

 Search

AWS Academy Student (Building a Highly Available, Scalable Web Application)

Salman Ali · [Follow](#)

26 min read · Oct 16, 2023

[Listen](#)[Share](#)

This project requires an understanding of core AWS services, such as compute, storage, networking, and database services. The project also requires knowledge of architectural best practices, such as high availability, scalability, and security. Students should have completed the AWS Academy Cloud Architecting course to gain this necessary knowledge. Students who have completed the AWS Academy Cloud Foundations course and are enrolled in the AWS Academy Cloud Architecting course can also try to complete this project with the help of course materials, labs from courses, and educator guidance. Knowledge of any programming language, such as Python or JavaScript, is an advantage but isn't mandatory.

Your Scenario is to plan, design, build, and deploy the web application to the AWS Cloud in a way that is consistent with best practices of the AWS Well-Architected Framework. During the peak admissions period, the application must support thousands of users, and be highly available, scalable, load-balanced, secure, and high performing.

Create an architectural diagram to depict various AWS services and their interactions with each other.

Estimate the cost of using services by using the AWS Pricing Calculator.

Deploy a functional web application that runs on a single virtual machine and is backed by a relational database.

Architect a web application to separate layers of the application, such as the web server and database.

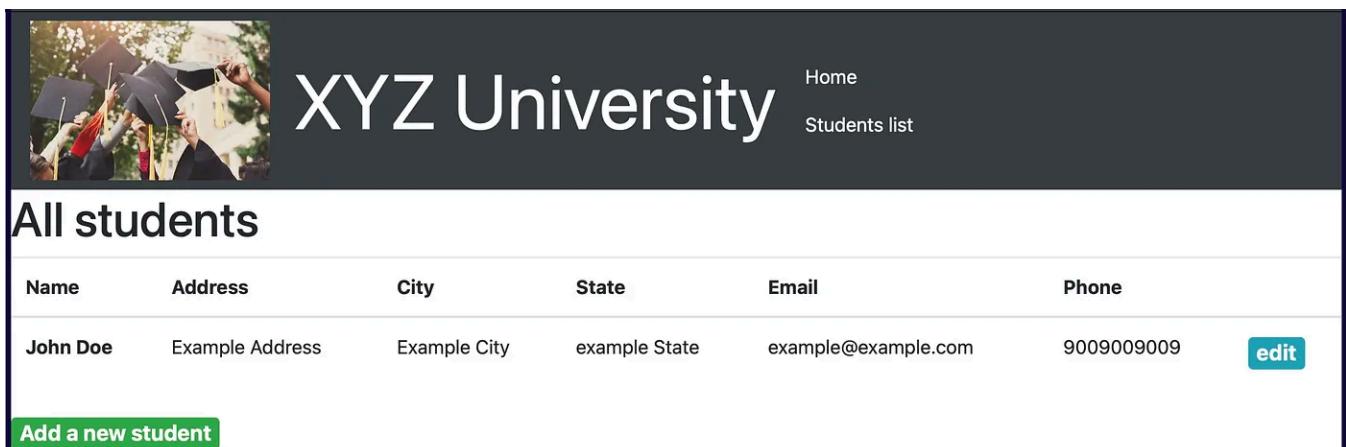
Create a virtual network that is configured appropriately to host a web application that is publicly accessible and secure.

Deploy a web application with the load distributed across multiple web servers.

Configure the appropriate network security settings for the web servers and database.

Implement high availability and scalability in the deployed solution.

Configure access permissions between AWS services.



The screenshot shows a web application for managing student records. At the top, there is a dark header bar with the text "XYZ University" in large white letters. To the right of the logo are links for "Home" and "Students list". Below the header, there is a section titled "All students" with a green background. This section contains a table with columns for Name, Address, City, State, Email, and Phone. A single row of data is shown: "John Doe", "Example Address", "Example City", "example State", "example@example.com", and "9009009009". To the right of the phone number is a blue "edit" button. At the bottom of this section is a green button labeled "Add a new student".

- **Functional:** The solution meets the functional requirements, such as the ability to view, add, delete, or modify the student records, without any perceivable delay.
- **Load balanced:** The solution can properly balance user traffic to avoid overloaded or underutilized resources.
- **Scalable:** The solution is designed to scale to meet the demands that are placed on the application.
- **Highly available:** The solution is designed to have limited downtime when a web server becomes unavailable.

Secure: The database is secured and can't be accessed directly from public networks.

The web servers and database can be accessed only over the appropriate ports.

The web application is accessible over the internet.

The database credentials aren't hardcoded into the web application.

- **Cost-optimized:** The solution is designed to keep costs low.
- **High performing:** The routine operations (viewing, adding, deleting, or modifying records) are performed without a perceivable delay under normal, variable, and peak loads.

Assumptions

This project will be built in a controlled lab environment that has restrictions on services, features, and budget. Consider the following assumptions for the project:

- The application is deployed in one AWS Region (the solution **does not need to be multi-regional**).
- The website **does not need to be** available over HTTPS or a custom domain (We will not utilize Amazon CloudFront, Route 53).
- The solution is deployed on *Ubuntu* machines by using the JavaScript code that is provided.
- Use the JavaScript code as written unless the instructions specifically direct you to change the code.
- The solution uses services and features within the restrictions of the lab environment.
- The *database* is hosted only in a **single Availability Zone**.
- The **website is publicly accessible without authentication**.
- The estimation of cost is approximate.

Disclaimer: A security best practice is to allow access to the website through the university network and authentication. However, because you are building this application as a POC.

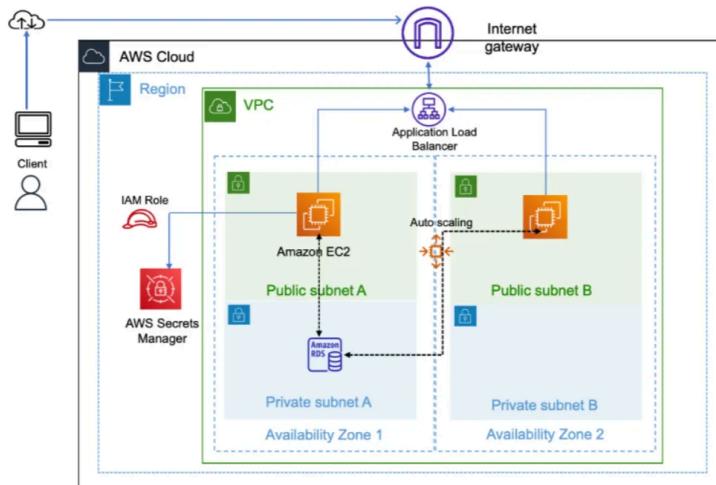
Planning the design and estimating the cost

Planning design You can use several tools to create architecture design one of the recommended tools is a [lucid chart](#), you would like to download an AWS Official [architecture icon](#), and you would like to find references architecture [AWS Reference Architecture Diagrams](#).

To find the estimated cost in AWS using the [AWS Pricing Calculator](#), you can also check AWS resources cost for example [Amazon Route 53](#) pricing just to make sure of cost because sometimes the pricing calculator is not updated to the latest.

Important: The AWS Pricing Calculator provides only an estimate of your AWS fees and doesn't include any taxes that might apply. Your actual fees depend on a variety of factors, including your actual usage of AWS services.

I've planned out some architecture as well as a pricing calculator below; feel free to come up with your designs:



First, we will create VPC: A Virtual Private Cloud (VPC) is a virtual network on the cloud that enables you to securely connect and manage resources within your cloud environment. It provides isolation and control over your network infrastructure, allowing you to define and configure network settings according to your specific requirements.

At the top of the AWS Management Console, in the search bar, search for and choose **VPC**

Create VPC, and configure the following:

Resources to create: **Choose VPC only**

Name tag: Enter the name you want to define

IPv4 CIDR: Enter **10.0.0.0/16** Note: The CIDR range that is provided for the VPC configuration is only an example. You can use a different range as allowed by the lab environment.

Choose **Create VPC**.

VPC > Your VPCs > Create VPC

Create VPC Info

A VPC is an isolated portion of the AWS Cloud populated by AWS objects, such as Amazon EC2 instances.

VPC settings

Resources to create Info
Create only the VPC resource or the VPC and other networking resources.

VPC only VPC and more

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

IPv4 CIDR block Info
 IPv4 CIDR manual input
 IPAM-allocated IPv4 CIDR block

IPv4 CIDR
10.0.0.0/16
CIDR block size must be between /16 and /28.

IPv6 CIDR block Info
 No IPv6 CIDR block
 IPAM-allocated IPv6 CIDR block
 Amazon-provided IPv6 CIDR block
 IPv6 CIDR owned by me

Tenancy Info
Default

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 - <i>optional</i>
<input type="text"/> Name <input type="button" value="X"/>	<input type="text"/> myvpc <input type="button" value="X"/> Remove tag

Add tag
You can add 49 more tags

Cancel

VPC CIDR block in AWS is a crucial element in defining the IP address range for your VPC. It determines the number of IP addresses available for your resources and subnets. When choosing a CIDR block, you should consider the size, potential overlap, scaling needs, and subnetting requirements of your VPC.

The notation “10.0.0.0/16” represents a block of IP addresses ranging from 10.0.0.0 to 10.0.255.255. The “/16” indicates the subnet mask, which means that the first 16 bits of the IP address are fixed and the remaining 16 bits can be used to assign specific addresses within that range. This allows for a total of 65,536 possible IP addresses within the 10.0.0.0/16 subnet.

On the other hand, “10.0.0.0/24” represents a smaller block of IP addresses ranging from 10.0.0.0 to 10.0.0.255. The “/24” subnet mask means that the first 24 bits are fixed, leaving only 8 bits available for addressing. This results in a total of 256 possible IP addresses within the 10.0.0.0/24 subnet.

VPC reserve 5 IP address so you always subtract the IP address that you will receive for example 256 IP address subtract 5, and the available IP address is 251 address.

Note: Add more IP address for private resources than public IP resources.

IPv4 is always enabled default, you can enable ipv6 but you can't remove IPv4

Update the settings for the VPC:

Choose Actions > **Edit VPC settings**.

In the DNS settings section, **select Enable DNS hostnames**.

Choose **Save**.

Your VPCs (1/4) [Info](#)

Actions ▲					Create VPC
					Create default VPC
					Create flow log
					Edit VPC settings
					Edit CIDRs
					Manage middlebox routes
					Manage tags
					Delete VPC

Search

Name	VPC ID	State	IPv4 CIDR
project-vpc	vpc-03de216fbffdb605e	Available	10.0.0.0/16
-	vpc-046a53731ac73f0aa	Available	172.31.0.0/16
<input checked="" type="checkbox"/> myvpc	vpc-099fa1f9a542408dc	Available	10.0.0.0/16
<input type="checkbox"/> vpcsr	vpc-028d38598b0d2e415	Available	10.0.0.0/16

DNS settings

Enable DNS resolution [Info](#)

Enable DNS hostnames [Info](#)

We will create Components of VPC, A VPC consists of the following components:

- Subnets:** Subnets are subdivisions of a VPC's IP address range. They allow you to logically isolate resources within your VPC and control access to them. You can configure routing tables at the subnet level to control traffic flow.
- Internet Gateway:** An Internet Gateway (IGW) is a horizontally scalable, redundant component that provides a connection between your VPC and the Internet. It allows resources in your VPC to communicate with the internet and vice versa.
- Route Tables:** Route tables define the rules for routing traffic within your VPC. Each subnet is associated with a route table, which determines how traffic is directed between subnets, the Internet, and other connected networks.

In the navigation pane, choose **Internet gateways**, and configure the following:

Choose: **Create internet gateway**

Name tag: **NameForYourIGW**

Choose **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.

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

 X

Value - optional

 XRemoveAdd new tag

You can add 49 more tags.

CancelCreate internet gateway

Internet Gateway: An Internet Gateway (IGW) is a horizontally scalable, redundant component that provides a connection between your VPC and the Internet. It allows resources in your VPC to communicate with the internet and vice versa.

Attach the internet gateway to the VPC:

Choose Actions > Attach to VPC.

Available VPCs: Choose VPCThatWeCreated

Choose Attach internet gateway

igw-0db4d4c9e1a5c3cae / accesstointernet

Actions ▲

Details Info

Internet gateway ID
 igw-0db4d4c9e1a5c3cae

State
 Detached

VPC ID
-

Owner
 626828110804

Attach to VPC

Detach from VPC

Manage tags

Delete

Tags

Manage tags

< 1 > ⚙

Key	Value
Name	accesstointernet

Attach to VPC (igw-0db4d4c9e1a5c3cae) Info

VPC

Attach an internet gateway to a VPC to enable the VPC to communicate with the internet. Specify the VPC to attach below.

Available VPCs

Attach the internet gateway to this VPC.

Select a VPC

vpc-099fa1f9a542408dc - myvpc

▶ AWS Command Line Interface command

vpc-099fa1f9a542408dc - myvpc

Cancel

Attach internet gateway

In the navigation pane, choose Subnets, and configure the following: Choose Create subnet. •

VPC ID: Choose VPCThatWeHaveCreated

Subnet name: Enter **Public Subnet 1**

Availability Zone: Choose the first Availability Zone from the dropdown list

IPv4 VPC CIDR block: Enter **10.0.0.0/16**

IPv4 subnet CIDR block: Enter **10.0.1.0/24**

Choose **Create subnet**

Create subnet Info

VPC

VPC ID

Create subnets in this VPC.

vpc-099fa1f9a542408dc (myvpc) ▾

Associated VPC CIDRs

IPv4 CIDRs

10.0.0.0/16

Subnet settings

Specify the CIDR blocks and Availability Zone for the subnet.

Subnet 1 of 1

Subnet name

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

publicsubnet

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.

US East (N. Virginia) / us-east-1a ▾

IPv4 VPC CIDR block Info

Choose the IPv4 VPC CIDR block to create a subnet in.

10.0.0.0/16 ▾

IPv4 subnet CIDR block

10.0.1.0/24

256 IPs

< > ^ v

▼ Tags - optional

Key

Value - optional

Name X

publicsubnet X

Remove

Add new tag

You can add 49 more tags.

Remove

Subnets: Subnets are subdivisions of a VPC's IP address range. They allow you to logically isolate resources within your VPC and control access to them. You can configure routing tables at the subnet level to control traffic flow.

create one more time but make sure the Ipv4 subnet CIDR Block is different and does not overlap:

For example, use Public subnet 2 CIDR 10.0.2.0/24 to put AZ in a different Availability zone to make it highly available, add another subnet to specific another

AZ because you can only associate to 1 AZ only.

We need to auto-assign public IPv4, public IP is not enabled by default, *you need to Enable auto-assign public IP.*

The screenshot shows the AWS Subnets (1/2) page. A list of subnets is displayed with columns: Name, Subnet ID, State, and VPC. Two subnets are listed: 'publicsubnet' (selected) and 'publicsubnet2'. The 'Actions' menu for 'publicsubnet' is open, showing options like 'View details', 'Create flow log', and 'Edit subnet settings', with 'Edit subnet settings' being highlighted.

Name	Subnet ID	State	VPC
publicsubnet	subnet-069976d27a8d169b5	Available	vpc-099fa1f9a5
publicsubnet2	subnet-04f369654b256df55	Available	vpc-099fa1f9a5

The screenshot shows the 'Edit subnet settings' dialog box. It contains three main sections:

- Auto-assign IP settings**: Includes an option to 'Enable auto-assign public IPv4 address' (checked) and another for 'Enable auto-assign customer-owned IPv4 address' (disabled).
- Resource-based name (RBN) settings**: Includes an option to 'Enable resource name DNS A record on launch' (unchecked), an option for 'Enable resource name DNS AAAA record on launch' (unchecked), and a 'Hostname type' section where 'IP name' is selected.
- DNS64 settings**: Includes an option to 'Enable DNS64' (unchecked).

At the bottom right of the dialog are 'Cancel' and 'Save' buttons.

Make sure to Enable the **Auto-assign IP** setting, it allows for the automatic allocation of IPv4 addresses to instances launched within the **public subnet**. This means that whenever you launch a new instance in the subnet, it will automatically be assigned a **unique public IPv4 address**. *This eliminates the need for manual configuration and ensures that each instance has a distinct address for communication purposes.*

Fun fact: When you stop your instance and start it, the public IP changes however the private IP address stays the same.

Route Table: Give your route table the name *PublicRouteTable* and select the VPC we created:

The screenshot shows the 'Create route table' wizard. In the 'Route table settings' section, the 'Name - optional' field contains 'PublicRouteTable'. Under 'VPC', the dropdown shows 'vpc-099fa1f9a542408dc (myvpc)'. In the 'Tags' section, there is one tag: 'Name' with value 'PublicRouteTable'. At the bottom, there are 'Cancel' and 'Create route table' buttons.

Click on the “Create” button to complete the process.

A public route table in AWS is a network resource that controls the **traffic flow** between subnets within a virtual private cloud (VPC) and the **internet**. It contains a set of rules, known as **routes**, that determine how traffic is directed. In this section, we will explore the key features and components of an AWS public route table.

Route → Edit routes → (destination 0.0.0.0/0 means **Anywhere**) (target Internet gateway)

Routes	Subnet associations	Edge associations	Route propagation	Tags
Routes (1)				
<input type="text"/> Filter routes	Both	Edit routes	< 1 >	⚙️
Destination	Target	Status	Propagated	
10.0.0.0/16	local	Active	No	

Edit routes

Destination	Target	Status	Propagated
10.0.0.0/16	local	Active	No
<input type="text"/> Q 0.0.0.0/0	<input type="text"/> Q igw- igw-0db4d4c9e1a5c3cae (accesstointernet)	-	No
<input type="button" value="Add route"/> <input type="button" value="Cancel"/> <input type="button" value="Preview"/> <input type="button" value="Save changes"/>			

When it comes to routing traffic, AWS **public route tables** function similarly to traditional routing tables. They use a destination-based routing model, where each route in the table specifies a destination CIDR block and a target. The target can be an **internet gateway**, a subnet has auto-assigned public IPv4.

Now we need to edit explicit **subnet associations** (*attach subnet to our route table*)

Routes	Subnet associations	Edge associations	Route propagation	Tags
Explicit subnet associations (0)				
<input type="text"/> Find subnet association	Edit subnet associations	< 1 >	⚙️	
Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	
No subnet associations You do not have any subnet associations.				
Subnets without explicit associations (2)				
The following subnets have not been explicitly associated with any route tables and are therefore associated with the main route table:				
<input type="text"/> Find subnet association	Edit subnet associations	< 1 >	⚙️	
Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	
publicsubnet	subnet-069976d27a8d169b5	10.0.1.0/24	-	
publicsubnet2	subnet-04f369654b256df55	10.0.2.0/24	-	

Explicit subnet associations

Edit subnet associations.

Select and Add a Public subnet to attach to the route table.

Edit subnet associations

Change which subnets are associated with this route table.

Available subnets (2/2)					
<input checked="" type="checkbox"/>	Name	Subnet ID	IPv4 CIDR	IPv6 CIDR	Route table ID
<input checked="" type="checkbox"/>	publicsubnet	subnet-069976d27a8d169b5	10.0.1.0/24	-	Main (rtb-0532d9f100b469423)
<input checked="" type="checkbox"/>	publicsubnet2	subnet-04f369654b256df55	10.0.2.0/24	-	Main (rtb-0532d9f100b469423)

Selected subnets

subnet-04f369654b256df55 / publicsubnet2 X subnet-069976d27a8d169b5 / publicsubnet X

Once you have created a public route table, you can configure its routes and associate it with subnets within your VPC. By associating a subnet with a route table, you enable the subnets to use the routes defined in the table for traffic routing.

It's important to note that a VPC can have **multiple route tables**, but each **subnet** can only be associated with **one route table** at a time. This allows you to have different routing configurations for different subnets within your VPC.

for example, we will **create now a *private subnet* associated with a *private route table***.

Create the same procedure as creating a public subnet but for the private subnet.

Make sure CIDR block different as well as availability zone. example:

Private subnet 10.0.3.0/24. AZ (1a).

Private subnet2 10.0.4.0/24. AZ (1b).

Important note: *no need to assign* (auto-assign public IPv4), because it's private no need to have a public IPv4.

Create a Private Route Table, In the Amazon VPC dashboard, click on Route Tables in the left navigation pane.

The screenshot shows the AWS VPC dashboard interface. At the top, there is a header bar with the AWS logo, a 'Services' button, and a search bar. Below the header, the main content area has a title 'VPC dashboard' with a close button ('X'). Underneath, there is a section titled 'EC2 Global View' with a 'New' badge. A dropdown menu labeled 'Select a VPC' is open. The left sidebar contains a collapsed section 'Virtual private cloud' and several other options: 'Your VPCs' (with a 'New' badge), 'Subnets', 'Route tables' (which is currently selected and highlighted in blue), 'Internet gateways', 'Egress-only internet gateways', and 'Carrier gateways'.

2. Click on the **Create Route Table** button

The screenshot shows the 'Create route table' page in the AWS VPC console. At the top, there is a navigation bar with a refresh icon, an 'Actions' dropdown menu, and a large orange 'Create route table' button. Below the navigation bar, there are navigation arrows (left, right, first, last) and a gear icon for settings. The main content area has a breadcrumb trail: 'VPC > Route tables > Create route table'. The title 'Create route table' is followed by an 'Info' link. A descriptive text explains that a route table specifies packet forwarding between subnets, VPC, internet, and VPN. The 'Route table settings' section contains a 'Name - optional' field with the value 'Private Route Table'. The 'VPC' section shows the selected VPC as 'vpc-099fa1f9a542408dc (myvpc)'. The 'Tags' section allows adding tags, with one tag 'Name: Private Route Table' already present. At the bottom, there are 'Cancel' and 'Create route table' buttons.

Step 4: Associate Subnets with the Route Table

1. In the **Route Tables** dashboard, locate the newly created private route table.
2. Click on the **Actions** button and select **Edit Subnet Associations**.

rtb-0aa14bad926e850a8 / Private Route Table

Actions ▾

Details [Info](#)

Route table ID rtb-0aa14bad926e850a8	Main <input checked="" type="checkbox"/> No	Explicit subnet associations -	Edge associations -
VPC vpc-099fa1f9a542408dc myvpc	Owner ID 626828110804		

Routes [Subnet associations](#) [Edge associations](#) [Route propagation](#) [Tags](#)

Explicit subnet associations (0)

[Edit subnet associations](#) [Find subnet association](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) [21](#) [22](#) [23](#) [24](#) [25](#) [26](#) [27](#) [28](#) [29](#) [30](#) [31](#) [32](#) [33](#) [34](#) [35](#) [36](#) [37](#) [38](#) [39](#) [40](#) [41](#) [42](#) [43](#) [44](#) [45](#) [46](#) [47](#) [48](#) [49](#) [50](#) [51](#) [52](#) [53](#) [54](#) [55](#) [56](#) [57](#) [58](#) [59](#) [60](#) [61](#) [62](#) [63](#) [64](#) [65](#) [66](#) [67](#) [68](#) [69](#) [70](#) [71](#) [72](#) [73](#) [74](#) [75](#) [76](#) [77](#) [78](#) [79](#) [80](#) [81](#) [82](#) [83](#) [84](#) [85](#) [86](#) [87](#) [88](#) [89](#) [90](#) [91](#) [92](#) [93](#) [94](#) [95](#) [96](#) [97](#) [98](#) [99](#) [100](#) [101](#) [102](#) [103](#) [104](#) [105](#) [106](#) [107](#) [108](#) [109](#) [110](#) [111](#) [112](#) [113](#) [114](#) [115](#) [116](#) [117](#) [118](#) [119](#) [120](#) [121](#) [122](#) [123](#) [124](#) [125](#) [126](#) [127](#) [128](#) [129](#) [130](#) [131](#) [132](#) [133](#) [134](#) [135](#) [136](#) [137](#) [138](#) [139](#) [140](#) [141](#) [142](#) [143](#) [144](#) [145](#) [146](#) [147](#) [148](#) [149](#) [150](#) [151](#) [152](#) [153](#) [154](#) [155](#) [156](#) [157](#) [158](#) [159](#) [160](#) [161](#) [162](#) [163](#) [164](#) [165](#) [166](#) [167](#) [168](#) [169](#) [170](#) [171](#) [172](#) [173](#) [174](#) [175](#) [176](#) [177](#) [178](#) [179](#) [180](#) [181](#) [182](#) [183](#) [184](#) [185](#) [186](#) [187](#) [188](#) [189](#) [190](#) [191](#) [192](#) [193](#) [194](#) [195](#) [196](#) [197](#) [198](#) [199](#) [200](#) [201](#) [202](#) [203](#) [204](#) [205](#) [206](#) [207](#) [208](#) [209](#) [210](#) [211](#) [212](#) [213](#) [214](#) [215](#) [216](#) [217](#) [218](#) [219](#) [220](#) [221](#) [222](#) [223](#) [224](#) [225](#) [226](#) [227](#) [228](#) [229](#) [230](#) [231](#) [232](#) [233](#) [234](#) [235](#) [236](#) [237](#) [238](#) [239](#) [240](#) [241](#) [242](#) [243](#) [244](#) [245](#) [246](#) [247](#) [248](#) [249](#) [250](#) [251](#) [252](#) [253](#) [254](#) [255](#) [256](#) [257](#) [258](#) [259](#) [260](#) [261](#) [262](#) [263](#) [264](#) [265](#) [266](#) [267](#) [268](#) [269](#) [270](#) [271](#) [272](#) [273](#) [274](#) [275](#) [276](#) [277](#) [278](#) [279](#) [280](#) [281](#) [282](#) [283](#) [284](#) [285](#) [286](#) [287](#) [288](#) [289](#) [290](#) [291](#) [292](#) [293](#) [294](#) [295](#) [296](#) [297](#) [298](#) [299](#) [300](#) [301](#) [302](#) [303](#) [304](#) [305](#) [306](#) [307](#) [308](#) [309](#) [310](#) [311](#) [312](#) [313](#) [314](#) [315](#) [316](#) [317](#) [318](#) [319](#) [320](#) [321](#) [322](#) [323](#) [324](#) [325](#) [326](#) [327](#) [328](#) [329](#) [330](#) [331](#) [332](#) [333](#) [334](#) [335](#) [336](#) [337](#) [338](#) [339](#) [340](#) [341](#) [342](#) [343](#) [344](#) [345](#) [346](#) [347](#) [348](#) [349](#) [350](#) [351](#) [352](#) [353](#) [354](#) [355](#) [356](#) [357](#) [358](#) [359](#) [360](#) [361](#) [362](#) [363](#) [364](#) [365](#) [366](#) [367](#) [368](#) [369](#) [370](#) [371](#) [372](#) [373](#) [374](#) [375](#) [376](#) [377](#) [378](#) [379](#) [380](#) [381](#) [382](#) [383](#) [384](#) [385](#) [386](#) [387](#) [388](#) [389](#) [390](#) [391](#) [392](#) [393](#) [394](#) [395](#) [396](#) [397](#) [398](#) [399](#) [400](#) [401](#) [402](#) [403](#) [404](#) [405](#) [406](#) [407](#) [408](#) [409](#) [410](#) [411](#) [412](#) [413](#) [414](#) [415](#) [416](#) [417](#) [418](#) [419](#) [420](#) [421](#) [422](#) [423](#) [424](#) [425](#) [426](#) [427](#) [428](#) [429](#) [430](#) [431](#) [432](#) [433](#) [434](#) [435](#) [436](#) [437](#) [438](#) [439](#) [440](#) [441](#) [442](#) [443](#) [444](#) [445](#) [446](#) [447](#) [448](#) [449](#) [450](#) [451](#) [452](#) [453](#) [454](#) [455](#) [456](#) [457](#) [458](#) [459](#) [460](#) [461](#) [462](#) [463](#) [464](#) [465](#) [466](#) [467](#) [468](#) [469](#) [470](#) [471](#) [472](#) [473](#) [474](#) [475](#) [476](#) [477](#) [478](#) [479](#) [480](#) [481](#) [482](#) [483](#) [484](#) [485](#) [486](#) [487](#) [488](#) [489](#) [490](#) [491](#) [492](#) [493](#) [494](#) [495](#) [496](#) [497](#) [498](#) [499](#) [500](#) [501](#) [502](#) [503](#) [504](#) [505](#) [506](#) [507](#) [508](#) [509](#) [510](#) [511](#) [512](#) [513](#) [514](#) [515](#) [516](#) [517](#) [518](#) [519](#) [520](#) [521](#) [522](#) [523](#) [524](#) [525](#) [526](#) [527](#) [528](#) [529](#) [530](#) [531](#) [532](#) [533](#) [534](#) [535](#) [536](#) [537](#) [538](#) [539](#) [540](#) [541](#) [542](#) [543](#) [544](#) [545](#) [546](#) [547](#) [548](#) [549](#) [550](#) [551](#) [552](#) [553](#) [554](#) [555](#) [556](#) [557](#) [558](#) [559](#) [560](#) [561](#) [562](#) [563](#) [564](#) [565](#) [566](#) [567](#) [568](#) [569](#) [570](#) [571](#) [572](#) [573](#) [574](#) [575](#) [576](#) [577](#) [578](#) [579](#) [580](#) [581](#) [582](#) [583](#) [584](#) [585](#) [586](#) [587](#) [588](#) [589](#) [590](#) [591](#) [592](#) [593](#) [594](#) [595](#) [596](#) [597](#) [598](#) [599](#) [600](#) [601](#) [602](#) [603](#) [604](#) [605](#) [606](#) [607](#) [608](#) [609](#) [610](#) [611](#) [612](#) [613](#) [614](#) [615](#) [616](#) [617](#) [618](#) [619](#) [620](#) [621](#) [622](#) [623](#) [624](#) [625](#) [626](#) [627](#) [628](#) [629](#) [630](#) [631](#) [632](#) [633](#) [634](#) [635](#) [636](#) [637](#) [638](#) [639](#) [640](#) [641](#) [642](#) [643](#) [644](#) [645](#) [646](#) [647](#) [648](#) [649](#) [650](#) [651](#) [652](#) [653](#) [654](#) [655](#) [656](#) [657](#) [658](#) [659](#) [660](#) [661](#) [662](#) [663](#) [664](#) [665](#) [666](#) [667](#) [668](#) [669](#) [670](#) [671](#) [672](#) [673](#) [674](#) [675](#) [676](#) [677](#) [678](#) [679](#) [680](#) [681](#) [682](#) [683](#) [684](#) [685](#) [686](#) [687](#) [688](#) [689](#) [690](#) [691](#) [692](#) [693](#) [694](#) [695](#) [696](#) [697](#) [698](#) [699](#) [700](#) [701](#) [702](#) [703](#) [704](#) [705](#) [706](#) [707](#) [708](#) [709](#) [710](#) [711](#) [712](#) [713](#) [714](#) [715](#) [716](#) [717](#) [718](#) [719](#) [720](#) [721](#) [722](#) [723](#) [724](#) [725](#) [726](#) [727](#) [728](#) [729](#) [730](#) [731](#) [732](#) [733](#) [734](#) [735](#) [736](#) [737](#) [738](#) [739](#) [740](#) [741](#) [742](#) [743](#) [744](#) [745](#) [746](#) [747](#) [748](#) [749](#) [750](#) [751](#) [752](#) [753](#) [754](#) [755](#) [756](#) [757](#) [758](#) [759](#) [760](#) [761](#) [762](#) [763](#) [764](#) [765](#) [766](#) [767](#) [768](#) [769](#) [770](#) [771](#) [772](#) [773](#) [774](#) [775](#) [776](#) [777](#) [778](#) [779](#) [780](#) [781](#) [782](#) [783](#) [784](#) [785](#) [786](#) [787](#) [788](#) [789](#) [790](#) [791](#) [792](#) [793](#) [794](#) [795](#) [796](#) [797](#) [798](#) [799](#) [800](#) [801](#) [802](#) [803](#) [804](#) [805](#) [806](#) [807](#) [808](#) [809](#) [810](#) [811](#) [812](#) [813](#) [814](#) [815](#) [816](#) [817](#) [818](#) [819](#) [820](#) [821](#) [822](#) [823](#) [824](#) [825](#) [826](#) [827](#) [828](#) [829](#) [830](#) [831](#) [832](#) [833](#) [834](#) [835](#) [836](#) [837](#) [838](#) [839](#) [840](#) [841](#) [842](#) [843](#) [844](#) [845](#) [846](#) [847](#) [848](#) [849](#) [850](#) [851](#) [852](#) [853](#) [854](#) [855](#) [856](#) [857](#) [858](#) [859](#) [860](#) [861](#) [862](#) [863](#) [864](#) [865](#) [866](#) [867](#) [868](#) [869](#) [870](#) [871](#) [872](#) [873](#) [874](#) [875](#) [876](#) [877](#) [878](#) [879](#) [880](#) [881](#) [882](#) [883](#) [884](#) [885](#) [886](#) [887](#) [888](#) [889](#) [890](#) [891](#) [892](#) [893](#) [894](#) [895](#) [896](#) [897](#) [898](#) [899](#) [900](#) [901](#) [902](#) [903](#) [904](#) [905](#) [906](#) [907](#) [908](#) [909](#) [910](#) [911](#) [912](#) [913](#) [914](#) [915](#) [916](#) [917](#) [918](#) [919](#) [920](#) [921](#) [922](#) [923](#) [924](#) [925](#) [926](#) [927](#) [928](#) [929](#) [930](#) [931](#) [932](#) [933](#) [934](#) [935](#) [936](#) [937](#) [938](#) [939](#) [940](#) [941](#) [942](#) [943](#) [944](#) [945](#) [946](#) [947](#) [948](#) [949](#) [950](#) [951](#) [952](#) [953](#) [954](#) [955](#) [956](#) [957](#) [958](#) [959](#) [960](#) [961](#) [962](#) [963](#) [964](#) [965](#) [966](#) [967](#) [968](#) [969](#) [970](#) [971](#) [972](#) [973](#) [974](#) [975](#) [976](#) [977](#) [978](#) [979](#) [980](#) [981](#) [982](#) [983](#) [984](#) [985](#) [986](#) [987](#) [988](#) [989](#) [990](#) [991](#) [992](#) [993](#) [994](#) [995](#) [996](#) [997](#) [998](#) [999](#) [1000](#) [1001](#) [1002](#) [1003](#) [1004](#) [1005](#) [1006](#) [1007](#) [1008](#) [1009](#) [1010](#) [1011](#) [1012](#) [1013](#) [1014](#) [1015](#) [1016](#) [1017](#) [1018](#) [1019](#) [1020](#) [1021](#) [1022](#) [1023](#) [1024](#) [1025](#) [1026](#) [1027](#) [1028](#) [1029](#) [1030](#) [1031](#) [1032](#) [1033](#) [1034](#) [1035](#) [1036](#) [1037](#) [1038](#) [1039](#) [1040](#) [1041](#) [1042](#) [1043](#) [1044](#) [1045](#) [1046](#) [1047](#) [1048](#) [1049](#) [1050](#) [1051](#) [1052](#) [1053](#) [1054](#) [1055](#) [1056](#) [1057](#) [1058](#) [1059](#) [1060](#) [1061](#) [1062](#) [1063](#) [1064](#) [1065](#) [1066](#) [1067](#) [1068](#) [1069](#) [1070](#) [1071](#) [1072](#) [1073](#) [1074](#) [1075](#) [1076](#) [1077](#) [1078](#) [1079](#) [1080](#) <a href

Routes	Subnet associations	Edge associations	Route propagation	Tags
Routes (1)				
<input type="text"/> Filter routes	Both	Edit routes	< 1 >	
Destination	Target	Status	Propagated	
10.0.0.0/16	local	Active	No	

Important note for private subnet:

Private subnet don't have auto-assign public IPv4.

Route table doesn't route to internet gateway which access to the internet, only local traffic in vpc network which is logically isolated.

Destination** field, enter the CIDR block for the network traffic you want to route (e.g., 10.0.0.0/16). Network will move internally only at *VPC Network CIDR Block*.

Creating EC2 for our web application

Click on “Launch Instance” to start the instance creation process.

Instances (6) Info			Connect	Instance state	Actions	Launch instances	< 1 >
<input type="text"/> Find instance by attribute or tag (case-sensitive)							
<input type="checkbox"/>	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone

3. In the Application and OS Images section, under Quick Start, choose **Ubuntu**

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

[Recents](#)[My AMIs](#)[Quick Start](#)[Browse more AMIs](#)

Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type

Free tier eligible

ami-053b0d53c279acc90 (64-bit (x86)) / ami-0a0c8eebcdd6dcdb0 (64-bit (Arm))

Virtualization: hvm ENA enabled: true Root device type: ebs

Description

Canonical, Ubuntu, 22.04 LTS, amd64 jammy image build on 2023-05-16

Architecture

AMI ID

64-bit (x86)

ami-053b0d53c279acc90

Verified provider

4. Select the desired instance type and click on “Next: Configure Instance Details”.
t2.micro for free tier (just for POC, if for production website will increase the instance type based on the specification business need).

In the key pair section, for Key pair name, choose **vockey**

▼ Instance type [Info](#)

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](#)

Additional costs apply for AMIs with pre-installed software

▼ 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 - *required*

vockey

[Create new key pair](#)

In the Network settings section, configure the following:

Choose **Edit**.

VPC: Choose **VPCThatWeHaveCreated**.

Auto-assign public IP: **Choose Enable**.

Note: This allows the instance to have a public IP address automatically assigned to it. This will enable the instance to communicate over the internet.

Firewall (security groups): Choose **Create security group**.

Security group name: **Enter SG NAME YOU WANT**

Choose **Add security group rule**.

Keep the existing SSH rule, and add two new rules with the following settings:

■ New rule 1: For Type, choose **HTTP**. For Source type, choose **Anywhere**. Note: This rule allows traffic from a web browser.

■ New rule 2: For Type, choose MYSQL/Aurora. For Source, enter 10.0.0.0/16 Note: This rule allows data to be exported from the database in a later task.

▼ Network settings [Info](#)

VPC - required [Info](#)

vpc-099fa1f9a542408dc (myvpc)
10.0.0.0/16

Subnet [Info](#)

subnet-069976d27a8d169b5 publicsubnet
VPC: vpc-099fa1f9a542408dc Owner: 626828110804 Availability Zone: us-east-1a
IP addresses available: 251 CIDR: 10.0.1.0/24

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

Security group name - required

EC2-SG

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

Description - required [Info](#)

launch-wizard-3 created 2023-10-11T16:03:15.076Z

Inbound Security Group Rules

▼ Security group rule 1 (TCP, 22, 0.0.0.0/0) [Remove](#)

Type Info	Protocol Info	Port range Info
ssh	TCP	22

Source type [Info](#)

Anywhere

Source [Info](#)

Add CIDR, prefix list or security

0.0.0.0/0 [X](#)

Description - optional [Info](#)

e.g. SSH for admin desktop

▼ Security group rule 2 (TCP, 3306, 10.0.0.0/16, EC2 ACCESS TO RDS) [Remove](#)

Type Info	Protocol Info	Port range Info
MYSQL/Aurora	TCP	3306

Source type [Info](#)

Custom

Source [Info](#)

Add CIDR, prefix list or security

Description - optional [Info](#)

EC2 ACCESS TO RDS

▼ Security group rule 3 (All, All, 0.0.0.0/0)

Remove

Type Info	Protocol Info	Port range Info
All traffic	All	All
Source type Info	Source Info	Description - optional Info
Anywhere	Add CIDR, prefix list or security 0.0.0.0/0 X	e.g. SSH for admin desktop

9. In the “Advanced details” page, you can also specify an **IAM instance profile** if you want the instance to communicate with AWS Secrets Manager or any other AWS services. This allows the instance to have the necessary permissions to access secrets securely.

▼ Advanced details Info

Purchasing option Info	<input type="checkbox"/> Request Spot Instances
Domain join directory Info	Select ▾ <input type="button" value="Create new directory"/>
IAM instance profile Info	LabInstanceProfile ▾ <input type="button" value="Create new IAM profile"/>
Hostname type Info	IP name ▾
DNS Hostname Info	<input checked="" type="checkbox"/> Enable IP name IPv4 (A record) DNS requests <input type="checkbox"/> Enable resource-based IPv4 (A record) DNS requests <input type="checkbox"/> Enable resource-based IPv6 (AAAA record) DNS requests

10. Lastly, you can provide user data on the “Configure Instance Details” page. **User data** is a script that runs on the instance during the boot process. You can specify the necessary steps to be performed after the instance is launched.

```
#!/bin/bash -xe
apt update -y
apt install nodejs unzip wget npm mysql-client -y
# wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACCAP1-
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACCAP1-1
cd /home/ubuntu
unzip code.zip -x "resources/codebase_partner/node_modules/*"
cd resources/codebase_partner
npm install aws aws-sdk
export APP_PORT=80
npm start &
echo '#!/bin/bash -xe
cd /home/ubuntu/resources/codebase_partner
export APP_PORT=80
npm start' > /etc/rc.local
chmod +x /etc/rc.local
```



11. Review all the configurations and click on “Launch” to create the EC2 instance.

Important: Check the formatting of the script after copying it into the user data field. If the code lines appear to be broken.

Note: This script installs Node.js, the student records application (website, JavaScript, CSS, and other files), and the MySQL database on the EC2 instance.

Important: Before Status check column moving to the next task, confirm that the instance is in the Running state and that the says “2/2 checks passed.” This will take a few minutes.

During session:

Did they prepare the cost estimate?

Did they create the architectural diagram?

Did they prepare to present the proposed solution in a presentation?

Did they create a functional web application on an Amazon Elastic Compute Cloud (Amazon EC2) instance?

To test the web application, access it from the internet by using the Public IPv4 address or Public IPv4 DNS of the instance.

Note: Ensure to use http (instead of https) while accessing the web application from the browser.

Perform a few tasks, such as adding new student records, editing records, and deleting records. Keep so that you have data to migrate to a new database in a later task. now have a functional website that is running on an EC2 instance.

Components exist on one virtual machine, is not flexible and is difficult to scale. In the next phase, students will separate the various layers. at least one record in the database The architecture that we have created so far was quick to build, with few components and a low cost. This approach would be suitable for a proof of concept (POC).

CREATING RDS (Relational Database)

The first step is to create a security group that will be associated to the RDS to open the ports needed for connection to the EC2 web server.

Create a security group for the database:

At the top of the AWS Management Console, in the search bar, search for and choose VPC.

In the navigation pane, choose **Security Groups**.

Choose **create Security Group**, and configure the following:

Security group name: Enter YournameDBSG.

Description: Enter **Security group for database**

VPC: Start to enter VPC that we had created and choose it when it appears.

In the **Inbound rules** section, choose **Add rule** and configure the following:

Type: Choose MySQL/Aurora. Source: Enter 10.0.0.0/16 in the field to the right of Custom.

Choose 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-NEW
Name cannot be edited after creation.

Description Info
Allows SSH access to developers

VPC Info
vpc-099fa1f9a542408dc

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>
MySQL/Aurora	TCP	3306	Cust... ▾	<input type="text"/> 10.0.0.0/16 X

Add rule

Outbound rules Info

Type <small>Info</small>	Protocol <small>Info</small>	Port range <small>Info</small>	Destination <small>Info</small>	Description - optional <small>Info</small>
All traffic	All	All	Cust... ▾	<input type="text"/> 0.0.0.0/0 X

Add rule

1. Login to your AWS account and navigate to the Amazon RDS console.

The screenshot shows the AWS search interface. On the left, there's a sidebar with categories: Services (14), Features (32), Resources (New), Blogs (1,977), Documentation (19,024), Knowledge Articles (20), Tutorials (17), and Events (10). The main search bar at the top has the placeholder "Try searching with longer queries for more relevant results". Below the search bar, the word "Services" is highlighted in blue. A search result for "RDS" is displayed, showing the icon, the name "RDS" with a star rating, and the description "Managed Relational Database Service". Below the result, there's a "Top features" section with links to "Dashboard", "Databases", "Query Editor", "Performance Insights", and "Snapshots". At the top right of the main area, there's a link "See all 14 results ▶".

2. Click on “Create database” to start the RDS creation process.



Try the new Amazon RDS Multi-AZ deployment option for MySQL and PostgreSQL.

For your Amazon RDS for MySQL and PostgreSQL workloads, improve transactional commit latencies by 2x, experience faster failover typically less than 35 seconds and, get read scalability with two readable standby DB instances by deploying the Multi-AZ DB cluster [Learn more](#).

X

[Create database](#)

Or, [Restore Multi-AZ DB Cluster from Snapshot](#)

3. Choose the standard creation method and select the MySQL engine and keep the engine version default.

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)



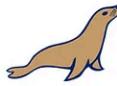
Aurora (PostgreSQL Compatible)



MySQL



MariaDB



PostgreSQL



Oracle

ORACLE®

Microsoft SQL Server



4. In the “Templates” section, choose the “Free Tier” option if you want to use the free tier benefits. This will ensure that you stay within the free tier limits and avoid any charges.

Templates

Choose a sample template to meet your use case.

Production

Use defaults for high availability and fast, consistent performance.

Dev/Test

This instance is intended for development use outside of a production environment.

Free tier

Use RDS Free Tier to develop new applications, test existing applications, or gain hands-on experience with Amazon RDS.

[Info](#)

5. Assign a **name** for your **DB instance identifier**, this name will be unique across all DB instances owned by your AWS Accounts.

Settings

DB instance identifier [Info](#)

Type a name for your DB instance. The name must be unique across all DB instances owned by your AWS account in the current AWS Region.

STUDENTS

The DB instance identifier is case-insensitive, but is stored as all lowercase (as in "mydbinstance"). 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.

6. You have two options to choose either using **master password** or **enable manage master credentials** in AWS Secrets Manager.

Master username: **nodeapp**

*To securely store the **master password**.*

OR

Enable Manage Master credentials in AWS Secrets Managers.

*You can write the **master password** and then use the **Cloud9 IDE** in the next step to create the secret in the secrets manager.*

▼ Credentials Settings

Master username [Info](#)
Type a login ID for the master user of your DB instance.
 ...

1 to 16 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](#)

Select the encryption key [Info](#)
You can encrypt using the KMS key that Secrets Manager creates or a customer managed KMS key that you create.
 ▼ C

[Add new key](#)

▼ Credentials Settings

Master username [Info](#)
Type a login ID for the master user of your DB cluster.
 ...

1 to 16 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](#)

Type: Choose MySQL/Aurora. Source: Enter 10.0.0.0/16 in the field to the right of Custom.

Choose Create security group.

7. Choose the instance type that best suits your needs. For example, you can select the “t3.micro” instance type if you are just starting out and don’t require a lot of computational power.

Instance configuration

The DB instance configuration options below are limited to those supported by the engine that you selected above.

ⓘ **Amazon RDS Optimized Writes - new** [Info](#)
 Show instance classes that support Amazon RDS Optimized Writes

DB instance class [Info](#)

- Standard classes (includes m classes)
- Memory optimized classes (includes r and x classes)
- Burstable classes (includes t classes)**

▼

db.t3.micro

Include previous generation classes

8. Set the storage size for your RDS instance. If you want to use the same storage as the instance type, select the **default** option.

The screenshot shows the 'Storage' configuration section of an AWS RDS instance setup. It includes fields for 'Storage type' (set to 'General Purpose SSD (gp2)'), 'Allocated storage' (set to 20 GiB), and a note about storage optimization. There is also a link to 'Storage autoscaling'.

Storage type [Info](#)
General Purpose SSD (gp2)
Baseline performance determined by volume size

Allocated storage [Info](#)
20 GiB
The minimum value is 20 GiB and the maximum value is 6,144 GiB

Info After you modify the storage for a DB instance, the status of the DB instance will be in storage-optimization. Your instance will remain available as the storage-optimization operation completes.
[Learn more](#)

▶ **Storage autoscaling**

9. Very important step:

Connect to EC2 Compute Resources (it's like attaching EC2 to RDS) no point in connecting RDS and EC2 if your connectivity section is not established.

Ensure that they are in the **same VPC** (Virtual Private Cloud) or have proper network connectivity between them. This can be done by checking the VPC settings and security groups associated with the EC2 instance and the RDS database. **Make sure that the security groups allow incoming and outgoing traffic between the two instances, for RDS we will create the SG in the below guide.**

EC2 instance: choose the public website that we have created.

Connectivity Info



Compute resource

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

Don't connect to an EC2 compute resource

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

Connect to an EC2 compute resource

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

EC2 instance Info

Choose the EC2 instance to add as the compute resource for this database. A VPC security group is added to this EC2 instance. A VPC security group is also added to the database with an inbound rule that allows the EC2 instance to access the database.

i-0935bfe6ea270060c

PublicwebsiteNew



Some VPC settings can't be changed when a compute resource is added

Adding an EC2 compute resource automatically selects the VPC, DB subnet group, and public access settings for this database. To allow the EC2 instance to access the database, a VPC security group rds-ec2-X is added to the database and another called ec2-rds-X to the EC2 instance. You can remove the new security group for the database only by removing the compute resource.

Virtual private cloud (VPC) Info

Choose the VPC. The VPC defines the virtual networking environment for this DB instance.

myvpc (vpc-099fa1f9a542408dc)

4 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.

Optional: If you launched your RDS already and you want to connect to your EC2.

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 [12](#)

Certificate update [4](#)

Connectivity & security

Endpoint & port	Networking	Security
Endpoint students.ckvdvkrxasc.us-east-1.rds.amazonaws.com	Availability Zone us-east-1a	VPC security groups rds-ec2-2 (sg-08acf5c32a1509c7d) (✓) Active
Port 3306	VPC myvpc (vpc-099fa1f9a542408dc)	DB-SG-NEW (sg-0cbbbf51ab5f03c) (✓) Active
	Subnet group default-vpc-099fa1f9a542408dc	Publicly accessible Yes
	Subnets subnet-0558e3881dabdf6ed subnet-09dbbcfe018d0d9c9 subnet-069976d27a8d169b5 subnet-04f369654b256df55	Certificate authority Info rds-ca-2019
	Network type IPv4	Certificate authority date August 22, 2024, 20:08 (UTC+03:00)
		DB instance certificate expiration date ⚠ August 22, 2024, 20:08 (UTC+03:00)

Connected compute resources (1) [Info](#)

Connections to compute resources that were created automatically by RDS are shown here. Connections to compute resources that were created manually aren't shown.

Resource identifier	Resource type	Availability Zone	VPC security group	Compute resource security group	Conn...
i-0935bfe6ea270060c	EC2 instance	us-east-1a	rds-ec2-2	ec2-rds-2	-

Management console:

Click RDS

Choose your database

Connectivity and security sections

Connected compute resources sections.

Connected compute resources (1) [Info](#)

Connections to compute resources that were created automatically by RDS are shown here. Connections to compute resources that were created manually aren't shown.

Resource identifier	Resource type	Availability Zone	VPC security group	Compute resource security group	Conn...
i-0935bfe6ea270060c	EC2 instance	us-east-1a	rds-ec2-2	ec2-rds-2	-

Action and select the instances

Done !!!

10. choose the existing subnet, and VPC security group select our DB-SG just now created.

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

DB subnet group [Info](#)

Choose the DB subnet group. The DB subnet group defines which subnets and IP ranges the DB instance can use in the VPC that you selected.

Choose existing

Choose existing DB subnet group

Automatic setup

RDS creates a new subnet group for you or reuses an existing subnet group

Existing DB subnet groups

default-vpc-099fa1f9a542408dc

4 Subnets, 2 Availability Zones



Public access [Info](#)

Yes

RDS assigns a public IP address to the database. Amazon EC2 instances and other resources outside of the VPC can connect to your database. Resources inside the VPC can also connect to the database. Choose one or more VPC security groups that specify which resources can connect to the database.

No

RDS doesn't assign a public IP address to the database. Only Amazon EC2 instances and other resources inside the VPC can connect to your database. Choose one or more VPC security groups that specify which resources can connect to the database.

VPC security group (firewall) [Info](#)

Choose one or more VPC security groups to allow access to your database. Make sure that the security group rules allow the appropriate incoming traffic.

Choose existing

Choose existing VPC security groups

Create new

Create new VPC security group

Additional VPC security group

Choose one or more options



DB-SG-NEW 

 Amazon RDS will add a new VPC security group *rds-ec2-4* to allow connectivity with your compute resource.

Availability Zone [Info](#)

us-east-1a



Database authentication: Default (Password authentication).

Monitoring: Disable Enable Enhanced monitoring.

Database authentication

Database authentication options [Info](#)

Password authentication

Authenticates using database passwords.

Password and IAM database authentication

Authenticates using the database password and user credentials through AWS IAM users and roles.

Password and Kerberos authentication

Choose a directory in which you want to allow authorized users to authenticate with this DB instance using Kerberos Authentication.

Monitoring

Enable Enhanced monitoring

Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

► Additional configuration

Database options, encryption turned on, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

CLICK Additional configurations

► Additional configuration

Database options, encryption turned on, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned on.

Specify a **name** for your **Initial database**. This is the name of the database that will be created once the **RDS** is created. You will use this database in the RDS instance for your web application hosted on the **EC2**.

Initial database name: STUDENTS

(The initial database is important that you write the name correctly and in uppercase, because name will be used to connect to your RDS instance).

Monitoring

Enable Enhanced monitoring

Enabling Enhanced monitoring metrics are useful when you want to see how different processes or threads use the CPU.

▼ Additional configuration

Database options, encryption turned on, backup turned on, backtrack turned off, maintenance, CloudWatch Logs, delete protection turned off.

Database options

Initial database name [Info](#)

STUDENTS

If you do not specify a database name, Amazon RDS does not create a database.

DB parameter group [Info](#)

default.mysql8.0



Option group [Info](#)

default:mysql-8-0



Disable automated backups

Disable Encryptions

Disable Log exports

Disable Maintenace

No preference Maintenace window

Disable Deletion protection

- Enable automated backups**
Creates a point-in-time snapshot of your database

Encryption

- Enable encryption**
Choose to encrypt the given instance. Master key IDs and aliases appear in the list after they have been created using the AWS Key Management Service console. [Info](#)

Log exports

Select the log types to publish to Amazon CloudWatch Logs

- Audit log
- Error log
- General log
- Slow query log

IAM role

The following service-linked role is used for publishing logs to CloudWatch Logs.

RDS service-linked role

Maintenance

Auto minor version upgrade [Info](#)

- Enable auto minor version upgrade**
Enabling auto minor version upgrade will automatically upgrade to new minor versions as they are released. The automatic upgrades occur during the maintenance window for the database.

Maintenance window [Info](#)

Select the period you want pending modifications or maintenance applied to the database by Amazon RDS.

- Choose a window
- No preference

Deletion protection

- Enable deletion protection**
Protects the database from being deleted accidentally. While this option is enabled, you can't delete the database.

LAUNCH RDS DATABASE

During sessions:

Did they decouple the architecture?

Did they create an Amazon Relational Database Service (Amazon RDS) database in a separate subnet?

If Yes, You can proceed.

Migrate the data from the original database, which is on an **EC2** instance, to the new **Amazon RDS** database.

Cloud9 is an integrated development environment (IDE) provided by Amazon Web Services (AWS). It allows developers to write, run, and debug their code in the cloud. With **Cloud9**, you can access your development environment from anywhere using just a web browser.

AWS **Cloud9** Scripts file to migrate the original data into the Amazon **RDS** database.

The screenshot shows the AWS Cloud9 search results page. The search bar at the top contains the query "cloud9". Below the search bar, there is a message: "Search results for 'cloud9'" followed by "Try searching with longer queries for more relevant results". On the left side, there is a sidebar with the following categories and counts: Services (48), Features (25), Resources (New), Blogs (6,077), Documentation (13,562), Knowledge Articles (17), Tutorials (28), Events (308), and Marketplace (13). The main content area is titled "Services" and shows three results: "Cloud9" (A Cloud IDE for Writing, Running, and Debugging Code), "Amazon CodeCatalyst" (Integrated DevOps Service), and "AWS Cloud Map" (Build a dynamic map of your cloud). Below the services section, there is another section titled "Features" with four items: "Cloud WAN" (VPC feature), "Namespaces" (AWS Cloud Map feature), "Workloads" (AWS Well-Architected Tool feature), and "Your VPCs" (VPC feature). The "See all 48 results" link is located at the top right of the services section, and the "See all 25 results" link is located at the top right of the features section.

Create a New instance, AWS recommends using t3.micro.

AWS Cloud9 > Environments > Create environment

Create environment Info

Details

Name

NAME

Limit of 60 characters, alphanumeric, and unique per user.

Description - optional

HIII

Limit 200 characters.

Environment type Info

Determines what the Cloud9 IDE will run on.

New EC2 instance

Cloud9 creates an EC2 instance in your account. The configuration of your EC2 instance cannot be changed by Cloud9 after creation.

Existing compute

You have an existing instance or server that you'd like to use.

New EC2 instance

Instance type Info

The memory and CPU of the EC2 instance that will be created for Cloud9 to run on.

t2.micro (1 GiB RAM + 1 vCPU)

Free-tier eligible. Ideal for educational users and exploration.

t3.small (2 GiB RAM + 2 vCPU)

Recommended for small web projects.

m5.large (8 GiB RAM + 2 vCPU)

Recommended for production and most general-purpose development.

Additional instance types

Explore additional instances to fit your need.

Platform Info

This will be installed on your EC2 instance. We recommend Amazon Linux 2.

Amazon Linux 2

Timeout

How long Cloud9 can be inactive (no user input) before auto-hibernating. This helps prevent unnecessary charges.

30 minutes

With **Secure Shell (SSH)**, you can securely access your AWS Cloud9 environment or any other remote server using encryption. This ensures that your communication and data transfer are protected from eavesdropping and tampering. Make sure it's in a **public subnet** and **within your vpc**.

Network settings Info

Connection

How your environment is accessed.

AWS Systems Manager (SSM)

Accesses environment via SSM without opening inbound ports (no ingress).

Secure Shell (SSH)

Accesses environment directly via SSH, opens inbound ports.

▼ VPC settings Info

Amazon Virtual Private Cloud (VPC)

The VPC that your environment will access. To allow the AWS Cloud9 environment to connect to its EC2 instance, attach an internet gateway (IGW) to your VPC. [Create new VPC](#)

vpc-099fa1f9a542408dc

Name - myvpc

Subnet

Used to setup your VPC configuration. To use a private subnet, select AWS Systems Manager (SSM) as the connection type. [Create new subnet](#)

subnet-069976d27a8d169b5

Name - publicsubnet

subnet-069976d27a8d169b5



You have chosen a public subnet for your Cloud9 environment, note the following:

- If accessing the EC2 instance directly through SSH, the instance can only be launched into a public subnet.
- You must attach an internet gateway to the Amazon VPC so the SSM Agent for the instance can connect to Systems Manager.
- You must ensure that the public subnet has a route table with a minimum set of routes. [Learn more](#)

Welcome x +

Developer Tools

AWS Cloud9

Welcome to your development environment

AWS Cloud9 allows you to write, run, and debug your code with just a browser. You can tour the IDE, write code for AWS Lambda and Amazon API Gateway, share your IDE with others in real time, and much more.

Toolkit for AWS Cloud9

The AWS Toolkit for Cloud9 is an IDE extension that simplifies accessing and interacting with resources from services such as AWS Lambda, AWS CloudFormation, and AWS API Gateway. With the

Getting started

Create File

Upload Files...

Clone from GitHub

bash - "ip-10-0-1-108.ec2.x" Immediate x +
vclabs:~/environment \$

OPTIONAL SECTION for creating a secret manager in AWS CLOUD9 if you didn't created it in RDS using secret manager option provided.

Template script:

```
aws secretsmanager create-secret \  
  --name Mydbsecret \  
  --description "Database secret for web app" \  
  --secret-string "{\"user\":\"<username>\",\"password\":\"<password>\",\"hos
```

Go to Configuration tab in RDS Section

<DB name>: STUDENTS

<username>: nodeapp

Connectivity & security	Monitoring	Logs & events	Configuration	Maintenance & backups
Instance				
Configuration				
DB instance ID students	Instance class db.t3.micro		Storage Encryption Not enabled	
Engine version 8.0.33	vCPU 2		Storage type General Purpose SSD (gp2)	
DB name STUDENTS	RAM 1 GB		Storage 20 GiB	
License model General Public License	Availability		Provisioned IOPS -	
Option groups default:mysql-8-0  In sync	Master username nodeapp		Storage throughput -	

Availability

Master username
nodeapp

<password>: Go to AWS Secret Manager, *rds!db-autogenerateID*

Note: If you created it using Cloud9 it will be named **Mydbsecret**.

AWS Secrets Manager > Secrets > rds!db-78359d1c-5fbd-4c8f-be6c-ff642ca9c49e

rds!db-78359d1c-5fbd-4c8f-be6c-ff642ca9c49e

This secret was created by Amazon RDS (rds). Because this secret is managed by Amazon RDS (rds), you will not be able to modify the secret value. However, the secret may be modified in any other manner. [Learn more](#)

Secret details

Encryption key: aws/secretsmanager

Secret name: rds!db-78359d1c-5fbd-4c8f-be6c-ff642ca9c49e

Secret ARN: arn:aws:secretsmanager:us-east-1:626828110804:secret:rds!db-78359d1c-5fbd-4c8fbe6c-ff642ca9c49e-Ycxul4

Secret description: Secret associated with primary RDS DB instance: arn:aws:rds:us-east-1:626828110804:db:ccp

Actions ▾

Tags

Find by key or value...

Key	Value
aws:rds:primaryDBInstanceArn	arn:aws:rds:us-east-1:626828110804:db:ccp
aws:secretsmanager:owningService	rds

Secret value [Info](#)

Retrieve and view the secret value.

[Retrieve secret value](#)

Secret value [Info](#)

Retrieve and view the secret value.

[Retrieve secret value](#)

Secret value [Info](#)

Retrieve and view the secret value.

[Close](#) [Edit](#)

Key/value	Plaintext
Secret key	
username	
password	RY\$uD:6c.iZ3C4*0W48?10.HeF-p

Copied secret value for key: password

<RDS Endpoint>: RDS connectivity & security

[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](#)

students

Summary

DB identifier

students

Role

Instance

[Connectivity & security](#)[Monitor](#)

Connectivity & security

Endpoint & port

Endpoint

students.cxkdvdkrxasc.us-east-1.rds.amazonaws.com

Modified version script:

```
aws secretsmanager create-secret \  
  --name Mydbsecret \  
  --description "Database secret for web app" \  
  --secret-string "{\"user\":\"nodeapp\",\"password\":\"RY$uD:6c.iZ3C4*0W48?!
```



```
{  
    "ARN": "arn:aws:secretsmanager:us-east-1:626828110804:secret:Mydbnewsecret-8YhdQ0",  
    "Name": "Mydbnewsecret",  
    "VersionId": "8ad0cca9-75f0-47f2-97cc-0d920c1efb1f"  
}
```

Now we have finished the Optional section

Note:

- The secret that is created in this step stores database credentials, which the web application will use through an AWS Identity and Access Management (IAM) role named LabRole. This enhances the security posture by not storing credentials in the application or the database.
- LabRole was pre-created in the lab environment. The role facilitates secure interactions between AWS services. The role already includes the appropriate permissions policies.

In this task, We will provision a **new EC2 instance** in the public subnet and install the web application. The solution is as follows:

1. At the top of the AWS Management Console, in the search bar, search for and choose **EC2**

2. Choose Launch instance > **Launch instance**, and then configure the following:

In the Name and tags section, for Name, enter **CapstoneAppServer**

in the Application and OS Images section, under Quick Start, choose **Ubuntu**.

In the Instance type section, for Instance type, choose **t2.micro**.

In the key pair section, for the Key pair name, choose **vockey**.

in the Network settings section, configure the following:

Choose Edit. VPC: Choose **VPCWeHaveCreated**.

Subnet: Choose **Public Subnet 1**.

Auto-assign public IP: Choose **Enable**.

Firewall (security group): Choose **Select existing security group**.

Common security groups: Choose **EC2-SG**.

Expand the Advanced Details section, and configure the following:

IAM instance profile: Choose **LabinstanceProfile**.

User data: Copy and paste the following code:

```
#!/bin/bash -xe
apt update -y
apt install nodejs unzip wget npm mysql-server -y
# wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACCAP1-
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-ACCAP1-1
cd /home/ubuntu
unzip code.zip -x "resources/codebase_partner/node_modules/*"
cd resources/codebase_partner
npm install aws aws-sdk
mysql -u root -e "CREATE USER 'nodeapp' IDENTIFIED WITH mysql_native_password"
mysql -u root -e "GRANT all privileges on *.* to 'nodeapp'@'%';"
mysql -u root -e "CREATE DATABASE STUDENTS;"
mysql -u root -e "USE STUDENTS; CREATE TABLE students(
    id INT NOT NULL AUTO_INCREMENT,
    name VARCHAR(255) NOT NULL,
    address VARCHAR(255) NOT NULL,
    city VARCHAR(255) NOT NULL,
    state VARCHAR(255) NOT NULL,
    email VARCHAR(255) NOT NULL,
    phone VARCHAR(100) NOT NULL,
    PRIMARY KEY ( id ));"
sed -i 's/.*bind-address.*/bind-address = 0.0.0.0/' /etc/mysql/mysql.conf.d/mysqld.cnf
systemctl enable mysql
service mysql restart
export APP_DB_HOST=$(curl http://169.254.169.254/latest/meta-data/local-ipv4)
export APP_DB_USER=nodeapp
export APP_DB_PASSWORD=student12
export APP_DB_NAME=STUDENTS
export APP_PORT=80
npm start &
echo '#!/bin/bash -xe
cd /home/ubuntu/resources/codebase_partner
export APP_PORT=80
npm start' > /etc/rc.local
chmod +x /etc/rc.local
```



An important part, we will go to **Cloud9** to migrate EC2 data to **RDS** and connect it.

Welcome

Developer Tools

AWS Cloud9

Welcome to your development environment

AWS Cloud9 allows you to write, run, and debug your code with just a browser. You can tour the IDE, write code for AWS Lambda and Amazon API Gateway, share your IDE with others in real time, and much more.

Toolkit for AWS Cloud9

The AWS Toolkit for Cloud9 is an IDE extension that simplifies accessing and interacting with resources from services such as AWS Lambda, AWS CloudFormation, and AWS API Gateway. With the

bash - "ip-10-0-1-108.ec2.x Immediate x +

vocabs:~/environment \$ █

Getting started

Create File

Upload Files...

Clone from GitHub

Now we will mysqldump EC2 web application to our Cloud9 environment.

```
mysql -h <EC2PrivateIP>-u nodeapp -p --databases <initaildatabase> > da
```

Run the following command, replacing `<EC2PrivateIP>` with the **private IP address of your EC2 instance**, `<initaildatabase>` with the **initial name of your database**, and `data.sql` with a desired name for your SQL dump file:

Instance: i-0935bfe6ea270060c (PublicwebsiteNew)

Details Security Networking Storage Status checks Monitoring Tags

Instance summary Info

Instance ID	Public IPv4 address	Private IPv4 addresses
i-0935bfe6ea270060c (PublicwebsiteNew)	34.230.56.6 [open address]	10.0.1.220
IPv6 address	Instance state	Public IPv4 DNS
-	Running	ec2-34-230-56-6.compute-1.amazonaws.com [open]

Private IP EC2 we have created for our web application, initial database we have created earlier STUDENTS.

When you run this command, you will be prompted to enter the password for the `nodeapp` user. Enter the password and press Enter.

```
mysqldump -h 10.0.0.254 -u nodeapp -p --databases STUDENTS > data.sql
```

4. When you run this command, you will be prompted to enter the password for the `nodeapp` user. Enter the password and press Enter.

>Password: student12

5. The `mysqldump` command will connect to the EC2 instance, dump the specified database, and save the output to the `data.sql` file in your Cloud9 environment.
6. Once the command finishes executing, you will have a complete SQL dump of your database in the `data.sql` file.

Now we will interface it with RDS

```
mysql -h <RDSEnpoint> -u nodeapp -p <initial database name> < data.sql
```

Then go to RDS to copy the RDS endpoint

student

Modify
Actions ▾

Summary

DB identifier student	CPU 2.77%	Status Available	Class db.t3.micro
Role Instance	Current activity 0 Connections	Engine MySQL Community	Region & AZ us-east-1a

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

Connectivity & security

Endpoint & port	Networking	Security
Endpoint student.cxkdvdkrxasc.us-east-1.rds.amazonaws.com	Availability Zone us-east-1a	VPC security groups DBSG (sg-057ae52d425bd640c) Active
Port 3306	VPC vpcsrc (vpc-028d38598b0d2e415) Subnet group default-vpc-028d38598b0d2e415 Subnets subnet-08b5cca3ba633f106 subnet-0256afaf3ca311628 subnet-090064de1a3b33293 Network type IPv4	Publicly accessible No Certificate authority Info rds-ca-2019 Certificate authority date August 22, 2024, 20:08 (UTC+03:00) DB instance certificate expiration date August 22, 2024, 20:08 (UTC+03:00)

password: RY\$uD:6c.iZ3C4*0W48?!0.HeF-p

from secret manager when we created it earlier in RDS

```
mysql -h students.cxkdvdkrxasc.us-east-1.rds.amazonaws.com -u nodeapp -p STUDEN
```



The screenshot shows the Cloud9 IDE interface. In the top navigation bar, the tabs are File, Edit, Find, View, Go, Run, Tools, Window, Support, Preview, Run, Share, and Settings. On the left sidebar, there's a search bar labeled 'Go to Anything (⌘ P)' and a file tree showing 'Cloud9DB - /home' with files 'data.sql' and 'README.md'. A small 'aws' icon is also present. The main editor area has two tabs: 'Welcome' and 'data.sql'. The 'data.sql' tab contains a MySQL dump script for the 'STUDENTS' database, including database creation, table structure, and data definitions. The bottom right corner of the editor shows '20:3 SQL Spaces: 2'. Below the editor is a terminal window titled 'bash - *ip-10-0-1-108.ec2.x'. The terminal prompt is 'vocabs:~/environment \$'.

This pop out!! in Cloud9

As we set up EC2, now we need to attach ALB (application load balancer) to our EC2 but first, what is ALB in the first place?

A load balancer is a component that evenly distributes incoming network traffic across multiple servers or instances to ensure the high availability and scalability of your application. It helps distribute the workload and prevents any single server from becoming overwhelmed with traffic.

Application Load Balancer (ALB)

The Application Load Balancer (ALB) is a type of load balancer provided by AWS that operates at the application layer (Layer 7) of the OSI model. It can intelligently route traffic based on various criteria such as URL path, host header, or query strings.

A Target Group acts as a logical group of EC2 instances that receive traffic from the ALB. To create a Target Group, follow these steps:

1. Open the Amazon EC2 console.

The screenshot shows the AWS EC2 Dashboard. On the left, a navigation pane lists various services: EC2 Dashboard, EC2 Global View, Events, Instances (with sub-options like Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Capacity Reservations), and Images (with sub-options like AMIs, AMI Catalog). The main content area is divided into several sections:

- Resources**: A summary of Amazon EC2 resources in the US East (N. Virginia) Region. The table shows:

Instances (running)	9	Auto Scaling Groups	1	Dedicated Hosts	0
Elastic IPs	0	Instances	9	Key pairs	1
Load balancers	1	Placement groups	0	Security groups	17
Snapshots	1	Volumes	9		
- Launch instance**: Options to "Launch instance" or "Migrate a server".
- Service health**: Shows the AWS Health Dashboard and the current Region (US East (N. Virginia)).
- Account attributes**: Details about the Default VPC (vpc-046a53731ac73f0aa), including Data protection and security, Zones, EC2 Serial Console, Default credit specification, and Console experiments.
- Explore AWS**: A callout box highlighting "Up to 40% better performance; 20% lower cost" for moving workloads to Graviton-based instances.

2. In the navigation pane, under “LOAD BALANCING”, choose “Target Groups”.



New EC2 Experience

[Tell us what you think](#)

EC2 Dashboard

[EC2 Global View](#)[Events](#)

▼ Instances

[Instances](#)[Instance Types](#)[Launch Templates](#)[Spot Requests](#)[Savings Plans](#)[Reserved Instances](#)[Dedicated Hosts](#)[Capacity Reservations](#)

▼ Images

AMIs

AMI Catalog

▼ **Elastic Block Store**

Volumes

Snapshots

Lifecycle Manager

▼ **Network & Security**

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

▼ **Load Balancing**

Load Balancers

Target Groups

▼ **Auto Scaling**

Auto Scaling Groups

▼ Load Balancing

Load Balancers

Target Groups

▼ Auto Scaling

Auto Scaling Groups

-
3. Choose “Create target group”.

- [EC2 Dashboard](#)
- [EC2 Global View](#)
- [Events](#)
- [Instances](#)
 - [Instances](#)
 - [Instance Types](#)
 - [Launch Templates](#)
 - [Spot Requests](#)
 - [Savings Plans](#)
 - [Reserved Instances](#)
 - [Dedicated Hosts](#)
 - [Capacity Reservations](#)
- [Images](#)
 - [AMIs](#)
 - [AMI Catalog](#)
- [Elastic Block Store](#)
 - [Volumes](#)
 - [Snapshots](#)
 - [Lifecycle Manager](#)
- [Network & Security](#)
 - [Security Groups](#)
 - [Elastic IPs](#)
 - [Placement Groups](#)
 - [Key Pairs](#)
 - [Network Interfaces](#)
- [Load Balancing](#)
 - [Load Balancers](#)
 - [Target Groups](#)

EC2 > Target groups

Target groups Info

Actions ▾ [Create target group](#)

Name	ARN	Port	Protocol	Target type	Load balance
No matching resource found					

0 target groups selected

Select a target group above.

4. Choose target type **instances** (Supports load balancing to instances within a specific VPC) provide a name for your Target Group, and select the protocol HTTP for PoC purposes and port 80 for HTTP, use the VPC that we created, rest keep it default.



Step 1
Specify group details

Step 2
Register targets

Specify group details

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

- Offers the flexibility for a Network Load Balancer to accept and route TCP requests within a specific VPC.
- Facilitates using static IP addresses and PrivateLink with an Application Load Balancer.

Target group name

EC2TARGET

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

Protocol Port

HTTP	▼	:	80
1-65535			

IP address type

Only targets with the indicated IP address type can be included in 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 target you register must have an assigned primary IPv6 address. This is configured on the instances default network interface (eth0). [Learn more](#)

HTTP : 80
1-65535

IP address type
Only targets with the indicated IP address type can be included in 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 target you register must have an assigned primary IPv6 address. This is configured on the instances 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.

myvpc
vpc-099fa1f9a542408dc
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.
/

Up to 1024 characters allowed.

Advanced health check settings

Attributes

5. Add the EC2 instances that should be part of this Target Group.

6. Click **Include as pending** below.

7. Create a target group.

EC2 > Target groups > Create target group

Step 1
Specify group details

Step 2
Register targets

Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (1/3)

Instance ID	Name	State	Security groups
i-04f5d6dd45a56bff8	aws-cloud9-Cloud9DB-2e79c5...	Running	aws-cloud9-Cloud9DB-2e79c596ad89..
i-0faf404c1a4f3271f	PublicWebsite	Running	EC2-SG
<input checked="" type="checkbox"/> i-0935bfe6ea270060c	PublicwebsiteNew	Running	EC2-SG

1 selected

Ports for the selected instances
Ports for routing traffic to the selected instances.

80
1-65535 (separate multiple ports with commas)

Review targets

Targets (0)

Remove	Health status	Instance ID	Name	Port	State	Security groups	Zone	Private IPv4 ad
No instances added yet Specify instances above, or leave the group empty if you prefer to add targets later.								

0 pending

The screenshot shows the AWS EC2 Target Groups page. At the top, a green banner displays the message "Successfully created target group: EC2TARGET". The left sidebar contains navigation links for EC2 Dashboard, EC2 Global View, Events, Instances, Images, Elastic Block Store, Network & Security, Load Balancing, and Auto Scaling. Under Load Balancing, "Target Groups" is selected. The main content area shows a table titled "Target groups (2) Info" with columns: Name, ARN, Port, Protocol, Target type, and Load balance. The table lists two entries: "ALBEC2" and "EC2TARGET". The "EC2TARGET" entry has a note "(i) None assoc." next to its Target type column.

Name	ARN	Port	Protocol	Target type	Load balance
ALBEC2	arn:aws:elasticloadbalancing:us-east-1:123456789012:targetgroup/ALBEC2/548973f2d43e433a8333333333333333	80	HTTP	Instance	ALBEC2
EC2TARGET	arn:aws:elasticloadbalancing:us-east-1:123456789012:targetgroup/EC2TARGET/548973f2d43e433a8333333333333333	80	HTTP	Instance	(i) None assoc.

Step 3: Create an Application Load Balancer

Now that you have a Target Group, you can create an ALB that will distribute traffic to your EC2 instances. Follow these steps to create an ALB:

1. In the Amazon EC2 console, under “LOAD BALANCING”, choose “Load Balancers”.

▼ **Load Balancing**

Load Balancers

Target Groups

▼ **Auto Scaling**

Auto Scaling Groups



New EC2 Experience
Tell us what you think X

[EC2 Dashboard](#)

[EC2 Global View](#)

[Events](#)

▼ Instances

[Instances](#)

[Instance Types](#)

[Launch Templates](#)

[Spot Requests](#)

[Savings Plans](#)

[Reserved Instances](#)

[Dedicated Hosts](#)

[Capacity Reservations](#)

▼ Images

[AMIs](#)

[AMI Catalog](#)

▼ Elastic Block Store

[Volumes](#)

[Snapshots](#)

[Lifecycle Manager](#)

▼ Network & Security

[Security Groups](#)

[EC2](#) > [Load balancers](#)

Load balancers

Elastic Load Balancing scales your load to handle more traffic.

Filter Load balancers



Name



0 load balancers selected

Select a load balancer above.

- Elastic IPs
- Placement Groups
- Key Pairs
- Network Interfaces
- ▼ Load Balancing
 - [Load Balancers](#)
 - Target Groups
- ▼ Auto Scaling
 - Auto Scaling Groups

2. Choose “Create Load Balancer”.

The screenshot shows the AWS Lambda console with the following interface elements:

- Load balancers**: The title of the page.
- Actions**: A dropdown menu icon.
- Create load balancer**: An orange button with white text.
- Filter Load balancers**: A search bar.
- No load balancers**: A message indicating there are no load balancers.
- You don't have any load balancers in us-east-1**: A sub-message below the first one.
- Create load balancer**: A large orange button at the bottom of the list.

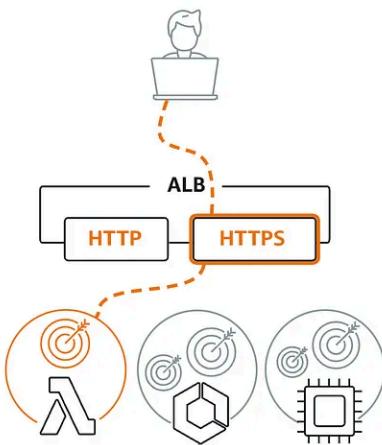
3. Select “Application Load Balancer” and click “Create”.

Compare and select load balancer type

A complete feature-by-feature comparison along with detailed highlights is also available. [Learn more](#)

Load balancer types

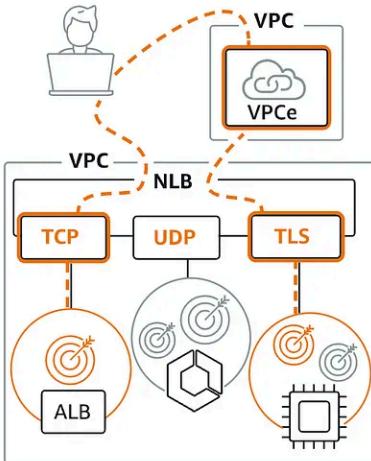
Application Load Balancer [Info](#)



Choose an Application Load Balancer when you need a flexible feature set for your applications with HTTP and HTTPS traffic. Operating at the request level, Application Load Balancers provide advanced routing and visibility features targeted at application architectures, including microservices and containers.

[Create](#)

Network Load Balancer [Info](#)



Choose a Network Load Balancer when you need ultra-high performance, TLS offloading at scale, centralized certificate deployment, support for UDP, and static IP addresses for your applications. Operating at the connection level, Network Load Balancers are capable of handling millions of requests per second securely while maintaining ultra-low latencies.

[Create](#)

Gateway Load Balancer [Info](#)

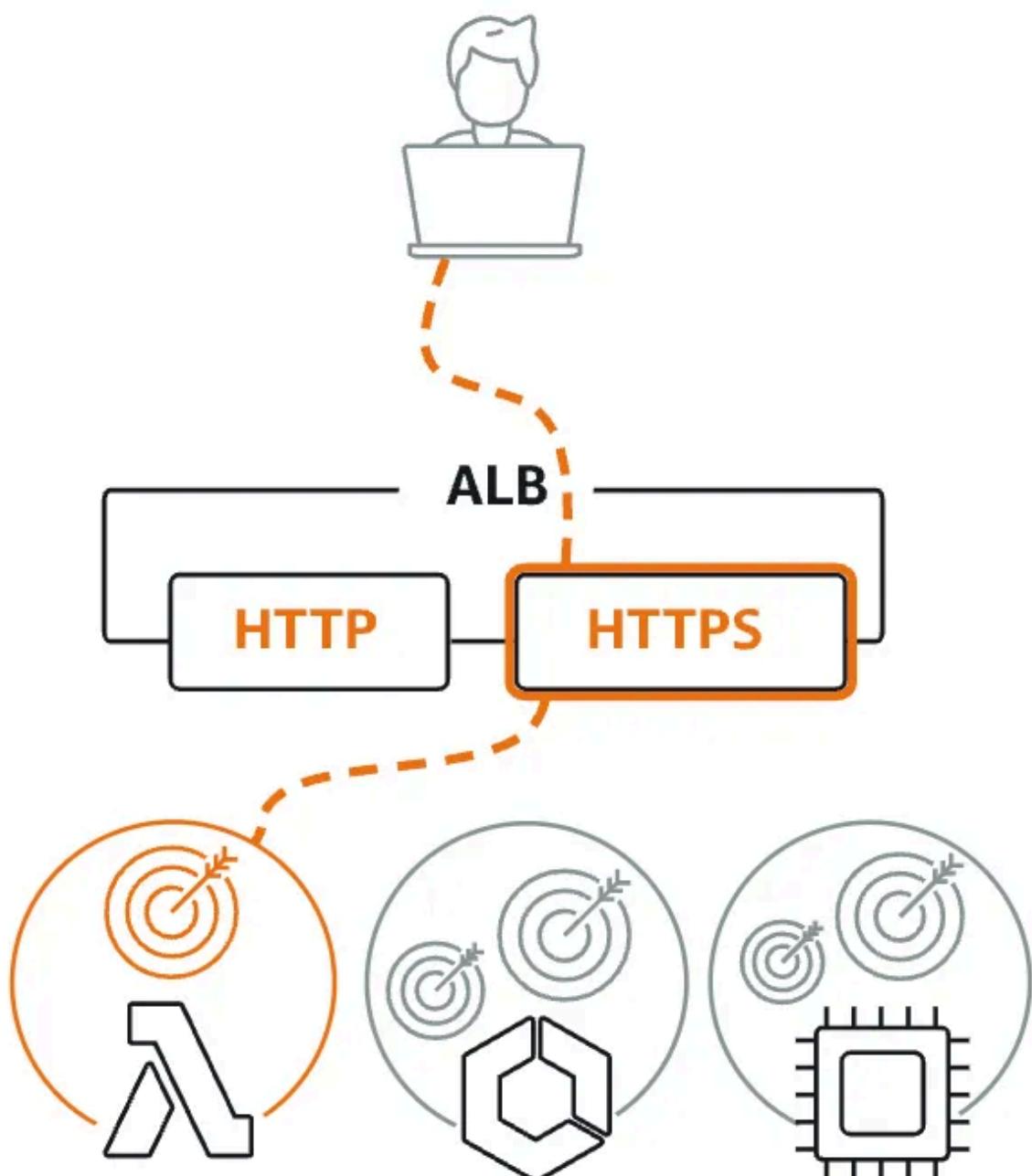


Choose a Gateway Load Balancer when you need to deploy and manage a fleet of third-party virtual appliances that support GENEVE. These appliances enable you to improve security, compliance, and policy controls.

[Create](#)

Load balancer types

Application Load Balancer [Info](#)



Choose an Application Load Balancer when

you need a flexible feature set for your applications with HTTP and HTTPS traffic. Operating at the request level, Application Load Balancers provide advanced routing and visibility features targeted at application architectures, including microservices and containers.

Create

4. Provide a name for your ALB, Internet-facing (Public ALB) and select the VPC and Public Subnets of each availability zone where your EC2 instances are located.

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.
 Dualstack
Includes IPv4 and IPv6 addresses.

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](#).

myvpc
vpc-099fa1f9a542408dc
IPv4: 10.0.0.0/16



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-az6)

Subnet

subnet-069976d27a8d169b5 publicsubnet ▾

IPv4 address

Assigned by AWS

us-east-1b (use1-az1)

Subnet

subnet-04f369654b256df55 publicsubnet2 ▾

IPv4 address

Assigned by AWS

5. Remove the default SG and configure a new security group for ALB.

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



⚠ Application Load Balancers require at least one security group. If none are selected, the VPC's default security group will be applied.

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](#).

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

Name cannot be edited after creation.

Description Info

VPC Info

 X

Inbound rules Info

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

All traffic	All	All	Any... ▾	<input type="text" value="0.0.0.0/0"/> X
-------------	-----	-----	----------	---

Add rule

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

Outbound rules Info

Type	Protocol	Port range	Destination	Description - optional
------	----------	------------	-------------	------------------------

All traffic	All	All	Cust... ▾	<input type="text" value="0.0.0.0/0"/> X
-------------	-----	-----	-----------	---

6. Configure the listeners by specifying the protocol and port to listen on, and the Target Group you created in the previous step.

The screenshot shows the AWS Load Balancer creation interface. In the 'Security groups' section, 'ALB-SG' is selected from a dropdown menu. In the 'Listeners and routing' section, a new listener for port 80 (HTTP) is being configured, forwarding traffic to an EC2 target group. Listener tags are optional, and an 'Add listener' button is visible.

7. Review your settings and click “Create” to create the ALB.

Create load balancer

Default DNS:

Once your ALB is created, you will be provided with a DNS name for your load balancer. No need to update your DNS settings to point your domain or subdomain to this DNS name, this will ensure that incoming traffic is directed to your ALB via its POC and the requirement section they don't need the domain name to be listed and be connected alias with ALB.

Check Target group is listening to ELB so ALB send traffic to the EC2.

Load balancers (1)						
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.						
<input type="text"/> Filter Load balancers						
<input type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type
<input type="checkbox"/>	ALB-EC2	ALB-EC2-847777563.us-e...	Active	vpc-099fa1f9a542408dc	2 Availability Zones	application

Select your ALB

Load balancers (1/1)						
Elastic Load Balancing scales your load balancer capacity automatically in response to changes in incoming traffic.						
<input type="text"/> Filter Load balancers						
<input checked="" type="checkbox"/>	Name	DNS name	State	VPC ID	Availability Zones	Type
<input checked="" type="checkbox"/>	ALB-EC2	ALB-EC2-847777563.us-e...	Active	vpc-099fa1f9a542408dc	2 Availability Zones	application

Listeners and rules section:

[EC2](#) > Load balancers

Load balancers (1/1)

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

Name	DNS name	State	VPC ID	Availability Zones	Type
ALB-EC2	ALB-EC2-847777563.us-e...	Active	vpc-099fa1f9a542408dc	2 Availability Zones	application

Load balancer: ALB-EC2

- Details
- Listeners and rules**
- Network mapping
- Security
- Monitoring
- Integrations
- Attributes
- Tags

Listeners and rules (1) [Info](#)

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

Protocol:Port	Default action	Rules	ARN	Security policy	Def...
HTTP:80	Forward to target group <ul style="list-style-type: none"> EC2TARGET: 1 (100%) Group-level stickiness: Off 	1 rule	ARN	Not applicable	Not applicable

Now we have finished ALB, we will create now Autoscaling Group (ASG)

To copy a new Amazon Machine Image (AMI) instance, follow these steps:

1. Open the Amazon EC2 console.

[EC2](#)

[New EC2 Experience](#) Tell us what you think

EC2 Dashboard

- EC2 Global View
- Events
- Instances**
- Instances
- Instance Types
- Launch Templates
- Spot Requests
- Savings Plans
- Reserved Instances
- Dedicated Hosts
- Capacity Reservations
- Images**
- AMIs
- AMI Catalog

Resources

You are using the following Amazon EC2 resources in the US East (N. Virginia) Region:

Instances (running)	9	Auto Scaling Groups	1	Dedicated Hosts	0
Elastic IPs	0	Instances	9	Key pairs	1
Load balancers	1	Placement groups	0	Security groups	17
Snapshots	1	Volumes	9		

Account attributes

- Default VPC** vpc-046a53731ac73f0aa
- Settings**
- Data protection and security [New](#)
- Zones
- EC2 Serial Console
- Default credit specification
- Console experiments

Explore AWS

Up to 40% better performance; 20% lower cost
Move your compute workloads to Graviton-based instances for better price performance compared to x86 instances. [Get started.](#)

2. In the navigation pane, choose “Instances”.

The screenshot shows the AWS EC2 Instances page. On the left, there's a navigation sidebar with links like EC2 Dashboard, EC2 Global View, Events, Instances (selected), Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, and Capacity Reservations. The main content area has a header 'Instances (1) Info' with a search bar 'Find instance by attribute or tag (case-sensitive)' and buttons for 'Connect', 'Actions', and 'Launch instances'. A table lists one instance: 'Name = PublicwebsiteNew' (Instance ID: i-0935bfe6ea270060c, State: Running, Type: t2.micro, Status check: 2/2 checks passed, Alarm status: No alarms, Availability Zone: us-east-1a). Below the table is a section titled 'Select an instance'.

3. Select the instance that you want to copy the AMI.

This screenshot is identical to the one above, but the instance 'PublicwebsiteNew' is now selected, indicated by a checked checkbox next to its name in the table.

4. Right-click on the selected instance and choose “Create Image”.

The screenshot shows the same EC2 Instances page with the instance 'PublicwebsiteNew' selected. A context menu is open on the right side of the screen, listing options: Connect, View details, Manage instance state, Instance settings, Networking, Security, Image and templates (which is highlighted with a blue border), and Monitor and troubleshoot.

The screenshot shows the AWS EC2 Instances page. A single instance, 'PublicwebsiteNew' (ID: i-0935bfe6ea270060c), is listed as 'Running'. The 'Actions' menu on the right provides options such as 'Create image', 'Create template from instance', and 'Launch more like this'.

5. In the “Create Image” dialogue box, provide a unique name and description for the new AMI.

The screenshot shows the 'Create image' dialog box for instance i-0935bfe6ea270060c. The 'Image name' field is set to 'EC2PublicWebsiteAMI'. The 'Image description' field contains 'AMI for ASG to elastically scale horizontally automatically'. Under 'Instance volumes', there is one EBS volume selected. The 'Tags - optional' section has the radio button 'Tag image and snapshots together' selected. At the bottom, there is an 'Add new tag' button and a note about adding up to 50 more tags.

6. Choose “Create” to start the AMI creation process.

Create image

7. Wait for the AMI creation process to complete. This might take a few minutes.

The screenshot shows the AWS EC2 Instances page. At the top, a green banner indicates that an AMI is currently being created. Below the banner, there is a search bar with the placeholder 'Find instance by attribute or tag (case-sensitive)' and a filter button labeled 'Name = PublicwebsiteNew'. The main table lists one instance:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone
PublicwebsiteNew	i-0935bfe6ea270060c	Running	t2.micro	2/2 checks passed	No alarms	us-east-1a

8. Once the AMI is created, you can view it in the “AMIs” section of the EC2 console.

The screenshot shows the AWS EC2 AMIs page. On the left sidebar, under the 'Images' section, the 'AMIs' option is selected. The main area displays the 'Amazon Machine Images (AMIs) (1/1)' table, which includes columns for Name, AMI ID, AMI name, Source, and Owner. The single entry is:

Name	AMI ID	AMI name	Source	Owner
EC2PublicWebsiteAMI	ami-0729edbcb65f9327c	EC2PublicWebsiteAMI	626828110804/EC2PublicWebsiteAMI	626828110804

You can proceed to create an autoscaling group. In the EC2 dashboard.

The screenshot shows the AWS EC2 Dashboard. On the left sidebar, the 'EC2 Dashboard' option is selected. The main area is divided into several sections: 'Resources' (listing running instances, auto scaling groups, dedicated hosts, elastic IPs, instances, key pairs, load balancers, placement groups, security groups, snapshots, and volumes), 'Launch instance' (with a prominent orange 'Launch instance' button), 'Service health' (linked to the AWS Health Dashboard), and 'Account attributes' (showing the default VPC and various settings). A promotional 'Explore AWS' box at the bottom right encourages moving workloads to Graviton-based instances.

Click on the “Autoscaling Groups” option in the sidebar menu. Then, click on the “Create Auto Scaling group” button.



EC2



New EC2 Experience

[Tell us what you think](#)



[EC2 Dashboard](#)

[EC2 Global View](#)

[Events](#)

▼ **Instances**

[Instances](#)

[Instance Types](#)

[Launch Templates](#)

[Spot Requests](#)

[Savings Plans](#)

[Reserved Instances](#)

[Dedicated Hosts](#)

[Capacity Reservations](#)

▼ **Images**

[AMIs](#)

AMI Catalog

▼ Elastic Block Store

Volumes

Snapshots

Lifecycle Manager

▼ Network & Security

Security Groups

Elastic IPs

Placement Groups

Key Pairs

Network Interfaces

▼ Load Balancing

Load Balancers

Target Groups

▼ Auto Scaling

[Auto Scaling Groups](#)

Create Auto Scaling group

Step 5: Configure the Autoscaling Group

In the autoscaling group creation wizard, you will need to configure several settings:

- Name: **Provide a name** for your autoscaling group.
- Launch Template or Configuration: Select the instance configuration you want to use for scaling.

Creating EC2 Launch template.

Launch template contents

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 [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

Owned by me

Shared with me



[Browse more AMIs](#)

Including AMIs from
AWS, Marketplace and
the Community

Amazon Machine Image (AMI)

EC2PublicWebsiteAMI

ami-0729edbcb65f9327c

2023-10-15T18:04:33.000Z Virtualization: hvm ENA enabled: true Root device type: ebs



Description

AMI for ASG to elastically scale horizontally automatically

Architecture AMI ID

x86_64 ami-0729edbcb65f9327c

▼ Instance type [Info](#)

[Advanced](#)

Instance type

t2.micro

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

Free tier eligible

All generations

[Compare instance types](#)

[Additional costs apply for AMIs with pre-installed software](#)

▼ 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

vockey

 [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

 [Compare security group rules](#)

EC2-SG sg-0b22d3077fe56820f 

VPC: vpc-099fa1f9a542408dc

▼ Advanced network configuration

No network interfaces are currently included in this template. Add a network interface to include it in the launch template.

[Add network interface](#)

▼ Storage (volumes) [Info](#)

EBS Volumes

[Hide details](#)

► Volume 1 (AMI Root) (8 GiB, EBS, General purpose SSD (gp2))

AMI Volumes are not included in the template unless modified

 Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage



[Add new volume](#)

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store volumes from the AMI will be accessible from the instance

▼ 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](#)

Purchasing option [Info](#)

Request Spot Instances

If Spot is selected you will not be able to create an Auto Scaling group that spans across multiple pricing options and instance types

IAM instance profile [Info](#)

LabInstanceProfile

arn:aws:iam::626828110804:instance-profile/LabInstanceProfile



[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](#)

Don't include in launch template



Not applicable for EC2 Auto Scaling

User data - *optional* [Info](#)

Upload a file with your user data or enter it in the field.

 [Choose file](#)

```
#!/bin/bash -xe
apt update -y
apt install nodejs unzip wget npm mysql-server -y
# wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-
ACCAP1-1-DEV/code.zip -P /home/ubuntu
wget https://aws-tc-largeobjects.s3.us-west-2.amazonaws.com/CUR-TF-200-
ACCAP1-1-79581/1-lab-capstone-project-1/code.zip -P /home/ubuntu
cd /home/ubuntu
unzip code.zip -x "resources/codebase_partner/node_modules/*"
cd resources/codebase_partner
npm install aws aws-sdk
mysql -u root -e "CREATE USER 'nodeapp' IDENTIFIED WITH
mysql_native_password BY 'student12'";
mysql -u root -e "GRANT all privileges on *.* to 'nodeapp'@'%';"
mysql -u root -e "CREATE DATABASE STUDENTS;"
```

User data has already been base64 encoded

Choose the launch template that we created just now:

Launch template [Info](#)

i 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.

ASG-PUBLICWEBSITE



[Create a launch template](#)

Version

Default (1)



[Create a launch template version](#)

Description

ASG-PublicWebsite

Launch template

ASG-PUBLICWEBSITE

Instance type

t2.micro

AMI ID

ami-0729edbcb65f9327c

Security groups

-

Request Spot Instances

No

Key pair name

vockey

Security group IDs

sg-0b22d3077fe56820f

Additional details

Storage (volumes)

-

Date created

Sun Oct 15 2023 21:21:46

GMT+0300 (Arabian Standard Time)

Network: Choose the VPC and subnets where your instances will be launched.

Choose instance launch options Info

Choose the VPC network environment that your instances are launched into, and customize the instance types and purchase options.

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.

▼C

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.

▼C

X

(publicsubnet)
10.0.1.0/24

X

(publicsubnet2)
10.0.2.0/24

[Create a subnet](#)

Load Balancer: If you have a load balancer set up, you can associate it with your autoscaling group.

Configure advanced options - optional Info

Integrate your Auto Scaling group with other services to distribute network traffic across multiple servers using a load balancer or to establish service-to-service communications using VPC Lattice. You can also set options that give you more control over health check replacements and monitoring.

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



EC2TARGET | HTTP

Application Load Balancer: ALB-EC2

Next

Group Size: Specify the desired capacity for your group, which is the number of instances you want to maintain, Scaling Policies: Define the scaling policies that dictate when and how instances are added or removed based on demand.

Group size - optional [Info](#)

Specify the size of the Auto Scaling group by changing the desired capacity. You can also specify minimum and maximum capacity limits. Your desired capacity must be within the limit range.

Desired capacity

2

Minimum capacity

1

Maximum capacity

4

Scaling policies - optional

Choose whether to use a scaling policy to dynamically resize your Auto Scaling group to meet changes in demand. [Info](#)

Target tracking scaling policy

Choose a desired outcome and leave it to the scaling policy to add and remove capacity as needed to achieve that outcome.

None

Scaling policy name

Target Tracking Policy

Metric type [Info](#)

Monitored metric that determines if resource utilization is too low or high. If using EC2 metrics, consider enabling detailed monitoring for better scaling performance.

Average CPU utilization ▾

Target value

50

Instance warmup [Info](#)

300

seconds

Disable scale in to create only a scale-out policy

Create Auto Scaling group

ASG-EC2-PUBLIC-WEBSITE, 1 Scaling policy created successfully

X

EC2 > Auto Scaling groups

Auto Scaling groups (2) Info		C	Launch configurations	Launch templates	Actions ▾	Create Auto Scaling group
<input type="text"/> Search your Auto Scaling groups						
<input type="checkbox"/>	Name	Launch template/configuration	Instances	Status	Desired capacity	⋮
<input type="checkbox"/>	ASG-EC2-PUBLIC-WEBSITE	ASG-PUBLICWEBSITE Version Default	2	-	2	⋮
<input type="checkbox"/>	ASG	EC2Template Version Default	1	-	1	⋮

During session:

Did they create a load balancer?

Did they configure automatic scaling?

Does the solution work in the new architecture?

Did they load test the application?

Conclusion

Creating an autoscaling group in AWS allows you to automatically manage the number of instances in your infrastructure based on demand. By following the steps outlined in this guide, you can easily create an autoscaling group and ensure that your application can handle varying workloads efficiently.

Reviewed and created by Salman Abdulrazaq Ali 12.CCP

Reviewed by my colleague Yousif ALBadawi 12.CCP



Follow



Written by Salman Ali

6 Followers

AWS Solutions Architect | Youngest & first high-school student in Bahrain BH | AWS Educate | AWS Academy | IGCSE certification | Cloud Ambassador

More from Salman Ali

Security credentials Access Advisor

ectly or through groups.

Filter by Type

All types ▾

▲ Type ▾ Attach

 Salman Ali

Securely manage identities and access to AWS services and resources

Hi my name is salman a pasionate high school studnet in the Kingdom of Bharain, Youngest and first highschool student to achive AWS...

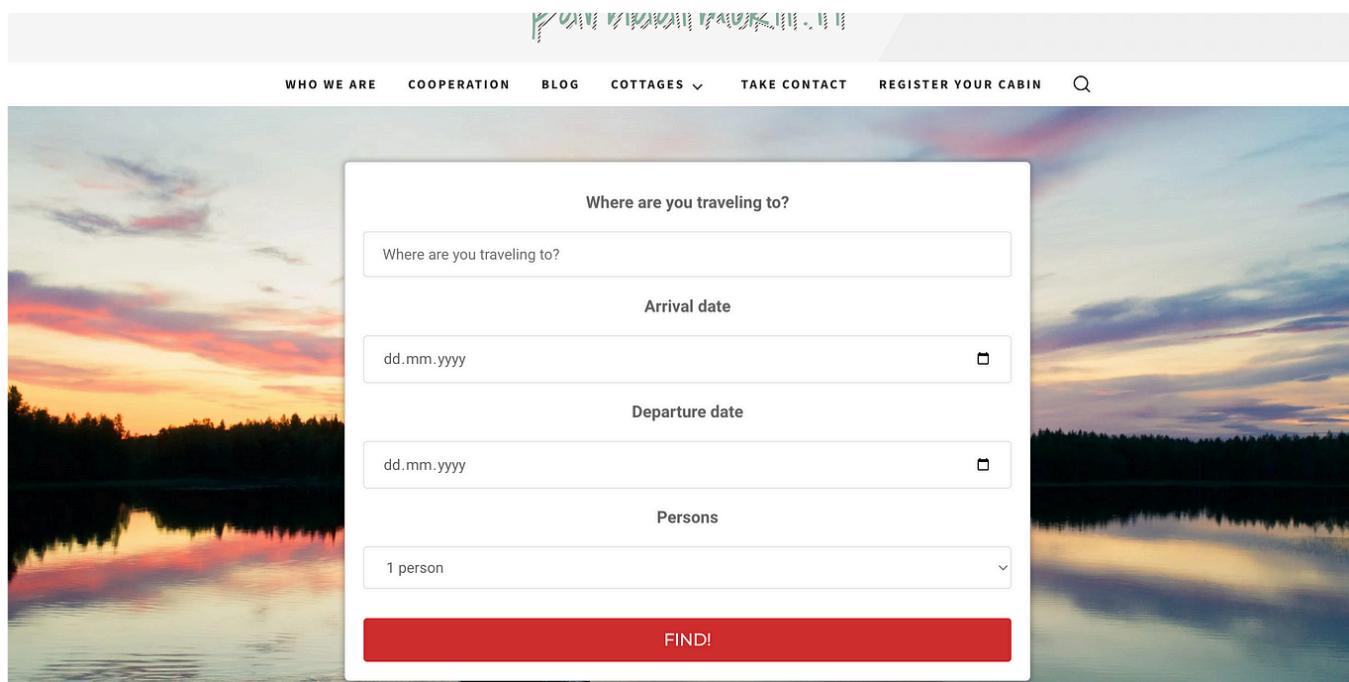
13 min read · Oct 2, 2023

 8 



See all from Salman Ali

Recommended from Medium



The screenshot shows a travel search interface overlaid on a scenic sunset over a lake. The interface includes fields for destination, arrival date, departure date, and number of persons, along with a red "FIND!" button.

Where are you traveling to?

Arrival date

dd.mm.yyyy

Departure date

dd.mm.yyyy

Persons

1 person

FIND!

 Artturi Jalli

I Built an App in 6 Hours that Makes \$1,500/Mo

Copy my strategy!

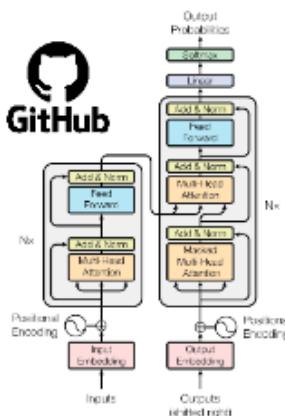
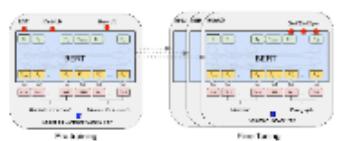
★ · 3 min read · Jan 23, 2024

 13.2K  156





fast.ai



kaggle



DeepLearning.AI



Gemini



InfiniDB



Benedict Neo in bitgrit Data Science Publication

Roadmap to Learn AI in 2024

A free curriculum for hackers and programmers to learn AI

11 min read · 1 day ago

5.5K

67



Lists



Staff Picks

597 stories · 816 saves



Stories to Help You Level-Up at Work

19 stories · 517 saves



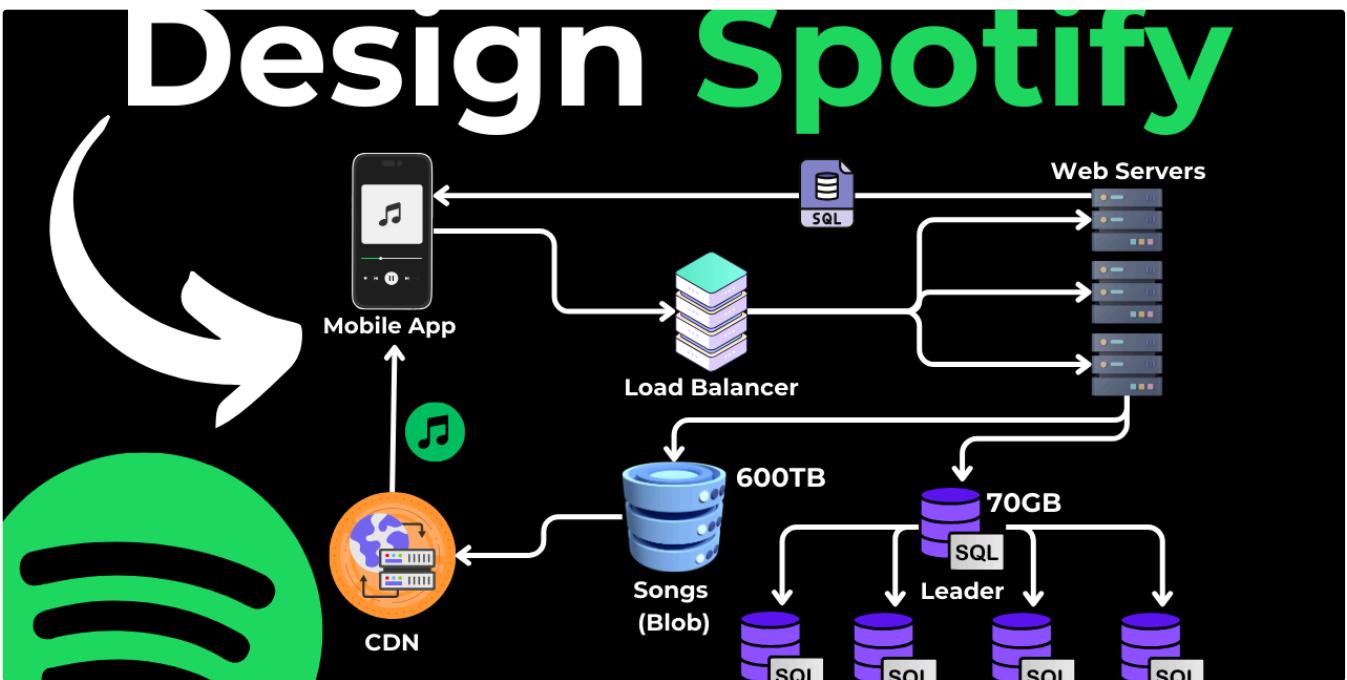
Self-Improvement 101

20 stories · 1479 saves



Productivity 101

20 stories · 1364 saves



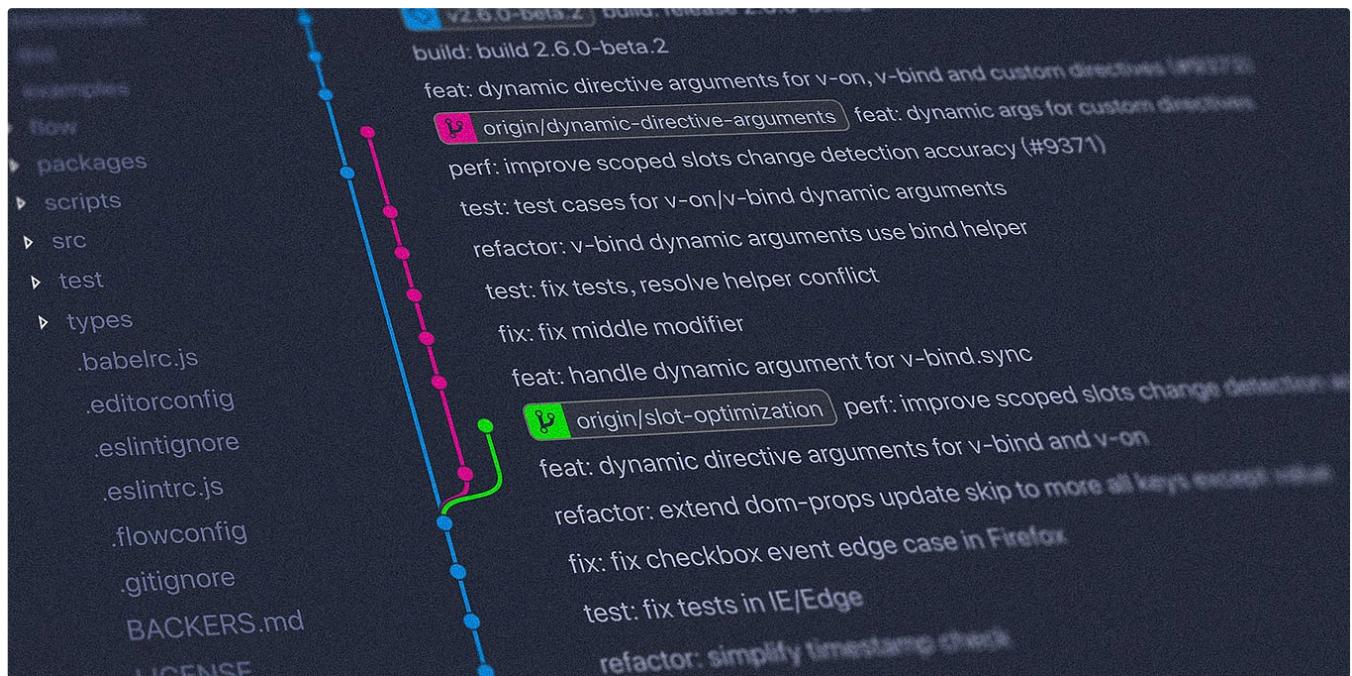
 Hayk Simonyan in Level Up Coding

System Design Interview Question: Design Spotify

High-level overview of a System Design Interview Question - Design Spotify.

6 min read · Feb 21, 2024

 3.4K  29 



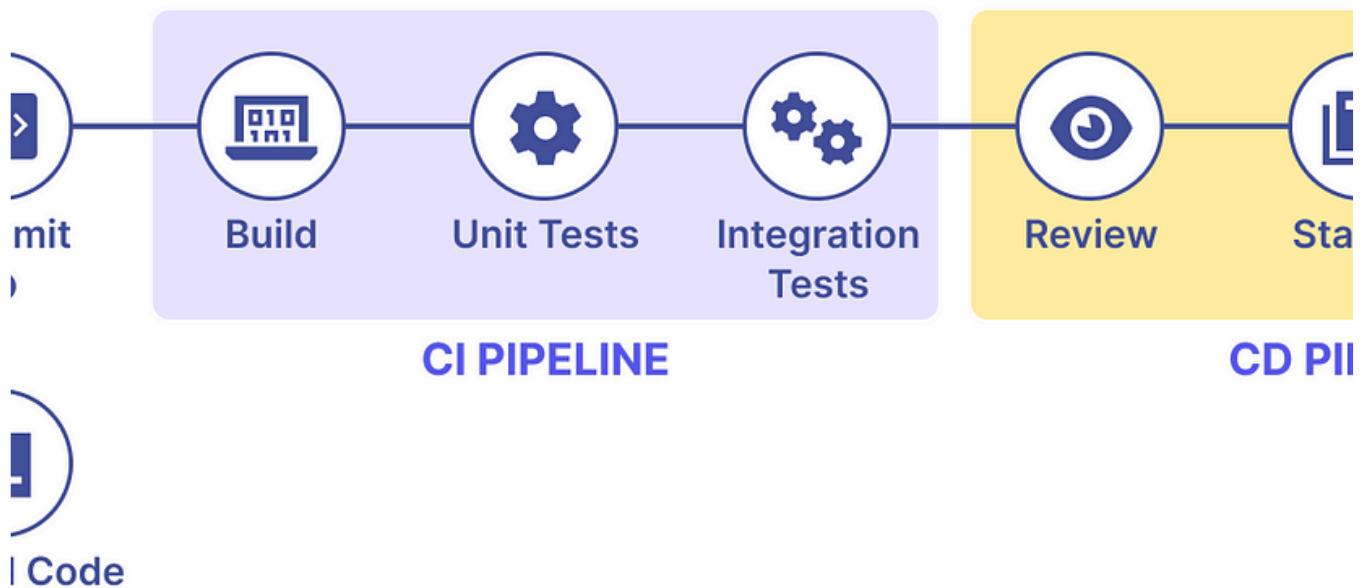
 Martin Heinz in ITNEXT

Modern Git Commands and Features You Should Be Using

It's not 2005 anymore and git offers more than just add, commit, push and pull. Let's explore all the new, modern git commands, that you...

★ · 6 min read · Mar 4, 2024

👉 767 💬 6



👉 I Code

CI/CD—My Notes for CI/CD and Implementation Example in GitHub Workflow

Continuous Integration

3 min read · Nov 5, 2023

👉 52 💬



{ JSON } is slow?

```
{  
  "name": "JSON is slow!",  
  "blog": true,  
  "writtenAt": 1695884403,  
  "topics": ["JSON", "Javascript"]  
}
```



Alternatives?



Vaishnav Manoj in DataX Journal

JSON is incredibly slow: Here's What's Faster!

Unlocking the Need for Speed: Optimizing JSON Performance for Lightning-Fast Apps and Finding Alternatives to it!

16 min read · Sep 28, 2023

14K

165



See more recommendations