

# Lab 5 Create Amazon RDS Instance

In this challenge, you will implement scaling for an Amazon Relational Database Service (RDS) instance. First, you will create security groups, and then you will deploy a MySQL DB instance. Next, you will create an Amazon Elastic Cloud Compute (Amazon EC2) instance to act as a server, and then you will add data to the database. Finally, you will scale the RDS instance vertically and horizontally, and then you will verify that you can access the data. Note: Once you begin the challenge, you will not be able to pause, save, or exit and then return to your challenge. Please ensure that you have set aside enough time to complete the challenge before you start.

## Task 1: Create security groups

EC2 -> Network and Security -> Security Groups -> create security group

The screenshot shows the AWS Management Console with the URL <https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#SecurityGroups>. The left sidebar includes sections for AMIs, AMI Catalog, Elastic Block Store (Volumes, Snapshots, Lifecycle Manager), Network & Security (Security Groups, Elastic IPs, Placement Groups, Key Pairs, Network Interfaces), and Load Balancing (Load Balancers, Target Groups, Trust Stores). The main content area displays a table titled "Security Groups (2)" with columns for Name, Security group ID, Security group name, and VPC ID. Two entries are listed: "sg-01e84c56768629bf2" (Security group name: default, VPC ID: vpc-0bac7adb58f9234da) and "sg-05422cf87edbfb45" (Security group name: default, VPC ID: vpc-0767fc4a25b8c9ae). A search bar at the top of the table says "Find security groups by attribute or tag". Below the table, a section titled "Select a security group" is visible. The bottom of the screen shows the Windows taskbar with various pinned icons and the date/time as 6:42 PM 5/22/2025.

CreateSecurityGroup | EC2 | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#CreateSecurityGroup:

aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserld51572103 @ 5108-0711-5675

EC2 > Security Groups > Create security group

### Create security group Info

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

**Basic details**

**Security group name Info**  
BHSG-51572103  
Name cannot be edited after creation.

**Description Info**  
Allow SSH

**VPC Info**  
vpc-0767fc4a25b8cc9ae (Lab VPC A)

**Inbound rules Info**  
This security group has no inbound rules.

**Add rule**

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CreateSecurityGroup | EC2 | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#CreateSecurityGroup:

aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserld51572103 @ 5108-0711-5675

EC2 > Security Groups > Create security group

### 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>
SSH	TCP	22	A... <small>Info</small>	0.0.0.0/0 <small>X</small> Delete

**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.**

### 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	Cu... <small>Info</small>	0.0.0.0/0 <small>X</small> Delete

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Click create security group

The screenshot shows the AWS EC2 Security Groups page. A green success message at the top states: "Security group (sg-02cd1e2018e9ff1bb | BHSG-51572103) was created successfully". Below this, the security group details are listed:

Security group name	BSHG-51572103	Security group ID	sg-02cd1e2018e9ff1bb	Description	Allow SSH
Owner	510807115675	Inbound rules count	1 Permission entry	Outbound rules count	1 Permission entry

The "Inbound rules" tab is selected, showing one rule:

Name	Security group rule ID	Type	Protocol
(empty)	(empty)	(empty)	(empty)

At the bottom, there are links for "Actions", "CloudShell", and "Feedback". The status bar at the bottom right shows "6:45 PM 5/22/2025".

## Create another security group

The screenshot shows the "Create security group" page. The "Basic details" section contains the following fields:

Security group name	DBSG-51572103
Description	Allow MySQL/Aurora traffic
VPC	vpc-0767fc4a25b8cc9ae (Lab VPC A)

The "Inbound rules" section indicates: "This security group has no inbound rules." There is a "Add rule" button.

At the bottom, there are links for "CloudShell", "Feedback", and "Feedback". The status bar at the bottom right shows "6:47 PM 5/22/2025".

In custom select the already created group BSHG-

CreateSecurityGroup | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#CreateSecurityGroup:

aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserld51572103 @ 5108-0711-5675

EC2 > Security Groups > Create security group

Inbound rules Info

Type	Info	Protocol	Port range	Info	Source	Info	Description - optional	Info
MySQL/Aurora	▼	TCP	3306	Cu... ▾	sg-02cd1e2018e9ff1b	sg-02cd1e2018e9ff1b		Delete

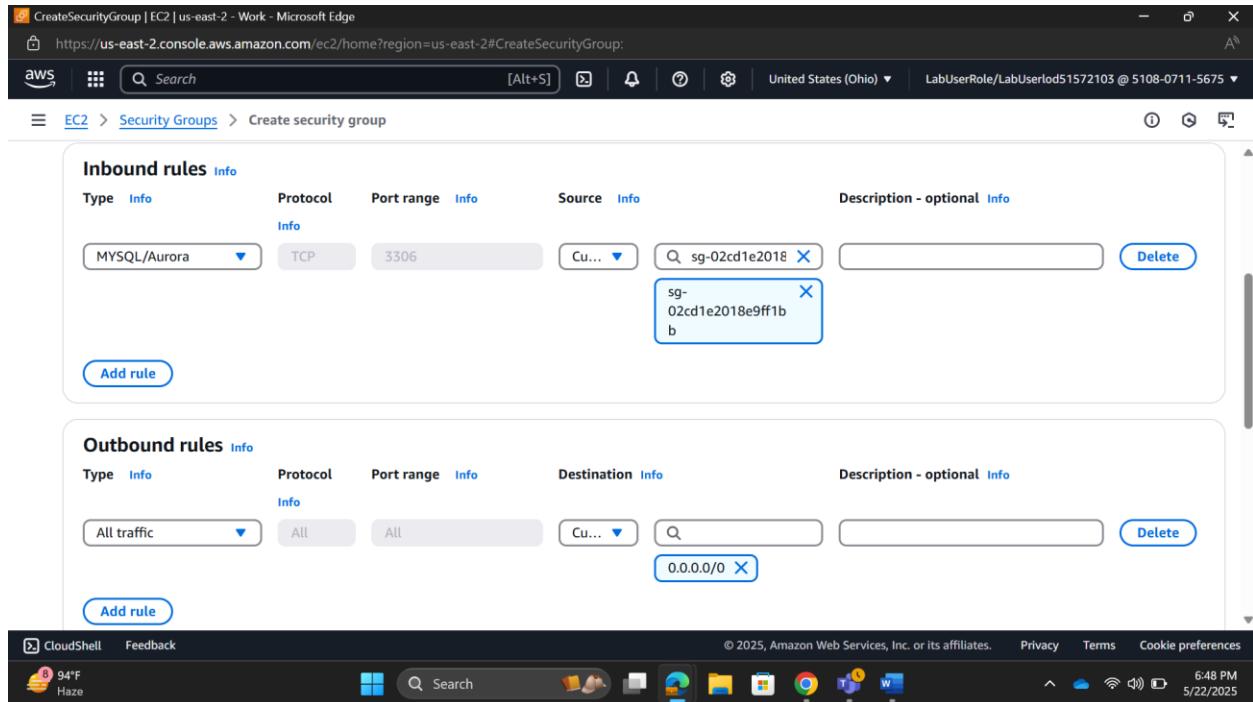
Add rule

Outbound rules Info

Type	Info	Protocol	Port range	Info	Destination	Info	Description - optional	Info
All traffic	▼	All	All	Cu... ▾	0.0.0.0/0	0.0.0.0/0		Delete

Add rule

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Click create security group

SecurityGroup | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#SecurityGroup:groupId=sg-0a944779f4f21236b

aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserld51572103 @ 5108-0711-5675

EC2 > Security Groups > sg-0a944779f4f21236b - DBSG-51572103

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 Trust Stores

sg-0a944779f4f21236b - DBSG-51572103 Actions

Details

Security group name	DBSG-51572103	Security group ID	sg-0a944779f4f21236b	Description	Allow MySQL/Aurora traffic
Owner	510807115675	Inbound rules count	1 Permission entry	Outbound rules count	1 Permission entry
VPC ID vpc-0767fc4a25b8cc9ae					

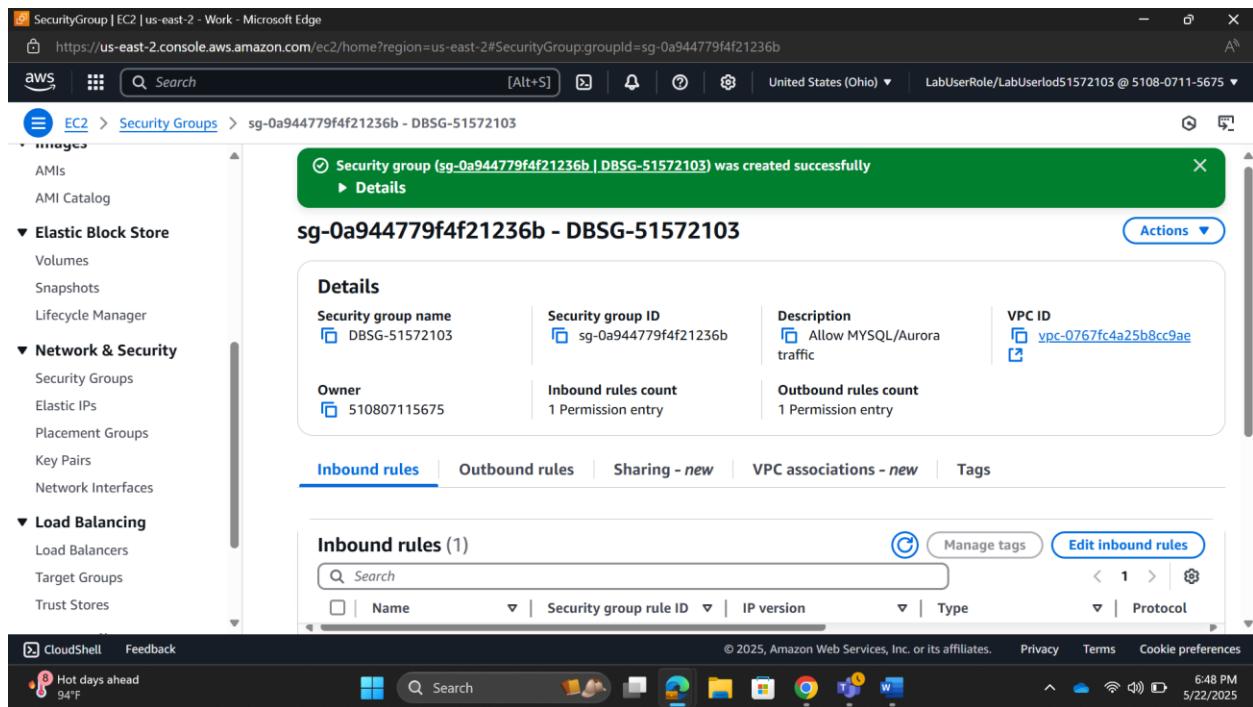
Inbound rules Outbound rules Sharing - new VPC associations - new Tags

Inbound rules (1)

Name	Security group rule ID	IP version	Type	Protocol

Manage tags Edit inbound rules

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## Task 2: Create a DB subnet group

RDS -> Subnet Groups -> Create DB subnet group

The screenshot shows the 'Create DB subnet group' page. In the 'Subnet group details' section, the 'Name' field contains 'dbsng-51572103'. The 'Description' field contains 'DB subnet group for RDS'. Under 'VPC', 'Lab VPC A (vpc-0767fc4a25b8cc9ae)' is selected, which includes '2 Subnets, 2 Availability Zones'.

The screenshot shows the 'Add subnets' section. Under 'Availability Zones', 'us-east-2a' and 'us-east-2b' are selected. Under 'Subnets', 'Public Subnet A1' and 'Public Subnet A2' are selected. A note at the bottom states: 'For Multi-AZ DB clusters, you must select 3 subnets in 3 different Availability Zones.'

Click create

Subnet Groups | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#db-subnet-groups-list

Aurora and RDS > Subnet groups

Aurora and RDS

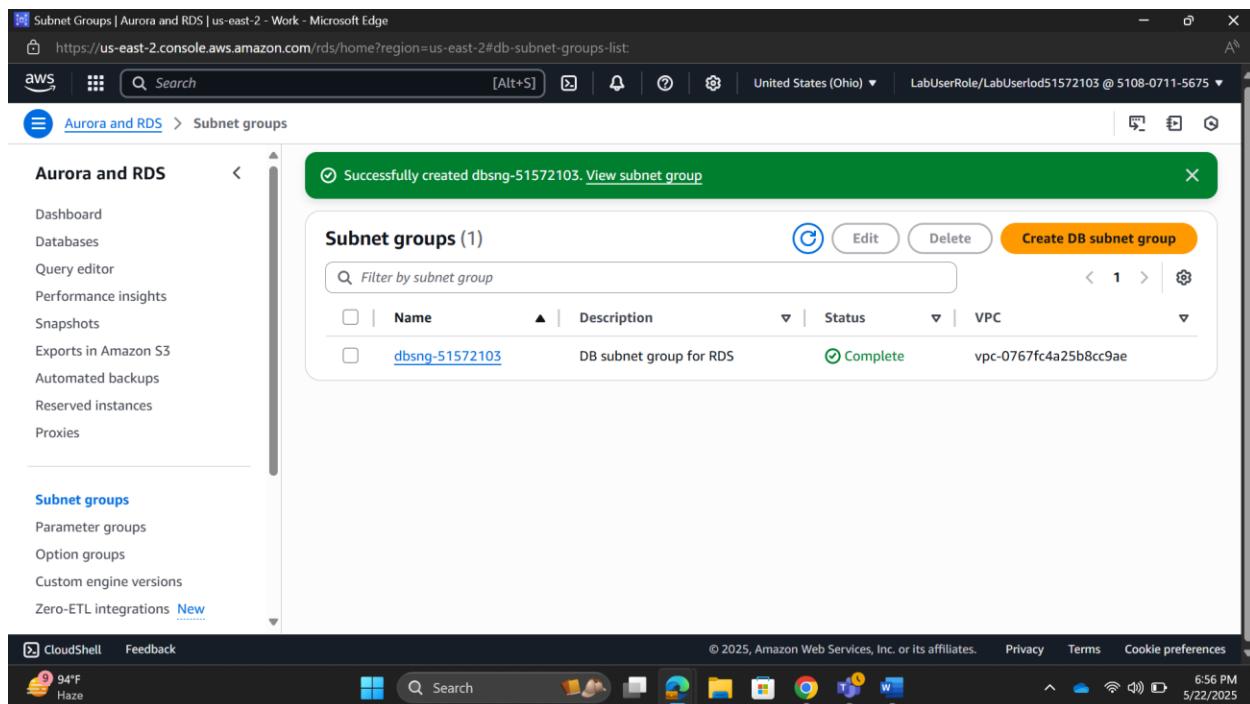
Subnet groups (1)

Successfully created dbsng-51572103. View subnet group

Filter by subnet group

Name	Description	Status	VPC
dbsng-51572103	DB subnet group for RDS	Complete	vpc-0767fc4a25b8cc9ae

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## Task 3: Create a MySQL DB instance in RDS

RDS -> databases -> create database

Create database | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#launch-dbinstance:

Aurora and RDS > Create database

Create database Info

Choose a database creation method

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 

PostgreSQL 

MariaDB 

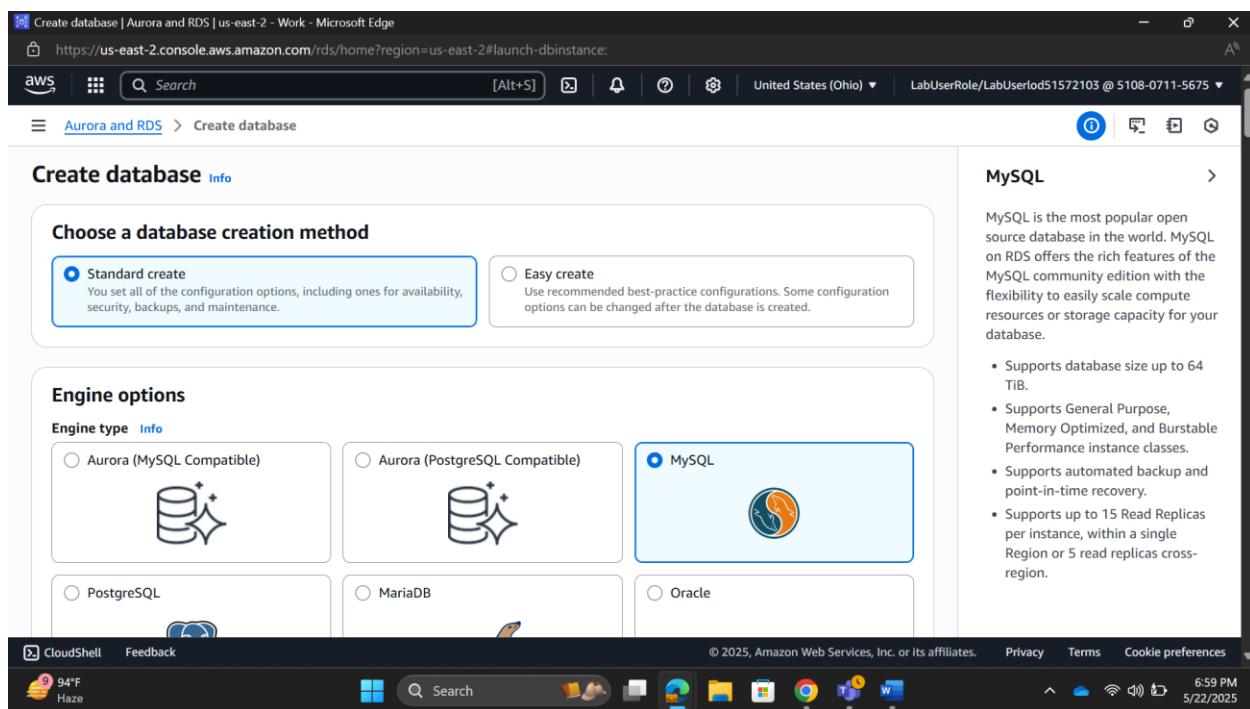
Oracle 

MySQL

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.

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Create database | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#launch-dbinstance:

Aurora and RDS > Create database

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](#)

**Availability and durability**

**Deployment options** [Info](#)

Choose the deployment option that provides the availability and durability needed for your use case. AWS is committed to a certain level of uptime depending on the deployment option you choose. Learn more in the [Amazon RDS service level agreement \(SLA\)](#).

Multi-AZ DB cluster deployment (3 instances) Creates a primary DB instance with two readable standbys in separate Availability Zones. This setup provides:

- 99.95% uptime
- Redundancy across Availability Zones
- Increased read capacity
- Reduced write latency

Multi-AZ DB instance deployment (2 instances) Creates a primary DB instance with a non-readable standby instance in a separate Availability Zone. This setup provides:

- 99.95% uptime
- Redundancy across Availability Zones

Single-AZ DB instance deployment (1 instance) Creates a single DB instance without standby instances. This setup provides:

- 99.5% uptime
- No data redundancy

Write/read endpoint Reader endpoints Write/read endpoint Standby (no endpoint) Write/read endpoint

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**MySQL**

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Create database | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#launch-dbinstance:

Aurora and RDS > Create database

**Credentials Settings**

**Master username** [Info](#)

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

labadmin

1 to 16 alphanumeric characters. The first character must be a letter.

**Credentials management**

You can use AWS Secrets Manager or manage your master user credentials.

Managed in AWS Secrets Manager - *most secure* RDS generates a password for you and manages it throughout its lifecycle using AWS Secrets Manager.

Self managed Create your own password or have RDS create a password that you manage.

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

**Master password** [Info](#)

\*\*\*\*\*

Password strength Very weak

Minimum constraints: At least 8 printable ASCII characters. Can't contain any of the following symbols: / ` ^ @

**Confirm master password** [Info](#)

Passw0rd!

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- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.

Create database | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#launch-dbinstance:

AWS Search [Alt+S] United States (Ohio) LabUserRole/LabUserlod51572103 @ 5108-0711-5675

Aurora and RDS > Create database

**Instance configuration**

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

**DB instance class** [Info](#)

**Hide filters**

Show instance classes that support Amazon RDS Optimized Writes [Info](#)  
Amazon RDS Optimized Writes improves write throughput by up to 2x at no additional cost.

Include previous generation classes

Standard classes (includes m classes)

Memory optimized classes (includes r and x classes)

Burstable classes (includes t classes)

db.t3.micro  
2 vCPUs 1 GiB RAM Network: Up to 2,085 Mbps

**Storage**

**Storage type** [Info](#)

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Create database | Aurora and RDS | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#launch-dbinstance:

AWS Search [Alt+S] United States (Ohio) LabUserRole/LabUserlod51572103 @ 5108-0711-5675

Aurora and RDS > Create 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.

**Network type** [Info](#)

To use dual-stack mode, make sure that you associate an IPv6 CIDR block with a subnet in the VPC you specify.

IPv4  
Your resources can communicate only over the IPv4 addressing protocol.

Dual-stack mode  
Your resources can communicate over IPv4, IPv6, or both.

**Virtual private cloud (VPC)** [Info](#)

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

Lab VPC A (vpc-0767fc4a25b8cc9ae)  
2 Subnets, 2 Availability Zones

Only VPCs with a corresponding DB subnet group are listed.

**MySQL**

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.

The screenshot shows the 'Create database' page in the AWS RDS console. Under 'Public access', the 'No' option is selected, indicating that the database will not have a public IP address. In the 'VPC security group (firewall)' section, the 'Choose existing' option is selected, and a dropdown menu shows 'DBSG-51572103'. On the right side, there is a sidebar titled 'MySQL' with a list of features.

**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

**Existing VPC security groups**

Choose one or more options ▾

DBSG-51572103 X

**Availability Zone** [Info](#)

us-east-2b

**RDS Proxy**

RDS Proxy is a fully managed, highly available database proxy that improves application scalability, resiliency, and security.

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**MySQL**

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.

## Uncheck Enhanced Monitoring checkbox if checked

The screenshot shows the 'Create database' page in the AWS RDS console. Under 'Additional configuration', the 'Database options' section includes 'Initial database name' set to 'app'. The 'Backup' section has a checked checkbox for 'Enable automated backups'. A note at the bottom states: '⚠ Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to'. On the right side, there is a sidebar titled 'MySQL' with a list of features.

**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](#)

app

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

**Backup**

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

⚠ Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to

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**MySQL**

MySQL is the most popular open source database in the world. MySQL on RDS offers the rich features of the MySQL community edition with the flexibility to easily scale compute resources or storage capacity for your database.

- Supports database size up to 64 TiB.
- Supports General Purpose, Memory Optimized, and Burstable Performance instance classes.
- Supports automated backup and point-in-time recovery.
- Supports up to 15 Read Replicas per instance, within a single Region or 5 read replicas cross-region.

The screenshot shows the 'Create database' configuration page for MySQL. On the left, there's a 'Backup' section with a checked checkbox for 'Enable automated backups'. A note below it states: 'Please note that automated backups are currently supported for InnoDB storage engine only. If you are using MyISAM, refer to details here.' Under 'Backup retention period', a dropdown menu is set to '1 day'. The 'Backup window' section has a radio button selected for 'No preference'. There's also a checked checkbox for 'Copy tags to snapshots'. The 'Backup replication' section contains an unchecked checkbox for 'Enable replication in another AWS Region'. On the right, a sidebar titled 'MySQL' provides an overview of the service, mentioning its popularity and various features like support for up to 64 TiB and up to 15 Read Replicas. At the bottom of the page, there are standard AWS navigation links for CloudShell, Feedback, and a footer with copyright information and a timestamp (7:06 PM, 5/22/2025).

Click create -> click close on next window

The screenshot shows the 'Databases' page after a database has been created. A prominent green notification bar at the top says 'Successfully created database app-db-51572103'. It includes a 'View connection details' button and a close button. Below the notification, the 'Notifications' section shows 1 pending notification. The main table lists the database 'app-db-51572103' with details: Status (Backin...), Instance (MySQL Co...), Region (us-east-2b), and Size (db.t3.micro). The table has columns for DB identifier, Status, Role, Engine, Region, and Size. At the bottom of the page, there are standard AWS navigation links for CloudShell, Feedback, and a footer with copyright information and a timestamp (7:16 PM, 5/22/2025).

## Task 4: Launch an EC2 bastion host instance

EC2 -> instances -> instances -> launch instances

The screenshot shows the 'Launch an instance' wizard in the AWS Cloud Console. The 'Name and tags' section has 'Bastion Host' entered in the Name field. The 'Application and OS Images (Amazon Machine Image)' section shows a search bar and a 'Quick Start' menu with options for Amazon, macOS, Ubuntu, Windows, Red Hat, and SUSE Linux. The 'Summary' panel on the right shows the following configuration:

- Number of instances:** 1
- Software Image (AMI):** Amazon Linux 2023.7.2... (ami-06c8f2ec674c67112)
- Virtual server type (instance type):** t2.micro
- Firewall (security group):** New security group
- Storage (volumes):** 1 volume(s) - 8 GB

At the bottom right are 'Cancel' and 'Launch instance' buttons.

The screenshot shows the 'Amazon Machine Image (AMI)' selection screen. Under the 'Quick Start' heading, there are icons for Amazon Linux, macOS, Ubuntu, Windows, Red Hat, and SUSE Linux. A 'Browse more AMIs' button is also present. The 'Amazon Machine Image (AMI)' details for 'Amazon Linux 2023 AMI' are shown, including its AMI ID (ami-06c8f2ec674c67112), architecture (x86\_64), boot mode (uefi-preferred), AMI ID (ami-06c8f2ec674c67112), publish date (2025-05-09), and a free tier eligible status. The 'Description' section provides a brief overview of Amazon Linux 2023. The 'Summary' panel on the right is identical to the one in the previous screenshot, showing the same instance configuration.

Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

**Instance type** [Info](#) | [Get advice](#)

**Instance type**

t2.micro      Free tier eligible

Family: t2 1 vCPU 1 GiB Memory Current generation: true  
On-Demand Ubuntu Pro base pricing: 0.0154 USD per Hour  
On-Demand Linux base pricing: 0.0116 USD per Hour  
On-Demand SUSE base pricing: 0.0116 USD per Hour  
On-Demand Windows base pricing: 0.0162 USD per Hour  
On-Demand RHEL base pricing: 0.026 USD per Hour

All generations      [Compare instance types](#)

**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**

Proceed without a key pair (Not recommended)      Default value [▼](#)      [Create new key pair](#)

**Summary**

Number of instances [Info](#)

1

Software Image (AMI)

Amazon Linux 2023 AMI 2023.7.2... [read more](#)  
ami-06c8f2ec674c67112

Virtual server type (instance type)

t2.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

[Cancel](#)      [Launch instance](#)      [Preview code](#)

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Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

**Network settings** [Info](#)

**VPC - required** [Info](#)

vpc-0767fc4a25b8cc9ae (Lab VPC A) [▼](#)

Subnet [Info](#)

subnet-09a7098ffb4dedc5c      Public Subnet A1  
VPC: vpc-0767fc4a25b8cc9ae Owner: 510807115675  
Availability Zone: us-east-2a Zone type: Availability Zone  
IP addresses available: 251 CIDR: 10.0.0.0/24

[Create new subnet](#)

Auto-assign public IP [Info](#)

Enable [▼](#)

Additional charges apply when outside of free tier allowance

Firewall (security groups) [Info](#)

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

[Create security group](#)       [Select existing security group](#)

Common security groups [Info](#)

Select security groups [▼](#)

**Summary**

Number of instances [Info](#)

1

Software Image (AMI)

Amazon Linux 2023 AMI 2023.7.2... [read more](#)  
ami-06c8f2ec674c67112

Virtual server type (instance type)

t2.micro

Firewall (security group)

BHSG-51572103

Storage (volumes)

1 volume(s) - 8 GiB

[Cancel](#)      [Launch instance](#)      [Preview code](#)

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Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

subnet-09a7098ffb4dedc5c Public Subnet A1

VPC: vpc-0767fc4a25b8cc9ae Owner: 510807115675 Availability Zone: us-east-2a Zone type: Availability Zone IP addresses available: 251 CIDR: 10.0.0.0/24

Create new subnet

Auto-assign public IP

Enable Additional charges apply when outside of free tier allowance

Firewall (security groups)

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

Create security group  Select existing security group BHSG-51572103 sg-02cd1e2018e9ff1bb

Common security groups

Select security groups BHSG-51572103 sg-02cd1e2018e9ff1bb

VPC: vpc-0767fc4a25b8cc9ae

Compare security group rules

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

Advanced network configuration

Summary

Number of instances: 1

Software Image (AMI) Amazon Linux 2023 AMI 2023.7.2...read more ami-06c8f2ec674c67112

Virtual server type (instance type) t2.micro

Firewall (security group) BHSG-51572103

Storage (volumes) 1 volume(s) - 8 GB

Cancel Launch instance Preview code

Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

Advanced details

Domain join directory

Select Create new directory

IAM instance profile

SSMInstanceProfile arn:aws:iam::510807115675:instance-profile/SSMInstanceProfile

Create new IAM profile

Hostname type

IP name

DNS Hostname

Enable IP name IPv4 (A record) DNS requests

Enable resource-based IPv4 (A record) DNS requests

Enable resource-based IPv6 (AAAA record) DNS requests

Instance auto-recovery

Select

Summary

Number of instances: 1

Software Image (AMI) Amazon Linux 2023 AMI 2023.7.2...read more ami-06c8f2ec674c67112

Virtual server type (instance type) t2.micro

Firewall (security group) BHSG-51572103

Storage (volumes) 1 volume(s) - 8 GB

Cancel Launch instance Preview code

Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

**AMD SEV-SNP** | Info

Select

AMD SEV-SNP is not supported with the selected instance type.

**Metadata accessible** | Info

Enabled

**Metadata IPv6 endpoint** | Info

Select

**Metadata version** | Info

V1 and V2 (token optional)

**⚠ EC2 recommends using metadata version 2 unless you explicitly require metadata version 1.**

**Metadata response hop limit** | Info

2

**Allow tags in metadata** | Info

Summary

Number of instances | Info

1

**Software Image (AMI)**  
Amazon Linux 2023 AMI 2023.7.2... [read more](#)  
ami-06c8f2ec674c67112

**Virtual server type (instance type)**  
t2.micro

**Firewall (security group)**  
BHSG-51572103

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

Cancel

Launch instance

Preview code

CloudShell Feedback

92°F Haze

Search

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7:25 PM 5/22/2025

Launch an instance | EC2 | us-east-2 - Work - Microsoft Edge

https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#LaunchInstances:

EC2 > Instances > Launch an instance

**User data - optional** | Info

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

**Choose file**

```
#!/bin/bash
yum update -y
sudo yum install stress -y
sudo yum install -y php php-common php-pecl
sudo yum install -y php-{cgi,curl,mbstring,gd,mysqlnd,gettext,json,xml,fpm,intl,zip}
sudo yum install -y mariadb105
```

User data has already been base64 encoded

Summary

Number of instances | Info

1

**Software Image (AMI)**  
Amazon Linux 2023 AMI 2023.7.2... [read more](#)  
ami-06c8f2ec674c67112

**Virtual server type (instance type)**  
t2.micro

**Firewall (security group)**  
BHSG-51572103

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

Cancel

Launch instance

Preview code

CloudShell Feedback

92°F Haze

Search

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7:25 PM 5/22/2025

```
#!/bin/bash

yum update -y

sudo yum install stress -y

sudo yum install -y php php-common php-pear

sudo yum install -y php-{cgi,curl(mbstring),gd,mysqlnd,gettext,json,xml,fpm,intl,zip}

sudo yum install -y mariadb105
```

click launch instance

wait until Status check shows 2/2 checks passed

The screenshot shows the AWS EC2 Instances page. At the top, there's a search bar and a filter dropdown set to 'All states'. Below the header, a table lists one instance:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public
Bastion Host	i-0f77d3357f0e7cf59	Running	t2.micro	2/2 checks passed	View alarms +	us-east-2a	ec2-18

At the bottom of the table, it says 'Select an instance'. The status check column shows '2/2 checks passed'.

## Task 5: Configure a database instance

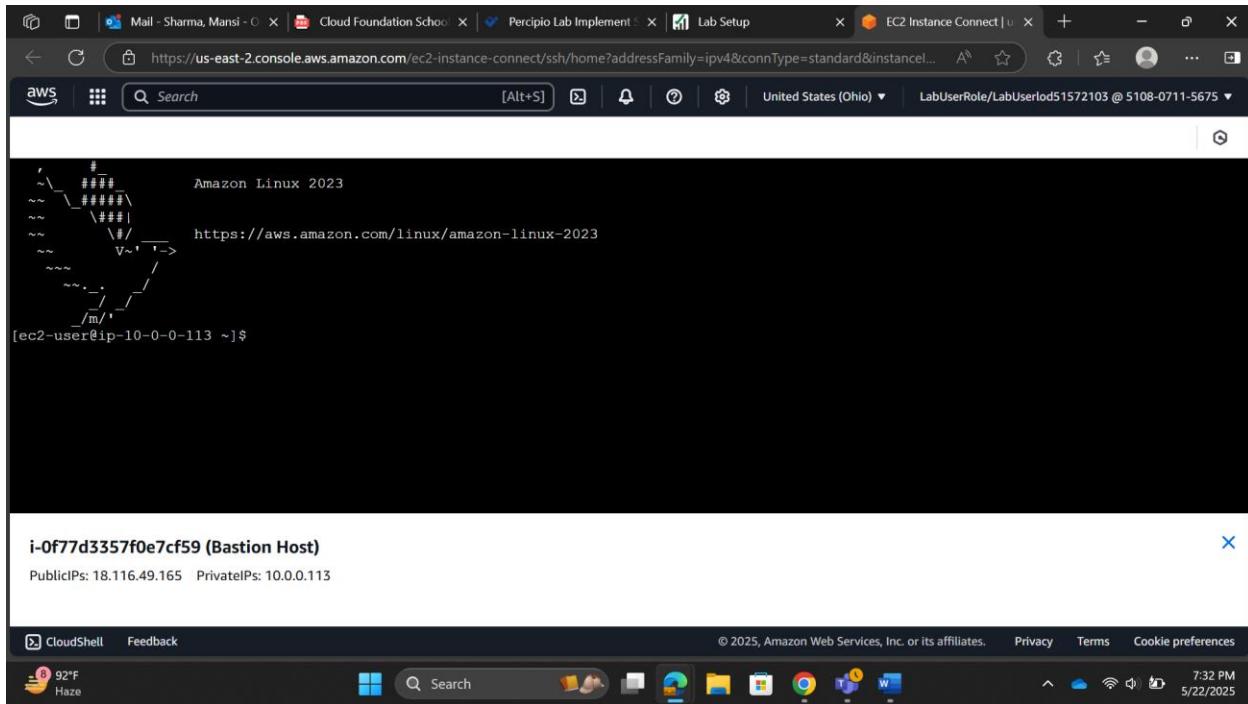
Select the instance created -> click on connect

The screenshot shows the AWS EC2 Instances page. A single instance, 'Bastion Host' (i-0f77d3357f0e7cf59), is listed as 'Running' with the instance type 't2.micro'. The 'Connect' button is highlighted. Below the table, the instance details for 'i-0f77d3357f0e7cf59 (Bastion Host)' are shown, including its Public IPv4 address (18.116.49.165) and Private IPv4 address (10.0.0.113). The browser status bar indicates the URL is https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#Instances.

Click connect

The screenshot shows the 'Connect to instance' configuration page for the selected instance. It offers three connection methods: 'EC2 Instance Connect' (selected), 'Session Manager', 'SSH client', and 'EC2 serial console'. Under 'EC2 Instance Connect', the 'Public IPv4 address' (18.116.49.165) is selected. Other options like 'Connect using EC2 Instance Connect Endpoint' and 'IPv6 address' are also shown. A note at the bottom states: 'Note: In most cases, the default username, ec2-user, is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI'. The browser status bar indicates the URL is https://us-east-2.console.aws.amazon.com/ec2/home?region=us-east-2#ConnectToInstance:instancetype=i-0f77d3357f0e7cf59.

Click connect and a new CLI tab will be opened



Command to connect the instance:

```
mysql -h app-db-51572103.cb68rtjebr3x.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
```

this will be different for everyone based on the endpoints.

For enter password: type the password and press enter but it will not be shown on screen as it's a Linux window

```
~> \#!/ https://aws.amazon.com/linux/amazon-linux-2023
~> V~\-->
~> /m/
[ec2-user@ip-10-0-0-113 ~]$ mysql -h app-db-51572103.cb68rtjebr3x.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
Enter password:
ERROR 1045 (28000): Access denied for user 'labadmin'@'10.0.0.113' (using password: YES)
[ec2-user@ip-10-0-0-113 ~]$ ^C
[ec2-user@ip-10-0-0-113 ~]$ mysql -h app-db-51572103.cb68rtjebr3x.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MySQL connection id is 31
Server version: 8.0.41 Source distribution

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

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

MySQL [app]>
```

i-0f77d3357f0e7cf59 (Bastion Host)  
PublicIPs: 18.116.49.165 PrivateIPs: 10.0.0.113

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**Now MySQL is there, we will write queries**

**SHOW DATABASES;**

```
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MySQL connection id is 34
Server version: 8.0.41 Source distribution

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

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

MySQL [app]> SHOW DATABASES;
+-----+
| Database      |
+-----+
| app          |
| information_schema |
| mysql         |
| performance_schema |
| sys           |
+-----+
5 rows in set (0.002 sec)

MySQL [app]>
```

i-0f77d3357f0e7cf59 (Bastion Host)  
PublicIPs: 18.116.49.165 PrivateIPs: 10.0.0.113

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## Now will create a table

```
CREATE TABLE subscribers
```

```
(  
    id      INT unsigned NOT NULL AUTO_INCREMENT, # Unique ID for the record  
    name    VARCHAR(150) NOT NULL,           # Name of the subscriber  
    benefactor  VARCHAR(150) NOT NULL,       # Benefactor of the subscriber  
    startdate DATE NOT NULL,                # Start date of the subscriber  
    PRIMARY KEY (id)                      # Make the id the primary key  
);
```

The screenshot shows a browser-based AWS CloudShell interface. At the top, there are several tabs: 'Mail - Sharma, Mansi - X', 'Cloud Foundation School - X', 'Percipio Lab Implement - X', 'Lab Setup - X', 'EC2 Instance Connect | u - X', and others. The main content area is a terminal window with the following history:

```
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.  
Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.  
MySQL [app]> SHOW DATABASES;  
+-----+  
| Database |  
+-----+  
| app     |  
| information_schema |  
| mysql   |  
| performance_schema |  
| sys     |  
+-----+  
5 rows in set (0.002 sec)  
  
MySQL [app]> CREATE TABLE subscribers ( id INT unsigned NOT NULL AUTO_INCREMENT, name VARCHAR(150) NOT NULL, benefactor VARCHAR(150) NOT NULL, startdate DATE NOT NULL, PRIMARY KEY (id) );  
Query OK, 0 rows affected (0.035 sec)  
  
MySQL [app]>
```

Below the terminal, a modal window displays the instance details:

i-0f77d3357f0e7cf59 (Bastion Host)  
PublicIPs: 18.116.49.165 PrivateIPs: 10.0.0.113

At the bottom, the CloudShell navigation bar includes 'CloudShell', 'Feedback', and links to 'Privacy', 'Terms', and 'Cookie preferences'. The system status bar shows '92°F Haze', a battery icon at 92%, and the time '7:51 PM 5/22/2025'.

## Will insert data in the table

```
INSERT INTO subscribers ( name, benefactor, startdate) VALUES
```

```
( 'Sally', 'Harry', '2021-02-04' ),  
( 'Tiger', 'Missy', '2020-12-14' ),  
( 'Goldie', 'Pat', '2018-06-22' );
```

MySQL [app]> SHOW DATABASES;

```
+-----+  
| Database |  
+-----+  
| app     |  
| information_schema |  
| mysql   |  
| performance_schema |  
| sys     |  
+-----+  
5 rows in set (0.002 sec)
```

MySQL [app]> CREATE TABLE subscribers ( id INT unsigned NOT NULL AUTO\_INCREMENT, name VARCHAR(150) NOT NULL, benefactor VARCHAR(150) NOT NULL, startdate DATE NOT NULL, PRIMARY KEY (id) );

Query OK, 0 rows affected (0.035 sec)

MySQL [app]> INSERT INTO subscribers (name, benefactor, startdate) VALUES ( 'Sally', 'Harry', '2021-02-04'), ( 'Tiger', 'Missy', '2020-12-14'), ( 'Goldie', 'Pat', '2018-06-22' );

Query OK, 3 rows affected (0.007 sec)

Records: 3 Duplicates: 0 Warnings: 0

MySQL [app]>

i-0f77d3357f0e7cf59 (Bastion Host)

Public IPs: 18.116.49.165 Private IPs: 10.0.0.113

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## Check the data

SELECT \* FROM subscribers;

MySQL [app]> CREATE TABLE subscribers ( id INT unsigned NOT NULL AUTO\_INCREMENT, name VARCHAR(150) NOT NULL, benefactor VARCHAR(150) NOT NULL, startdate DATE NOT NULL, PRIMARY KEY (id) );

Query OK, 0 rows affected (0.035 sec)

MySQL [app]> INSERT INTO subscribers (name, benefactor, startdate) VALUES ( 'Sally', 'Harry', '2021-02-04'), ( 'Tiger', 'Missy', '2020-12-14'), ( 'Goldie', 'Pat', '2018-06-22' );

Query OK, 3 rows affected (0.007 sec)

Records: 3 Duplicates: 0 Warnings: 0

MySQL [app]> SELECT \* FROM subscribers;

```
+----+----+----+  
| id | name | benefactor | startdate |  
+----+----+----+  
| 1  | Sally | Harry      | 2021-02-04 |  
| 2  | Tiger | Missy     | 2020-12-14 |  
| 3  | Goldie | Pat       | 2018-06-22 |  
+----+----+----+  
3 rows in set (0.002 sec)
```

MySQL [app]>

i-0f77d3357f0e7cf59 (Bastion Host)

Public IPs: 18.116.49.165 Private IPs: 10.0.0.113

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## Task 6: Vertically scale an RDS DB instance

Select the database created -> click modify

The screenshot shows two consecutive screenshots of the AWS RDS console.

**Screenshot 1: Databases Page**

The URL is <https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#databases>. The left sidebar shows 'Aurora and RDS' with 'Databases' selected. The main area displays a table titled 'Databases (1)'. The single row shows:

DB identifier	Status	Role	Engine	Region
app-db-51572103	Available	Instance	MySQL Co...	us-east-2b

A blue callout box at the top right of the table area says: "Consider creating a blue/green deployment to minimize downtime during upgrades. You may want to consider using Amazon RDS Blue/Green Deployments and minimize your downtime during upgrades. A Blue/Green Deployment provides a staging environment for changes to production databases. [RDS User Guide](#) [Aurora User Guide](#)".

**Screenshot 2: Modify Instance Page**

The URL is <https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#modify-instance:id=app-db-51572103>. The page title is 'Modify Instance | Aurora and RDS | us-east-2 - Work - Microsoft Edge'. The left sidebar shows 'Aurora and RDS' with 'Databases' selected, followed by 'Modify DB instance: app-db-51572103'. The main area has sections for 'DB instance class' (set to db.t3.small), 'Storage' (set to General Purpose SSD (gp2)), and 'Allocated storage' (set to 20 GiB). Both sections have 'Info' links. The bottom of the page includes standard browser controls and a status bar showing '92°F Haze'.

Select continue -> apply immediately -> Modify DB instance

Modify Instance | Aurora and RDS | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#modify-instance:id=app-db-51572103

Aurora and RDS > Databases > Modify DB instance: app-db-51572103

## Modify DB instance: app-db-51572103

**Summary of modifications**

You are about to submit the following modifications. Only values that will change are displayed. Carefully verify your changes and click Modify DB Instance.

Attribute	Current value	New value
DB instance class	db.t3.micro	db.t3.small

**Schedule modifications**

**When to apply modifications**

Apply during the next scheduled maintenance window  
Current maintenance window: May 26, 2025 13:37 - 14:07 (UTC+5.5:00)

Apply immediately  
The modifications in this request and any pending modifications will be asynchronously applied as soon as possible, regardless of the maintenance window setting for this database instance.

Cancel Back Modify DB instance

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Wait until status shows Available

Databases | Aurora and RDS | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#databases:

Aurora and RDS > Databases

**Aurora and RDS**

- Dashboard
- Databases**
- Query editor
- Performance insights
- Snapshots
- Exports in Amazon S3
- Automated backups
- Reserved instances
- Proxies

Subnet groups

Parameter groups

Option groups

Custom engine versions

Zero-ETL integrations New

**Databases (1)**

Successfully modified app-db-51572103.

DB identifier	Status	Role	Engine	Region
app-db-51572103	Available	Instance	MySQL Co...	us-east-2b

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## Task 7: Horizontally scale RDS

Select the Database created -> Actions -> Create read replica

Databases | Aurora and RDS | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#databases:  
aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserlod51572103 @ 5108-0711-5675  
Aurora and RDS > Databases

Aurora and RDS

Successfully modified app-db-51572103.

Databases (1)

Filter by databases

DB identifier	Status
app-db-51572103	Modifying

Actions ▾

Create database

Stop temporarily  
Reboot  
Delete  
Set up EC2 connection  
Set up Lambda connection  
Migrate data from EC2 database - new  
**Create read replica**  
Create Aurora read replica  
Create blue/green deployment  
Promote  
Convert to Multi-AZ deployment  
Take snapshot

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

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Create Read Replica | Aurora and RDS | us-east-2 - Work - Microsoft Edge  
https://us-east-2.console.aws.amazon.com/rds/home?region=us-east-2#create-read-replica&id=app-db-51572103;is-cluster=false;isHermesDB=false  
aws Search [Alt+S] United States (Ohio) LabUserRole/LabUserlod51572103 @ 5108-0711-5675  
Aurora and RDS > Databases > Create read replica

**Create read replica**

You are creating a replica DB instance from a source DB instance. This new DB instance will have the source DB instance's DB security groups and DB parameter groups.

**Settings**

**Replica source**  
Source DB instance identifier  
app-db-51572103 Role: Instance

**DB instance identifier**  
This is the unique key that identifies a DB instance. This parameter is stored as a lowercase string (for example, mydbinstance).  
app-db-2-51572103

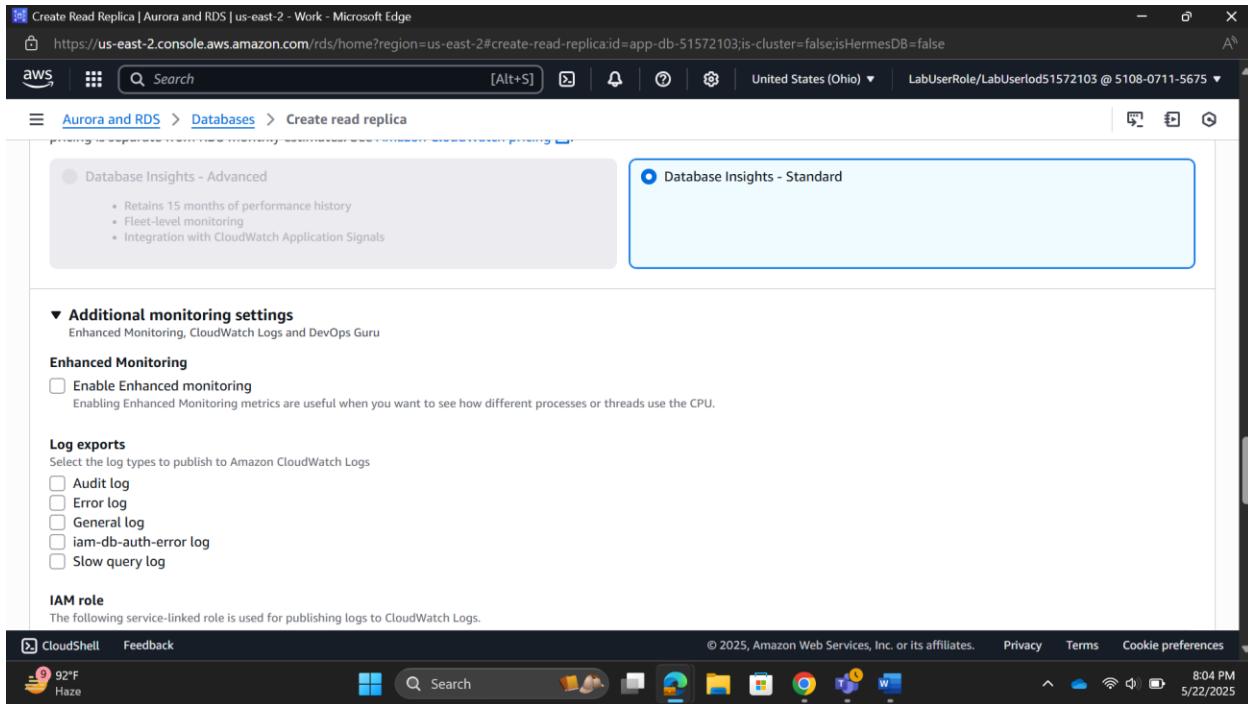
**Instance configuration**  
The DB instance configuration options below are limited to those supported by the engine that you selected above.

**DB instance class** Info

▼ Hide filters

Include previous generation classes

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Click create read replica

## Task 8: Validate data access

Open the CLI tab again

Again, enter the command and password

Command can be different for everyone based on the endpoints created

**Command:**

```
mysql -h app-db-2-51591596.cle4eqgwuda0.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
```

```
| 3 | Goldie | Pat      | 2018-06-22 |
+---+-----+-----+
3 rows in set (0.001 sec)

MySQL [app]> \c
MySQL [app]>
[1]+ Stopped                  mysql -h app-db-51591596.cle4eqgwuda0.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
[ec2-user@ip-10-0-0-7 ~]$ mysql -h app-db-2-51591596.cle4eqgwuda0.us-east-2.rds.amazonaws.com -P 3306 -u labadmin -p app
Enter password:
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MySQL connection id is 21
Server version: 8.0.41 Source distribution

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

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

MySQL [app]>
```

i-062996d3eb2f4c10a (Bastion Host)  
PublicIPs: 52.14.86.221 PrivateIPs: 10.0.0.7

MySQL is enabled, so will write queries now

## STATUS:

```
MySQL [app]> STATUS
-----
mysql Ver 15.1 Distrib 10.5.25-MariaDB, for Linux (x86_64) using EditLine wrapper

Connection id:          21
Current database:       app
Current user:           labadmin@10.0.0.7
SSL:                   Not in use
Current pager:          stdout
Using outfile:          ''
Using delimiter:        ;
Server:                 MySQL
Server version:         8.0.41 Source distribution
Protocol version:       10
Connection:              app-db-2-51591596.cle4eqgwuda0.us-east-2.rds.amazonaws.com via TCP/IP
Server characterset:    utf8mb4
Db     characterset:    utf8mb4
Client characterset:   utf8mb3
Conn. characterset:    utf8mb3
TCP port:               3306
Uptime:                 7 min 11 sec

Threads: 9  Questions: 940  Slow queries: 0  Opens: 250  Flush tables: 3  Open tables: 164  Queries per second avg: 2.180
-----

MySQL [app]>
```

SHOW DATABASES;

Server: MySQL  
Server version: 8.0.41 Source distribution  
Protocol version: 10  
Connection: app-db-2-51591596.cle4eqgwuda0.us-east-2.rds.amazonaws.com via TCP/IP  
Server characterset: utf8mb4  
Db characterset: utf8mb4  
Client characterset: utf8mb3  
Conn. characterset: utf8mb3  
TCP port: 3306  
Uptime: 7 min 11 sec  
  
Threads: 9 Questions: 940 Slow queries: 0 Opens: 250 Flush tables: 3 Open tables: 164 Queries per second avg: 2.180  
  
MySQL [app]> SHOW DATABASES;  
+-----+  
| Database |  
+-----+  
| app |  
| information\_schema |  
| mysql |  
| performance\_schema |  
| sys |  
+-----+  
5 rows in set (0.002 sec)  
  
MySQL [app]>

SELECT \* FROM subscribers;

Threads: 9 Questions: 940 Slow queries: 0 Opens: 250 Flush tables: 3 Open tables: 164 Queries per second avg: 2.180  
  
MySQL [app]> SHOW DATABASES;  
+-----+  
| Database |  
+-----+  
| app |  
| information\_schema |  
| mysql |  
| performance\_schema |  
| sys |  
+-----+  
5 rows in set (0.002 sec)  
  
MySQL [app]> SELECT \* FROM subscribers;  
+----+----+----+  
| id | name | benefactor | startdate |  
+----+----+----+  
1	Sally	Harry	2021-02-04
2	Tiger	Missy	2020-12-14
3	Goldie	Pat	2018-06-22
+----+----+----+  
3 rows in set (0.001 sec)  
  
MySQL [app]>

- Run the following T-SQL command to display the status of the current database:

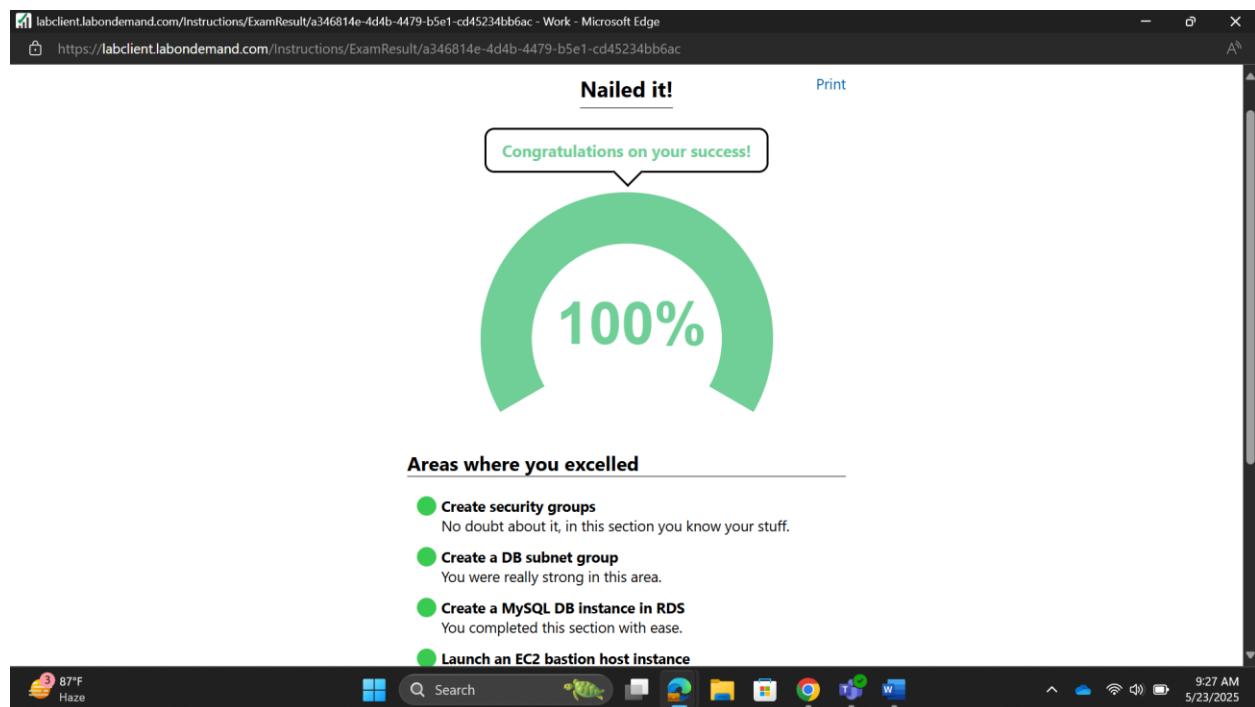
```
STATUS
```

- Run the following T-SQL command to display the current database:

```
SHOW DATABASES;
```

- Run the following T-SQL command to display all of the records in the subscribers table:

```
SELECT * FROM subscribers;
```



**You are done with the Lab!!!**