close and reopen your terminal to start using nvm or run the following to use it now:

export NVM_DIR="$HOME/.nvm"
[ -s "$NVM_DIR/nvm.sh" ] && \. "$NVM_DIR/nvm.sh" # This loads nvm
[ -s "$NVM_DIR/bash_completion" ] && \. "$NVM_DIR/bash_completion" # This loads nvm bash_completion
[ec2-user@ip-10-0-0-112 bin]$ source ~/.bashrc
[ec2-user@ip-10-0-0-112 bin]$ nvm install 16
Downloading and installing node v16.20.2...
Downloading https://nodejs.org/dist/v16.20.2/node-v16.20.2-linux-x64.t
ar.xz...
#####
100.0%
Computing checksum with sha256sum
Checksums matched!
Now using node v16.20.2 (npm v8.19.4)
Creating default alias: default -> 16 (-> v16.20.2)
[ec2-user@ip-10-0-0-112 bin]$ nvm use 16
Now using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-0-112 bin]$ npm install -g pm2
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher
```



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```
Checksums matched!
Now using node v16.20.2 (npm v8.19.4)
Creating default alias: default -> 16 (-> v16.20.2)
[ec2-user@ip-10-0-0-112 bin]$ nvm use 16
Now using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-0-112 bin]$ npm install -g pm2
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher
. Older versions may use Math.random() in certain circumstances, which is known to be problematic. See https://v8.dev/blog/math-random for details.
```

added 157 packages, and audited 158 packages in 8s

13 packages are looking for funding  
run `npm fund` for details

2 **moderate** severity vulnerabilities

Some issues need review, and may require choosing  
a different dependency.

Run `npm audit` for details.

```
npm notice
npm notice New major version of npm available! 8.19.4 -> 10.2.4
npm notice Changelog: https://github.com/npm/cli/releases/tag/v10.2.4
npm notice Run npm install -g npm@10.2.4 to update!
npm notice
```



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Session ID: root-00fa06d3d336261f7

Instance ID: i-0e2239540c88a807e

Terminate

```
sh-4.2$ sudo -su ec2-user
[ec2-user@ip-10-0-0-112 bin]$ curl -o- https://raw.githubusercontent.com/nvm-
sh/nvm/v0.38.0/install.sh | bash
% Total    % Received % Xferd  Average Speed   Time     Time     Time  Curre
nt
                                         Dload  Upload   Total   Spent   Left  Speed
 0     0    0     0    0     0      0  --::-- --::-- --::--
100 14926  100 14926    0     0   164k      0  --::-- --::-- --::-- 165
k
=> nvm is already installed in /home/ec2-user/.nvm, trying to update the scri
pt

=> nvm source string already in /home/ec2-user/.bashrc
=> bash_completion source string already in /home/ec2-user/.bashrc
=> Close and reopen your terminal to start using nvm or run the following to
use it now:

export NVM_DIR="$HOME/.nvm"
[ -s "$NVM_DIR/nvm.sh" ] && \. "$NVM_DIR/nvm.sh" # This loads nvm
[ -s "$NVM_DIR/bash_completion" ] && \. "$NVM_DIR/bash_completion" # This lo
ads nvm bash_completion
[ec2-user@ip-10-0-0-112 bin]$ source ~/.bashrc
[ec2-user@ip-10-0-0-112 bin]$ nvm install 16
v16.20.2 is already installed.
^[[A^[[DNow using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-0-112 bin]$ nvm use 16
Now using node v16.20.2 (npm v8.19.4)
[ec2-user@ip-10-0-0-112 bin]$ npm install -g pm2
npm WARN deprecated uuid@3.4.0: Please upgrade to version 7 or higher. Olde
r versions may use Math.random() in certain circumstances, which is known to
be problematic. See https://v8.dev/blog/math-random for details.
```

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Session ID: root-00fa06d3d336261f7

Instance ID: i-0e2239540c88a807e

Terminate

```
er/src/reportWebVitals.js
download: s3://3tier-project-bucket/web-tier/src/assets/3TierArch.png to web-
tier/src/assets/3TierArch.png
download: s3://3tier-project-bucket/web-tier/src/components/Burger/Burger.sty-
led.js to web-tier/src/components/Burger/Burger.styled.js
[ec2-user@ip-10-0-0-112 ~]$ cd ~/web-tier
[ec2-user@ip-10-0-0-112 web-tier]$ npm install
```

changed 1 package, and audited 1494 packages in 7s

```
248 packages are looking for funding
  run `npm fund` for details
```

8 vulnerabilities (2 moderate, 6 high)

```
To address all issues (including breaking changes), run:
  npm audit fix --force
```

Run `npm audit` for details.

```
[ec2-user@ip-10-0-0-112 web-tier]$ npm run build
```

```
> aws-3tier-web-layer@0.1.0 build
> react-scripts build
```

```
Creating an optimized production build...
Compiled successfully.
```

File sizes after gzip:

```
73.84 kB  build/static/js/main.54dba04e.js
1.79 kB   build/static/js/787.24ed0841.chunk.js
493 B     build/static/css/main.b20b6ac4.css
```





Session ID: root-00fa06d3d336261f7

Instance ID: i-0e2239540c88a807e

Terminate

```
70 unbound1.17           available      [ =stable ]
72 collectd-python3      available      [ =stable ]
† Note on end-of-support. Use 'info' subcommand.
[ec2-user@ip-10-0-0-112 web-tier]$ cd /etc/nginx/
[ec2-user@ip-10-0-0-112 nginx]$ sudo cp nginx.conf nginx.conf_bkp
[ec2-user@ip-10-0-0-112 nginx]$ aws s3 cp s3://3tier-project-bucket/nginx.conf .
download failed: s3://3tier-project-bucket/nginx.conf to ./nginx.conf [Errno
13] Permission denied: u'/etc/nginx/nginx.conf.c8Cb3e46'
[ec2-user@ip-10-0-0-112 nginx]$ sudo service nginx restart
Redirecting to /bin/systemctl restart nginx.service
[ec2-user@ip-10-0-0-112 nginx]$ vi nginx.conf
[ec2-user@ip-10-0-0-112 nginx]$ sudo service nginx status
Redirecting to /bin/systemctl status nginx.service
● nginx.service - The nginx HTTP and reverse proxy server
   Loaded: loaded (/usr/lib/systemd/system/nginx.service; disabled; vendor preset: disabled)
   Active: active (running) since Sun 2023-11-26 09:09:43 UTC; 5min ago
     Process: 2387 ExecStart=/usr/sbin/nginx (code=exited, status=0/SUCCESS)
     Process: 2383 ExecStartPre=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
     Process: 2382 ExecStartPre=/usr/bin/rm -f /run/nginx.pid (code=exited, status=0/SUCCESS)
   Main PID: 2389 (nginx)
  CGroup: /system.slice/nginx.service
          ├─2389 nginx: master process /usr/sbin/nginx
          └─2390 nginx: worker process

Nov 26 09:09:43 ip-10-0-0-112.ec2.internal systemd[1]: Starting The nginx HTTP and reverse proxy server...
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal nginx[2383]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal nginx[2383]: nginx: configuration file /etc/nginx/nginx.conf test is successful
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal systemd[1]: Started The nginx HTTP and reverse proxy server.
[ec2-user@ip-10-0-0-112 nginx]$ chmod -R 755 /home/ec2-user
[ec2-user@ip-10-0-0-112 nginx]$ sudo chkconfig nginx on
Note: Forwarding request to 'systemctl enable nginx.service'.
```



AWS GitHub Consol 3tier Insta S System Load 3tier RDS subne GitHub AWS Full Eng server +

us-east-1.console.aws.amazon.com/systems-manager/session-manager/i-0e2239540c88a807e...

Session ID: root-00fa06d3d336261f7 Instance ID: i-0e2239540c88a807e Terminate

```
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal nginx[2383]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal nginx[2383]: nginx: configuration file /etc/nginx/nginx.conf test is successful
Nov 26 09:09:43 ip-10-0-0-112.ec2.internal systemd[1]: Started The nginx HTTP and reverse proxy server.
[ec2-user@ip-10-0-0-112 nginx]$
[ec2-user@ip-10-0-0-112 nginx]$ chmod -R 755 /home/ec2-user
[ec2-user@ip-10-0-0-112 nginx]$ sudo chkconfig nginx on
Note: Forwarding request to 'systemctl enable nginx.service'.
Created symlink from /etc/systemd/system/multi-user.target.wants/nginx.service to /usr/lib/systemd/system/nginx.service.
[ec2-user@ip-10-0-0-112 nginx]$ curl localhost:80
<!DOCTYPE html>
<html>
<head>
<title>Welcome to nginx!</title>
<style>
html { color-scheme: light dark; }
body { width: 35em; margin: 0 auto;
font-family: Tahoma, Verdana, Arial, sans-serif; }
</style>
</head>
<body>
<h1>Welcome to nginx!</h1>
<p>If you see this page, the nginx web server is successfully installed and
working. Further configuration is required.</p>

<p>For online documentation and support please refer to
<a href="http://nginx.org/">nginx.org</a>.<br/>
Commercial support is available at
<a href="http://nginx.com/">nginx.com</a>.</p>

<p><em>Thank you for using nginx.</em></p>
</body>
</html>
[ec2-user@ip-10-0-0-112 nginx]$
```



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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:search=:Running;v...

aws Services Search [Alt+S] C Connect Instance state Actions ▲ Launch instances ▼

Instances (1/4) Info Find Instance by attribute or tag (case-sensitive)

Running X Clear filters

Name	Instance ID	Instance state	Instance type	Status check	Alarm status
Demo-Web-se...	i-0e2239540c88a807e	Running	t2.micro	2/2 checks pass	No alarms
	i-0d9d6db735518809a	Running	t2.micro	2/2 checks pass	No alarms

Instance: i-0e2239540c88a807e (Demo-Web-server)

Actions ▲ Connect View details Manage instance state Instance settings Networking Security Image and templates Monitor and troubleshoot

Create image Create template from instance Launch more like this

Details Security Networking Storage Status checks Monitoring Tags

▼ Instance summary Info

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0e2239540c88a807e (Demo-Web-server)	18.204.205.202   open address	10.0.0.112
IPv6 address	Instance state	Public IPv4 DNS
-	Running	-
Hostname type	Private IP DNS name (IPv4 only)	Elastic IP addresses
IP name: ip-10-0-0-112.ec2.internal	ip-10-0-0-112.ec2.internal	
Answer private resource DNS name	Instance type	
	t2.micro	



AWS Services Search [Alt+S] N. Virginia Subham Pradhan

EC2 > Instances > i-0e2239540c88a807e > Create image

## Create image Info

An image (also referred to as an AMI) defines the programs and settings that are applied when you launch an EC2 instance. You can create an image from the configuration of an existing instance.

Instance ID

i-0e2239540c88a807e (Demo-Web-server)

Image name

WebServerImage

Maximum 127 characters. Can't be modified after creation.

Image description - *optional*

WebServerImage

Maximum 255 characters

No reboot

Enable

Instance volumes

Storage type	Device	Snapshot	Size	Volume type	IOPS	Throughput	Delete on termination	Encrypted
--------------	--------	----------	------	-------------	------	------------	-----------------------	-----------

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTargetGroup:

Services Search [Alt+S]

EC2 > Target groups > Create target group

Step 1 Specify group details

Your load balancer routes requests to the targets in a target group and performs health checks on the targets.

Step 2 Register targets

**Basic configuration**

Settings in this section can't be changed after the target group is created.

**Choose a target type**

Instances

- Supports load balancing to instances within a specific VPC.
- Facilitates the use of [Amazon EC2 Auto Scaling](#) to manage and scale your EC2 capacity.

IP addresses

- Supports load balancing to VPC and on-premises resources.
- Facilitates routing to multiple IP addresses and network interfaces on the same instance.
- Offers flexibility with microservice based architectures, simplifying inter-application communication.
- Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.

Lambda function

- Facilitates routing to a single Lambda function.
- Accessible to Application Load Balancers only.

Application Load Balancer

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\*3TierArchitectureEndtoEnd - Notepad

File Edit Format View Help

```
$ curl localhost:80
```

Demo Web Server - Create an Image - Webserverimage  
Create Target Group - Instances - WebTierTG  
HTTP - 80 - HTTP1  
Health check - HTTP  
Health\_check\_Path - /health  
Targets - All

Create Load Balancer - Application Load Balancer - name-Web-tier-extern  
schema - internal, IPv4  
Subnet - Public-Web-Subnet-AZ-1 and Public-Web-  
Security Groups - InternetFacing-lb-sg  
Protocol - HTTP -80  
Select Target Group - Webserver TG

Launch Template - Web server LT  
My AMIs - Owned by me (Select existing which you crea  
key pair - Don't need a key pair to access  
SG - WebTier-sg  
Advance details - IAM role select

Auto Scaling - WebserverASG  
Select Launch Template - Web server LT  
VPC - Public-Web-Subnet-AZ-1 and Public-Web-Subnet-AZ-2  
Attach to an existing load balancer - Web-tier-external  
targets group - Webserver TG  
Configure group size = 2  
scaling policies = None

aws Services us-east-1.console.aws... VPN N. Virginia Subham Pradhan

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.  
**VPC-3TIER**  
vpc-02af9ec2fad7fffb7c  
IPv4: 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.  
 **gRPC**  
Send requests to targets using gRPC. Supported when the request protocol is gRPC.

Health checks  
The associated load balancer periodically sends requests, per the settings below, to the registered targets to test their status.

Health check protocol  
HTTP

Health check path  
Use the default path of "/" to ping the root, or specify a custom path if preferred.  
**/health**  
Up to 1024 characters allowed.

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Ln 242, Col 52 110% Windows (CRLF) UTF-8 © 2023, Amazon Web Services, Inc. or its affiliates.  
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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#TargetGroups:

EC2 Services Search [Alt+S] N. Virginia Subham Pradhan

EC2 Dashboard EC2 Global View Events Instances Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security

EC2 Target groups

Target groups (2) [Info](#)

Filter target groups

Name	ARN	Port	Protocol	Target type	Load balancer	VPC ID
WebTierTG	arn:aws:elasticloadbalancing:us-east-1:123456789012:targetgroup/WebTierTG/5555555555555555	80	HTTP	Instance	None associated	vpc-02345678901234567
AppTierTG	arn:aws:elasticloadbalancing:us-east-1:123456789012:targetgroup/AppTierTG/5555555555555555	80	HTTP	Instance	None associated	vpc-02345678901234567

Actions Create target group

0 target groups selected

Select a target group above.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard:

Services Search [Alt+S] EC2 > Load balancers > Create Application Load Balancer

## Create Application Load Balancer Info

The Application Load Balancer distributes incoming HTTP and HTTPS traffic across multiple targets such as Amazon EC2 instances, microservices, and containers, based on request attributes. When the load balancer receives a connection request, it evaluates the listener rules in priority order to determine which rule to apply, and if applicable, it selects a target from the target group for the rule action.

### ▶ How Elastic Load Balancing works

### Basic configuration

Load balancer name

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

Web server LT

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.

IP address type Info

Select the type of IP addresses that your subnets use.

IPv4

Recommended for internal load balancers.

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**aws** Services Search [Alt+S]

## Network mapping Info

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

**VPC Info**  
Select the virtual private cloud (VPC) for your targets or you can [create a new VPC](#). Only VPCs with an internet gateway are enabled for selection. The selected VPC can't be changed after the load balancer is created. To confirm the VPC for your targets, view your [target groups](#).

**VPC-3TIER**  
vpc-02af9ec2fad7ffb7c  
IPv4: 10.0.0.1/16

**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.

us-east-1a (use1-az2)  
Subnet: subnet-0622093a71429752e Public-Web-Subnet-AZ-1

IPv4 address: Assigned by AWS

us-east-1b (use1-az4)  
Subnet: subnet-0a8d6e5542317c7c Public-Web-Subnet-AZ-2

IPv4 address: Assigned by AWS

## 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.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateALBWizard:

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### 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 ▾ C

InternetFacing-lb-sg X sg-09a2ad3fd6bc5b VPC: vpc-02af9ec2fad7ffb7c

### Listeners and routing Info

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▼ Listener HTTP:80 Remove

Protocol	Port	Default action
HTTP	: 80 1-65535	Forward to WebTierTG Target type: Instance, IPv4 HTTP ▾ C <a href="#">Create target group</a>

Listener tags - *optional*  
Consider adding tags to your listener. Tags enable you to categorize your AWS resources so you can more easily manage them.

Add listener tag

You can add up to 50 more tags.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LoadBalancers:

EC2 Services Search [Alt+S] N. Virginia Subham Pradhan

EC2 Dashboard EC2 Global View Events Instances Instances Instance Types Launch Templates Spot Requests Savings Plans Reserved Instances Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security

EC2 > Load balancers

## Load balancers (2)

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input type="checkbox"/>	<a href="#">Web-server-LT</a>	<a href="#">Web-server-LT-21238073...</a>	Provisioning..	vpc-02af9ec2fad7ffb7c	2 Availability Zones	application	November 26
<input type="checkbox"/>	<a href="#">App-tier-internal-lb</a>	<a href="#">internal-App-tier-internal-...</a>	Active	vpc-02af9ec2fad7ffb7c	2 Availability Zones	application	November 26

Filter load balancers < 1 > ⚙

**0 load balancers selected**

Select a load balancer above.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

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EC2 > Launch templates > Create launch template

## Create launch template

Creating a launch template allows you to create a saved instance configuration that can be reused, shared and launched at a later time. Templates can have multiple versions.

**Launch template name and description**

Launch template name - required  
WebTier-LaunchTemplate  
Must be unique to this account. Max 128 chars. No spaces or special characters like '&', '#', '@'.

Template version description  
WebTier-LaunchTemplate  
Max 255 chars

Auto Scaling guidance [Info](#)  
Select this if you intend to use this template with EC2 Auto Scaling  
 Provide guidance to help me set up a template that I can use with EC2 Auto Scaling

► Template tags  
► Source template

**Summary**

Software Image (AMI)  
Virtual server type (instance type)  
Firewall (security group)  
Storage (volumes)

**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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet. X

Cancel **Create launch template**

### Launch template contents

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Specify the details of your launch template below. Leaving a field blank will result in the field not being included in the launch template.

**Application and OS Images (Amazon Machine Image) - required**

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

Recents | My AMIs | Quick Start

Search bar: Specify a custom value...

AMIs listed:

- AppTierimage  
ami-064635e63f4b41c04  
2023-11-26T07:00:48.000Z Virtualization: hvm ENA enabled: true Root device type: ebs
- WebServerImage  
ami-06b25375510e0998d  
2023-11-26T09:17:52.000Z Virtualization: hvm ENA enabled: true Root device type: ebs
- WebServerImage  
ami-06b25375510e0998d  
2023-11-26T09:17:52.000Z Virtualization: hvm ENA enabled: true Root device type: ebs

Description: WebServerImage

Architecture: x86\_64      AMI ID: ami-06b25375510e0998d

**Summary**

Software Image (AMI)  
WebServerImage  
ami-06b25375510e0998d

Virtual server type (instance type)

Firewall (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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Create launch template

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

**Key pair (login)** Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name

test-key ▼ Create new key pair

**Network settings** Info

Subnet Info

Don't include in launch template ▼ Create new subnet

When you specify a subnet, a network interface is automatically added to your template.

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.

Select existing security group Create security group

Security groups Info

Select security groups ▼

WebTier-sg sg-054a20c0515fe73de X  
VPC: vpc-02af9ec2fad7fffb7c

Compare security group rules

**Advanced network configuration**

**Summary**

Software Image (AMI)  
WebServerImage  
ami-06b25375510e0998d

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
WebTier-sg

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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet. X

Cancel Create launch template

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateTemplate:

Services Search [Alt+S] N. Virginia Subham Pradhan

**Resource tags** Info

No resource tags are currently included in this template. Add a resource tag to include it in the launch template.

Add new tag You can add up to 50 more tags.

**Advanced details** Info

IAM instance profile | Info 3tier-ROLE-IAM arn:aws:iam::782921506756:instance-profile/3tier-ROLE-IAM Create new IAM profile

Hostname type | Info Don't include in launch template

DNS Hostname | Info  Enable resource-based IPv4 (A record) DNS requests  Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery | Info Don't include in launch template

Shutdown behavior | Info

**Summary**

Software Image (AMI)  
WebServerImage  
ami-06b25375510e0998d

Virtual server type (instance type)  
t2.micro

Firewall (security group)  
WebTier-sg

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, 30 GiB of EBS storage, 2 million IOs, 1 GB of snapshots, and 100 GB of bandwidth to the internet.

Cancel Create launch template

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LaunchTemplates:

aws Services Search [Alt+S] N. Virginia Subham Pradhan

**Launch Templates (1/2) Info**

Search

Launch Template ID Launch Template Name Default Version Latest Version Create Time Created By

Launch Template ID	Launch Template Name	Default Version	Latest Version	Create Time	Created By
lt-090fa4985b91c38f8	AppTier-LaunchTemplate	1	1	2023-11-26T07:14:39.000Z	arn:aws:iam::78292...
lt-088cb6b4c17706931	WebTier-LaunchTemplate	1	1	2023-11-26T09:29:52.000Z	arn:aws:iam::78292...

**AppTier-LaunchTemplate (lt-090fa4985b91c38f8)**

**Launch template details**

Actions Delete template

Launch template ID	Launch template name	Default version	Owner
lt-090fa4985b91c38f8	AppTier-LaunchTemplate	1	arn:aws:iam::782921506756:root

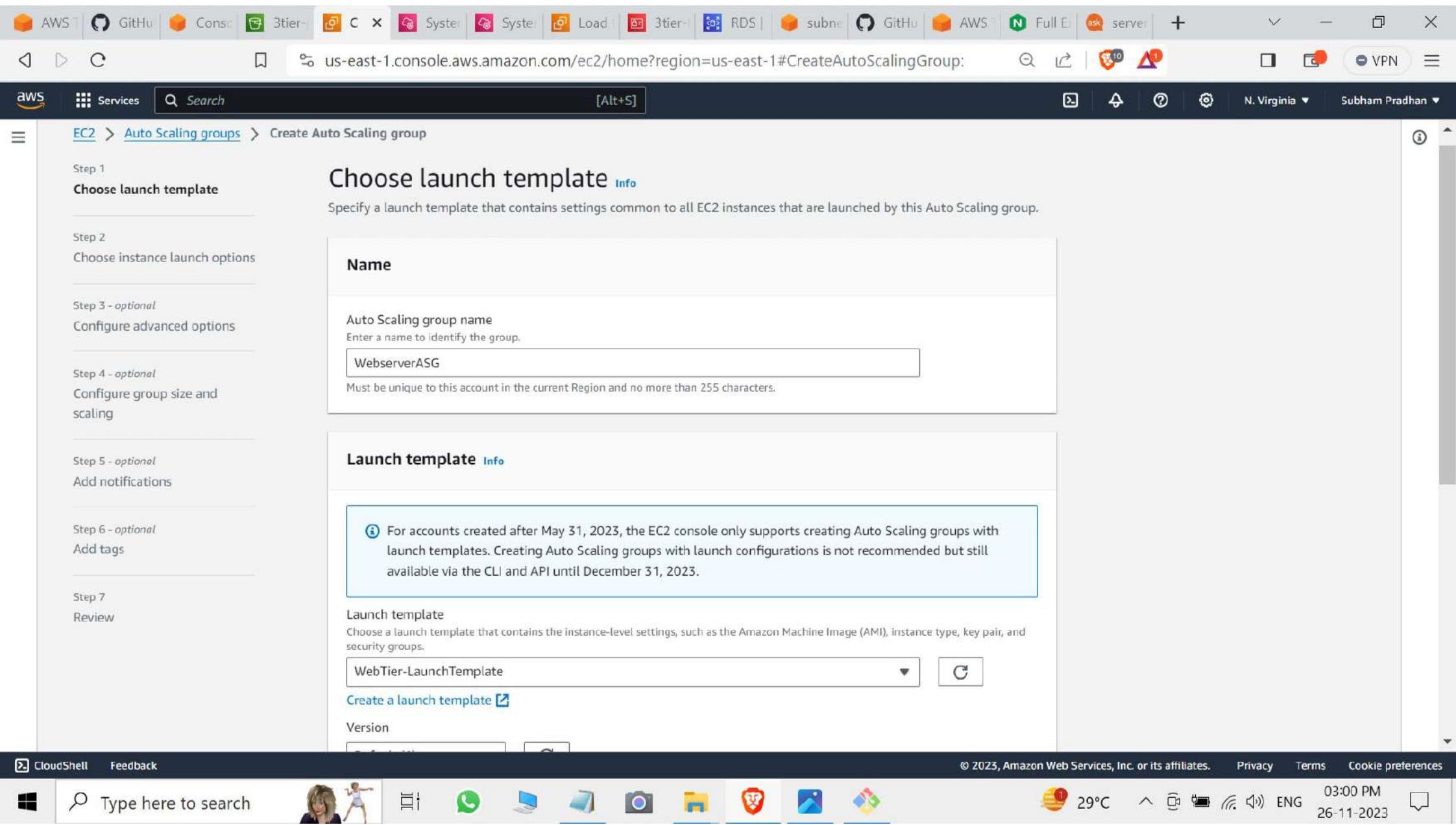
Details Versions Template tags

**Launch template version details**

Actions Delete template version

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

Services Search [Alt+S] N. Virginia Subham Pradhan

Step 5 - optional Add notifications

Step 6 - optional Add tags

Step 7 Review

**t2.micro**

**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-02af9ec2fad7ffb7c (VPC-3TIER)  
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

us-east-1a | subnet-0622093a71429752e (Public- Web-Subnet-AZ-1)  
10.0.0.0/24

us-east-1b | subnet-0a8d6e5542317c7c7 (Public- Web-Subnet-AZ-2)  
10.0.1.0/24

Create a subnet

Cancel Skip to review Previous Next

AWS GitHub Consol 3tier- C System System Load 3tier- RDS subne GitHub AWS Full E ask server + VPN

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

Services Search [Alt+S] N. Virginia Subham Pradhan

Step 3 - optional  
Configure advanced options

Step 4 - optional  
Configure group size and scaling

Step 5 - optional  
Add notifications

Step 6 - optional  
Add tags

Step 7  
Review

### 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 X C

WebTierTG | HTTP X  
Application Load Balancer: Web-server-LT

### VPC Lattice integration options Info

To improve networking capabilities and scalability, integrate your Auto Scaling group with VPC Lattice. VPC Lattice facilitates communications between AWS services and helps you connect and manage your applications across compute services in AWS.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateAutoScalingGroup: [Alt+S]

Services Search N. Virginia Subham Pradhan

Step 5 - optional  
[Add notifications](#)

Desired capacity  
Specify your group size.  
2

Step 6 - optional  
[Add tags](#)

Step 7  
[Review](#)

**Scaling** Info  
You can resize your Auto Scaling group manually or automatically to meet changes in demand.

**Scaling limits**  
Set limits on how much your desired capacity can be increased or decreased.

Min desired capacity: 2  
Max desired capacity: 2

Equal or less than desired capacity  
Equal or greater than desired capacity

**Automatic scaling - optional**  
Choose whether to use a target tracking policy Info  
You can set up other metric-based scaling policies and scheduled scaling after creating your Auto Scaling group.

No scaling policies  
Your Auto Scaling group will remain at its initial size and will not dynamically resize to meet demand.

Target tracking scaling policy  
Choose a CloudWatch metric and target value and let the scaling policy adjust the desired capacity in proportion to the metric's value.

**Instance maintenance policy - new** Info  
Control your Auto Scaling group's availability during instance replacement events. This includes health checks, instance refreshes, maximum instance lifetime features and events that happen automatically to keep your group balanced, called rebalancing events.

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#AutoScalingGroups:

EC2 Services Search [Alt+S] EC2 > Auto Scaling groups

Auto Scaling groups (2) Info C Launch configurations Launch templates Actions Create Auto Scaling group

Search your Auto Scaling groups

<input type="checkbox"/>	Name	Launch template/configuration	Instances	Status	Desired capacity	Min	Max
<input type="checkbox"/>	<a href="#">WebserverASG</a>	<a href="#">WebTier-LaunchTemplate</a>   Version Default	2	-	2	2	2
<input type="checkbox"/>	<a href="#">AppserverASG</a>	<a href="#">AppTier-LaunchTemplate</a>   Version Default	2	-	2	2	2

0 Auto Scaling groups selected

Select an Auto Scaling group

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us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#LoadBalancers:

Services Search [Alt+S]

EC2 > Load balancers

Load balancers (1/2)

Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.

Filter load balancers

Name DNS name State VPC ID Availability Zones Type Date created

Name	DNS name	State	VPC ID	Availability Zones	Type	Date created
<input checked="" type="checkbox"/> Web-server-LT	Web-server-LT-21238073...	Active	vpc-02af9ec2fad7ffb7c	2 Availability Zones	application	November 26
<input type="checkbox"/> App-tier-internal-lb	internal-App-tier-internal-...	Active	vpc-02af9ec2fad7ffb7c	2 Availability Zones	application	November 26

Actions Create load balancer

Load balancer: Web-server-LT

Application Active vpc-02af9ec2fad7ffb7c IPv4

Scheme Hosted zone Availability Zones Date created

Internet-facing Z355XD0TRQ7X7K subnet-0a8d6e5542317c7c7 us-east-1b (use1-az4) November 26, 2023, 14:57 (UTC+05:30)

subnet-0622093a71429752e us-east-1a (use1-az2)

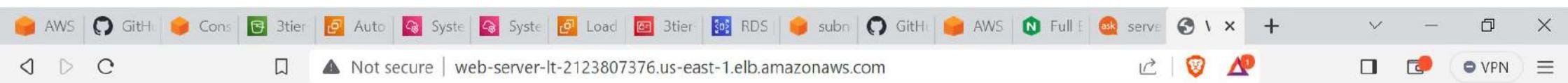
DNS name copied

Load balancer ARN arn:aws:elasticloadbalancing:us-east-1:782921506756:loadbalancer/app/Web-server-LT/d13d803b84ab34df

Web-server-LT-2123807376.us-east-1.elb.amazonaws.com (A Record)

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# Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to [nginx.org](http://nginx.org).  
Commercial support is available at [nginx.com](http://nginx.com).

*Thank you for using nginx.*

