

Two tier java application deployment →

Front-end → java based app → using tomcat server

Database → mariadb → using AWS Relational database service

Create MariaDB database using RDS

The screenshot shows the 'Create database' wizard in the AWS RDS console. The first step, 'Choose a database creation method', has 'Standard create' selected. The second step, 'Engine options', shows various database engines: Aurora (MySQL Compatible), Aurora (PostgreSQL Compatible), MySQL, PostgreSQL, MariaDB (selected), and Oracle. The MariaDB section includes a small icon of a seal. On the right, a detailed description of the MariaDB engine is provided, listing its features such as support for up to 64 TiB, General Purpose, Memory Optimized, and Burstable Performance instance classes, automated backup, and point-in-time recovery.

The screenshot shows the continuation of the 'Create database' wizard. Under 'Engine version', 'MariaDB 10.11.9' is selected. In the 'Templates' section, 'Free tier' is chosen, which is highlighted with a blue border. The 'Settings' section contains fields for 'DB instance identifier' (set to 'mariaDB') and 'Master username' (set to 'admin'). The 'Credentials Settings' section is collapsed. On the right, the same detailed description of the MariaDB engine is shown.

RDS > Create database

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

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](#)

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

DB instance class [Info](#)
 Show 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.

MariaDB

MariaDB Community Edition is a MySQL-compatible database with strong support from the open source community, and extra features and performance optimizations.

- 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.
- Supports global transaction ID (GTID) and thread pooling.
- Developed and supported by the MariaDB open source community.

RDS > Create database

Confirm master password [Info](#)

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

DB instance class [Info](#)
 Show filters

Show instance classes that support Amazon RDS Optimized Writes [Info](#)
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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 vCPU | 1 GiB RAM | Network: Up to 2,085 Mbps

Storage

Storage type [Info](#)
 Provisioned IOPS SSD (io2) storage volumes are now available.

General Purpose SSD (gp2)
 Baseline performance determined by volume size

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RDS > Create database

General Purpose SSD (gp2)
 Baseline performance determined by volume size

Allocated storage [Info](#)
 GiB
 Allocated storage value must be 20 GiB to 6,144 GiB

Additional storage configuration

Storage aut-scaling [Info](#)
 Provides dynamic scaling support for your database's storage based on your application's needs.

Enable storage aut-scaling
 Enabling this feature will allow the storage to increase after the specified threshold is exceeded.

Availability & durability

Multi-AZ deployment [Info](#)

- Create a standby instance (recommended for production usage)
 Creates a standby in a different Availability Zone (AZ) to provide data redundancy, eliminate I/O freezes, and minimize latency spikes during system backups.
- Do not create a standby instance**

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.

CloudShell **Feedback** © 2025, Amazon Web Services, Inc. or its affiliates. **Privacy** **Terms** **Cookie preferences**

Screenshot of the AWS RDS 'Create database' configuration page. The 'Network type' section shows 'IPv4' selected. The 'Virtual private cloud (VPC)' section shows 'Default VPC (vpc-0282371e334da139b)' selected. The 'DB subnet group' section shows 'default' selected. The 'Public access' section shows 'Yes' selected. The 'VPC security group (firewall)' section shows 'Choose existing' selected. The bottom of the page includes CloudShell, Feedback, and navigation links.

Screenshot of the AWS RDS 'Create database' configuration page. The 'VPC security group (firewall)' section shows 'Choose existing' selected. The 'Existing VPC security groups' dropdown shows 'default' selected. The 'Availability Zone' section shows 'us-east-1a' selected. The 'RDS Proxy' section has the checkbox 'Create an RDS Proxy' unchecked. The 'Certificate authority - optional' section shows 'rds-ca-rsa2048-g1 (default)' selected. The bottom of the page includes CloudShell, Feedback, and navigation links.

Screenshot of the AWS RDS 'Create database' configuration page. The 'Additional configuration' section includes 'Database port' set to 3306, 'Tags - optional' (with a key-value pair 'studentAPPDB:studentAPPDB'), 'Database authentication' (with 'Password authentication' selected), and 'Monitoring' (with 'Enable Enhanced Monitoring' unchecked). The bottom of the page includes CloudShell, Feedback, and navigation links.

Screenshot of the AWS RDS 'Create database' configuration page:

Initial database name: Info

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

DB parameter group: default.mariadb10.11

Option group: default:mariadb-10-11

Backup:

- 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.

AWS KMS key: Info

(default) aws/rds

Account: 555786028785

KMS key ID: alias/aws/rds

Log exports:

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

RDS service-linked role

Maintenance:

- 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.

Estimated monthly costs:

The Amazon RDS Free Tier is available to you for 12 months. Each calendar month, the free tier will allow you to use the Amazon RDS resources listed below for free:

- 750 hrs of Amazon RDS in a Single-AZ db.t2.micro, db.t3.micro or db.t4g.micro Instance.
- 20 GB of General Purpose Storage (SSD).
- 20 GB for automated backup storage and any user-initiated DB Snapshots.

Learn more about AWS Free Tier.

When your free usage expires or if your application use exceeds the free usage tiers, you simply pay standard, pay-as-you-go service rates as described in the [Amazon RDS Pricing page](#).

Database is created

Screenshot of the AWS RDS 'Databases' list page:

Databases (1)

DB identifier	Status	Role	Engine	Region ...	Size	Recommendations	CPU	Current activity	Actions
mariadb	Creating	Instance	MariaDB	us-east-1a	db.t3.micro	-	-	-	Actions

Amazon RDS:

- Dashboard
- Databases** (selected)
- 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

Events

Recommendations: 0

Certificate update:

CloudShell Feedback

The screenshot shows the AWS RDS console with the 'Databases' section selected. A single database, 'mariadb', is listed. The details for 'mariadb' are as follows:

DB identifier	Status	Role	Engine	Region	Size	Recommendations	CPU
mariadb	Available	Instance	MariaDB	us-east-1a	db.t3.micro		12.38

Now create an EC2 instance and deploy the student app java application with tomcat server

Instance name → studentapp

The screenshot shows the AWS EC2 Instances page. A single instance, 'studentapp', is listed. The instance details are as follows:

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Public IPv4 DNS	Public
studentapp	i-0281fb136f7092046	Running	t2.micro	Initializing		us-east-1b	ec2-52-90-5-33.comput...	52.90...

Connect to that instance →

Install java on that instance , because we are using JAVA Application for deployment

```
[ec2-user@ip-172-31-86-36 ~]$ sudo -i
[root@ip-172-31-86-36 ~]# yum update -y
Last metadata expiration check: 0:06:33 ago on Mon Jan 20 17:15:53 2025.
Dependencies resolved.
Nothing to do.
Complete!
[root@ip-172-31-86-36 ~]# yum search java
Last metadata expiration check: 0:06:52 ago on Mon Jan 20 17:15:53 2025.
=====
Name & Summary Matched: java =====
R-java.x86_64 : R with Fedora provided Java Runtime Environment
R-java-devel.x86_64 : Development package for use with Java enabled R components
ant-javadoc.noarch : Javadoc for ant
ant-javamail.noarch : Optional javamail tasks for ant
antlr-javadoc.noarch : Javadoc for antlr
apache-commons-beanutils-javadoc.noarch : Javadoc for apache-commons-beanutils
apache-commons-collections-javadoc.noarch : Javadoc for apache-commons-collections
apache-commons-exec-javadoc.noarch : Javadocs for apache-commons-exec
aptguardian-javadoc.noarch : Javadoc for aptguardian
aquae-bnd-javadoc.noarch : Javadoc for aquae-bnd
bouncycastle-javadoc.noarch : Javadoc for bouncycastle
byte-buddy-javadoc.noarch : Javadoc for byte-buddy
byteman-javadoc.noarch : Javadoc for byteman
capstone-java.noarch : Java bindings for capstone
cglib-javadoc.noarch : Javadoc for cglib
collectd-java.x86_64 : Java bindings for collectd
disruptor-javadoc.noarch : Javadoc for disruptor
dom4j-javadoc.noarch : Javadoc for dom4j
easyMock-javadoc.noarch : Javadoc for easymock
exec-maven-plugin-javadoc.noarch : Javadoc for exec-maven-plugin
google-noto-sans-javanese-fonts.noarch : Noto Sans Javanese font
graphviz-java.x86_64 : Java extension for graphviz
hamcrest-javadoc.noarch : Javadoc for hamcrest
hawtjni-javadoc.noarch : Javadocs for hawtjni
```

```
[root@ip-172-31-86-36 ~]# yum install java-1.8.0-amazon-corretto.x86_64 -y
Last metadata expiration check: 0:08:56 ago on Mon Jan 20 17:15:53 2025.
Dependencies resolved.
=====
Package           Architecture      Version          Repository      Size
=====
Installing:
java-1.8.0-amazon-corretto.x86_64        1:1.8.0_432.b06-1.amzn2023      amazonlinux    38 M
Installing dependencies:
adwaita-cursor-theme          noarch        40.1.1-1.amzn2023.0.2      amazonlinux   623 k
adwaita-icon-theme            noarch        40.1.1-1.amzn2023.0.2      amazonlinux   11 M
alsa-lib                      x86_64        1.2.7.2-1.amzn2023.0.2      amazonlinux   594 k
at-spi2-atk                   x86_64        2.38.0-2.amzn2023.0.2      amazonlinux   86 k
at-spi2-core                  x86_64        2.40.3-1.amzn2023.0.1      amazonlinux   178 k
atk                           x86_64        2.36.0-3.amzn2023.0.2      amazonlinux   271 k
avahi-libs                    x86_64        0.8-14.amzn2023.0.14       amazonlinux   68 k
cairo                         x86_64        1.18.0-4.amzn2023.0.1      amazonlinux   718 k
cairo-gobject                 x86_64        1.18.0-4.amzn2023.0.1      amazonlinux   20 k
colorltd-libs                 x86_64        1.4.5-2.amzn2023.0.2      amazonlinux   235 k
cups-libs                     x86_64        1:2.3.3op2-18.amzn2023.0.8  amazonlinux   262 k
dejavu-sans-fonts             noarch        2.37-16.amzn2023.0.2       amazonlinux   1.3 M
dejavu-sans-mono-fonts        noarch        2.37-16.amzn2023.0.2       amazonlinux   467 k
dejavu-serif-fonts            noarch        2.37-16.amzn2023.0.2       amazonlinux   1.0 M
duktape                       x86_64        2.7.0-21.amzn2023          amazonlinux   171 k
fontconfig                    x86_64        2.13.94-2.amzn2023.0.2     amazonlinux   273 k
fonts-filesystem              noarch        1:2.0.5-12.amzn2023.0.2     amazonlinux   9.5 k
freetype                      x86_64        2.13.2-5.amzn2023.0.1      amazonlinux   423 k
fribidi                       x86_64        1.0.11-3.amzn2023.0.2      amazonlinux   54 k
gdk-pixbuf2                  x86_64        2.42.10-1.amzn2023.0.1     amazonlinux   467 k
gdk-pixbuf2-modules           x86_64        2.42.10-1.amzn2023.0.1     amazonlinux   88 k
glib                          x86_64        5.2.1-9.amzn2023.0.1       amazonlinux   49 k
glib-networking               x86_64        2.80.0-186.amzn2023.0.1    amazonlinux   185 k
google-noto-fonts-common      noarch        20201206-2.amzn2023.0.2    amazonlinux   15 k
```

```

jbigkit-libs-2.1-21.amzn2023.0.2.x86_64
langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch
libX11-1.8.10-2.amzn2023.0.1.x86_64
libX11-xcb-1.8.10-2.amzn2023.0.1.x86_64
libXcomposite-0.4.6-3.amzn2023.0.1.x86_64
libXdamage-1.1.6-3.amzn2023.0.1.x86_64
libXfixes-6.0.1-3.amzn2023.0.1.x86_64
libXtst-1.8.2-1.amzn2023.0.1.x86_64
libXrandr-1.5.4-3.amzn2023.0.1.x86_64
libXtst-1.2.5-1.amzn2023.0.1.x86_64
libbrotli-1.0.9-4.amzn2023.0.2.x86_64
libdatrie-0.2.13-1.amzn2023.0.2.x86_64
libexpat-1.5.9-1.amzn2023.0.2.x86_64
libglvnd-glx-1.1.7.0-4.amzn2023.0.1.x86_64
libicu-67.1-7.amzn2023.0.3.x86_64
libpciaccess-0.16-4.amzn2023.0.2.x86_64
libproxy-0.5.7-3.amzn2023.0.1.x86_64
libstemmer-0.16.585svn.amzn2023.0.2.x86_64
libtiff-4.4.0-4.amzn2023.0.19.x86_64
libusbx-1.0.24-2.amzn2023.0.2.x86_64
libwayland-cursor-1.22.0-1.amzn2023.0.2.x86_64
libwayland-server-1.22.0-1.amzn2023.0.2.x86_64
libxcb-1.17.0-1.amzn2023.0.1.x86_64
libxshmfence-1.3.2-3.amzn2023.0.1.x86_64
mesa-dri-drivers-24.2.6-1267.amzn2023.0.1.x86_64
mesa-libGL-24.2.6-1267.amzn2023.0.1.x86_64
mesa-libglapi-24.2.6-1267.amzn2023.0.1.x86_64
pango-1.54.0-2.amzn2023.0.4.x86_64
shared-mime-info-2.2-2.amzn2023.0.1.x86_64
xkeyboard-config-2.41-1.amzn2023.0.1.noarch

json-glib-1.6.6-1.amzn2023.0.2.x86_64
lcms2-2.12-1.amzn2023.0.3.x86_64
libX11-common-1.8.10-2.amzn2023.0.1.noarch
libKau-1.0.11-6.amzn2023.0.1.x86_64
libXcursor-1.2.1-7.amzn2023.0.1.x86_64
libXext-1.3.6-1.amzn2023.0.1.x86_64
libXft-2.3.8-6.amzn2023.0.1.x86_64
libXinerama-1.1.5-6.amzn2023.0.1.x86_64
libXrender-0.9.11-6.amzn2023.0.1.x86_64
libXxf86vm-1.1.5-6.amzn2023.0.1.x86_64
libCloudproviders-0.3.1-3.amzn2023.0.2.x86_64
libdrm-2.4.123-1.amzn2023.0.1.x86_64
libglnvd-1.1.7.0-4.amzn2023.0.1.x86_64
libgbus-0.3.8-1.amzn2023.0.2.x86_64
libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64
libpng-2:1.6.37-10.amzn2023.0.6.x86_64
libsoup-2.72.0-6.amzn2023.0.3.x86_64
libthai-0.1.28-6.amzn2023.0.2.x86_64
libtracker-sparql-3.1.2-1.amzn2023.0.2.x86_64
libwayland-client-1.22.0-1.amzn2023.0.2.x86_64
libwayland-egl-1.22.0-1.amzn2023.0.2.x86_64
libwebp-1.2.4-1.amzn2023.0.6.x86_64
libxkbcommon-1.6.0-2.amzn2023.0.1.x86_64
llvm-libs-15.0.7-3.amzn2023.0.1.x86_64
mesa-filesystem-24.2.6-1267.amzn2023.0.1.x86_64
mesa-libgbm-24.2.6-1267.amzn2023.0.1.x86_64
mesa-va-drivers-24.2.6-1267.amzn2023.0.1.x86_64
pixman-0.43.4-1.amzn2023.0.4.x86_64
tracker-3.1.2-1.amzn2023.0.2.x86_64
xml-common-0.6.3-56.amzn2023.0.2.noarch

Complete!
[root@ip-172-31-86-36 ~]#

```

Check java is installed command → java -version

```

[root@ip-172-31-86-36 ~]# java -version
openjdk version "1.8.0_432"
OpenJDK Runtime Environment Corretto-8.432.06.1 (build 1.8.0_432-b06)
OpenJDK 64-Bit Server VM Corretto-8.432.06.1 (build 25.432-b06, mixed mode)
[root@ip-172-31-86-36 ~]#

```

We are deploying java application so we have to install and configure tomcat webserver

Download Apache tomcat

curl -O <https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.98/bin/apache-tomcat-9.0.98.zip>

```

[root@ip-172-31-86-36 ~]# curl -O https://dlcdn.apache.org/tomcat/tomcat-9/v9.0.98/bin/apache-tomcat-9.0.98.zip
% Total    % Received % Xferd  Average Speed   Time   Time  Current
          Dload  Upload Total Spent   Left Speed
100 12.6M  100 12.6M    0      0  12.3M    0:00:01  0:00:01 --:--:-- 12.3M
[root@ip-172-31-86-36 ~]# ls
apache-tomcat-9.0.98.zip
[root@ip-172-31-86-36 ~]# unzip apache-tomcat-9.0.98.zip
Archive: apache-tomcat-9.0.98.zip
  creating: apache-tomcat-9.0.98/
  creating: apache-tomcat-9.0.98/bin/
  creating: apache-tomcat-9.0.98/conf/
  creating: apache-tomcat-9.0.98/lib/
  creating: apache-tomcat-9.0.98/logs/
  creating: apache-tomcat-9.0.98/temp/
  creating: apache-tomcat-9.0.98/webapps/
  creating: apache-tomcat-9.0.98/webapps/ROOT/
  creating: apache-tomcat-9.0.98/webapps/WEB-INF/
  creating: apache-tomcat-9.0.98/webapps/docs/
  creating: apache-tomcat-9.0.98/webapps/docs/META-INF/
  creating: apache-tomcat-9.0.98/webapps/docs/WEB-INF/
  creating: apache-tomcat-9.0.98/webapps/docs/WEB-INF/jsp/
  creating: apache-tomcat-9.0.98/webapps/docs/annotationapi/
  creating: apache-tomcat-9.0.98/webapps/docs/api/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/docs/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/src/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/src/mypackage/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/web/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/web/WEB-INF/
  creating: apache-tomcat-9.0.98/webapps/docs/appdev/sample/web/images/
  creating: apache-tomcat-9.0.98/webapps/docs/architecture/
  creating: apache-tomcat-9.0.98/webapps/docs/architecture/requestProcess/

```

```
[root@ip-172-31-86-36 ~]# ls
apache-tomcat-9.0.98 apache-tomcat-9.0.98.zip
[root@ip-172-31-86-36 ~]# mv apache-tomcat-9.0.98 /opt/tomcat
[root@ip-172-31-86-36 ~]# cd /opt
[root@ip-172-31-86-36 opt]# ls
aws tomcat
[root@ip-172-31-86-36 opt]# cd tomcat
[root@ip-172-31-86-36 tomcat]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[root@ip-172-31-86-36 tomcat]#
```

To check the tomcat server is working or not we have to start the server .

To start the tomcat server we need to run one bash file

/opt/tomcat/bin/ startup.sh

Requires executable permission

```
chmod +x catalina.sh
bash startup.sh
```

```
[root@ip-172-31-86-36 ~]# ls
apache-tomcat-9.0.98 apache-tomcat-9.0.98.zip
[root@ip-172-31-86-36 ~]# mv apache-tomcat-9.0.98 /opt/tomcat
[root@ip-172-31-86-36 ~]# cd /opt
[root@ip-172-31-86-36 opt]# ls
aws tomcat
[root@ip-172-31-86-36 opt]# cd tomcat
[root@ip-172-31-86-36 tomcat]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[root@ip-172-31-86-36 tomcat]# cd bin
[root@ip-172-31-86-36 bin]# pwd
/opt/tomcat/bin
[root@ip-172-31-86-36 bin]# ls
bootstrap.jar ciphers.bat configtest.bat digest.sh setclasspath.sh startup.sh tool-wrapper.sh
catalina-tasks.xml ciphers.sh configtest.sh makebase.bat shutdown.bat tomcat-juli.jar version.bat
catalina.bat commons-daemon-native.tar.gz daemon.sh makebase.sh shutdown.sh tomcat-native.tar.gz version.sh
catalina.sh commons-daemon.jar digest.bat setclasspath.bat startup.sh tool-wrapper.bat
[root@ip-172-31-86-36 bin]# ^C
[root@ip-172-31-86-36 bin]# ^C
[root@ip-172-31-86-36 bin]# cat catalina
catalina-tasks.xml catalina.bat catalina.sh
[root@ip-172-31-86-36 bin]# cat catalina.sh
#!/bin/sh
#
# Licensed to the Apache Software Foundation (ASF) under one or more
# contributor license agreements. See the NOTICE file distributed with
# this work for additional information regarding copyright ownership.
# The ASF licenses this file to You under the Apache License, Version 2.0
# (the "License"); you may not use this file except in compliance with
# the License. You may obtain a copy of the License at
#
#     http://www.apache.org/licenses/LICENSE-2.0
#     
```

Requires executable permission

```
chmod +x catalina.sh
bash startup.sh
```

```

[root@ip-172-31-86-36 bin]# ls
bootstrap.jar      ciphers.bat      configtest.bat digest.sh      setclasspath.sh startup.sh      tool-wrapper.sh
catalina-tasks.xml ciphers.sh      configtest.sh   makebase.bat shutdown.bat  tomcat-juli.jar version.bat
catalina.bat        commons-daemon-native.tar.gz daemon.sh      makebase.sh   shutdown.sh    tomcat-native.tar.gz version.sh
catalina.sh         commons-daemon.jar digest.bat     setclasspath.bat startup.bat   tool-wrapper.bat
[root@ip-172-31-86-36 bin]# bash startup.sh
Cannot find ./catalina.sh
The file is absent or does not have execute permission
This file is needed to run this program
[root@ip-172-31-86-36 bin]# ^C
[root@ip-172-31-86-36 bin]# chmod +x catalina.sh
[root@ip-172-31-86-36 bin]# bash startup.sh
Using CATALINA_BASE: /opt/tomcat
Using CATALINA_HOME: /opt/tomcat
Using CATALINA_TMPDIR: /opt/tomcat/temp
Using JRE_HOME: /usr
Using CLASSPATH: /opt/tomcat/bin/bootstrap.jar:/opt/tomcat/bin/tomcat-juli.jar
Using CATALINA_OPTS:
Tomcat started.
[root@ip-172-31-86-36 bin]#

```

Now check that tomcat is running ,through browser

For that you have to enable port 8080 , in security groups

The screenshot shows the AWS CloudShell interface with the AWS logo at the top. Below it, the navigation bar includes IAM, EC2 (selected), VPC, S3, and RDS. The main content area is titled "Edit inbound rules" with a "Info" link. It displays three existing rules:

Security group rule ID	Type	Protocol	Port range	Source	Description - optional
sgr-0b04d10bb8fb2fd52	SSH	TCP	22	Custom	<input type="text" value="0.0.0.0/0"/> X
sgr-0d45162c35b57d577	HTTP	TCP	80	Custom	<input type="text" value="0.0.0.0/0"/> X
sgr-09fffe8aa891ab6c	Custom TCP	TCP	8080	Custom	<input type="text" value="0.0.0.0/0"/> X

At the bottom of the table, there is a blue "Add rule" button. A warning message in a yellow box states: "⚠ 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." To the right of the message are "Cancel", "Preview changes", and a large orange "Save rules" button.

Now install mariadb in ec2 instance and connect to the mariadb database we created through RDS

```
[root@ip-172-31-86-36 bin]# yum search mariadb
Last metadata expiration check: 1:17:11 ago on Mon Jan 20 17:15:53 2025.
=====
Name & Summary Matched: mariadb =====
mariadb-connector-c.x86_64 : The MariaDB Native Client library (C driver)
mariadb-connector-c-devel.x86_64 : Development files for mariadb-connector-c
mariadb-connector-c-test.x86_64 : Testsuite files for mariadb-connector-c
mariadb105-connect-engine.x86_64 : The CONNECT storage engine for MariaDB
mariadb105-devel.x86_64 : Files for development of MariaDB/MySQL applications
mariadb105-ograph-engine.x86_64 : The Open Query GRAPH engine for MariaDB
mariadb105-pam.x86_64 : PAM authentication plugin for the MariaDB server
mariadb105-rocksdb-engine.x86_64 : The RocksDB storage engine for MariaDB
mariadb105-server.x86_64 : The MariaDB server and related files
mariadb105-server-utils.x86_64 : Non-essential server utilities for MariaDB/MySQL applications
mariadb105-sphinx-engine.x86_64 : The Sphinx storage engine for MariaDB
mariadb105-test.x86_64 : The test suite distributed with MariaDB
perl-DBD-MariaDB.x86_64 : MariaDB and MySQL driver for the Perl5 Database Interface (DBI)
perl-DBD-MariaDB-tests.x86_64 : Tests for perl-DBD-MariaDB
=====
Name Matched: mariadb =====
mariadb-connector-c-config.noarch : Configuration files for packages that use /etc/my.cnf as a configuration file
mariadb105.x86_64 : A very fast and robust SQL database server
mariadb105-backup.x86_64 : The mariabackup tool for physical online backups
mariadb105-common.x86_64 : The shared files required by server and client
mariadb105-cracklib-password-check.x86_64 : The password strength checking plugin
mariadb105errmsg.x86_64 : The error messages files required by server and embedded
mariadb105-gssapi-server.x86_64 : GSSAPI authentication plugin for server
=====
Summary Matched: mariadb =====
mysql-selinux.noarch : SELinux policy modules for MySQL and MariaDB packages
[root@ip-172-31-86-36 bin]# ^C
[root@ip-172-31-86-36 bin]#
```

```
[root@ip-172-31-86-36 bin]# yum install mariadb105.x86_64 -y
Last metadata expiration check: 1:18:18 ago on Mon Jan 20 17:15:53 2025.
Dependencies resolved.
=====
| Package           | Architecture | Version      | Repository | Size |
|=====|
| Installing:     |             |             |            |       |
| mariadb105       | x86_64      | 3:10.5.25-1.amzn2023.0.1 | amazonlinux | 1.6 M |
|=====|
| Installing dependencies: |             |             |            |       |
| mariadb-connector-c | x86_64      | 3.1.13-1.amzn2023.0.3 | amazonlinux | 196 k |
| mariadb-connector-c-config | noarch      | 3.1.13-1.amzn2023.0.3 | amazonlinux | 9.2 k |
| mariadb105-common | x86_64      | 3:10.5.25-1.amzn2023.0.1 | amazonlinux | 29 k  |
| perl-Sys-Hostname | x86_64      | 1.23-477.amzn2023.0.6 | amazonlinux | 18 k  |
|=====|
Transaction Summary
=====
Install 5 Packages

Total download size: 1.8 M
Installed size: 19 M
Downloading Packages:
(1/5): mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch.rpm          238 kB/s | 9.2 kB   00:00
(2/5): mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64.rpm                  4.1 MB/s | 196 kB   00:00
(3/5): mariadb105-common-10.5.25-1.amzn2023.0.1.x86_64.rpm                 1.2 MB/s | 29 kB   00:00
(4/5): perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64.rpm                  855 kB/s | 18 kB   00:00
(5/5): mariadb105-10.5.25-1.amzn2023.0.1.x86_64.rpm                   20 MB/s | 1.6 MB   00:00
=====
Total                                         15 MB/s | 1.8 MB   00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction

```

Connect to database

mysql -h mariadb.cz24iwq4ecb0.us-east-1.rds.amazonaws.com -P 3306 -u admin -p

Setting	Value
Endpoint	mariadb.cz24iwq4ecb0.us-east-1.rds.amazonaws.com
Port	3306
VPC Security Groups	default (sg-046da41edc0d8ee61)
Publicly Accessible	Yes
Certificate Authority	rds-ca-rsa2048-g1
DB Instance Certificate Expiration Date	January 20, 2026, 22:40 (UTC+05:30)

need to enable port 3306 in security groups

```
[root@ip-172-31-86-36 bin]# mysql -h mariadb.cz24iwq4ecb0.us-east-1.rds.amazonaws.com -P 3306 -u admin -p
Enter password:
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 159
Server version: 10.11.9-MariaDB managed by https://aws.amazon.com/rds/
Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> []
```

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

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

MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| innodb |
| mysql |
| performance_schema |
| sys |
+-----+
5 rows in set (0.001 sec)

MariaDB [(none)]> create database studentapp;
Query OK, 1 row affected (0.001 sec)

MariaDB [(none)]> show databases;
+-----+
| Database |
+-----+
| information_schema |
| innodb |
| mysql |
| performance_schema |
| studentapp |
| sys |
+-----+
6 rows in set (0.001 sec)

MariaDB [(none)]> []
```

Create data base and it is schema

Query →

use studentapp;

CREATE TABLE if not exists students(student_id INT NOT NULL AUTO_INCREMENT,

```

        student_name VARCHAR(100) NOT NULL,
        student_addr VARCHAR(100) NOT NULL,
        student_age VARCHAR(3) NOT NULL,
        student_qual VARCHAR(20) NOT NULL,
        student_percent VARCHAR(10) NOT NULL,
        student_year_passed VARCHAR(10) NOT NULL,
        PRIMARY KEY (student_id)
    );

```

```

+-----+
6 rows in set (0.001 sec)

MariaDB [(none)]> use studentapp;
Database changed
MariaDB [studentapp]> CREATE TABLE if not exists students(student_id INT NOT NULL AUTO_INCREMENT,
-> student_name VARCHAR(100) NOT NULL,
-> student_addr VARCHAR(100) NOT NULL,
-> student_age VARCHAR(3) NOT NULL,
-> student_qual VARCHAR(20) NOT NULL,
-> student_percent VARCHAR(10) NOT NULL,
-> student_year_passed VARCHAR(10) NOT NULL,
-> PRIMARY KEY (student_id)
-> );
Query OK, 0 rows affected (0.010 sec)

MariaDB [studentapp]> desc studentapp;
ERROR 1146 (42S02): Table 'studentapp.studentapp' doesn't exist
MariaDB [studentapp]> desc students;
+-----+-----+-----+-----+-----+-----+
| Field      | Type       | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| student_id | int(11)   | NO  | PRI | NULL    | auto_increment |
| student_name | varchar(100) | NO  |     | NULL    |                |
| student_addr | varchar(100) | NO  |     | NULL    |                |
| student_age | varchar(3)  | NO  |     | NULL    |                |
| student_qual | varchar(20) | NO  |     | NULL    |                |
| student_percent | varchar(10) | NO  |     | NULL    |                |
| student_year_passed | varchar(10) | NO  |     | NULL    |                |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.002 sec)

MariaDB [studentapp]> []

```

Now connect tomcat to RDS Mariadb →

Download mariadb connector jar

Curl -O <https://downloads.mariadb.com/Connectors/java/connector-java-3.1.2/mariadb-java-client-3.1.2.jar>

Them move this jar file to /opt/tomcat/lib folder

```

[root@ip-172-31-86-36 bin]# pwd
/opt/tomcat/bin
[root@ip-172-31-86-36 bin]# cd ..
[root@ip-172-31-86-36 tomcat]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[root@ip-172-31-86-36 tomcat]# curl -O https://downloads.mariadb.com/Connectors/java/connector-java-3.1.2/mariadb-java-client-3.1.2.jar
% Total    % Received % Xferd  Average Speed   Time   Time     Current
          Dload  Upload Total Spent   Left Speed
100  622k  100  622k    0     0  644k  0 --:--:--:--:--:--:--:--:644k
[root@ip-172-31-86-36 tomcat]# ls
BUILDING.txt  LICENSE  README.md  RUNNING.txt  conf  logs  temp  work
CONTRIBUTING.md  NOTICE  RELEASE-NOTES  bin  lib  mariadb-java-client-3.1.2.jar  webapps
[root@ip-172-31-86-36 tomcat]# mv mariadb-java-client-3.1.2.jar lib/
[root@ip-172-31-86-36 tomcat]# cd lib
[root@ip-172-31-86-36 lib]# ls
annotations-api.jar  catalina.jar  jsp-api.jar  tomcat-dbcp.jar  tomcat-i18n-ko.jar  tomcat-util-scan.jar
catalina-ant.jar  ej-4.20.jar  mariadb-java-client-3.1.2.jar  tomcat-i18n-cs.jar  tomcat-i18n-pt-BR.jar  tomcat-util.jar
catalina-ha.jar  el-api.jar  servlet-api.jar  tomcat-i18n-de.jar  tomcat-i18n-ru.jar  tomcat-websocket.jar
catalina-ssi.jar  jasper-el.jar  tomcat-api.jar  tomcat-i18n-es.jar  tomcat-i18n-zh-CN.jar  websocket-api.jar
catalina-storeconfig.jar  jasper.jar  tomcat-coyote-ffm.jar  tomcat-i18n-fr.jar  tomcat-jdbc.jar
catalina-tribes.jar  jaspic-api.jar  tomcat-coyote.jar  tomcat-i18n-ja.jar  tomcat-jni.jar
[root@ip-172-31-86-36 lib]#

```

Then configure the tomcat server in /opt/tomcat/conf/context.xml

```

[root@ip-172-31-86-36 lib]#
[root@ip-172-31-86-36 lib]# pwd
/opt/tomcat/lib
[root@ip-172-31-86-36 lib]# cd ..
[root@ip-172-31-86-36 tomcat]# ls
BUILDING.txt CONTRIBUTING.md LICENSE NOTICE README.md RELEASE-NOTES RUNNING.txt bin conf lib logs temp webapps work
[root@ip-172-31-86-36 tomcat]# cd conf
[root@ip-172-31-86-36 conf]# ls
Catalina  catalina.properties  jaspic-providers.xml  logging.properties  tomcat-users.xml  web.xml
catalina.policy  context.xml  jaspic-providers.xsd  server.xml  tomcat-users.xsd
[root@ip-172-31-86-36 conf]# vim context.xml
[root@ip-172-31-86-36 conf]#

```

```

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distributed under the License is distributed on an "AS IS" BASIS,
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limitations under the License.
-->

<Context>

<Resource name="jdbc/mariadb"
          auth="Container"
          type="javax.sql.DataSource"
          username="admin"
          password="12345678"
          driverClassName="org.mariadb.jdbc.Driver"
          url="jdbc:mariadb://mariadb.cz24iwq4ecb0.us-east-1.rds.amazonaws.com:3306/studentapp"
          maxActive="20"
          maxIdle="10"
          maxWait="10000" />

<!-- Default set of monitored resources. If one of these changes, the web application will be reloaded. -->
<WatchedResource>WEB-INF/web.xml</WatchedResource>
<WatchedResource>WEB-INF/tomcat-web.xml</WatchedResource>
-- INSERT --

```

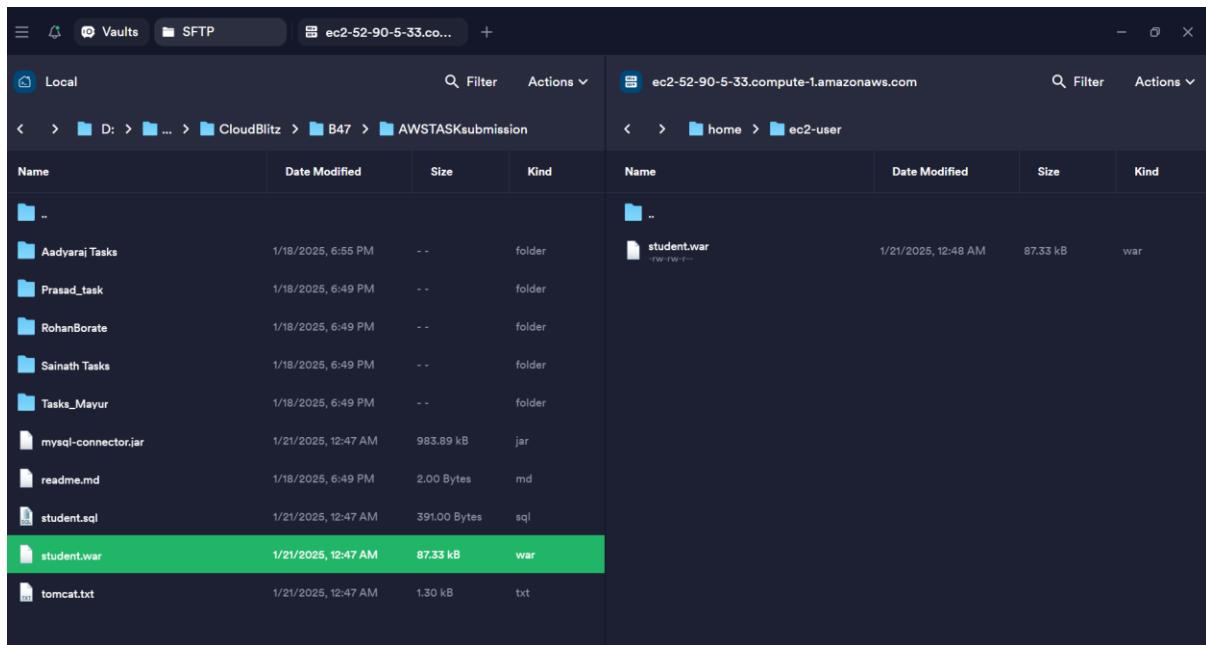
restart the tomcat server

/opt/tomcat/bin/shutdown.sh

/opt/tomcat/bin/startup.sh

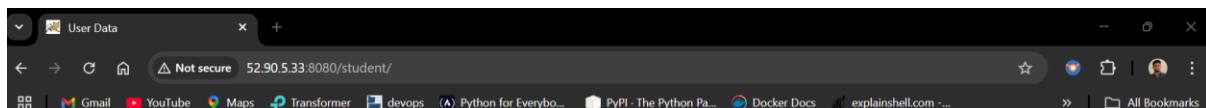
Now deploy your web application in tomcat server

Copy .war file to /opt/tomcat/webapps directory



```
[root@ip-172-31-86-36 ~]# cd /home
[root@ip-172-31-86-36 home]# ls
ec2-user
[root@ip-172-31-86-36 home]# cd ec2-user/
[root@ip-172-31-86-36 ec2-user]# ls
student.war
[root@ip-172-31-86-36 ec2-user]# cp student.war /opt/tomcat/webapps/
[root@ip-172-31-86-36 ec2-user]# cd /opt/tomcat/webapps
[root@ip-172-31-86-36 webapps]# ls
ROOT docs examples host-manager manager student student.war
[root@ip-172-31-86-36 webapps]# ]
```

now access the application

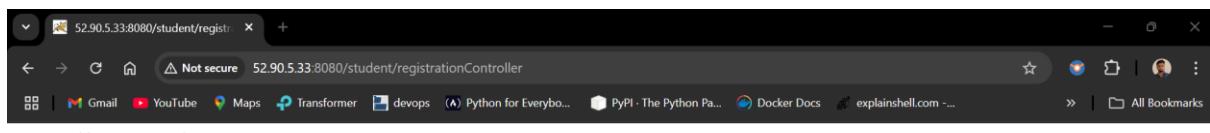
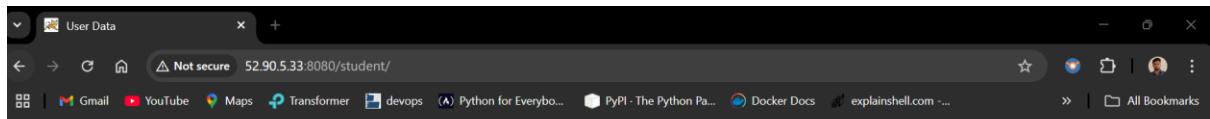


Student Registration Form



Student Name	<input type="text"/>
Student Address	<input type="text"/>
Student Age	<input type="text"/>
Student Qualification	<input type="text"/>
Student Percentage	<input type="text"/>
Year Passed	<input type="text"/>
<input type="button" value="register"/>	

Add data and check it is saving to database or not



Server needs to be restart if error observed

After server is restarted start the tomcat server

